

TABLE OF CONTENTS

1.	INTRODUCTION	1-1
1.1	Project Background	1-1
1.2	The Project	1-1
1.3	Main Objectives of the Project.....	1-2
1.4	Designated Projects	1-3
1.5	Purpose of the Manual	1-5
1.6	Development Programme of the Project	1-6
1.7	Project Organisation	1-8
2.	AIR QUALITY	2-1
2.1	Introduction	2-1
2.2	Construction Phase	2-1
2.3	Dust Monitoring Stations	2-4
2.4	Impact Monitoring	2-6
2.5	Operation Phase.....	2-9
2.6	Mitigation Measures	2-15
2.7	Audit Requirements	2-15
3.	NOISE	3-1
3.1	Introduction	3-1
3.2	Monitoring Equipment	3-1
3.3	Monitoring Parameters for Construction Noise	3-1
3.4	Monitoring Locations for Construction Noise	3-2
3.5	Baseline Monitoring for Construction Noise	3-3
3.6	Impact Monitoring for Construction Noise	3-3
3.7	Event and Action Plan for Construction Noise	3-4
3.8	Noise Parameters for Operational Road Traffic Noise	3-6
3.9	Monitoring Locations for Operational Road Traffic Noise	3-6
3.10	Mitigation Measures	3-6
3.11	Audit Requirements	3-9
4.	WATER QUALITY	4-1
4.1	Introduction	4-1
4.2	Water Quality Parameters	4-1
4.3	Sampling Procedures and Monitoring Equipment.....	4-2
4.4	Laboratory Measurement / Analysis.....	4-4
4.5	Water Quality Monitoring Stations.....	4-4
4.6	Details of Water Quality Monitoring.....	4-7
5.	SEWERAGE AND SEWAGE TREATMENT IMPLICATIONS	5-1
5.1	Introduction	5-1
5.2	Sewerage and Sewage Treatment Implications during Construction Phase	5-1
5.3	Mitigation Measures	5-1
5.4	Operation Phase.....	5-1
6.	WASTE MANAGEMENT IMPLICATION	6-1
6.1	Introduction	6-1
6.2	Mitigation Measures	6-1
6.3	Audit Requirement.....	6-1
7.	LAND CONTAMINATION	7-1
7.1	Introduction	7-1
7.2	Construction Phase	7-1
7.3	Operation Phase.....	7-1
8.	LANDFILL GAS HAZARD	8-1
8.1	Introduction	8-1
8.2	Monitoring Parameters, Locations and Frequency	8-1

9. ECOLOGY	9-1
9.1 Introduction.....	9-1
9.2 Mitigation Measures	9-1
9.3 Monitoring and Audit Measures.....	9-23
10. FISHERIES IMPACT	10-1
10.1 Introduction.....	10-1
10.2 Mitigation Measures	10-1
10.3 Monitoring and Audit Measures.....	10-5
11. CULTURAL HERITAGE	11-1
11.1 Introduction.....	11-1
11.2 Mitigation Measures	11-1
12. HAZARD TO LIFE	12-1
12.1 Introduction.....	12-1
12.2 EM&A Requirement.....	12-1
13. LANDSCAPE AND VISUAL IMPACT	13-1
13.1 Introduction.....	13-1
13.2 Mitigation Measures	13-1
13.3 Baseline Monitoring.....	13-1
14. ELECTRIC AND MAGNETIC FIELD	14-1
14.1 Introduction.....	14-1
15. SITE ENVIRONMENTAL AUDIT	15-1
15.1 Site Inspections	15-1
15.2 Compliance with Legal and Contractual Requirements	15-2
15.3 Environmental Complaints	15-2
16. REPORTING	16-1
16.1 General.....	16-1
16.2 Electronic Reporting of EM&A Information.....	16-1
16.3 Baseline Monitoring Report	16-1
16.4 Monthly EM&A Reports	16-2
16.5 Quarterly EM&A Summary Reports	16-6
16.6 Final EM&A Review Reports for Construction Phase	16-7
16.7 EM&A Reports for Operation Phase	16-8
16.8 Data Keeping.....	16-9
16.9 Interim Notifications of Environmental Quality Limit Exceedances	16-9

List of Tables

Table 1.1	Schedule 2 Designated Projects in this Project
Table 1.2	Preliminary Construction and Population Intake Schedule
Table 2.1	Recommended Performance Metrics and Target Values for On-site Checking of PM Monitoring Equipment
Table 2.2	Proposed Dust Monitoring Stations
Table 2.3	Action and Limit Levels for Air Quality (Dust)
Table 2.4	Event and Action Plan for Air Quality (Construction Dust)
Table 2.5	Emission Limit for CHP Units
Table 2.6	Emission Limit for Boiler
Table 2.7	Analytical Parameters and Methodology
Table 2.8	Emission Rate Limit for proposed Food Waste Pre-treatment Facilities
Table 2.9	Odour Intensity Levels
Table 2.10	Action and Limit Levels for Air Quality (Odour)
Table 2.11	Event and Action Plan for Air Quality (Odour)
Table 3.1	Proposed Construction Noise Monitoring Stations during Construction
Table 3.2	Action and Limit Levels for Construction Noise
Table 3.3	Event and Action Plan for Construction Noise

Table 3.4	Proposed Road Traffic Noise Monitoring Stations during Operation
Table 3.5	Extent and Locations of Considered LNRS and Noise Barriers
Table 4.1	Parameters measured in the Marine Water Quality Monitoring
Table 4.2	Proposed Water Quality Monitoring Stations under Construction Phase
Table 4.3	Proposed Water Quality Monitoring Stations under Operation Phase
Table 4.4	Mitigation Measures and Monitoring Requirement for Follow-up Emergency Discharge Exercise during Operation of the STLMC EPP
Table 4.5	Action and Limit Levels for Water Quality
Table 4.6	Event and Action Plan for Water Quality Monitoring
Table 8.1	Limit Levels and Action Plan for Landfill Gas
Table 9.1	Species to be Considered for Enhanced Freshwater Wetland Habitat
Table 9.2	Tree Species to be Considered for Re-provision of Roosting Substratum
Table 9.3	Flora Species to be Considered for Woodland Compensatory Planting
Table 11.1	Proposed 3As Limiting Criteria for Vibration, Settlement, Tilting Monitoring for Grade 3 Historic Building
Table 11.2	Guidelines on 3As Criteria Recommended in PNAP APP-137

List of Figures

<u>Figure 1.1</u>	Project Location Plan
<u>Figure 1.2</u>	Revised Recommended Outline Development Plan (RODP)
<u>Figure 1.3</u>	Locations of Designated Projects
<u>Figure 1.4</u>	Development Phasing Plan
<u>Figure 2.1</u>	Locations of Construction Dust Monitoring Points
<u>Figure 3.1</u>	Locations of Construction Noise Monitoring Stations
<u>Figure 3.2</u>	Locations of Traffic Noise Monitoring Stations
<u>Figure 4.1</u>	Locations of Water Quality Monitoring Stations for Construction Phase
<u>Figure 4.2</u>	Locations of Water Quality Monitoring Stations for Operation Phase
<u>Figure 8.1</u>	Location Plan of Ngau Tam Mei Landfill
<u>Figure 9.1a</u>	Indicative Location for Proposed Enhanced Wetland
<u>Figure 9.1b</u>	Indicative Location for Enhancement Measures
<u>Figure 9.2</u>	100m Buffer Area for Egrettries
<u>Figure 9.3</u>	Potential Locations for Woodland Compensation
<u>Figure 9.4a</u>	Potential Location for Re-provision of Ha Wan Tsuen Night Roost
<u>Figure 9.4b</u>	Potential Location for Re-provision of San Tin Open Storage Night Roost
<u>Figure 9.5a</u>	Existing Wildlife Corridor Underneath San Sham Road and Proposed Wildlife Corridor
<u>Figure 9.5b</u>	Proposed Wildlife Corridor
<u>Figure 9.6</u>	Indicative Location of EZ, RDZ and 500m for Monitoring of Construction Disturbance
<u>Figure 11.1</u>	Location of Cultural Heritage Resources and Other Identified Items with Potential Impact Anticipated
<u>Figure 11.2</u>	Mitigation Measures for Archaeology

List of Appendices

<u>Appendix A</u>	Project Organisation
<u>Appendix B</u>	Preliminary Construction Programme
<u>Appendix C</u>	Implementation Schedule
<u>Appendix D</u>	Data Record Sheets
<u>Appendix E</u>	Complaint Registration Form
<u>Appendix F</u>	Sample of the Interim Notification

1. INTRODUCTION

1.1 Project Background

- 1.1.1.1 The 2013 Policy Address first stated the need to take forward further development of the New Territories North (NTN) with a view to developing a modern new town there on a similar scale of the Fanling or Sheung Shui New Towns. In 2014, the Government commissioned the Preliminary Feasibility Study on Developing NTN (referred hereafter as “the Preliminary Study”) and an area in San Tin / Lok Ma Chau (STLMC) was identified as having potential for further development. In October 2016, a Broad Land Use Concept Plan (BLCP) of the area was promulgated in the public engagement of “Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030” (Hong Kong 2030+).
- 1.1.1.2 Following the announcement of advancing the studies on developing brownfield sites in the NTN in the 2018 Policy Address and the acceptance of the eight land supply options recommended by the Task Force on Land Supply in February 2019, the Feasibility Study on STLMC Development Node (STLMC FS) as the first phase development of NTN was jointly commissioned by the Civil Engineering and Development Department (CEDD) and the Planning Department (PlanD) in September 2019 to further develop the BLCP into a Preliminary Outline Development Plan (PODP) and confirm its feasibility. The PODP was presented to the Legislative Council in mid-2021 in the form of an Initial Land Use Plan.
- 1.1.1.3 In October 2021, the 2021 Policy Address proposed to expand STLMC Development Node into San Tin Technopole together with the Hong Kong-Shenzhen Innovation and Technology Park (HSITP) at the Loop. By making use of the land to be released by the Lok Ma Chau Boundary Control Point (LMC BCP) upon commissioning of the new Huanggang Port with co-location arrangement, and replanning the rural areas and fishponds around LMC BCP, it is proposed to increase the land supply for innovation and technology (I&T) development so as to achieve industry clustering effect with economy of scale. It is also proposed to increase the housing supply in San Tin Technopole to help address the housing shortage in the territory, in which some of the units can be used as talent apartments for I&T enterprises and research institutes. The Northern Metropolis has been incorporated in the Conceptual Spatial Framework promulgated in the Final Report of Hong Kong 2030+.
- 1.1.1.4 In the same month, CEDD and PlanD jointly commissioned AECOM Asia Co. Ltd. (AECOM) to undertake the Investigation Study on STLMC Development Node (hereinafter referred to as “the Project”) to take forward the San Tin Technopole initiative and formulate the Recommended Outline Development Plan (RODP) for STLMC area, carry out engineering and technical assessments including the statutory Environmental Impact Assessment (EIA), and conduct public engagement (PE) to facilitate public discussions and foster consensus building. A 2-month PE was conducted between June and August 2023 to solicit public views on the RODP. Taking into account the public views collected in the PE, planning and engineering considerations, technical assessments as well as departmental comments and advice, a Revised RODP was formulated.
- 1.1.1.5 According to the Revised RODP, STLMC area will be developed into an I&T hub and a new community providing about 50,000 to 54,000 flats for a new population of about 147,000 to 159,000. It will generate about 165,000 jobs including 120,000 jobs on I&T sites. It will be an integral part of San Tin Technopole, providing ample amount of I&T land in various sizes for different I&T uses, as well as an integrated community with wide range of commercial, retail, community, recreational and cultural facilities.

1.2 The Project

- 1.2.1.1 The Project area is located to the west of Kwu Tung North (KTN) and Fanling North (FLN) New Development Areas (NDAs) and Fanling and Sheung Shui New Towns, and to the northeast of Yuen Long and Tin Shui Wai New Towns. The Project area is bisected by San Tin Highway into northern and southern parts, and bounded by the Shenzhen River and

the proposed Sam Po Shue Wetland Conservation Park (SPS WCP) to the north; the Loop to the northeast; some village settlements and Ki Lun Shan to the east; San Tin Barracks and Ngau Tam Shan to the south; and Tam Mei Barracks and some residential developments to the southwest. The two “Village Type Development” (“V”) sites covering the existing Shek Wu Wai village and the village clusters (San Tin Seven Villages) bounded by San Tin Highway, San Tin Tsuen Road and Tung Wing On Road are excluded from the Project boundary.

- 1.2.1.2 As compared with the PODP released in March 2021, the Project boundary has been extended from about 320 ha to about 610 ha. The expanded area mainly covers (i) the formed land at LMC BCP which will be released for development upon commissioning of the new Huanggang Port with colocation arrangement on the Shenzhen (SZ) side, (ii) the fish ponds and rural land adjacent to the existing LMC BCP, and (iii) a “Green Belt” (GB) south of Ki Lun Shan at Pang Loon Tei, which is also a response to the suggestion raised by LegCo members during funding application of the subject Study in 2021. The Project boundary is shown in **Figure 1.1**.

1.3 Main Objectives of the Project

- 1.3.1.1 The Project includes the following main objectives: -
- (a) to review the PODP formulated under the STLMC FS, taking into account the results of stakeholder engagement, the latest NOL scheme (available information at the time of preparation of this EIA report), including the proposed San Tin Station and proposed station near Chau Tau as well as the land to be released from LMC BCP, existing fishponds north of San Tin Tsuen Road, existing rural area and fishponds near Chau Tau Tsuen and existing rural area near Pang Loon Tei, to conduct market positioning and identify the potential for integrated I&T uses of the formed land, and to formulate the RODP (as shown in **Figure 1.2**) supported by engineering and technical assessments for the STLMC DN to meet housing, economic and development needs of Hong Kong beyond 2030 in a carbon-neutral community;
 - (b) to adopt the Integrated Approach in land use layout formulation, and design the STLMC DN as appropriate and deliver Planning, Urban Design and Landscape Design Frameworks, Recommended Master Urban Design Plan (MUDP) and Recommended Landscape Master Plan (LMP), Recommended Urban Design Scheme Plan (UDSP) and Design Illustrations to demonstrate the design proposals/solutions to the proposed Developments, including specific areas, precincts, key zones, nodes and facilities between major uses and infrastructure of the STLMC DN, incorporated with feasible smart, green and resilient (SGR) framework / initiatives, and justified assessments on pedestrian and cyclist connectivity, visual, landscape, streetscape, air ventilation, infrastructure, architectural design, feasibility, implementation modes, etc. that lay a solid basis for consolidating design scopes/guidelines for follow-up in the design and construction stage and facilitate the future implementation of the urban design and landscape design proposals;
 - (c) to formulate Urban Design and Landscape Design Guidelines as well as SGR Guidelines to create a green, high quality and sustainable townscape and a liveable and future-proof environment;
 - (d) to provide an overall implementation plan to take forward the SGR framework/initiatives, and demonstrate how the objective for a carbon neutral community could be achieved in the STLMC DN;
 - (e) to ascertain the infrastructure requirements of the proposed development and carry out the preliminary design;
 - (f) to carry out economic and market analysis in the formulation of land use and development proposals, including the positioning and commercial viability of the

- proposed land uses, taking into account the latest planning circumstance, development and trend;
- (g) to confirm the feasibility and sustainability of the development and infrastructure proposals and RODP by undertaking a series of technical assessments on aspects including traffic and transport, environment, ecology, air ventilation, geotechnical, land requirement, site formation, drainage, sewerage, water supply and utilities, land contamination, socio-economic, sustainability, landscape and visual, SGR framework/initiatives, carbon appraisal, urban design, etc.;
 - (h) to conduct ecological survey arising from the expanded area from original assignment and review on the compensation and mitigation measures on affected ponds / wetland as well as to undertake EIA study and obtain statutory approval for the proposed development and the associated engineering infrastructures recommended in the RODP under the Environmental Impact Assessment Ordinance (EIAO);
 - (i) to formulate a public engagement strategy and conduct public engagement exercise on the RODP, to explore good development concepts from the community, and gauge public feedback through engagement activities;
 - (j) to formulate the implementation strategy and programme including land resumption / clearance and development mode with cost and revenue estimates;
 - (k) to serve as a reference for detailed design in the next stage based on the findings of assessments;
 - (l) to conduct site investigation and site supervision; and
 - (m) to adopt a capacity-creating approach as embedded in the Hong Kong 2030+ in land use and infrastructure planning of the Services. The approach aims to pro-actively plan with visions in advance of the additional capacity to enhance the city’s liveability for our existing and future population, as well as to cater for demands from unforeseen challenge and opportunities in a timely manner.

1.4 Designated Projects

1.4.1.1 The Project is a designed project (DP) under Item 1 Schedule 3 of Environmental Impact Assessment Ordinance (EIAO) as it covers a development area of approximately 610 ha. It is estimated that the Project will accommodate 147,000 to 159,000 population with provision of about 165,000 jobs upon full development. Various infrastructure and associated development supporting this population and employment is presented in the Revised RODP which formed the basis of this EIA study.

1.4.1.2 The Project would also comprise Schedule 2 DPs as shown in **Table 1.1** and **Figure 1.3**.

Table 1.1 Schedule 2 Designated Projects in this Project

Ref. No.	Schedule 2 Designated Project		Work Component / Reference in Revised RODP
DP1 ¹	A.1	A carriageway for motor vehicles that is an expressway, trunk road, primary distributor road or district distributor road	Construction and operation of primary distributor road P1, district distributor road D1, D2, D3, D4, D5 and D6
DP2 ¹	F.1	Sewage treatment works with an installed capacity of more than 15,000m ³ per day	Construction and operation of STLMC Effluent Polishing Plant
	F.2	Sewage treatment works with an installed capacity of more than 5,000m ³ per day; and a boundary of which is less than 200m from the nearest boundary of	

		an existing or planned residential area and educational institution	
DP3 ¹	F.4	A facility for generating, from sewage effluent treated by a sewage treatment plant, reclaimed water for use by the general public	Construction and operation of STLMC Water Reclamation Plant
DP4 ²	G.2	A refuse transfer station	Construction and operation of a refuse transfer station
DP5 ²	H.1	A 400kV electricity substation and transmission line	Construction and operation of two 400kV electricity substations
DP6 ¹	I.1	A drainage channel or river training and diversion works located less than 300 m from the nearest boundary of an existing or planned conservation area	Revitalisation works (i.e. river training, diversion works) for San Tin Eastern Main Drainage Channel are located less than 300m from Conservation Area ³
DP7 ¹	P.1	A residential or recreational development, other than New Territories exempted houses, within Deep Bay Buffer Zone 2	Recreational development for proposed Sites O.1.1, O.1.2, and O.1.3 (as open space) encroach into Deep Bay Buffer Zone 2

Notes:

- 1 Subject to an Environmental Permit application for both construction and operation phases of the DP under the EIA Study
- 2 Subject to separate EIA Study, as required
- 3 The future zoning of the concerned 'Conservation Area' as shown in [Figure 1.3](#) are subject to change due to the land use proposal as reflected in the Revised RODP.

DP 1 – Construction of New Primary Distributor and District Distributor Road

1.4.1.3 The Project will be served by a network of PD, DD and LD roads. The PD will run between the existing STI and San Sham Road at the northern part of the Project area in form of viaduct structure. DD roads will run through the Project in the form of a ring serving as the major linkage between the Project's LD network and the four external connections including San Tin Highway, Fanling Highway, Huanggang Port, and the potential external connection at the South-east of the Project. LD roads will have several connections to the proposed DD roads.

1.4.1.4 On top of the existing slip roads at SWWI, two additional slip roads will be constructed to connect the Project with the eastbound and westbound of San Tin Highway. Furthermore, one slip road will be constructed along the southbound of Road D6 connecting to the southbound of Road P1 to facilitate the traffic connection at the northern part of the Project.

1.4.1.5 Moreover, the existing road system is to be largely demolished / realigned / upgraded apart from the section of Castle Peak Road fronting Yan Shau Wai, Ha Wan Tsuen East Road, and a section of Lok Ma Chau Road.

DP2 – Construction of STLMC Effluent Polishing Plant (EPP)

1.4.1.6 A new sewage treatment works, which will be a tertiary EPP, will be built to support the population of the Project. The treatment capacity of the EPP is proposed to be at 125,000 m³/day.

DP3 – Construction of STLMC Water Reclamation Plant (WRP)

1.4.1.7 A new WRP will be built to support the population of the Project. The capacity of the STLMC WRP is proposed to be around 112,500 m³/day.

DP4 – Construction of Refuse Transfer Station (RTS)

- 1.4.1.8 In the eastern part of the Project area along the Fanling Highway, site OU.1.9 has been proposed for the provision of a new RTS with treatment capacity of 3,000 tonnes per day (tpd) together with a new resource recovery facility (RRF) to cope with the new population waste generation of the Project and also for territory treatment purpose.

DP5 – Construction of 400kV Electricity Substation

- 1.4.1.9 Two 400kV electricity substations are proposed within the Project area to cope with the power demand generated from the new development. These include sites OU.1.7 and OU.4.2.

DP6 – Revitalisation of San Tin Eastern Main Drainage Channel

- 1.4.1.10 The current San Tin Eastern Main Drainage Channel (STEMDC) that sits within the Project boundary is mainly concrete channelised waterway. The proposed waterway framework aims to maximise opportunities for open channel treatment and enhance benefits from flood resilience infrastructure. The revitalisation of the drainage channels is proposed via dechannelisation where appropriate and applicable. It is proposed that the embankments of the channel be treated with greening measures appropriate to each individual context. This includes strategy such as naturalisation of channel bank, replacing concrete bank with sloped green edge, gabion wall design, planting with native vegetation etc. Most of the vegetation species along the channel should comprise native species and refer to existing local flora.
- 1.4.1.11 The revitalisation of STEMDC is proposed to improve the flood resilience and adaptation to climate change of the development area. Flood attenuation measures such as underground storage tank, integrated ponds and retention ponds are proposed along the upstream of STEMDC. The existing engineered channel at downstream is proposed to be naturalised embankment which provides green buffer along the revitalised water channel and further enhances ecological and landscape value. Open spaces encompassing STEMDC will be designed with floodable landscape treatments to enhance the resiliency of the adjacent area.
- 1.4.1.12 To cater for the upgrading works of existing Tun Yu Road, the STEMDC is proposed to shift eastwards and re-profile with natural and hybrid embankment treatment. The width of riverbed between the natural and hybrid embankment is approximately 28m.

DP7 – Recreational Development within Deep Bay Buffer Zone 2

- 1.4.1.13 With reference to the demarcation of Deep Bay Buffer Zone, open space provided with tree planting and water features locating at site O.1.1, O.1.2 and O.1.3 within Deep Bay Buffer Zone 2 are proposed as recreational development for the enjoyment of the general public. The Mai Po Lung Village Egretty will be preserved at O.1.3.

1.5 Purpose of the Manual

- 1.5.1.1 The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the setups of an EM&A programme to ensure compliance with the EIA study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme for the construction and operation phases of the proposed Project. It aims to provide systematic procedures for monitoring, auditing and minimising environmental impacts associated with construction works and operational activities.
- 1.5.1.2 Hong Kong environmental regulations and the Hong Kong Planning Standards and Guidelines have served as environmental standards and guidelines in the preparation of

this Manual. In addition, the EM&A Manual has been prepared in accordance with the requirements stipulated in Annex 21 of the EIAO-TM.

1.5.1.3 This Manual contains the following information:

- Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET) and Independent Environment Checker (IEC) with respect to the environmental monitoring and audit requirements during the course of the Project;
- Project organisation for the Project;
- The basis for, and description of the broad approach underlying the EM&A programme;
- Requirements with respect to the construction programme schedule and the necessary environmental monitoring and audit programme to track the varying environmental impact;
- Details of the methodologies to be adopted, including all field laboratories and analytical procedures, and details on quality assurance and quality control programme;
- The rationale on which the environmental monitoring data will be evaluated and interpreted;
- Definition of Action and Limit levels;
- Establishment of Event and Action plans;
- Requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints;
- Requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures; and
- Requirements for review of EIA predictions and the effectiveness of the mitigation measures / environmental management systems and the EM&A programme.

1.5.1.4 For the purpose of this manual, the ET leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the EM&A requirements.

1.6 Development Programme of the Project

1.6.1.1 The Project would be commissioned in phases with the first population intake in Year 2031. The major construction work is targeted to commence in Year 2024 and be completed by Year 2039 for full population intake. The development phasing is illustrated in **Figure 1.4** and the construction programme is presented in **Appendix B**. A summary of Construction and Population Intake Schedule is tabulated in **Table 1.2**

Initial Phase

1.6.1.2 Initial phase comprises mainly the residential sites for the first population intake in Year 2031, first batch of lands for Innovation and Technology (I&T) use and the key supporting infrastructures. The existing Chau Tau area, Lok Ma Chau Boundary Control Point and Ha Wan Tsuen will be developed in this phase to provide the lands for I&T use. Majority of these areas consist of road connection from existing road networks. The future key access roads for the above-mentioned areas will be implemented under this phase.

1.6.1.3 The major site formation and infrastructure works in this development phase will include:

- Site formation and development works for one "Public Housing" ("RSc") site, one "Dedicated Rehousing Estate" ("DRE") site, village resite and one "Private Housing" ("R1") site at south-west of the Project area
- Site formation and development works for "Other Specified Uses" ("OU") sites for key infrastructures including EPP, food waste pre-treatment facilities, FWSR and RWSR, STLMC WRP, DCS, sewerage pumping stations (SPSs), stormwater pumping

stations (SmPSs), ESS, RTS, refuse collection point (RCP), etc.

- Site formation and development works for “Government, Institution or Community” (“G/IC”) sites
- Site formation and development works for “Other Specified Uses (Innovation and Technology)” (“OU(I&T)”) sites and “OU(LSW)” sites
- Site formation and development works for “Education” (“E”) sites
- Primary Distributor Road P1 and associated interchange/junction works connecting with San Sham Road, Castle Peak Road and San Tin Interchange
- District Distributors Road D1 (portion), D2 (portion), D3, D4 and D6, associated interchange/junction works connecting with San Tin Highway and Castle Peak Road, local roads, pedestrian connectivity including footbridge and subway, and associated pedestrian walkway and cycle tracks
- Common Utilities Enclosure (CUE) along the roads and utilities laying works for future development of relevant sites, such as watermains, power supply cables, DCS pipes, telecommunication cables, etc.
- Associated open spaces and amenity areas

Main Phase

1.6.1.4 Main phase comprises mainly the I&T lands at north-west of the Project area and the areas to the south of San Tin Highway. The development in this phase is to support mass population intake in Year 2034 and provide second batch of lands for I&T use. The future access roads for this area will be implemented under this phase. There will be interface with NOL in this phase.

- 1.6.1.5 The major site formation and infrastructure works in this development phase will include:
- Site formation and development works for “RSc” and “R1” sites at south and south-east of the Project area
 - Site formation and development works for “OU” sites for key infrastructures including DCS, ESSs, PTI, FSD facilities, etc.
 - Site formation and development works for “G/IC” sites
 - Site formation and building works for “OU(I&T)” sites at north-west and south-east of the Project area
 - Site formation and development works for “E” sites
 - District Distributors Road D1 (portion), D2 (remaining portion) and D5, associated interchange/junction works connecting with San Tin Highway and Kwu Tung Road, local roads, pedestrian connectivity including footbridge and subway, and associated pedestrian walkway and cycle tracks
 - CUE along the roads and utilities laying works for future development of relevant sites, such as watermains, power supply cables, DCS pipes, telecommunication cables, etc.
 - Associated open spaces and amenity areas

Remaining Phase

1.6.1.6 Remaining phase is the last phase and the remaining development at the area surrounding San Tin Station and proposed station near Chau Tau will be completed. It mainly comprises residential, mixed use and government land.

- 1.6.1.7 The major site formation and infrastructure works in this development phase will include:
- Site formation and development works for “RSc” site at south of the Project area
 - Site formation and development works for “Other Specified Uses (Mixed Use)”

(“OU(MU)”) sites at proposed San Tin Station and proposed station near Chau Tau including the associated TIHs

- Site formation and development works for “G/IC” sites for Cultural and Recreational Complex and Wetland Conservation Park Management Office
- District Distributors Road D1 (remaining portion), local roads connecting the sites with existing and completed road network and associated pedestrian walkway and cycle tracks
- Utilities laying works for future development of relevant sites, such as watermains, power supply cables, DCS pipes, telecommunication cables, etc.
- Associated open spaces and amenity areas

Table 1.2 Preliminary Construction and Population Intake Schedule

Development Stage	Area	Rationale of Phasing	Earliest Date for Commencement of Infrastructure Works	Earliest Date for Availability of Land for Building Works	Anticipated First Occupation/ Population Intake Date
Initial Phase	North-east of the Project area including Government land, I&T land, LSW land, infrastructures, etc; West of the Project area including Residential, Government land, LSW land, Effluent Polishing Plant, Service Reservoirs, other infrastructures, etc.	- Key infrastructures - Areas with road connection from existing road network	End 2024	2026	2031
Main Phase	North-west of the Project area including mainly I&T land; South of the Project area including Residential, Government land, I&T land, infrastructures, etc.	- To commence infrastructure works for targeted population intake	2026	2029	2034
Remaining Phase	Area surrounding San Tin Station and Chau Tau Station including Residential, Mixed Use and Government land	- Remaining works to suit the programme of other interfacing works	2032	2034	2039

1.7 Project Organisation

1.7.1.1 The roles and responsibilities of the various parties involved in the EM&A process and the organisational structure of the organisations responsible for implementing the EM&A programme are outlined below. The proposed project organisation and lines of communication with respect to environmental protection works are shown in **Appendix A**.

The Contractor

1.7.1.2 The Contractor shall report to the Engineer. The duties and responsibilities of the Contractor are:

- implement the recommendations and requirements of the EIA study;
- provide assistance to ET in carrying out monitoring;
- submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;

- implement measures to reduce impact where Action and Limit levels are exceeded until the events are resolved;
- implement the corrective actions instructed by the Engineer;
- accompany joint site inspection undertaken by the ET; and
- adhere to the procedures for carrying out complaint investigation.

Environmental Team (ET)

1.7.1.3 The ET Leader and the ET shall be employed to conduct the EM&A programme and ensure the Contractor's compliance with the project's environmental performance requirements during construction. The ET Leader shall be an independent party from the Contractor and have relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the Engineer's Representative (ER) and the Environmental Protection Department (EPD). The ET shall be led and managed by the ET leader. The ET leader shall possess at least 10 years of experience in EM&A and/or environmental management.

1.7.1.4 The duties and responsibilities of the ET are:

- monitor various environmental parameters as required in this EM&A Manual;
- analyse the environmental monitoring and audit data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- carry out regular site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems; carry out ad hoc site inspections if significant environmental problems are identified;
- audit and prepare monitoring and audit reports on the environmental monitoring data and site environmental conditions;
- report on the environmental monitoring and audit results to the Independent Environmental Checker, Contractor, the ER and EPD or its delegated representative;
- recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- advice to the Contractor on environmental improvement, awareness, enhancement matters, etc. on site;
- timely submission of the EM&A report to the Project Proponent and the EPD; and
- adhere to the procedures for carrying out complaint investigation in accordance with Section 13 of this Manual.

Engineer or Engineer's Representative (ER)

1.7.1.5 The Engineer is responsible for overseeing the construction works and for ensuring that the works undertaken by the Contractor in accordance with the specification and contractual requirements. The duties and responsibilities of the Engineer with respect to EM&A may include:

- supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with;
- inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- participate in joint site inspection undertaken by the ET; and

- adhere to the procedures for carrying out complaint investigation.

The Engineer may delegate some of his power to the ER, who is his representative on site, in order to meet the site supervision needs.

Independent Environmental Checker (IEC)

1.7.1.6 The IEC shall be an independent party from the Contractor and the Environmental Team and possess at least 10 years' experience in EM&A and/or environmental management.

1.7.1.7 The duties and responsibilities of the IEC are:

- review the EM&A works performed by the ET (at least at monthly intervals);
- carry out random sample check and audit the monitoring activities and results (at least at monthly intervals);
- conduct random site inspection;
- review the EM&A reports submitted by the ET;
- review the effectiveness of environmental mitigation measures and project environmental performance;
- review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary; and
- adhere to the procedures for carrying out complaint investigation.

1.7.1.8 Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibilities, as required under the EM&A programme for the duration of the Project.

2. AIR QUALITY

2.1 Introduction

- 2.1.1.1 Potential air quality impact arising from the construction phase of the Project was addressed in the EIA Report. No adverse air quality impact arising from construction of the Project with the implementation of the mitigation measures. Dust monitoring and regular site audit are proposed to be conducted during the entire construction phase of the Project so as to check compliance with the legislative requirements.
- 2.1.1.2 Potential air pollutant emissions impact from operation of the proposed Effluent Polishing Plant (EPP) was assessed and no adverse air pollutant emissions impact would be anticipated during the operation phase. Nevertheless, it is recommended to conduct commissioning test prior to operation of the proposed EPP at each stack of combined heat and power (CHP) units and boiler to demonstrate compliance with the design emission limits.
- 2.1.1.3 Cumulative odour impact from the planned odour sources including proposed EPP, Food Wastes Pre-treatment Facilities (FWPF), Refuse Transfer Station (RTS) and three proposed sewage pumping stations, and two existing odour sources including retained pig farm at Chau Tau and sewage treatment works (STW) of San Tin Barracks within the 500m assessment area from the Project boundary was assessed. No adverse cumulative odour impact would be anticipated at the planned air sensitive uses and existing air sensitive receivers (ASRs) except that residual impact was predicted at the village houses in the vicinity of retained pig farm and STW of San Tin Barracks predominantly due to existing odour sources. Nevertheless, odour monitoring in terms of H₂S at the deodorizers is recommended upon commissioning and during first three years of operation of proposed EPP to determine whether it can meet the odour removal performance requirement. Upon the third-year monitoring, the odour monitoring should be reviewed and agreed with EPD if the monitoring is required to be continued. In addition, odour patrol should be carried out after regular and ad hoc maintenance or cleaning of the deodorization system of proposed EPP to ensure no adverse odour impacts arisen from the operation of the Project. For the proposed FWPF, continuous monitoring of H₂S and NH₃ concentrations and air flow at the exhaust outlet of the deodorisation system are required after commissioning. In addition, odour patrol should be carried out after regular and ad hoc maintenance or cleaning of the deodorisation system of the proposed FWPF. An Odour Complaint Registration System is proposed for proposed EPP and FWPF to check whether the deodorizing units can fulfil the recommended odour removal performance. There will be a separate EIA Study for the proposed RTS, the environmental monitoring and audit requirement should be subject to the outcome of its EIA study. However, continuous H₂S and NH₃ monitoring and air flow at the exhaust outlet of the deodorisation system after commissioning, odour complaint registration system and odour patrol are proposed to be conducted during operation of the RTS for consideration.
- 2.1.1.4 This section presents the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impact during the construction and operation phases of the Project.

2.2 Construction Phase

Monitoring Parameters

- 2.2.1.1 For regulatory purpose, the concentration of particulate matters including 24-hour average Respirable Suspended Particulates (RSP) concentrations and 24-hour average Fine Suspended Particulate (FSP) concentrations are recommended to be monitored and audited at the proposed monitoring locations during the construction phase. To ensure that any deteriorating air quality could be readily detected and timely action could be undertaken,

1-hour average RSP concentrations should also be monitored at the proposed monitoring locations during the construction phase.

- 2.2.1.2 Monitoring and audit of the abovementioned RSP and FSP concentrations shall be carried out by the ET. Should any deteriorating air quality be detected, timely action shall be undertaken to rectify such situation.

Monitoring Equipment

- 2.2.1.3 The abovementioned parameters should be monitored continuously by air sensor at monitoring stations specified in **Section 2.3**. The air sensor to be employed should meet the purpose of the monitoring which is 1-hour RSP, 24-hour RSP and 24-hour FSP concentrations in the ambient air. It should be capable of detection of PM₁₀, while size specification would be optional subject to the environmental management strategy of the site. Particulates is typically measured using an optical approach where light scattered by a particle is used to estimate the particle mass concentration. The measurement range and detection limit of the air sensor should be able to measure the full range of particulates commonly found in the ambient, e.g. 0 – 1000 µg/m³. The accuracy of a sensor, in terms of precision and bias, should also be evaluated during selection of air sensor, according to the manufacturer's specification, evaluation reports and published literature. Whether the air sensor has calibrated upon purchase, when and how collocation should be performed and how to correct the measurement should be consulted with the sensor manufacturer and fully understood before the air monitoring. Other factors, such as response time, durability, enclosure, ease of use, power supply, any data display, data transmission, data access, data handling and cost should also be considered when selecting air sensor. *Guidelines on the use of air sensor refer to The Enhanced Air Sensor Guidebook 2022, USEPA, or for further technical details at USEPA's Air Sensor Toolbox website.*
- 2.2.1.4 Generally, air sensors should be placed at least 1.5 metres above ground and away from any obstruction, vegetation or emission source which would interfere with the measurement. Other factors of the monitoring location, such as security, availability of power supply, reliable communication (cellular, Wi-Fi, etc.), should also be considered.

On-site Calibration and Quality Control

- 2.2.1.5 To ensure accuracy of the measurement, monitoring equipment, including the air sensors, should be calibrated regularly. The calibration should be conducted by collocating the air sensor and a Transfer Standard (TS).
- 2.2.1.6 A Transfer Standard (TS) is another particulate matter (PM) monitor that is at least as capable as the air sensor to be calibrated. Another sensor that has just been calibrated may serve the purpose provided its performance is known to be stable during the subsequent collocation period to be used as TS. Right before each on-site calibration, the TS itself needs to be calibrated e.g. collocating with an PM reference monitor - such as the Federal Reference Method (FRM) or the Federal Equivalent Method (FEM) PM monitor at the accredited laboratories or research institutes - that has been calibrated against traceable standard. The TS/reference monitor collocation should last at least seven days.
- 2.2.1.7 The TS with known performance characteristics will visit and collocate with each air sensor for calibration. During collocation, the TS should be placed near the subject sensor (<1 m if practicable) so that both devices would be monitoring under the same environment, i.e. the same pollution sources and weather conditions. The TS is then turned on to warm-up for 30–60 minutes. The collocation period starts after the warm-up and TS is then left running with the subject sensor for at least three hours. The measurements from the sensor to be calibrated and the TS during the collocation period will be statistically analysed. The response of the sensor should be adjusted if its performance during on-site calibration does not meet the evaluation criteria as shown in **Table 2.1**.
- 2.2.1.8 On-site calibration of the monitoring equipment shall be conducted by ET and agreed by IEC on the following approach:

- Prepare a TS for PM monitoring, which has been calibrated against a PM reference monitor (i.e. the FRM or FEM PM monitor).
- The inlets of the TS and the subject sensor shall be collocated at the same height with a horizontal separation distance of <1 m.
- Warm-up the transfer standard on-site if necessary.
- Collocated monitoring shall be conducted in a continuous period to collect at least 180 valid minute average measurements. The valid data rate shall be at least 80% during the collocation period.
- The collected minute average measurement results should be statistically analysed using the two-tier approach as presented in **Table 2.1**.

Table 2.1 Recommended Performance Metrics and Target Values for On-site Checking of PM Monitoring Equipment

Performance Metric			Target Value
Tier 1 – Linear regression of minute average measurements	Bias	Slope	0.75 – 1.25
	Linearity	Coefficient of Determination (R ²)	>0.70
Tier 2 – Root mean squared error of minute average measurements	Error	Root Mean Squared Error (RMSE)	<8 µg ^m - ³ for RSP and <5 µg ^m - ³ for FSP

2.2.1.9 During Tier 1 checking, linear regression of the minute average measurements from the sensors and the TS should be performed. The slope and coefficient of determination (R²) from the linear regression should be calculated and meet the target values in **Table 2.1**. If these criteria are not met due to narrow range of PM concentration (>30 µg/m³ and >25µg/m³ as recommended span range for RSP and FSP, respectively) during the collocation period, the Tier 2 checking on mean squared error shall be determined and compared against the target value in **Table 2.1**. If the monitoring equipment fails to meet both Tiers 1 and 2 target values, the monitoring equipment needs to be re-calibrated or replaced.

2.2.1.10 The collocated monitoring of TS and each air sensor on the field should be carried out every month. If a sensor failed in 3 consecutive collocated monitoring, the sensor should be checked or maintained to improve its performance, or it should be replaced.

Wind Data Monitoring Equipment

2.2.1.11 Wind data monitoring equipment should also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location should be proposed by the ET and agreed with the ER in consultation with the IEC. For installation and operation of wind data monitoring equipment, the following points should be observed:

- the wind sensors should be installed on masts at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- the wind data should be captured by a data logger. The data recorded in the data logger should be downloaded periodically for analysis at least once a month;
- the wind data monitoring equipment should be re-calibrated at least once every six months; and
- wind direction should be divided into 16 sectors of 22.5 degrees each.

2.2.1.12 In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from the IEC.

2.2.1.13 If the ETL proposes alternative dust monitoring equipment / methodology after the approval of this Manual, agreement from the IEC and EPD should be sought. The instrument should

also be calibrated regularly following the requirements specified by the equipment manufacturers.

Construction Dust Monitoring Plan

2.2.1.14 Before commencing the air monitoring, the ET should formulate a construction dust monitoring plan with air sensor and submit to IEC to seek their feedback and consent. The plan should be aligned with the EM&A Manual and verified by IEC. The plan should include but not limited to the followings:

- Details on the pollutants and environmental parameters to be monitored;
- Describe the equipment and measurement method to be used;
- Address the criteria for placing air sensors;
- Discuss the monitoring locations selected and rationale;
- Describe the criteria for selecting air sensors and test to determine if they are working properly;
- Determine the collocation location and establish the calibration and/or collocation and data correction methods;
- Identify types of data that may be used in the data analysis, including nearby reference monitor data, weather data, etc.
- List the procedures to maintain and operate air sensors, including site visits, routine maintenance, emergency maintenance, daily data review, periodic collocations, etc.;
- Describe the QC procedures to be performed;
- Describe how the data are processed, stored and adjusted;
- Describe the ownership of the data and who is granted access to it;
- Describe how the air monitoring data to be managed, tracing the path of data generation in the field to the final data use and end storage;
- Describe the procedures to verify and validate data during collection period;
- Describe the methods to produce meaningful figures and visualization;
- Describe how the monitoring results will be used.

2.2.1.15 The ET is responsible for the provision of the monitoring equipment and should provide sufficient number of air sensors for the field work and TS for carrying out continuous on-site monitoring and ad-hoc monitoring.

2.3 Dust Monitoring Stations

2.3.1.1 The selected monitoring locations are air sensitive receivers located in the vicinity of construction sites and covered different wind directions to capture the potential worst-case impact from the construction of the Project. The proposed dust monitoring locations during construction phase are listed in **Table 2.2** and are illustrated in **Figure 2.1**. The ET should agree with IEC on the position of the air sensor for installation. The considerations for the positioning of air sensor refer to **Section 2.3.1.3**, the air monitoring plan with sensors and the feedbacks from IEC and EPD.

Table 2.2 Proposed Dust Monitoring Stations

Monitoring Station No. ¹	ASR ID in EIA Report	ASR Description	Duration
M01	A16	Lok Ma Chau Village	December 2024 – 2028
M02	A15	Ha Wan Fisherman San Tsuen	December 2024 – 2028
M03	A14	Pun Uk Tsuen	December 2024 – 2028

Monitoring Station No. ¹	ASR ID in EIA Report	ASR Description	Duration
M04	A13	Chau Tau Tsuen	December 2024 – 2028
M05	A17	Mai Po San Tsuen	December 2024 – 2029
M06	A18	Mai Po San Tsuen	December 2024 – 2028
M07	A09	Tsing Lung Tsuen	December 2024 – 2028
M08	A12	Yan Shau Wai	December 2024 – 2029
M09	A07	Wing Ping Tsuen	December 2024 – 2028, 2032 – 2034
M10	A04	Village house	December 2024 – 2029
M11	A01	Shek Wui Wai	December 2024 – 2029
M12	A03	Shek Wui Wai	December 2024 -
M13	A19	Rolling Hills	December 2024 – 2028
M14	A20	Rolling Hills	December 2024 – 2028, 2032 – 2039
M15	A21	Scenic Heights	December 2024 – 2029
M16	P109	Planned Private Housing	2026 – 2029
M17	P145	Planned Open Space	2026 – 2029
M18	P127	Planned Information and Technology - Zone 1	2026 – 2029
M19	P222	Planned 3 Secondary School	2032 – 2034
M20	P231	Planned Public Housing	2032 – 2034
M21	P241	Planned Cultural & Recreational Complex	2032 – 2034
M22	P269	Planned Secondary School	2032 – 2034
M23	P217	Planned Information and Technology - Zone 1	2032 – 2034
M24	P113	Planned Information and Technology - Zone 2	2032 – 2034

Note:

1 Continuous hourly RSP and FSP monitoring should be conducted at the monitoring stations when there are Project-related major construction activities including site formation, excavation or piling works being undertaken within a radius of 500m from the monitoring stations.

2.3.1.2 The status and locations of air monitoring locations may change after this Manual is issued. In such case, the ET should propose alternative monitoring locations and seek agreement from the IEC and EPD.

2.3.1.3 When alternative monitoring locations are proposed, the monitoring stations should be chosen based on the following criteria:

- Monitoring at ASRs close to the major site activities which are likely to have air quality impacts;
- Monitoring as close as possible to the ASRs as defined in the EIAO-TM;
- Assurance of minimal disturbance to the occupants and working under a safe condition during monitoring; and
- Take into account the prevailing meteorological conditions.

2.3.1.4 The ET should agree with IEC on the position of the air sensor for installation of the monitoring equipment. When positioning the air sensor, the following points should be noted:

- A horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- general housekeeping, cleaning works and other preventative maintenance activities such as checking the operating status of individual monitoring equipment should be carried out to ensure the proper operation of the system;
- the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- a minimum of 2m separation from walls, parapets and penthouses is required for rooftops samplers;
- a minimum of 2m separation from any supporting structure, measures horizontally is required;
- no furnace or incinerator flue is located nearby the samplers;
- airflow around the sampler is unrestricted;
- the sampler is more than 20m from the dripline;
- any wire fence and gate to protect the sampler, should not cause any obstruction during monitoring;
- permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the samplers.

2.3.1.5 Subject to site conditions and monitoring results, the ETL, with IEC and EPD endorsement, may decide whether additional monitoring locations should be included or any monitoring locations could be removed / relocated during the construction phase.

2.4 Impact Monitoring

2.4.1.1 During construction phase of the Project, the ET shall carry out continuous impact monitoring in terms of 1-hour average RSP concentration, 24-hour rolling average RSP concentration and 24-hour rolling average FSP concentration, with air sensors throughout the construction phase of the Project.

2.4.2 Event and Action Plan

2.4.2.1 The ET shall compare the impact monitoring results with air quality criteria set up for RSP and FSP. **Table 2.3** shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occur, action in accordance with the Action Plan in **Table 2.4** shall be carried out.

Table 2.3 Action and Limit Levels for Air Quality (Dust)

Parameter	Action Level	Limit Level
1-hour RSP	150 µg/m ³	Not Applicable
24-hour RSP (rolling average)	Not Applicable	100 µg/m ³
24-hour FSP (rolling average)	Not Applicable	50 µg/m ³

Table 2.4 Event and Action Plan for Air Quality (Construction Dust)

Event	Action			
	ET	IEC	ER	Contractor
Action level exceedance for one sample	<ol style="list-style-type: none"> 1. Notify IEC and ER; 2. Check the monitoring data and error messages to confirm if the performance of the monitoring equipment is normal; 3. If exceedance is confirmed, identify source(s), investigate the causes of exceedance and propose remedial measures; 4. Assess effectiveness of Contractor's remedial measures and keep IEC and ER informed of the results until exceedance stops. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Advise ER and ET on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consultation with IEC and ET, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Identify sources of exceedance and discuss with ER, ET and IEC on possible remedial measures; 2. Implement remedial measures; 3. Amend working methods if appropriate.
Action level exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IEC and ER; 2. Check the monitoring data and the performance of the monitoring equipment (refer to Annex A); 3. If exceedance is confirmed, identify source(s), investigate the causes of exceedance and propose remedial measures; 4. Discuss with IEC and Contractor on possible remedial measures required; 5. Assess effectiveness of Contractor's remedial measures and keep IEC and ER informed of the results until exceedance stops. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method and verify the performance of the monitoring equipment to be checked by ET (refer to Annex A); 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise ER and ET on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consultation with IEC and ET, agree with the Contractor on the proposal for remedial measures to be implemented; 4. Ensure the proposal for remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Identify the sources and discuss with ER, ET and IEC on possible remedial measures; 2. Submit a proposal for remedial measures to ER, IEC and ET within 2 working days of notification of exceedance for agreement; 3. Implement the agreed proposal; 4. Amend proposal if appropriate.

Event	Action			
	ET	IEC	ER	Contractor
	6. Notify EPD if the exceedance is confirmed to be related to the Project.			
Limit level exceedance for one 24-hr rolling average RSP concentration record or/and one 24-hr rolling average FSP concentration record	1. Notify IEC, ER, Contractor and EPD; 2. Check the monitoring data and the performance of the monitoring equipment (refer to Annex A); 3. If exceedance is confirmed, identify source(s), investigate the causes of exceedance and propose remedial measures; 4. Discuss with IEC, ER and Contractor on possible remedial measures required; 5. Assess effectiveness of Contractor's remedial measures and keep IEC and ER informed of the results until exceedance stops. 6. Notify EPD if the exceedance is confirmed to be related to the Project.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; and verify the performance of the monitoring equipment to be checked by ET (refer to Annex A); 3. Discuss with ER, ET and Contractor on the possible remedial measures; 4. Advise ER and ET on the effectiveness of the proposed remedial measures; 5. Review Contractor's remedial measures whenever necessary to assure their effectiveness and advise ER and ET accordingly; 6. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consultation with the IEC and ET, agree with the Contractor on the proposal for remedial measures to be implemented; 4. Ensure the proposal for remedial measures are properly implemented; 5. If exceedance continues, identify what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Identify the sources and discuss with ER, ET and IEC on possible remedial measures; 2. Take immediate action to avoid further exceedance; 3. Submit a proposal for remedial measures to ER, IEC and ET within 2 working days of notification of exceedance for agreement; 4. Implement the agreed proposal; 5. Review and resubmit proposals if the problem is still not under control; 6. Stop the relevant portion of works as determined by ER until the exceedance is abated.

2.5 Operation Phase

Commissioning Test at the Exhausts of CHP and Boiler of Proposed EPP

2.5.1.1 Measurement of air quality parameters of concern due to stack emissions from the combined heat and power (CHP) units and boiler should be conducted at each stack during commissioning stage, i.e. prior to operation of the proposed EPP, to demonstrate the process/facility is properly operated and the emissions can be minimized to meet the design emission limits as presented in **Table 2.5** and **Table 2.6**. The proposed analytical parameters and methodology for measured parameters are listed in **Table 2.7**. The proposed methods below are for reference only. The monitoring can be conducted via on-site sampling and laboratory analysis, on-site monitoring by portable meters, or continuous monitoring, subject to availability of suitable equipment. The commissioning test scopes, including but not limited to measurement duration, frequency, equipment and methods to be adopted, shall be agreed with EPD at least one month before measurement.

Table 2.5 Emission Limit for CHP Units

Parameters	Maximum Emission Level (mg/Nm ³)
RSP	15
NO _x	250
SO ₂	50

Note:

1 The emission level refers to oxygen content in the exhaust gas of 5% and dry basis.

Table 2.6 Emission Limit for Boiler

Parameters	Maximum Emission Level (mg/Nm ³)
RSP	15
NO _x	250
SO ₂	50

Note:

1 All emission levels refer to oxygen content in the exhaust gas of 5% and dry basis.

Table 2.7 Analytical Parameters and Methodology

Parameters	Method
Particulates (as RSP)	USEPA Method 201A
NO _x	USEPA Reference methods USEPA Method 7 and associated methods
SO ₂	USEPA Method 8

Hydrogen Sulphide Monitoring at Proposed EPP

2.5.1.2 The odour monitoring (in term of H₂S concentration) at the inlets and outlets of each deodorising (DO) unit shall be conducted by H₂S sensor upon commissioning and quarterly in the first three years upon operation of the proposed EPP to determine whether the odour removal efficiency meet the requirements as stated in the EIA Report. Since H₂S is the major emission source from effluent polishing plant, the H₂S concentration should be measured at inlet and outlet of each of the DO unit. The outlet odour concentration (in OU) should be reduced by at least 97% based on the assessment. As a conservative approach, it is recommended that a removal efficiency of 99.5%, in terms of H₂S concentration, shall be adopted to minimize the odour emission. The first odour monitoring shall be conducted within one month, after the operation of the proposed EPP. Subsequent odour monitoring shall be conducted quarterly, i.e. at the 4th, 7th and 10th month for the first year. For the second and third years, the frequency of the impact monitoring could be reduced to once every 6 months subject to EPD's approval, if no non-compliance is found.

- 2.5.1.3 If there is any non-compliance, the operator should inspect the deodorization unit, consider change of filter materials and replacing the DO unit. The H₂S concentration at DO inlet and outlet should be measured to ensure at least 99.5% H₂S removal efficiency. The frequency of odour monitoring shall be resumed to quarterly.
- 2.5.1.4 Upon the third year monitoring, the odour monitoring should be reviewed and agreed with EPD if the monitoring is required to be continued.

Monitoring at Proposed FWPF

- 2.5.1.5 For the proposed FWPF, continuous monitoring of H₂S and NH₃ concentrations and air flow at the exhaust outlets of the deodorisation systems is required after the commissioning to ensure the actual odour emission rate not exceeding the emission limit adopted in the calculation shown in Appendix 3.10 of the EIA Report. **Table 2.8** presents the required emission rate limit.

Table 2.8 Emission Rate Limit for proposed Food Waste Pre-treatment Facilities

Parameters	Odour Emission Rate (OU/s) ¹
NH ₃	151.5453
H ₂ S	636.815

Note:

- ¹ The emission rate limits are derived from emission concentration and air flow rate of the proposed FWPF as stated in Appendix 3.10 of the EIA Report.

Odour Complaint Registration for Proposed EPP and FWPF

- 2.5.1.6 In the event when an odour complaint is received at the proposed EPP and FWPF, the operator shall liaise with the complainant and a Complaint Registration Form shall be completed. The Complaint Registration Form is to record detailed information regarding the odour complaint and hence, facilitates efficient investigation work. The registration form shall contain, but not be limited to the following information:
- Location of where the odour nuisance occurred, including whether the odour was experienced indoors or outdoors;
 - Date and time of the complaint and the nuisance event;
 - Description of the complaint, i.e., the type and characteristics of the odour; and an indication of the odour strength (highly offensive / offensive / slightly offensive / just continuously detectable /intermittently detectable); and
 - Name and contact information of the complainant.
- 2.5.1.7 This information shall be obtained by the plant engineer or his representative(s) of the proposed EPP when the complaint is received. The Complaint Registration Form is shown in **Appendix E** for reference.
- 2.5.1.8 In addition, the following information shall be obtained during investigation and presented in the Complaint Registration Form:
- Meteorological conditions (including temperature, wind speed, relative humidity) from the Hong Kong Observatory's Wetland Park automatic weather stations at the time of the complaint;
 - Whether any abnormal operations were being carried out at the proposed EPP and FWPF at the time the nuisance occurred;
 - Possible odour sources causing the nuisance; and
 - Remedial and preventive actions taken to resolve the odour problem.

2.5.1.9 The Odour Complaint Register shall be kept at the proposed EPP and FWPF.

Odour Patrol for Proposed EPP and FWPF

2.5.1.10 Odour patrol is proposed to monitor the potential odour impact from the proposed EPP and the FWPF after regular and ad hoc maintenance or cleaning of the deodorisation system. The odour patrols will be conducted by an odour patrol team. The odour patrol team will patrol and sniff along an odour patrol route within the proposed EPP and the FWPF site boundary. The implementation of the odour patrols shall be subject to the prevailing weather forecast condition and should not be carried out during rainy days.

2.5.1.11 The odour patrol team shall be comprised of at least two independent trained personnel / competent persons, who should pass a set of screening tests and fulfil the following requirements:

- Have their individual odour threshold of n-butanol in nitrogen gas in the range of 20 to 80 ppb/v required by the European Standard Method (EN 13725);
- Be at least 16 years of age and willing and able to follow instructions;
- Be free from any respiratory illnesses;
- Be engaged for a sufficient period to build up and monitor/detect at several monitoring location;
- Not be allowed to smoke, eat, drink (except water) or use chewing gum or sweets 30 minutes before and during odour patrol;
- Take great care not to cause any interference with their own perception or that of others by lack of personal hygiene or the use of perfumes, deodorants, body lotions or cosmetics; and
- Not communicate with each other about the results of their choices.

2.5.1.12 The independent trained personnel / competent persons should use their noses (olfactory sensors) to sniff odours along the site boundaries of the proposed EPP and FWPF. The main odour emission sources and the areas to be affected by the odour nuisance shall be identified.

2.5.1.13 The perceived odour intensity is divided into 5 levels. **Table 2.9** describes the odour intensity for different levels.

Table 2.9 Odour Intensity Levels

Level	Odour Intensity
0	Not detected. No odour perceived or an odour so weak that it cannot be easily characterised or described
1	Slight identifiable odour, and slight chance to have odour nuisance
2	Moderate identifiable odour, and moderate chance to have odour nuisance
3	Strong identifiable, likely to have odour nuisance
4	Extreme severe odour, and unacceptable odour level

2.5.1.14 The independent trained personnel / competent persons shall record the findings including date and time, weather condition (e.g. sunny, fine, cloudy, and rainy), odour intensity, odour nature and possible odour sources, local wind speed, and wind direction at each location.

Event and Action Plan

2.5.1.15 **Table 2.10** shows the air quality criteria, namely Action and Limit levels to be used for the odour patrol and odour complaint registration. Should the action or limit level be reached, action in accordance with the Action Plan in **Table 2.11** shall be carried out.

Table 2.10 Action and Limit Levels for Air Quality (Odour)

Parameter	Action Level	Limit Level
Odour Patrol	Odour intensity of 2 is measured from odour patrol	Odour intensity of 3 or above is measured from odour patrol
Odour Complaint	When one documented complaint is received	Two or more documented complaints are received within a week

Table 2.11 Event and Action Plan for Air Quality (Odour)

EVENT	ACTION		
	EPP Engineer-in-charge of Odour Patrol and Odour Complaint Register	DSD Sewage Treatment Division 1 (ST1)	DSD Sewerage Projects Division (SP) / Electrical and Mechanical Projects Division (E&MP)
ACTION LEVEL			
Action level from Odour Patrol is reached	<ol style="list-style-type: none"> 1. Identify source / reason of exceedance; 2. Repeat odour patrol to confirm finding 	<ol style="list-style-type: none"> 1. Carry out investigation to identify the source/reason of exceedance; 2. Rectify any unacceptable practice; 3. Implement more mitigation measures if necessary. 	<ol style="list-style-type: none"> 1. Assist ST1 to find the root cause of non-compliance; and 2. Modify or improve design as appropriate.
Receipt of any Odour Complaint	<ol style="list-style-type: none"> 1. Identify source/reason of odour complaint 	<ol style="list-style-type: none"> 1. Carry out investigation to identify the source/reason of complaints; 2. Rectify any unacceptable practice; 3. Amend working methods if required; 4. Inform DSD SP/E&MP if cause of complaint is considered to be caused by civil or E&M design problems; 5. Correspond to the complainant within 10 days to inform the cause of the nuisance and action taken; and 6. Implement amended working methods. 	<ol style="list-style-type: none"> 1. Assist ST1 to find the root cause of the complaint; and 2. Modify or improve design as appropriate.
LIMIT LEVEL			
Limit level from Odour Patrol is reached	<ol style="list-style-type: none"> 1. Identify source / reason of non-compliance; 2. Repeat odour patrol to confirm findings; 3. Assess effectiveness of remedial action and keep EPD informed of the results 	<ol style="list-style-type: none"> 1. Carry out investigation to identify the source/reason of non-compliance; 2. Rectify any unacceptable practice; 3. Amended working methods if required; 4. Notify DSD SP / E&MP; 5. Formulate remedial actions; 6. Ensure amended working methods and remedial actions properly implemented; 7. If non-compliance continues, consider what portion of the work is responsible and stop that portion of the work until the non-compliance is abated; and 8. Correspond to the complainant within 10 days to inform the cause of the nuisance and action taken. 	<ol style="list-style-type: none"> 1. Assist ST1 to find the root cause of non-compliance; 2. Modify or improve design as appropriate; and 3. Formulate remedial actions in association with ST1.

EVENT	ACTION		
	EPP Engineer-in-charge of Odour Patrol and Odour Complaint Register	DSD Sewage Treatment Division 1 (ST1)	DSD Sewerage Projects Division (SP) / Electrical and Mechanical Projects Division (E&MP)
Two or more documented complaints are received within a week	<ol style="list-style-type: none"> 1. Identify source / reason of odour complaints; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency to monthly; 4. If non-compliance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Carry out investigation to identify the source/reason of complaints. Investigation shall be completed within 1 week; 2. Rectify any unacceptable practice; 3. Amended working methods if required; 4. Notify DSD SP / E&MP; 5. Formulate remedial actions; 6. Ensure amended working methods and remedial actions properly implemented; 7. If non-compliance continues, consider what portion of the work is responsible and stop that portion of the work until the non-compliance is abated; and 8. Correspond to the complainant within 10 days to inform the cause of the nuisance and action taken.; 	<ol style="list-style-type: none"> 1. Assist ST1 to find the root cause of non-compliance; 2. Modify or improve design as appropriate; and 3. Formulate remedial actions in association with ST1.

- 2.5.1.16 There will be a separate EIA Study for the proposed RTS, the environmental monitoring and audit requirement should be subject to the outcome of its EIA study. However, continuous H₂S and NH₃ monitoring and air flow at the exhaust outlet of the deodorisation system after commissioning, odour complaint registration system and odour patrol are proposed to be conducted during operation of the RTS.

2.6 Mitigation Measures

- 2.6.1.1 Mitigation measures for construction phase air quality impacts and appropriate design for minimizing potential operational odour impact have been recommended in the EIA Report. All the recommended mitigation measures and designs are detailed in the implementation schedule in **Appendix C**. The Contractor should be responsible for the design and implementation of these measures.

2.7 Audit Requirements

- 2.7.1.1 Regular site inspection and audit at least once per week should be conducted during the entire construction phase of the Project to ensure the recommended mitigation measures are properly implemented.

3. NOISE

3.1 Introduction

- 3.1.1.1 Construction noise impact during the construction phase of the project, road traffic noise, fixed noise as well as air-borne railway noise are assessed in the EIA Study.
- 3.1.1.2 Construction noise mitigation measures would be required to reduce noise levels to the stipulated standard. A noise monitoring and audit programme should be undertaken to confirm such mitigation measures would be implemented properly.
- 3.1.1.3 There would be no adverse traffic noise impact anticipated from Project contribution with the proposed mitigation measures in place. Road traffic noise levels will be monitored at representative NSRs, which are in the vicinity of the recommended direct mitigation measures, during the first year after road opening.
- 3.1.1.4 For fixed noise, the contractor should ensure the fixed noise sources would fulfil the maximum allowed sound power levels stipulated in the EIA Study by carrying out commissioning test as per contract requirement prior to operation of the proposed fixed plant noise sources, to ensure compliance of the operation airborne noise levels with the appropriate Technical Memorandum (TM)'s stipulated noise standard. On this basis, no noise monitoring during operation phase is required.
- 3.1.1.5 No adverse airborne railway noise impact would be expected without any mitigation measures based on the EIA Study. No noise monitoring would be required during the operation phase.
- 3.1.1.6 In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of noise impacts during the construction and operation phases of the Proposed Project are presented.

3.2 Monitoring Equipment

- 3.2.1.1 As referred to in the TM issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements shall be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0 dB.
- 3.2.1.2 Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.
- 3.2.1.3 The Environmental Team (ET) is responsible for the provision of the monitoring equipment. The ET shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled. The equipment installation location shall be proposed by the ET Leader and agreed with the Engineer's Representative (ER) and Environmental Protection Department (EPD) in consultation with the IEC.

3.3 Monitoring Parameters for Construction Noise

- 3.3.1.1 The construction noise levels should be measured in terms of the 30-minute A-weighted equivalent continuous sound pressure level ($L_{eq(30-min)}$). $L_{eq(30-min)}$ should be used as the

monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays.

- 3.3.1.2 Supplementary information for data auditing and statistical results such as L10 and L90 should also be obtained for reference. Sample noise field data sheets are shown in **Appendix D** of this Manual for reference. The Environmental Team (ET) Leader may modify the data record sheet for this EM&A programme but the format of which should be agreed by the Independent Environmental Checker (IEC).

3.4 Monitoring Locations for Construction Noise

- 3.4.1.1 Noise monitoring locations for the construction phase is shown in **Figure 3.1**. The proposed noise monitoring locations are summarised in **Table 3.1**.

Table 3.1 Proposed Construction Noise Monitoring Stations during Construction

Station	NSR ID (Referenced to EIA Report)	Location
CM1	E-MP-R1	69 Mai Po San Tsuen
CM2	E-MP-R4	1C Mai Po San Tsuen
CM3	E-SH-R1	Scenic Heights Block B2
CM4	E-RH-R1	30 Rolling Hills Phase II
CM5	E-SWW-R1	35C Shek Wu Wai
CM6	E-TLT-R2	81 Tsing Lung Tsuen
CM7	E-SLT-R1	2J San Lung Tsuen
CM8	E-YSW-R1	80A Yan Shau Wai
CM9	E-WPT-R2	285B Wing Ping Tsuen
CM10	E-CT-R1	291 Chau Tau Tsuen
CM11	E-CT-R3	218 Chau Tau Tsuen
CM12	E-CT-R5	74 Pun Uk Tsuen
CM13	E-TS-R1	Village house to the south of lamp post EA2021
CM14	E-SHT-R4	616 Siu Hom Tsuen
CM15	E-AB12-E1	310 Wing Ping Tsuen
CM16	E-PSA-E1	Village House near Pak Shek Au
CM17	E-SAT-E3	Village House near Shek Wu Wai
CM18	E-SAT-E4	89 Shek Wu Wai
CM19	E-LMC-R1	Temporary Structure near Lok Ma Chau
CM20	E-LMC-R2	301 Lok Ma Chau
CM21	P-RSc24-R42	Proposed Residential Development at RSc.2.4
CM22	P-RSc25-R19	Proposed Residential Development at RSc.2.5
CM23	P-RSc27-R13	Proposed Residential Development at RSc.2.7
CM24	P-RSc122-R10	Proposed Residential Development at RSc.1.2.2
CM25	P-RSc1232-R17	Proposed Residential Development at RSc.1.2.2
CM26	P-RSc132-R11	Proposed Residential Development at R1.2.3

- 3.4.1.2 Noise sensitive receivers may change after issuing this Manual. If such cases exist, the ET shall propose updated monitoring locations and seek approval from the ER and IEC and agreement from EPD of the proposal.
- 3.4.1.3 When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:
- (i) at locations close to the major site activities which are likely to have noise impacts;
 - (ii) close to the noise sensitive receivers; and
 - (iii) for monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- 3.4.1.4 The construction noise monitoring station shall normally be at a point 1m from the exterior of the sensitive receivers building façade and be a position 1.2m above the ground. If there is a problem with access to the normal monitoring position, an alternative position shall be chosen, and a correction to the measurements shall be made. For reference, a correction of +3dB(A) shall be made to the free field measurements. The ET shall agree with the ER and IEC on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

3.5 Baseline Monitoring for Construction Noise

- 3.5.1.1 Baseline noise monitoring shall be carried out daily in all of the identified monitoring stations for at least 2 weeks prior to the commissioning of the construction works. A schedule of the baseline monitoring shall be submitted to the ER for approval before the monitoring starts.
- 3.5.1.2 During the baseline monitoring, there shall not be any construction activities in the vicinity of the monitoring stations.
- 3.5.1.3 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET leader shall liaise with EPD and in consultation with ER and the IEC to agree on an appropriate set of data to be used as a baseline reference.

3.6 Impact Monitoring for Construction Noise

- 3.6.1.1 Construction noise monitoring should be carried out at the designated monitoring station when there are Project-related construction activities being undertaken within a radius of 300m from the monitoring stations. The monitoring frequency should depend on the scale of the construction activities. An initial guide on the monitoring is to obtain one set of L_{eq} (30-minute) measurement at each station between 0700 and 1900 hours on normal weekdays at a frequency of once a week when construction activities are underway.
- 3.6.1.2 If construction works are extended to include works during the hours of 1900 - 0700, additional weekly impact monitoring shall be carried out during evening and night-time works. Applicable permits under NCO shall be obtained by the Contractor.
- 3.6.1.3 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 3.3** shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

3.7 Event and Action Plan for Construction Noise

3.7.1.1 The Action and Limit levels for construction noise are defined in **Table 3.2**. Should non-compliance of the criteria occur, action in accordance with the Action Plan in **Table 3.3** shall be carried out.

Table 3.2 Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When one documented complaint is received	75 dB(A)*

Notes:

- 1 If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.
- 2 *70 dB(A) and 65 dB(A) for schools during normal teaching periods and school examination periods, respectively.

Table 3.3 Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; and 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; and 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; and 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; and 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; and 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; and 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; and 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; and 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

3.8 Noise Parameters for Operational Road Traffic Noise

- 3.8.1.1 The ET should carry out monitoring of road traffic noise after the works under Contract are completed and upon commencement of operation of the Project. The noise monitoring should be carried out during the first year of the operation phase. The road traffic noise during operation of the Project should be measured in terms of the A-weighted equivalent of L10 (1-hr). During the traffic noise measurement, traffic count including traffic volume, percentage of heavy vehicles as defined in Calculation of Road Traffic Noise (CRTN) and traffic speed should also be undertaken concurrently. Supplementary information for data auditing and statistical results such as Leq and L90 should also be obtained for reference.
- 3.8.1.2 Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

3.9 Monitoring Locations for Operational Road Traffic Noise

- 3.9.1.1 The most affected NSRs identified in the EIA Report are selected as the noise monitoring locations in this EM&A Manual. The traffic noise monitoring locations during operation phase are listed in **Table 3.4** and shown in **Figure 3.2**. The locations for operation noise monitoring shall be defined during detailed design on the basis of the status of the most up-to-date information on proposed developments surrounding the Project.

Table 3.4 Proposed Road Traffic Noise Monitoring Stations during Operation

Station	NSR ID (Referenced to EIA Report)	Location
OM1	P-VR-R2	Village Re-Site at VR3.1
OM2	P-VR-R5	Village Re-Site at VR3.1
OM3	E-YSW-R1	80A Yan Shau Wai
OM4	E-SHT-R9	511 Siu Hom Tsuen
OM5	E-SWW-R1	35C Shek Wu Wai
OM6	E-SWW-R5	89 Shek Wu Wai
OM7	E-SWW-R8	Temporary Structure in DD105 404
OM8	E-SWW-R10	Temporary Structure in DD102 833
OM9	E-TLT-R2	81 Tsing Lung Tsuen
OM10	E-TCW-R1	63A Tung Chan Wai
OM11	E-WPT-R1	161 Wing Ping Tsuen
OM12	E-WPT-R4	285B Wing Ping Tsuen
OM13	E-CT-R2	271 Chau Tau Tsuen
OM14	E-CT-R3	218 Chau Tau Tsuen
OM15	E-SHT-R2	610 Siu Hom Tsuen
OM16	E-SHT-R4	616 Siu Hom Tsuen
OM17	E-LMC-R1	Temporary Structure near Lok Ma Chau

3.10 Mitigation Measures

3.10.1 Construction Phase

- 3.10.1.1 To alleviate the construction noise impact on the affected NSRs, adoption of quiet Powered Mechanical Equipment (PME)s, use of movable noise barriers/enclosures are for particular items of plant are recommended during construction phase. It is anticipated that suitably designed barriers could achieve at least 5 - 10 dB(A) noise reduction. The barrier material shall have a surface mass of not less than 14 kg/m² on skid footing with 25mm thick internal

sound absorptive lining to achieve the maximum screening effect. Besides, full enclosures can be considered as an alternative to shelter relatively static items of plant. The provision of full enclosure is expected able to provide ~15 dB(A) noise reduction. In additional, quieter construction methods such as silent piling by press-in method can be adopted as an alternative of traditional sheet piling to further reduce the construction noise impact.

- 3.10.1.2 The Contractor shall also liaise with the school representative(s) to obtain the examination schedule so as to avoid noisy construction activities during school examination period. Scheduling of construction works outside school examination period to less intrusive periods or restricting critical works area would reduce the overall construction noise impacts at the NSRs and ensuring compliance with the construction noise criterion.
- 3.10.1.3 If the above measures are not sufficient to restore the construction noise quality to acceptable levels upon the advice of ET Leader, the Contractor shall liaise with the ET Leader to identify further mitigation measures. They shall be proposed to ER for approval, and the contractor shall then implement these additional mitigation measures.
- 3.10.1.4 In addition to the above construction noise mitigation measures, good site practices listed below and the noise control requirements stated in EPD’s “Recommended Pollution Control Clauses for Construction Contracts” should be included in the Contract Specification for the Contractors to follow and implemented to further minimize the potential noise impacts during the construction phase of the Project:
- Quiet PME, such as those listed in EPD’s Quality Powered Mechanical Equipment, should be considered for construction works to further minimize the potential construction noise impact.
 - Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction period.
 - Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction program.
 - Mobile plant, if any, should be sited as far away from NSRs as possible.
 - Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.
 - Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.
 - Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.
- 3.10.1.5 The implementation schedule for the recommended mitigation measures is presented in **Appendix C**.

3.10.2 Operation Phase

- 3.10.2.1 Direct traffic noise mitigation measures such as low noise road surfacing (LNRS), noise barriers as well as acoustic windows are proposed to alleviate adverse traffic noise impact during the operation phase, as presented in **Table 3.5**. Alternative land use, alternative siting, screening by noise tolerant buildings shall be considered and evaluated in appropriate manner.

Table 3.5 Extent and Locations of Considered LNRS and Noise Barriers

ID	Type	Vertical Height, m	Approx. Length, m	Location
LNRS1	LNRS	N/A	220	Road D1
LNRS2	LNRS	N/A	470	Road D1
LNRS3	LNRS	N/A	155	Road D1
LNRS4	LNRS	N/A	250	Road D1
LNRS5	LNRS	N/A	200	Road D1

ID	Type	Vertical Height, m	Approx. Length, m	Location
LNRS6	LNRS	N/A	240	Road D1
LNRS7	LNRS	N/A	590	Road D1
LNRS8	LNRS	N/A	200	Road D2
LNRS9	LNRS	N/A	275	Road D4
LNRS10	LNRS	N/A	135	Road D5
LNRS11	LNRS	N/A	100	Road P1
LNRS12	LNRS	N/A	450	Road P1
LNRS13	LNRS	N/A	240	Road L1
LNRS14	LNRS	N/A	860	Road L3
LNRS15	LNRS	N/A	450	Road L4
LNRS16	LNRS	N/A	255	Road L5
LNRS17	LNRS	N/A	250	Road L6
LNRS18	LNRS	N/A	245	Road L7
LNRS19	LNRS	N/A	255	Road L8
LNRS20	LNRS	N/A	100	Road L9
LNRS21	LNRS	N/A	110	Road L10
LNRS22	LNRS	N/A	240	Road L10
LNRS23	LNRS	N/A	55	Road L13
LNRS24	LNRS	N/A	100	Road L13
LNRS25	LNRS	N/A	280	Road L14
LNRS26	LNRS	N/A	80	Road L14
LNRS27	LNRS	N/A	350	Road L19
LNRS28	LNRS	N/A	65	Road L20
AW1	Acoustic Windows/ Acoustic Balconies	N/A	N/A	RSc.2.1
AW2	Acoustic Windows/ Acoustic Balconies	N/A	N/A	RSc.2.2
AW3	Acoustic Windows/ Acoustic Balconies	N/A	N/A	R.1.2.1
AW4	Acoustic Windows/ Acoustic Balconies	N/A	N/A	R.1.2.2
AW5	Acoustic Windows/ Acoustic Balconies	N/A	N/A	R.1.2.3.2
AW6	Acoustic Windows/ Acoustic Balconies	N/A	N/A	R.1.3.2
AW7	Acoustic Windows/ Acoustic Balconies	N/A	N/A	OU(MU)1.2.1
AW8	Acoustic Windows/ Acoustic Balconies	N/A	N/A	OU(MU)2.1.1
AW9	Acoustic Windows/ Acoustic Balconies	N/A	N/A	G.3.1
AW10	Acoustic Windows/ Acoustic Balconies	N/A	N/A	RSc.3.2
NB1	Vertical Noise Barrier	7	200	Road L8, Road L9
NB2	Vertical Noise Barrier	4	50	Road L6
NB3	Vertical Noise Barrier	5	50	Road L6
NB4	Vertical Noise Barrier	4	25	Road L6
NB5	Vertical Noise Barrier	3	75	Road L6
NB6	Vertical Noise Barrier	4	125	Road L7
NB7	Vertical Noise Barrier	3	50	Road L7
NB8	Vertical Noise Barrier	4	60	Road L13
NB9	Vertical Noise Barrier	5	35	Near Existing San Tin Tuen Road
NB10	Vertical Noise Barrier	2	35	Road L14
NB11	Vertical Noise Barrier	4	60	Road L14
NB12	Vertical Noise Barrier	5	150	Road L14

ID	Type	Vertical Height, m	Approx. Length, m	Location
NB13	5m (H) with 3m Cantilever at 30 Degree	5	100	San Tin Highway
NB14	7m (H) with 3m Cantilever at 30 Degree	7	175	San Tin Highway
NB15	7m (H) with 3m Cantilever at 30 Degree	7	135	San Tin Highway
NB16	7m (H) with 3m Cantilever at 30 Degree	7	315	San Tin Highway
NB17	7m (H) with 3m Cantilever at 30 Degree	7	285	San Tin Highway

- 3.10.2.2 For existing NSRs, with the implementation the proposed LNRS and noise barriers, the “Project roads” noise levels at all representative NSRs would comply with the relevant noise criteria and the “Project roads” contributions to the overall noise levels at all representative NSRs would be insignificant, i.e. less than 1.0 dB(A), no further direct mitigation measures would be required. Based on the result of eligibility test, none of the existing NSRs are eligible for consideration for indirect technical remedies under the EIAO-TM, and no further indirect noise mitigation measures would be required.
- 3.10.2.3 For the planned NSRs, the predicted traffic noise levels will comply with relevant traffic noise criteria with the implementation of acoustic windows, LNRS as well as the noise barriers.
- 3.10.2.4 The implementation schedule for the recommended mitigation measures is presented in **Appendix C**.

3.11 Audit Requirements

- 3.11.1.1 Regular site environmental audit during the construction phase of the Project should be conducted at least once per week to ensure proper implementation of mitigation measures and good site practices as listed in Appendix B and the noise control requirements stated in EPD’s “Recommended Pollution Control Clauses for Construction Contracts” to further minimize the potential noise nuisance during construction phase.

4. WATER QUALITY

4.1 Introduction

4.1.1.1 During the construction phase, the key water quality impact would be associated with the land-based construction. The potential water quality impact from the land-based construction activities would be controlled by the mitigation measures recommended in the EIA Report. Regular site inspections and water quality monitoring should be undertaken during the construction phase to inspect the construction activities and work areas to ensure that the recommended mitigations measures are properly implemented.

4.1.1.2 During operation phase, there is possibility of failure of power supply, or mechanical faults / equipment failures under operation of the proposed STL MC EPP. Therefore, water quality monitoring is recommended in case of any emergency discharge events during the operation phase of the proposed STL MC EPP and three new SPSs.

4.1.1.3 Under normal operation of the STL MC EPP, treated effluent would be discharged through Ngau Tam Mei Channel and Kam Tin River and finally enters the marine water of Deep Bay. Water quality monitoring during the first year of the STL MC EPP and three new SPSs operation is recommended. Monitoring of the treated effluent quality from the STL MC EPP will be governed by the Water Pollution Control Ordinance (WPCO) license to ensure that the effluent quality would comply with the design standards, which is under the ambit of regional office (RO) of EPD.

4.1.1.4 Water quality monitoring for the Project can be divided into the following stages:

- Water quality monitoring during the STL MC DN construction;
- Water quality monitoring during the first year operation of the STL MC EPP;
- Follow-up water quality monitoring after any emergency discharge event at any stage.

4.2 Water Quality Parameters

4.2.1.1 The parameters that have been selected for measurement in-situ and in the laboratory are those that were either determined in the EIA to be those with the most potential to be affected by the construction works or are a standard check on water quality conditions. Parameters to be measured in the construction phase, operation phase and emergency discharge are summarized in **Table 4.1**.

Table 4.1 Parameters measured in the Marine Water Quality Monitoring

Parameters	Unit	Abbre.	Remarks			
			Baseline	Construction	STL MC EPP Water Quality Monitoring	Emergency Discharge (at any stage)
<i>In-situ measurements</i>						
Dissolved Oxygen	mg/L	DO	✓	✓	✓	✓
Salinity	-	-	✓	✓	✓	✓
Temperature	°C	-	✓	✓	✓	✓
pH	-	-	✓	✓	✓	✓
Turbidity	NTU	-	✓	✓	✓	✓
<i>Laboratory measurements</i>						
Suspended Solids	mg/L	SS	✓	✓	✓	✓
Biochemical Oxygen Demand	mg/L	BOD ₅	✓		✓	✓
Ammonia Nitrogen	mg/L	NH ₃ -N	✓		✓	✓
Nitrite Nitrogen	mg/L	NO ₂ -N	✓		✓	✓

Parameters	Unit	Abbrev.	Remarks			
			Baseline	Construction	STLMC EPP	Emergency Discharge (at any stage)
					Water Quality Monitoring	
Nitrate Nitrogen	mg/L	NO ₃ -N	✓		✓	✓
Total Inorganic Nitrogen	mg/L	TIN	✓		✓	✓
Total Kjeldahl Nitrogen	mg/L	TKN	✓		✓	✓
Total Nitrogen	mg/L	TN	✓		✓	✓
Total Phosphorus	mg/L	TP	✓		✓	✓
<i>E.coli</i>	cfu/100mL	-	✓		✓	✓

4.2.1.2 Measurements shall be taken at three water depths, including 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted. If the water depth is less than 3 m, only the mid-depth station will be monitored.

4.2.1.3 In addition to the water quality parameters as shown in **Table 4.1**, other relevant data shall also be recorded, including monitoring location / position, time, water depth, pH value, salinity, temperature, tidal stages, current velocity and direction, sea conditions, weather conditions and any special phenomena or work activities undertaken around the monitoring and works area that may influence the monitoring results. A sample data record sheet is shown in **Appendix D** for reference.

4.3 Sampling Procedures and Monitoring Equipment

Dissolved Oxygen and Temperature Measuring Equipment

4.3.1.1 The instrument shall be a portable and weatherproof DO measuring instrument complete with cable and sensor, and use a DC power source. The equipment shall be capable of measuring:

- a DO level in the range of 0 - 20 mg L⁻¹ and 0 - 200% saturation; and
- a temperature of 0 - 45 degree Celsius.

4.3.1.2 It shall have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary. For example, YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument.

4.3.1.3 Shall salinity compensation not be built-in to the DO equipment, *in-situ* salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

Turbidity Measurement Instrument

4.3.1.4 Turbidity shall be measured *in-situ* by the nephelometric method. The instrument shall be portable and weatherproof turbidity measuring instrument using a DC power source complete with cable, sensor and comprehensive operation manuals. It shall have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU (for example, Hach model 2100P or an approved similar instrument). The cable shall not be less than 25m in length. The meter shall be calibrated to establish the relationship between NTU units and the levels of suspended solids.

Sampler

4.3.1.5 A water sampler is required. It shall comprise a transparent Polyvinyl Chloride (PVC) cylinder, with a capacity of not less than 2 liters, which can be effectively sealed with latex

cups at both ends. The sampler shall have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (for example, Kahlsico Water Sampler or an approved similar instrument).

Water Depth Detector

- 4.3.1.6 A portable, battery-operated echo sounder shall be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

Salinity

- 4.3.1.7 A portable salinometer capable of measuring salinity in the range of 0 - 40 parts per thousand (ppt) shall be provided for measuring salinity of the water at each monitoring location.

pH

- 4.3.1.8 The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1 pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 shall be used for calibration of the instrument before and after use. Details of the method shall comply with American Public Health Association (APHA), 19th ed. 4500-HTB.

Sample Containers and Storage

- 4.3.1.9 Water samples shall be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory and analysed as soon as possible after collection. Sufficient volume of samples shall be collected to achieve the required detection limit.

Monitoring Position Equipment

- 4.3.1.10 A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication or other equipment instrument of similar accuracy, shall be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

Current Velocity and Direction

- 4.3.1.11 No specific equipment is recommended for measuring the current velocity and direction. The environmental contractor shall seek approval of their proposed equipment with the client prior to deployment.

Calibration of In-Situ Instruments

- 4.3.1.12 All *in-situ* monitoring instruments shall be checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring programme. Responses of sensors and electrodes shall be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.

- 4.3.1.13 Sufficient stocks of spare parts shall be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration, etc.

4.4 Laboratory Measurement / Analysis

4.4.1.1 Analysis of SS, BOD, TIN⁽¹⁾, NH₃-N, NO₂-N, NO₃-N, UIA⁽²⁾, TKN, TP and *E. coli* levels shall be carried out in a HOKLAS or other international accredited laboratory. Sufficient water samples shall be collected at the monitoring stations for carrying out the necessary laboratory analysis. The analysis shall commence within 24 hours after collection of the water samples. The analyses shall follow the standard methods described in APHA Standard Methods for the Examination of Water and Wastewater, 19th edition or other approved methods. Detailed testing methods, pre-treatment procedures, instrument use, Quality Assurance/Quality Control (QA/QC) details (such as blank, spike recovery, number of duplicate samples per batch, etc.), detection limits and accuracy shall be submitted to EPD for approval prior to the commencement of monitoring programme. EPD may also request the laboratory to carry out analysis of known standards provided by EPD for quality assurance. Additional duplicate samples may be required by EPD for inter laboratory calibration. Remaining samples after analysis shall be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to EPD. In any circumstance, the sample testing shall have comprehensive quality assurance and quality control programmes. The laboratory shall prepare to demonstrate the programmes to EPD or his representatives when requested.

4.5 Water Quality Monitoring Stations

4.5.1 Construction Phase

4.5.1.1 Water quality monitoring is proposed in the watercourses in the Project area including San Tin Eastern Main Drainage Channel (STEMDC) and its tributaries, San Tin Western Main Drainage Channel (STWMDC) and its tributaries, Shenzhen River, Lok Ma Chau Meander, small watercourses at Sam Po Shue, Lin Barn Tsuen, and along Sam Tam Road.

4.5.1.2 It is recommended to establish control and impact monitoring stations to monitor water quality impact during construction phase. The impact monitoring stations have been selected at locations in vicinity to the construction site that may potentially be affected during the construction phase. Water quality at these locations shall be monitored during the construction. The control stations have been selected such that they are located within the same water body as the impact monitoring stations but are located outside the area of influence of the works. Data collected from the control stations enables a comparison of the water quality at the potentially impacted site with the ambient water quality. The proposed water quality monitoring stations are shown in **Table 4.2**. **Figure 4.1** indicates the approximate locations of the water quality monitoring stations.

Table 4.2 Proposed Water Quality Monitoring Stations under Construction Phase

Fresh Water System	Station	Description	Easting	Northing
San Tin Eastern Main Drainage Channel (STEMDC)	U1a	Upstream Station	826 721	838 781
	U1b	Upstream Station	827 247	840 556
	G1a	Gradient Station	826 686	839 212
	G1b	Gradient Station	826 472	839 908
	G1c	Gradient Station	826 339	840 303
	G1d	Gradient Station	826 316	840 657
	D1	Impact Station	825 157	841 843
San Tin Western Main Drainage Channel (STWMDC)	U2a	Upstream Station	826 181	838 334
	U2b	Upstream Station	825 533	838 215
	G2	Gradient Station	825 588	839 518

(1) Total Inorganic Nitrogen (TIN) = Ammonia Nitrogen (NH₃-N) + Nitrate-N (NO₃-N) + Nitrite Nitrogen (NO₂-N)

(2) The level of Unionized Ammonia (UIA) shall be calculated from the Ammonia Nitrogen (NH₃-N) level, salinity, pH and temperature using the method proposed by Bower, C. E. and Bidwell, J. P. (1978)

Fresh Water System	Station	Description	Easting	Northing
	D2a	Impact Station	825 200	839 396
	D2b	Impact Station	824 645	840 192
	D2c	Impact Station	824 846	840 373
	D2d	Impact Station	825 239	839 846
Shenzhen River	U3	Upstream Station	825 654	842 083
	D3	Impact Station	824 959	841 872
Lok Ma Chau Meander	U4	Upstream Station	826 108	841 741
	D4	Impact Station	825 642	841 988
Small Watercourses at Sam Po Shue	D5	Impact Station	825 138	840 810
Small Watercourses at Lin Barn Tsuen	D6a	Impact Station	824 440	839 694
	D6b	Impact Station	824 196	839 949
Small Watercourses along Sam Tam Road	D7	Impact Station	824 254	838 831
Small Watercourses near Mai Po Village	D8	Impact Station	824 188	839 310

- 4.5.1.3 STEMDC and STWMDC (and their tributaries) are the major river systems which spread across the majority of the Project area.
- 4.5.1.4 STEMDC and its tributaries are located at the eastern Project area. Two monitoring stations (namely U1a and U1b respectively) should be set in the tributaries of STEMDC upstream of the works area as control stations, and one impact monitoring station (namely D1) should be set in STEMDC downstream of the works area as shown in **Figure 4.1**. Four gradient stations (namely G1a, G1b, G1c and G1d respectively) should also be set within the Project area to assist in the identification of the potential sources of any impact at Station D1.
- 4.5.1.5 STWMDC and its tributaries are located at the western Project area. Two monitoring stations (namely U2a and U2b) should be set in the tributaries of STWMDC upstream of the works area as control station, and four impact monitoring stations (namely D2a, D2b, D2c and D2d) should be set in STWMDC downstream of the works area as shown in **Figure 4.1**. One gradient station (namely G2) should also be set within the Project area to assist in the identification of the potential sources of any impact at Station D2.
- 4.5.1.6 Shenzhen River is the largest modified watercourse in the northern portion of the Project area. One monitoring station (namely U3) should be set in this river upstream of the Project area as control station, and one impact monitoring station (namely D3) should be set in this river downstream of the Project area as shown in **Figure 4.1**.
- 4.5.1.7 Lok Ma Chau Meander is the largest natural watercourse in the northern portion of the Project area. One monitoring station (namely U4) should be set in the watercourse upstream of the Project area as control station, and one impact monitoring station (namely D4) should be set in the watercourse downstream of the Project area as shown in **Figure 4.1**.
- 4.5.1.8 Three small watercourses are located within the Project area as shown in **Figure 4.1**. Only four impact stations (namely D5, D6a, D6b and D7) should be set in these watercourses downstream of the Project area. Since the upstream section of these watercourses will be removed under this Project and are also within the Project area, no upstream control station can be identified for these watercourses. In addition, one impact station (namely D8) is set near Mai Po Village outside the Project area.

4.5.2 Operation Phase

4.5.2.1 During operation phase, water quality monitoring during the first year of the STLMC EPP operation as well as emergency discharge are proposed to be conducted at 11 monitoring stations within the Inner Deep Bay as well as along Kam Tin River, including:

- Ten Impacts stations within Inner Deep Bay covering Ma Po Marshes SSSI (E1 and E8), Mai Po Inner Deep Bay Ramsar Site / Inner Deep Bay SSSI (E2), oyster culture area (E3), mangroves (Inner Deep Bay) (E4), mangroves along Shan Pui River (E5), mangroves along Kam Tin River (E6 and E7), small watercourses along Sam Tam Road (S1) and Ngau Tam Mei Channel (NTM2), which represent the water sensitive receivers, which are likely affected by the Project during emergency discharge; and
- Four Control Stations within Inner Deep Bay (DB1) as well as at Shan Pui River (SP1), Kam Tin River (KT1) and Ngau Tam Mei Channel (NTM1) (in sections upstream of the discharge point) to assist in the identification of the source of any impact.

4.5.2.2 The locations of the proposed monitoring stations are illustrated in **Figure 4.2** and summarized in **Table 4.3**.

Table 4.3 Proposed Water Quality Monitoring Stations under Operation Phase

Station	Description	Easting	Northing
<i>Impact Stations</i>			
E1	Ma Po Marshes SSSI	821 036	837 913
E2	Mai Po Inner Deep Bay Ramsar Site / Inner Deep Bay SSSI	820 025	838 830
E3	Oyster Culture Area	816 047	837 277
E4	Mangroves (Inner Deep Bay)	820 238	838 028
E5	Mangroves along Shan Pui River	821 005	836 665
E6	Mangroves along Kam Tin River (near Ngau Tam Mei Channel)	822 398	836 267
E7	Mangroves along Kam Tin River (near Shan Pui River)	821 279	836 701
E8	Ma Po Marshes SSSI (south of Lut Chau)	821 233	836 908
S1	Small Watercourses along Sam Tam Road	824 203	838 741
NTM2	Ngau Tam Mei Channel	823 612	837 740
<i>Control Stations</i>			
DB1	Inner Deep Bay	814 631	836 460
SP1	Shan Pui River, upstream of discharge point	821 192	835 933
KT1	Kam Tin River, upstream of discharge point	822 637	835 988
NTM1	Ngau Tam Mei Channel	824 079	837 717

4.5.2.3 The status and locations of water sensitive receivers and the marine activities may change after issuing this Manual. Any change to the monitoring stations shall be justified by the ET Leader, agreed by the ER, verified by the IEC before seeking approval from EPD prior to its implementation.

4.5.2.4 The status and availability of monitoring locations may change after issuing this Manual. If such cases exist, the appointed ET Leader may propose alternative monitoring locations taking into consideration of the latest status, availability and/or accessibility of the various possible monitoring locations. Any change to the monitoring stations shall be justified by the ET Leader, agreed by the ER, verified by the IEC before seeking approval from EPD prior to the implementation of sampling programme.

- 4.5.2.5 When alternative monitoring locations are proposed, they should be chosen based on the following criteria:
- at locations close to and preferably at the boundary of the site activities as indicated in the EIA report, which are likely to have water quality impacts;
 - close to the sensitive receptors which are directly or likely to be affected;
 - for monitoring locations located in the vicinity of the sensitive receptors, care should be taken to cause minimal disturbance during monitoring; and
 - control station shall be selected at a location to allow a comparison of the water quality at the potentially impacted site with the ambient water quality. The control station shall be selected such that it is located within the same body of water as the impact monitoring station but is located outside the area of influence of the works.

4.5.2.6 Enough replicates *in-situ* measurements and sample collected from each independent sampling event are required for all parameters to ensure a robust statistically interpretable dataset.

4.6 Details of Water Quality Monitoring

4.6.1 Baseline Monitoring

4.6.1.1 Baseline conditions of water quality should be established by the ET and agreed with IEC and EPD. The purposes of the baseline monitoring are to establish ambient conditions prior to the commencement of the works, to demonstrate the suitability of the proposed control and impact monitoring stations, and for establishment of the action and limit levels.

4.6.1.2 The baseline conditions should be established by measuring the water quality parameters including pH, salinity, temperature, turbidity, DO (in mg/L and % of saturation) and SS at the proposed monitoring stations as shown in **Figure 4.1** (see **Table 4.2**) and water quality parameters as specified in **Table 4.1** at the proposed monitoring stations as shown in **Figure 4.2** (see **Table 4.3**), 3 days a week, for a period of 4 weeks prior to the commencement of construction works. The interval between two sets of monitoring shall not be less than 36 hours, and the baseline monitoring schedule shall be submitted to DEP and IEC at least one week prior to the commencement of the baseline monitoring. The ET Leader shall seek approval from the ER, IEC and EPD on the alternative proposal prior to its implementation.

4.6.1.3 There shall not be any major construction activities in the vicinity of the stations during the baseline monitoring. The ET shall be responsible for undertaking the baseline monitoring and submitting the results within 10 working days from the completion of the baseline monitoring work.

4.6.1.4 In exceptional cases when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall seek approval from the ER, IEC and EPD on an appropriate set of data to be used as baseline reference.

4.6.1.5 For operation phase, the ET Leader shall seek approval from the ER, IEC and EPD on an appropriate set of data to be used as baseline reference, and if additional baseline monitoring is required, the baseline monitoring methodology for operation phase prior to the commencement of such monitoring.

4.6.2 Construction Monitoring

4.6.2.1 During the course of the construction works, impact monitoring shall be undertaken three days per week, with sampling/measurement at the monitoring stations as shown in **Figure 4.1** and **Table 4.2**. The ET should carry out spot check to ensure that the Contractor has undertaken all recommended control measures to prevent direct contact of pollutants with rainwater or runoff, and measures to abate contaminants in the stormwater runoff. Parameters to be monitored include pH, salinity, temperature, turbidity, DO (in mg/L and %

of saturation) and SS (see **Table 4.1**). The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency shall be increased.

4.6.2.2 Requirements as stated in **Section 4.5.2.4** shall be followed. Any change to the EM&A requirements or programme shall be justified by the ET Leader, agreed by the ER, verified by the IEC before seeking approval from EPD prior to its implementation.

4.6.2.3 Upon completion of all construction activities, a post project monitoring exercise on water quality shall be carried out for four weeks in the same manner as the baseline monitoring. The results of the monitoring shall be presented in the Final EM&A Summary Report.

4.6.2.4 Proposed water quality monitoring schedule shall be submitted to ER, IEC and EPD at least 1 week before the first day of the monitoring month. The ER, IEC and EPD shall also be notified immediately for any changes in schedule.

4.6.3 First Year Operation Phase

4.6.3.1 Upon commencement of the STLMC EPP, an operation phase water quality monitoring exercise should be carried out for a minimum of once per week at mid-flood and mid-ebb tides for one-year.

4.6.3.2 The proposed water quality monitoring schedule should be submitted to ER, IEC and EPD at least 4 weeks before the first day of the monitoring month. The ER, IEC and EPD should also be notified immediately for any changes in schedule. Water quality parameters presented in **Table 4.1** should be monitored at the 11 proposed monitoring stations as shown in **Figure 4.2** and **Table 4.3**.

4.6.3.3 After obtaining one year of monitoring results, the ET shall review against the baseline conditions to identify if there is any change to the overall water quality in Deep Bay and propose remedial action if there is any deterioration in water quality due to the Project.

4.6.4 Emergency Discharge Follow-up Monitoring Exercise

4.6.4.1 The emergency discharge follow-up monitoring requirements will be proposed in the Emergency Response Plan that will be formulated prior to commissioning of STLMC EPP. As a basic approach, in case of emergency discharge during operation phase of this Project, a follow-up water quality monitoring exercise shall be commenced within 24 hours after the start of the emergency discharge at all the 11 designated stations as shown in **Figure 4.2** and **Table 4.3**. The monitoring shall be conducted by DSD or other agent appointed by the DSD. The result of the monitoring each day shall be compared with the baseline data collected under normal Project operation to identify the degree of impact caused by the emergency discharge. The monitoring exercise shall be repeated on the next day until the baseline water quality is restored for 2 consecutive days.

4.6.4.2 DSD or its appointed agent shall inform the mariculturists, relevant stakeholders and relevant government departments (e.g. AFCD, EPD) everyday on the latest results of the water quality monitoring exercise to allow these parties to make informed decisions. By the end of the follow-up water quality monitoring exercise, DSD or its appointed agent shall also inform these parties that the ambient water quality is restored at all WSRs for two consecutive days to signal the recovery of water quality. It is recommended that the DSD / Plant operators shall maintain good communications with various concerned parties. A list of address, email address, phone and fax number of key persons in various departments responsible for action shall be made available to the Plant operators. A summary of the mitigation measures and monitoring requirements for emergency discharge is provided in **Table 4.4**.

Table 4.4 Mitigation Measures and Monitoring Requirement for Follow-up Emergency Discharge Exercise during Operation of the STLMC EPP

Event	Mitigation Measures and Monitoring Requirement
Emergency Discharge during operation of the STLMC EPP	<ol style="list-style-type: none"> 1. Investigate the reason of failure and determine possible remedial measures and identify the need of emergency discharge. 2. Inform EPD and AFCD of the emergency discharge. 3. Ensure remedial measures are implemented. 4. Assess the effectiveness of the implemented remedial measures and identify alternative measures if necessary. 5. Discuss with EPD and AFCD for the required remedial actions if necessary and ensure all necessary remedial actions are properly implemented. 6. Conduct water quality impact monitoring daily until the baseline water quality is restored for 2 consecutive days. 7. The monitoring data collected in Item 6 above shall be compared with the baseline data collected under normal Project operation to identify the degree of impact caused by the emergency discharge.

4.6.5 Water Quality Compliance

4.6.5.1 Construction phase water quality monitoring will be evaluated against Action and Limit Levels. The proposed Action and Limit Levels for water quality is presented in **Table 4.5**. Action and Limit levels are used to determine whether operational modifications are necessary to mitigate impacts to water quality. In the event that the levels are exceeded, appropriate actions in Event and Action Plan (**Table 4.6**) should be undertaken and a review of works will be carried out by the Contractor(s).

4.6.5.2 Any noticeable change to water quality will be recorded in the monitoring reports and will be investigated and remedial actions will be undertaken to reduce impacts. Particular attention will be paid to the Contractor(s)'s implementation of the recommended mitigation measures.

Table 4.5 Action and Limit Levels for Water Quality

Parameters	Action	Limit
Construction Phase Water Quality Monitoring		
DO in mg/L (Surface, Middle & Bottom) ²	<u>Surface & Middle</u> 5%-ile of baseline data for surface and middle layer. <u>Bottom</u> 5%-ile of baseline data for bottom layer.	<u>Surface & Middle</u> 4 mg/L or 1%-ile of baseline data for surface and middle layer <u>Bottom</u> 2 mg/L or 1%-ile of baseline data for bottom layer
SS in mg/L (depth-averaged ¹) ³	95%-ile of baseline data or 120% of upstream control station's SS recorded on the same day	99%-ile of baseline data or 130% of upstream control station's SS recorded on the same day
Turbidity in NTU (depth-averaged ¹) ³	95%-ile of baseline data or 120% of upstream control station's turbidity recorded on the same day	99%-ile of baseline data or 130% of upstream control station's turbidity recorded on the same day

Notes:

- 1 "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- 2 For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- 3 For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits

Table 4.6 Event and Action Plan for Water Quality Monitoring

Event	Action			
	ET	IEC	ER	Contractor
Action level being exceeded by one sampling day	<ul style="list-style-type: none"> ○ Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; ○ Check monitoring data, plant, equipment and Contractor(s)'s working methods; ○ Identify source(s) of impact and record in notification of exceedance; ○ Inform IEC, Contractor(s) and ER 	<ul style="list-style-type: none"> ○ Check monitoring data submitted by ET and Contractor(s)'s working methods; ○ Inform EPD and AFCD. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing; ○ Check plant and equipment and rectify unacceptable practice.
Action level being exceeded by two or more consecutive sampling days	<ul style="list-style-type: none"> ○ Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; ○ Check monitoring data, plant, equipment and Contractor(s)'s working methods; ○ Identify source(s) of impact and record in notification of exceedance; ○ Inform IEC, Contractor(s) and ER; ○ Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented. 	<ul style="list-style-type: none"> ○ Check monitoring data submitted by ET and Contractor(s)'s working methods; ○ Inform EPD and AFCD; ○ Discuss with ET and Contractor(s) on additional mitigation measures and advise ER accordingly; ○ Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing; ○ Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. ○ Ensure additional mitigation measures are properly implemented. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing; ○ Check plant and equipment and rectify unacceptable practice; ○ Consider changes of working methods; ○ Discuss with ET and IEC on additional mitigation measures and propose them to ER within 3 working days; ○ Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	<ul style="list-style-type: none"> ○ Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; ○ Check monitoring data, plant, equipment and Contractor(s)'s working methods; ○ Identify source(s) of impact and record in notification of exceedance; ○ Inform IEC, Contractor(s) and ER; ○ Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented. 	<ul style="list-style-type: none"> ○ Check monitoring data submitted by ET and Contractor(s)'s working methods; ○ Inform EPD and AFCD; ○ Discuss with ET and Contractor(s) on additional mitigation measures and advise ER accordingly; ○ Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing; ○ Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. ○ Ensure additional mitigation measures are properly implemented. ○ Request Contractor(s) to critically review the working methods. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing; ○ Check plant and equipment and rectify unacceptable practice; ○ Critically review the need to change working methods; ○ Discuss with ET and IEC on additional mitigation measures and propose them to ER within 3 working days; ○ Implement the agreed mitigation measures.

Event	Action			
	ET	IEC	ER	Contractor
Limit level being exceeded by two or more consecutive sampling days	<ul style="list-style-type: none"> ○ Repeat <i>in situ</i> measurement on the next day of exceedance to confirm findings; ○ Check monitoring data, plant, equipment and Contractor(s)'s working methods; ○ Identify source(s) of impact and record in notification of exceedance; ○ Inform IEC, Contractor(s) and ER; ○ Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented. 	<ul style="list-style-type: none"> ○ Check monitoring data submitted by ET and Contractor(s)'s working methods; ○ Inform EPD and AFCD; ○ Discuss with ET and Contractor(s) on additional mitigation measures and advise ER accordingly; ○ Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing; ○ Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. ○ Ensure additional mitigation measures are properly implemented. ○ Request Contractor(s) to critically review the working methods. 	<ul style="list-style-type: none"> ○ Confirm receipt of notification of exceedance in writing; ○ Check plant and equipment and rectify unacceptable practice; ○ Critically review the need to change working methods; ○ Discuss with ET and IEC on additional mitigation measures and propose them to ER within 3 working days; ○ Implement the agreed mitigation measures.

4.6.6 Construction Site Audits

4.6.6.1 Regular site environmental audit during the construction phase of the Project should be conducted at least once per week to ensure that the recommended mitigation measures are to be properly undertaken during construction phase of the Project. It can also provide an effective control of any malpractices and therefore achieve continual improvement of environmental performance on site.

4.6.6.2 Site inspections shall be carried out by the ET based on the recommended mitigation measures for water pollution control as detailed in **Appendix C**. In the event that the recommended mitigation measures are not fully or properly implemented, deficiency shall be recorded and reported to the site management. Suitable actions are to be carried out to:

- Investigate the problems and the causes;
- Issue action notes to the Contractor which is responsible for the works;
- Implement remedial and corrective actions immediately;
- Re-inspect the site conditions upon completion of the remedial and corrective actions; and
- Record the event and discuss with the Contractor for preventive actions.

5. SEWERAGE AND SEWAGE TREATMENT IMPLICATIONS

5.1 Introduction

5.1.1.1 An assessment of potential impacts due to the sewage arising from the proposed Project has been assessed in Section 6 of the EIA Report.

5.2 Sewerage and Sewage Treatment Implications during Construction Phase

5.2.1.1 The sewage generated during the construction stage from the on-site workforce will be collected in chemical toilets and disposed of off-site. Therefore, no sewerage impacts are expected from the site during the construction phase. As such, environmental monitoring and audit of the sewerage system is considered not required.

5.3 Mitigation Measures

5.3.1.1 The implementation schedule of the relevant mitigation measures is presented in **Appendix C**.

5.4 Operation Phase

5.4.1.1 The different design / mitigation measures to minimise the emergency discharges have been thoroughly considered and assessed under Section 6.11 and 6.14 of the EIA Report.

6. WASTE MANAGEMENT IMPLICATION

6.1 Introduction

- 6.1.1.1 It will be the contractor's responsibility to ensure that any wastes produced during the construction and demolition works are handled, stored and disposed of in accordance with good waste management practices and relevant EPD's regulations and other legislative requirements.
- 6.1.1.2 Waste arisings generated during construction activities, such as construction and demolition (C&D) materials, chemical waste, excavated sediment, floating refuse and general refuse, are recommended to be audited monthly to ensure that proper storage, transportation and disposal practices are being implemented. The Contractor would be responsible for the implementation of any mitigation measures recommended in the EIA report to minimise waste or resolve the issues associated with the management of wastes. Regular environmental audit should be conducted to ensure proper management and handling of waste, and appropriate implementation of the pollution control measures. A Waste Management Plan (WMP), as a part of the Environmental Management Plan (EMP), should be prepared by the Contractor in accordance with *ETWB TC (W) No. 19/2005* and submitted to the Engineer for approval. A trip ticket system in accordance with *DEVB TCW No. 6/2010* should be in place. The auditing requirement stated in *ETWB TC (W) No. 19/2005* and *DEVB TCW No. 6/2010* should be followed with regard to the management of C&D materials.
- 6.1.1.3 Provided that the waste is handled, transported and disposed of using approved methods, adverse environmental impacts would be expected with the implementation of good waste management practices. EM&A would not be necessary during the operation phase.

6.2 Mitigation Measures

- 6.2.1.1 Mitigation measures for waste management recommended in the EIA Report should form the basis of the site WMP to be developed by the Contractor in the construction stage. **Appendix C** provides the implementation schedule of the recommended mitigation measures during both construction and operation phases.
- 6.2.1.2 Waste generated during the construction activities should be audited regularly by the ET to determine if waste is being managed in accordance with approved procedures and the site WMP. The audit should look at all aspects of on-site waste management practices including waste generation, storage, recycling, transport and disposal. Apart from site inspection, documents including licences, permits, disposal and recycling records should be reviewed and audited for compliance with the legislations and contract requirements. In addition, the routine site inspections should check the implementation of the recommended good site practices, waste reduction measures, and other waste management mitigation measures.
- 6.2.1.3 With the appropriate handling, storage and removal of waste arisings during the construction and operation of the Project as presented in **Appendix C**, the potential to cause adverse environmental impacts would be minimised. During the site inspections, the ET shall pay special attention to the issues relating to waste management and check whether the Contractor has implemented the recommended good site practices, waste reduction measures and other mitigation measures.

6.3 Audit Requirement

- 6.3.1.1 Regular audits and site inspections should be carried out during construction phase by the ER, ET and Contractor to ensure that the recommended good site practices and the recommended mitigation measures in **Appendix C** are properly implemented by the Contractor. The audits should concern all aspects of on-site waste management practices

including waste generation, storage, recycling, transport and disposal. Apart from site inspection, documents including licences, permits, disposal and recycling records should be reviewed and audited for compliance with the legislation and contract requirements.

- 6.3.1.2 The requirements of the environmental audit programme are set out in Section 15 of this Manual. The audit programme will verify the implementation status and evaluate the effectiveness of the mitigation measures.

7. LAND CONTAMINATION

7.1 Introduction

7.1.1.1 The land contamination assessment identified potentially contaminative land uses within the assessment area to assess potential impact to future land use. The majority of potentially contaminated sites could not be physically accessed to inspect and assess site specific conditions at the time of reporting. For those sites that were able to be accessed for detailed reconnaissance; permission was unable to be obtained to implement site investigation (SI) works due to village objections on the STLA application.

7.1.1.2 As the sites identified as potentially contaminated remain in operation and potential exists for a change in land use or land use operations prior to development of these sites; re-appraisal and SI works will be required after the sites are handed over to Project Proponent for development. Further works will include submission of supplementary Contamination Assessment Plan(s) (CAP(s)), Contamination Assessment Report(s) (CAR(s)) and Remediation Action Plan(s) (RAP(s)). These submissions require endorsement by the Environmental Protection Department (EPD). If contaminated soil and/or groundwater is identified, remediation should be carried out according to the approved RAP(s) and upon completion of remediation works, Remediation Report(s) (RR(s)) submitted to EPD for record. No development works shall commence prior to EPD's agreement of the RR(s).

7.1.1.3 High concentrations of naturally occurring arsenic in soil (termed High Arsenic Containing (HAC)) soil is confirmed by ground investigation works. Health Impact Assessment calculates a risk based arsenic threshold of 571 mg/kg. Further arsenic assessment and a detailed treatment approach has been proposed based on the Revised RODP. The Government will treat HAC soil in the shallow region before land allocation or land lease. The treatment depth will depend on the future land use in Revised RODP. Subsequent Developer/Works Departments will treat HAC soil in deep regions for excavations required for basements, piles and utilities. The treatment approach is provided in Section 5 of Appendix 8.2 Health Impact Assessment Report of the EIA Report.

7.1.1.4 After sites are handed to the Project Proponent for development, the detailed treatment approach comprises submission of Arsenic Assessment Plan(s) (AAP(s)), site investigation works for arsenic and submission of Arsenic Assessment Report(s) (AAR(s)) for the EPD's endorsement. If HAC soil are identified, Arsenic Treatment Plan(s) (ATP(s)) will be submitted for EPD endorsement and following successful treatment of HAC soil, Arsenic Treatment Report(s) (ATR(s)) will be submitted to EPD for record.

7.2 Construction Phase

7.2.1.1 Remediation / implementation of mitigation measures of HAC soil, if necessary, would be carried out prior to commencement of construction works, with the necessary measures stated in the EPD endorsed RAP(s)/ATP(s). EM&A requirements include regular site inspection to ensure the recommended measures in RAP(s)/ATP(s) are properly implemented with audit findings reported in EM&A reports.

7.2.1.2 The Contractor shall follow all requirements under the Factories and Industrial Undertaking Ordinance (F&IUO) and its subsidiary regulations. Control measures shall be proposed in a safety plan which shall be fully implemented by the Contractor.

7.3 Operation Phase

7.3.1.1 As any contaminated soil / groundwater would be identified and properly treated prior to the re-development, land contamination during the operation phase is not expected. As such, environmental monitoring and audit during operation phase for land contamination is not necessary.

- 7.3.1.2 As a 4m - 8m thick arsenic free/treated soil zone will be exist beneath the future development, this will provide an effective barrier to any exposure to deeper HAC soil therefore, no mitigation measures are required during the Project operation.

8. LANDFILL GAS HAZARD

8.1 Introduction

- 8.1.1.1 A small portion of the development node planned for development of an electricity substation lies within the Landfill Consultation Zone of the closed and restored Ngau Tam Mei Landfill (NTML) as shown in **Figure 8.1**.
- 8.1.1.2 Qualitative LFG risk assessment in Section 8 of the EIA Report indicates that potential hazard associated with landfill gas presents “Very low” risk and “Low” risk during construction and operation of the planned electricity substation respectively.
- 8.1.1.3 For low risk situations, some precautionary measures will be required to ensure that the planned development is safe. This low risk classification is intended only as preliminary guidance on the nature of protective works anticipated for the development, and reassessment at the development stage will allow targeted and more accurate design of any protective measures required.
- 8.1.1.4 Generic measures may be limited to passive gas control such as provision of barriers to the movement of gas or high permeability vents such as no-fines gravel in trenches or voids/permeable layers below structures. As such, some precautionary measures (“passive control”) will be required to ensure construction and operation of potentially affected elements of the development area are safe. Definitions of “passive control” are annotated in Chapter 4 of the Landfill Gas Hazard Assessment Guidance Note issued by EPD.

8.2 Monitoring Parameters, Locations and Frequency

- 8.2.1.1 The following precautionary and protection measures are considered appropriate for the Project area within 250m landfill consultation zone:

Design Phase

- 8.2.1.2 Cut-off barrier to seal any service trench entering ground floor or below ground buildings within the LFG consultation zone. Figure B.6 in the Guidance Note provides details of a suitable design; and
- 8.2.1.3 Grill covers for below grade cable trenches within the LFG consultation zone.

Construction Phase

- 8.2.1.4 No monitoring is required during the construction phase of the Project.

Operation Phase

- 8.2.1.5 By nature, an electrical substation is a restricted access facility which the public will not have access to, however Site operatives shall be alerted to possible LFG hazards;
- 8.2.1.6 Smoking and open fires are prohibited on site.
- 8.2.1.7 Dependant on construction phase monitoring result, conduct regular LFG monitoring at buildings, manholes, utility pits at the Project Site within the 250m landfill consultation zone.

8.2.2 Landfill Gas Parameters

- 8.2.2.1 LFG monitoring shall be carried out to identify any migration between the former NTML and planned development of an electricity substation to ensure the safety of the construction, operation and maintenance personnel working on-site.

8.2.2.2 The following parameters shall be monitored:

- Methane
- Oxygen
- Carbon Dioxide
- Barometric Pressure

8.2.2.3 The presentation format for LFG monitoring shall be agreed with EPD in advance.

8.2.3 Monitoring Equipment

8.2.3.1 For the Project area within 250m landfill consultation zone, LFG monitoring shall be carried out using intrinsically safe, a portable multi-gas monitoring instrument normally operating in diffusion mode unless required for spot sampling when it should be capable of operating by means of an aspirator or pump. The equipment should have low battery, fault and over range indicators incorporated and be able to datalog measurements for subsequent download.

8.2.3.2 The equipment should be able to measure in the following ranges:

Methane	0-100% Lower Explosion Limit (LEL) and 0-100% v/v
Carbon dioxide	0-100%
Oxygen	0-21%
barometric pressure	mBar (absolute)

8.2.3.3 The equipment should alarm (audibly and visibly) in the event that:

Methane	>10% LEL
Carbon dioxide	>0.5% by volume; and
Oxygen	<19% by volume

8.2.4 Monitoring Locations and Frequency

Construction Phase

8.2.4.1 No monitoring is required during the construction phase of the Project.

Operation Phase

8.2.4.2 Following construction, and dependant on the detailed design, routine monitoring may be required for buildings within the 250m landfill consultation zone. The anticipated monitoring frequency will be monthly for the first year of operation. If the monitoring results show no sign of LFG migration, reduce the monitoring frequency to once every six months.

8.2.4.3 Manholes and utility pits should be monitored at mid depth and the base with each measurement recorded over a minimum period of 10 minutes. A steady reading and peak reading should be recorded for each measurement. The need for venting the manhole/utility pit and further monitoring will be reviewed after the initial monitoring. As the exact location of these will be dependent upon the detailed design monitoring locations cannot be specified prior to completion of the detailed design.

8.2.5 Limit Levels and Action Plan For LFG

8.2.5.1 Limit levels and Actions in the event of LFG being detected in excavations, utilities or any enclosed on-site areas are shown in **Table 8.1**.

Table 8.1 Limit Levels and Action Plan for Landfill Gas

Parameter	Limit Level	Action
Oxygen	<19%	Ventilate trench/void to restore O ₂ to > 19%
	<18%	Stop works Evacuate personnel/prohibit entry Increase ventilation to restore oxygen to >19%
Methane	>10% LEL (i.e. > 0.5% by volume)	Post "No Smoking" signs Prohibit hot works Ventilate to restore methane to <10% LEL
	>20% LEL (i.e. > 1% by volume)	Stop works Evacuate personnel / prohibit entry Increase ventilation to restore methane to <10% LEL
Carbon Dioxide	>0.5%	Ventilate to restore carbon dioxide to < 0.5%
	>1.5%	Stop works Evacuate personnel / prohibit entry Increase ventilation to restore carbon dioxide to < 0.5%

9. ECOLOGY

9.1 Introduction

9.1.1.1 As stated in the EIA, potential ecological impacts have been identified with mitigation measures proposed accordingly. No adverse residual ecological impacts are expected from the Project upon the proper implementation of mitigation measures, as summarised in **Section 9.2**. Nonetheless, environmental monitoring and audit is needed and the requirements are described below in **Section 9.3**.

9.2 Mitigation Measures

9.2.1 Overview of Proposed Mitigation Measures

9.2.1.1 Under the current proposed Development, key ecological impacts include the loss of wetland habitats (pond and other freshwater wetland habitats), potential impacts on Mai Po Lung Village Egret, Mai Po Village Egret, night roosts, potential obstruction of flight paths, loss of woodland habitats, and potential impact on flora and fauna species of conservation importance. Mitigation measures are proposed for each of these aforementioned ecological resources, as detailed in the following sections.

9.2.1.2 As areas within the Project site will be mostly taken up for development, it would be infeasible to include compensation areas on-site (within Project site) due to the large area requirement for habitat compensation. Compensation areas are recommended as close as possible, at strategic areas to enhance connectivity and environmental carrying capacity of the proposed compensation (e.g. nearby wetland habitats to the northwest in Sam Po Shue, and woodland habitat near existing woodland compensation areas).

9.2.2 Impact on Wetland Habitats (Pond and Other Freshwater Wetland Habitats)

Consideration of Wetland Compensation

9.2.2.1 As described and assessed under the EIA report, the Project would result in unavoidable loss of and disturbance to pond and other wetland habitats in some sites of conservation importance, namely Conservation Area (“CA” zone) under OZP No. S/YL-ST/8, Wetland Conservation Area (WCA), Wetland Buffer Area (WBA), and Priority Site for Enhanced Conservation (Priority Site) on the northern portion the Assessment Area. Further wetland compensation measures would be required at the proposed SPS WCP. Pond habitats within the Project boundary would be considered under the wetland compensation strategy to achieve a holistic approach in the compensation of wetland loss. Other wetland habitats (including relatively scattered ponds on the southern portion, reed / marsh, watercourses, etc.) within the Assessment Area would also be subject to direct loss and indirect disturbance impacts, with associated wetland compensation measures also considered.

9.2.2.2 The Government will develop the Sam Po Shue Wetland Conservation Park (SPS WCP) with a proposed area of approximately 338 ha to create environmental capacity for the development of San Tin Technopole. Among the 338 ha, while 10 ha is reserved for supporting facilities such as visitor center and other basic infrastructure, the Government will enhance the ecological function and capacity of 288 ha of wetlands and fisheries resources of 40 ha of fishponds by establishing the SPS WCP with active conservation management and modernised aquaculture to compensate for the loss in wetland habitats and fisheries resources arising from the development of San Tin Technopole and to achieve no-net-loss in ecological function and capacity of the wetlands concerned. Among the 288 ha, there will be 253 ha³ of “ecologically enhanced fishponds” compensating for

³ The 253 ha will compensate for the potential impact on pond habitats, in the northern portion of the Project site, including the direct loss of about 89 ha of contiguous pond habitat due to filling of fishponds within the development boundary of San Tin Technopole, and indirect disturbance to adjacent contiguous pond habitat of about 63 ha outside the development boundary of San Tin Technopole.

pond habitat loss, and 35 ha⁴ of “enhanced freshwater wetland habitat” compensating for other freshwater wetland habitat loss. The Government aims to start the development of SPS WCP in around 2026/2027 for completion by 2039 or earlier to tie in with the full operation of San Tin Technopole. For the site formation works of the first batch of land at San Tin Technopole targeted for commencement in late 2024, no pond filling will be involved. On current planning, pond filling works will not start until 2026/27, and the pace of pond filling will tie in with the development progress of the SPS WCP. To this end, a working group will be formed between CEDD (as San Tin Technopole’s works agent) and AFCD (as SPS WCP’s sponsoring department) to coordinate the progress of pond filling and SPS WCP implementation. Enhancement measures (in the form of improvement of tidal channel at Mai Po Nature Reserve, and removal of exotic mangrove species in the Deep Bay area) would also be implemented. Furthermore, interim wetland enhancement works would also be conducted at suitable ponds in the Inner Deep Bay area prior to the commencement of pond filling works.

Wetland Compensation Strategy (Pond Habitats)

9.2.2.3 To compensate for the direct loss of the contiguous pond habitat and indirect disturbance impact to the associated wildlife especially the disturbance sensitive bird species in the northern portion, enhanced wetland in the form of “ecologically enhanced fishponds” shall be established. Enhancing the ecological function and capacity of these ponds would compensate for the loss or reduction of functional value (i.e., the abundance of wildlife species that the ponds are able to support) resulting from the Project. These ecologically enhanced fishponds would comprise existing pond habitats, and ponds that would be converted from existing brownfield or wasteland areas. The ponds shall be enhanced with various features to increase density of wildlife they are able to support, thereby compensating for the loss of the functional value by accommodating a higher abundance of wildlife. Enhancement measures could include:

- Increase in pond area and enhance connectivity;
- Physical modification of pond habitats to increase environmental carrying capacity;
- Managing and sequencing pond drain down across multiple ponds in the dry season to maximize feeding opportunities for avifauna and other wildlife;
- Providing fencing/controlling access to reduce disturbance from human activities and also prevent disturbance and predation of wildlife by feral dogs;
- Removal of existing bird scaring devices at actively managed ponds, where appropriate;
- Stocking ponds with suitable prey items (i.e., trash-fish) for target wildlife species (may be considered as an enhancement measure to achieve higher enhancement value).

Increase in Pond Area and Enhanced Connectivity

9.2.2.4 To compensate the loss of pond habitats, some areas of existing brownfield areas, inactive and abandoned fishponds could be converted to ecologically enhanced fishpond habitats within the proposed wetland enhancement area. The ecologically enhanced fishponds habitat will connect with existing high value wetland habitats in Mai Po (in the west) and compensatory wetlands for LMC Spur Line and the Loop (in the east), creating a large contiguous patch of high value habitats. Overall ecological connectivity in the wider area could also be enhanced, including the Ecological Area in the Loop and the LMC meander.

⁴ The 35 ha will compensate for the potential impact on other freshwater wetland habitats, including the direct loss of about 28 ha (at a compensation ratio of 1:1) within the development boundary of San Tin Technopole, and indirect disturbance to about 8 ha outside of development boundary (at a compensation ratio of 1:1 to 1:0.5, depending on the distance of habitat from development boundary).

Physical Modification of Pond Habitats

9.2.2.5 Across the entire ecologically enhanced fishpond areas, ponds could be physically modified to enhance ecological function and capacity. Typical measures to be implemented could be based on successful examples in Hong Kong, including:

- Consolidating smaller, fragmented ponds into larger waterbodies that support higher densities of avifauna and attract larger, more disturbance sensitive species;
- Reprofiling pond banks to make the edges more gently sloping and shallower, increasing the available foraging area for avifauna;
- Creating habitat islands that provide refuge for avifauna and other wildlife;
- Floating platforms / wetlands will be placed in each pond to provide additional foraging areas for wetland avifauna and potential breeding sites for other species.

Pond Drain-down and Water Management

9.2.2.6 To help enhance the functional value of fishpond habitats, the total number of ponds drained down at any one time can be increased over and above levels currently implemented under the current Management Agreement (MA) practice. The MA involves NGO groups collaborating with fishpond operators to adopt traditional and ecologically sustainable operation regime to manage their fishponds such as regular drain-down of fishponds, maintenance of shallow pond habitats for bird feeding and roosting, clearance of weeds on pond bunds to create more habitats for birds and prohibition of the use of lethal bird deterring device etc. The key conservation objectives are to restore and enhance the conservation value of commercial fishponds in the Deep Bay area and build up a more harmonious relationship between local fishpond farming and bird conservation. Under current MA practice, a relatively small number of ponds across the SPS WCP are drained down at any one time. Furthermore, most ponds participating in the programme are only partially drained for a period of 7 days. Feeding opportunities for avifauna will be enhanced by making the following changes to drain-down practices:

- The total area of fishponds drain-down at any one time could be increased;
- Full drain-down will be implemented rather than partial draining;
- Similar to recommendations in the approved EIA report for Proposed Development at Fung Lok Wai, Yuen Long (Mutual Luck Investment Limited, 2008), drain-down periods will be extended to longer than typical commercial practices or drain-downs under current practices.
- Extending the length of drain down would allow for water levels to be lowered more gradually. Where ponds have been reprofiled to have a shallower gradient, this would result in progressively larger areas of shallow water/mud being exposed. Overall, this would provide a more stable, high-value feeding habitat for avifauna compared to ponds which are drained down more quickly.

9.2.2.7 Fishpond water will primarily be supplied by direct rainfall that will be retained and re-circulated during drain-down periods. As with current practice in the area, supplemental water can be sourced from drainage channels that traverse the site as required.

9.2.2.8 For controlling water levels in the ponds, adjustable sluices or similar water control devices can be provided to connect adjacent ponds, with ponds adjacent to retained drainage channels also having similar devices connecting the ponds to the drainage channels. The water control device levels can be adjusted to allow excess water to flow from pond to pond towards the drainage channels gravity during storm events to prevent overtopping.

Controlled Access and Feral Dog Control

9.2.2.9 Public access to ecologically enhanced fishponds habitat area could be controlled to reduce disturbance from human activities. This could be achieved by potential gating key access points along the Border Road, Tun Yu Road and San Tin Tsuen Road (where appropriate, subject to detailed design). Smaller gates can be provided to control vehicular access along fishpond bunds. Site access would be maintained and controlled during the construction and operation phases of the SPS WCP.

9.2.2.10 Measures (such as trapping and neutering) would be adopted to minimise disturbance and predation of wildlife by feral dogs.

Removing Bird-scaring Devices

9.2.2.11 The use of wire strung across ponds or other devices to discourage birds preying on fish stocks is still relatively common across the proposed SPS WCP area, particularly in the west close to MPNR. Removing these devices will add value to the ponds for wetland avifauna.

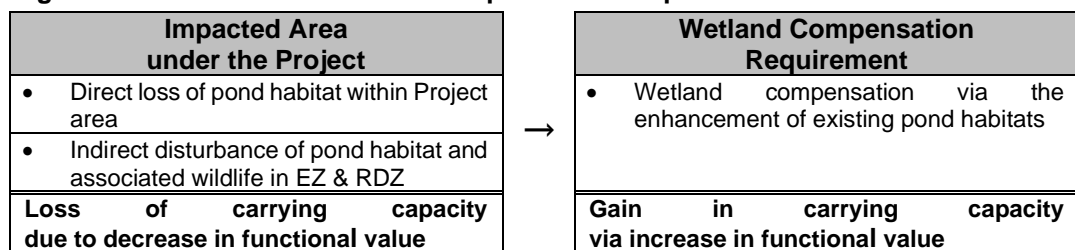
Trash-fish Stocking

9.2.2.12 Stocking shallow ponds with small fish provides a high-quality feeding resource for many species of bird and other fish-eating species and may be considered as an additional measure to achieve higher enhancement value).

Compensation Requirement (Overview)

9.2.2.13 To compensate for such loss of carrying capacity from direct impacts (habitat loss) and indirect impact (disturbance impact and decrease in carrying capacity) arising from the Project, a compensation approach has been proposed to enhance the wetland habitat within the proposed SPS WCP, using the enhancement strategies as provided above. The enhancement should achieve a level that is adequate to support the existing ecological resources in the enhanced area, and on top of that, additional capacity to accommodate the ecological resources that are affected by the Project. This is illustrated below in **Diagram 1**.

Diagram 1: Illustration of Wetland Compensation Requirement.



Compensation Requirement (Enhancement of Ponds)

9.2.2.14 With reference to available desktop literature as well as EIA ecological survey data (detailed in **Section 10 of the EIA Report**), baseline densities and abundance for four indicator species (larger disturbance-sensitive wetland avifauna species, including Black-faced Spoonbill, Great Cormorant, Great Egret, Grey Heron) were estimated across areas that could potentially be used for enhancement within the proposed SPS WCP. With reference to these species, the functional value of existing habitats, and anticipated value upon wetland enhancement was estimated. In terms of ecological function and capacity, existing brownfield and/or wasteland areas supported little to no waterbirds and wetland-dependent species, hence they are considered with insignificant functional value. Other than that, there are three types of existing ponds in the area observed during the survey period, including:

- active/inactive ponds (under active management, or inactive ponds that are not currently farmed, but have the potential to easily revert to active management),

- abandoned ponds (show no signs of active management, and/or overgrown with vegetation or are drying out and converting to terrestrial habitat), and
 - wired ponds that have wires or other bird-scaring devices present and were under active production (i.e., were not drained down or being re-profiled).
- 9.2.2.15 Based on previous approved EIA reports such as the Proposed Development at Fung Lok Wai, Yuen Long (Mutual Luck Investment Limited, 2008), it is assumed the functional value of areas of typical commercially managed ponds (i.e., active/inactive ponds) can be increased by up to 45% upon the implementation of ecological enhancement measures, including the following measures proposed under the EIA:
- The size of the fishponds will be increased by re-profiling unwanted bunds,
 - emergent vegetation will be allowed to develop,
 - Areas of shallow water and intermittently exposed muddy islands will be created, and
 - Modified pond drain-down regime providing enhanced feeding opportunities. Study on drain-down effects of ponds under existing fishpond management agreement has shown that pond drain-down is effective in attracting high abundance and species richness of most waterbird species, with significant increase in abundance of avifauna after pond drain-down (ACE NCSC, 2016)⁵.
- 9.2.2.16 In comparison, the enhancement measures proposed under the current wetland compensation strategy (refer to **Section 10 of the EIA Report**) has included and allowed the ecological functions described under the EIA for Fung Lok Wai, but would adopt an enhanced fishpond drain-down regime in the dry season, with a higher percentage of ponds drained down at any one time than planned for in the EIA for Fung Lok Wai or current management practices. As such, an increase in functional value of 45% could be anticipated under this Project.
- 9.2.2.17 Furthermore, removal of existing bird scaring devices were also proposed under the current wetland compensation strategy. It should be noted that the increase in functional value for abandoned ponds and wired ponds would be even higher, taking into consideration the lower existing functional value of these ponds as compared to typical active/inactive ponds.
- 9.2.2.18 With the assumed increase in functional value of 45% compared to typical active/inactive fishponds upon the implementation of ecological enhancement measures at the pond areas, the total compensation requirement for pond habitats is estimated to be 253 ha, which would also achieve no-net-loss in ecological function and capacity of the wetlands concerned. The estimated compensation requirements are summarised in **Section 10.11** of the EIA Report.
- 9.2.2.19 Based on these estimated changes in functional values for indicator species, compensation could be provided through the provision of 253 ha of ecologically enhanced fishpond habitat within the proposed SPS WCP (**Figure 9.1a**). Additional enhancement measures, such as trash-fish stocking, will be derived as needed to further enhance the functional value of the ponds.
- 9.2.2.20 As stated in **Section 9.2.2.14**, four indicator species was used for estimating fishpond compensation requirements as they are key sensitive receivers that would be most affected by the Project due to their generally high usage of fishpond habitats as well as high disturbance sensitivity. It should also be noted that the ecological enhancement of fishpond habitats would also increase the ecological function and capacity of the enhancement area for other wildlife species of conservation importance recorded from fishpond habitats in the Project area (including ducks and grebes, shorebirds, freshwater wetland avifauna, other wetland-associated avifauna species, Eurasian Otters, and other non-avifaunal species of conservation importance), as detailed in the **Section 10 of the EIA Report**.

Wetland Compensation Strategy (Other Freshwater Wetland Habitats)

⁵ Study on pond drain-down effect (ACE NCSC, 2016) showed significant increase in abundance of target waterbird species per fishpond (i.e. Cormorants, Ardeids, and Spoonbills), with at least about two-fold increase or higher.

- 9.2.2.21 Aside from the contiguous pond habitat, other wetland habitats (including scattered ponds on the southern portion, mitigation wetland, marsh / reed, watercourse, seasonally wet grassland, and wet agricultural land) were recorded within the Project site that would be subject to direct loss (including permanent loss upon site formation, or temporary loss that would be reinstated / revitalised). Some of these wetland habitats were also recorded along the Exclusion Zone (EZ) and Reduced Density Zone (RDZ) under the Project (detailed in **Section 10 of the EIA Report**), which would be subject to disturbance impact from the Project. Ecological values of these wetland habitats ranges from “low” to “moderate”.
- 9.2.2.22 The significance of impacts to these habitats varies, ranging from ‘low’ to ‘low to moderate’ only due to the relatively lower ecological values and different ecological characteristics (e.g., lower densities of disturbance sensitive avifauna) of the other freshwater wetland habitats compared to pond habitats. As such, an area-based approach was adopted to estimate compensation requirements. The potential ecological impacts on these habitats are provided in **Section 10.9 of the EIA Report**. As a conservative approach, compensation of wetland habitats will be considered for wetland loss with “low to moderate” or above ecological impacts. The areas of wetland habitats with such criteria are summarised in **Section 10 of the EIA Report**.
- 9.2.2.23 Due to the relatively lower ecological value and different ecological characteristics (i.e., lower densities of disturbance sensitive avifauna) of the other freshwater wetland habitats compared to pond habitats, an area-based approach was adopted to estimate compensation requirements. Wetland habitats within the Project site would be subject to direct impact (including permanent and temporary loss), hence would be compensated for on a 1:1 compensation. Habitats within both EZ and RDZ are anticipated to support lower density of wildlife due to disturbance, where disturbance sensitive avifauna species is estimated at 0% and 50% at EZ and RDZ respectively (refer to **Section 10 of the EIA Report**). As such, compensation ratios of 1:1 and 1:0.5 are proposed for wetland habitats within the EZ and RDZ respectively. Under the current wetland compensation strategy, about 35 ha of “enhanced freshwater wetland habitats” would be required within the proposed SPS WCP.
- 9.2.2.24 The “enhanced freshwater wetland habitats” would be designed to compensate for impacts on a like-for-like basis as far as practicable, and could include various habitat types that would support communities currently utilising impacted freshwater habitats:
- Ducks and Grebes;
 - Freshwater Wetland Avifauna;
 - Other Wetland-associated Avifauna Species;
 - Eurasian Otters; and
 - Other Non-Avifaunal Species of Conservation Interest
- 9.2.2.25 Details on the habitat requirement of these species are provided in Section 10 of the EIA report, and in the subsequent “Habitat Creation and Management Plan” (HCMP).
- 9.2.2.26 Native wetland plants species would be used to in vegetated areas of the enhanced freshwater wetland habitats, including the following species:

Table 9.1 Species to be Considered for Enhanced Freshwater Wetland Habitat

Open Water	
<i>Nymphaea spp.</i>	<i>Nelumbo nucifera</i>
Permanent Wetland	
<i>Vallisneria natans</i>	<i>Cyperus malaccensis</i>
<i>Ottelia alismoides</i>	<i>Sagittaria trifolia</i>
<i>Hydrilla verticillata</i>	<i>Ludwigia ascendens</i>
<i>Eleocharis dulcis</i>	
Reed bed	
<i>Phragmites australis</i>	
Seasonal Wetland	
<i>Bacopa monnieri</i>	<i>Sagittaria guyanensis</i>

<i>Sagittaria trifolia</i>	<i>Saururus chinensis</i>
<i>Polygonum barbatum</i>	<i>Eleocharis tetraquetra</i>
<i>Eleocharis equisetina</i>	<i>Polygonum hydropiper</i>
<i>Polygonum glabrum</i>	<i>Polygonum juncundum</i>
<i>Schoenoplectus mucronatus</i>	

9.2.2.27 The disturbance impact from the Project is anticipated to result in EZ and RDZ along the Project boundary, which is expected to support lower densities of disturbance sensitive of wildlife, in particular avifauna species. As the species recorded in marsh / reed habitats tend to be less disturbance-sensitive than species utilizing more open wetland habitats, the proposed “enhanced freshwater wetland habitats” could be considered along these EZ and RDZ, where the remaining areas of the proposed SPS WCP (outside the EZ and RDZ) can be maximised for ecologically enhanced fishponds.

9.2.2.28 Upon the establishment of the proposed SPS WCP, it could be able to accommodate the aforementioned enhanced wetland of about 288 ha (253 ha of “ecologically enhanced fishponds” and 35 ha of “enhanced freshwater wetland habitats”). The Government will enhance the ecological function and capacity of 288 ha of wetlands in the proposed SPS WCP with active conservation management to compensate for the loss in wetland habitats arising from the development of San Tin Technopole, which would create sufficient environmental capacity to support the compensation requirement of the Project.

Habitat Creation and Management Plan (HCMP)

9.2.2.29 The implementation details of the enhanced wetland, the associated management and monitoring requirements (e.g. monitoring location, frequency and parameters) will be provided in the subsequent HCMP. The HCMP should be submitted for approval from relevant Government departments (including AFCD and EPD), at least three months before the commencement of pond filling works.

Minimising Construction Phase Indirect Impacts on Sites of Conservation Importance and Associated Habitats

9.2.2.30 To further minimise potential adverse impacts to the wetland habitats in sites of conservation importance due to extensive construction activities, especially at pond habitat, phasing of pond filling works in San Tin – Sam Po Shue area should be adopted. The pond filling works will be phased to tie in with the phased development of the SPS WCP, with a working group formed to coordinate the progress of pond filling and SPS WCP implementation. The pond filling works should also be started from urbanised area towards the wider wetland area (i.e. from the southeast near STEMDC or San Tin Highway towards the northwest) and construction activities should be minimised at any one time, so as to allow gradual migration of wildlife to the wetland habitats northwest to the Project area. Pond filling works should also be conducted in wet season as far as possible when there is a lower abundance of avifauna. In order to reduce the scale of disturbance and the total area of pond filling at the same time, filling of ponds in San Tin / Sam Po Shue should be conducted in multiple wet seasons (at least 2 years or more).

9.2.2.31 With particular focus to minimize construction disturbance to the wetlands and waterbirds with high bird usage, site hoarding of about 3 m high should be erected along the works site and works area before commencement of construction activities. The hoarding would shield the avifauna in the nearby wetlands from the disturbance of human activities during construction phase. Such hoarding would be non-transparent and superimposing dark patterns or stripes to avoid the risk of potential bird collision.

Wetland Enhancement Measures

9.2.2.32 Together with the development of the Project, enhancement measures would also be implemented to enhance the ecological value of wetland habitats in the Deep Bay area

- 9.2.2.33 Two management issues at Mai Po Inner Deep Bay Ramsar Site would be addressed to enhance environmental capacity across the broader NWNT wetland system:
- Firstly, tidal channels that link *gei wai* in the Mai Po Nature Reserve to the Inner Deep Bay have become silted up over time, limiting tidal exchange and degrading the function of habitats within the *gei wai*. De-silting of these channels can promote tidal exchange and enhance habitat condition within the *gei wai* (**Figure 9.1b** refers);
 - Secondly, the invasive exotic mangrove *Sonneratia* sp. Has spread rapidly across mudflat habitats and drainage channels across the NWNT. Selective clearance of larger *Sonneratia* stands can help restore wetland habitats in affected areas.

- 9.2.2.34 Realising the beneficial effects brought by the enhancement measures, they are targeted to be commenced as early as possible. Both enhancement measures shall be undertaken in the wet season (April – September) to minimise disturbance impacts to overwintering avifauna and hence they are proposed to be commenced earliest at the start of the 2025 wet season. Details of the enhancement measures (e.g. details, timeframe and requirement/frequency of repetition for the enhancement works) shall be provided in a separate work plan, and submitted to AFCD for agreement at least three months prior to the commencement of these works.

Improvement of Tidal Channel

- 9.2.2.35 *Gei wai* located within the Mai Po Nature Reserve are managed for conservation, especially as feeding and roosting grounds for over-wintering birds (WWF, 2018). By draining these *gei wai*, waterbirds can utilize the shallow water inside as a feeding ground. *Gei wai* in Deep Bay, together with mudflat and fishponds, provide feeding ground for over 40,000 wintering birds (HKBWS, 2022).

- 9.2.2.36 The *gei wai* at Mai Po are now only linked to the Deep Bay waters through a number of water channels several hundred metres in length (**Figure 9.1b** refers). Tidal exchange is further limited by direct sediment deposition within the channels. Limited tidal exchange would result in inferior water quality due to lack of exchange, diminishing food source for avifauna (diminished resupply of fish and shrimp for the exchange), as well as lack of water level control within the *gei wai* that may affect wetland vegetation growth.

- 9.2.2.37 Under the current Project, selected tidal channels (**Figure 9.1b** refers) would be de-silted. These channels connect to the sluice-gates of several existing *gei wai*, where proposed de-silting works could potentially enhance the functioning of 10 *gei wai*. The total length of proposed channel de-silting is approximately 5.1km. Similar works proposed under the Shenzhen Western Corridor EIA (HyD, 2002) estimated the de-silting in each channel would be approximately 4m in width, with the elevation of water channel bottoms reduced by approximately 1m. Assuming a similar scale of de-silting is required for the current works, the total volume of material removed would be approximately 20,400 m³. De-silting works would be undertaken in the wet season (April – September) by phases to minimise disturbance impacts to overwintering avifauna.

Sonneratia Clearance

- 9.2.2.38 The exotic mangrove genus *Sonneratia* was first recorded in the Deep Bay area in the early 2000's and has spread rapidly across NWNT and some other parts of Hong Kong. The *Sonneratia* that occur in Hong Kong are invasive alien species that can cause two main issues to existing intertidal communities:
- *Sonneratia* are fast-growing species that have the potential to out-compete native mangrove species;
 - *Sonneratia* grow on the seaward side of the mangrove, and can extend out onto and impact mudflat habitats that are important feeding grounds for avifauna.

- 9.2.2.39 Under the current project, additional enhancement of the Deep Bay area will be provided by the removal of exotic mangrove species on mudflat (*Sonneratia* spp.). The removal of exotic mangrove species would be undertaken in the wet season (April – September) selectively to minimise disturbance impacts to overwintering avifauna.

Interim Wetland Enhancement

- 9.2.2.40 Interim wetland enhancement measures prior to the commencement of pond filling works would also be implemented. Suitable ponds in the Inner Deep Bay area will be identified for implementing interim enhancement works, which may comprise restoration of abandoned ponds and arrangement of active management including fish stocking for suitable ponds. Details of the suitable ponds and interim enhancement works shall be provided in a separate Interim Wetland Enhancement Plan and submitted for approval from relevant Government departments (including AFCD and EPD) at least three months before the commencement of these interim enhancement works.

9.2.3 Impact on Egrettries

Mai Po Lung Village (MPLV) Egrettry

- 9.2.3.1 In view of the encroachment of Project boundary into the MPLV Egrettry, the Revised RODP of the Project was refined with the aim to preserve the MPLV Egrettry, and the vegetation currently used by the breeding ardeids. An “Open Space” is currently proposed to preserve the egrettry and the vegetation (**Figure 9.2** refers). As such, direct loss of the whole egrettry due to encroachment of the Project footprint has been actively avoided, the overall direct impact on MPLV Egrettry has been minimised.

- 9.2.3.2 Detailed design of this “Open Space” shall incorporate enhancement features, which may include:

- Preservation of trees currently within the core area of the MPLV Egrettry;
- Incorporation of water features within the “Open Space” area, adjacent to the existing of MPLV Egrettry;
- Planting of mature trees adjacent to the water features, with native species that are currently used as egrettry substratum;
- Maintaining a buffer area between the water features and the established mature trees from the adjacent proposed land-uses (e.g. logistics storage and workshop, district cooling system, and traffic roads).

- 9.2.3.3 The purpose of these enhancement measures will aim to supplement potentially suitable substratum for the breeding ardeids, in addition to the avoidance measure (preservation of trees) proposed above. The enhancement measures should be completed as far as possible before construction phase. Furthermore, the proposed “Open Space” area were also recorded to support some breeding ardeids and their nests in the past 10 years (2012 – 2021), which are no longer observed in recent ecological survey (2022) (refer to **Figure 10.6A** in the EIA report). These measures could serve to revitalise the previous extent of the egrettry, and potentially reactivate / encourage breeding ardeids usage in the proposed “Open Space”. Buffer planting along the Open Space could also maintain some distance away from the (located along the northern and eastern boundary of the “Open Space”), minimise potential indirect disturbance impacts on the egrettry from adjacent proposed land-use and traffic network during operation phase. An Egrettry Habitat Enhancement and Management Plan including the details of design plan, site preparation works, works schedule and management plan should be prepared for approval from relevant Government departments (including EPD and AFCD) before the commencement of construction works. In addition, pre-construction surveys are necessary to confirm the latest boundary, condition, flight paths of both MPLV Egrettry and MPV Egrettry and the associated mitigation measures before commencement of the construction works.

9.2.3.4 Under the proposed “Open Space”, only low intensity activities would be allowed (e.g. plant nursery), while other recreational activities (e.g. sports and recreation) would not be included in the “Open Space” in order to minimise the disturbance to the MPLV Egret.

9.2.3.5 Two other existing egretries occur within man-made urban parks in Hong Kong, including the North District Park and Penfold Park, suggesting the adaptabilities of breeding ardeids to man-made features. The design of water features and vegetation structure shall make reference to these two egretries to promote the potential usage by future breeding ardeids, while the tree species to be planted at the “Open Space” shall also make reference to the tree species used as substratum at the MPLV Egret, as well as tree species commonly used by the target species at MPLV Egret (i.e. Little Egret and Chinese Pond Heron).

9.2.3.6 Mitigation measures for flight paths from the egret are further described in **Section 9.2.5**.

Mai Po Village (MPV) Egret

9.2.3.7 During the current ecological survey (2022), the footprint of MPV Egret was recorded outside the Project boundary to the west, where no direct impact would be anticipated. A historical record of the MPV Egret footprint within the past 10 years (2012 – 2021) revealed the presence of some breeding ardeids at a small area on the western tip of the Project boundary (**Figure 9.2** refers). Nonetheless, breeding ardeids were no longer recorded within this area of MPV Egret within the Project boundary from recent surveys.

9.2.3.8 Under the Revised RODP, the currently active extent of the MPV Egret will be avoided. The historical extent encroached within the Project boundary will be subject to potential loss, mainly including minor works associated with the Castle Peak Road (San Tin Section), such as roadside and landscape planting, and reprovisioning of pedestrian access on both sides of the road.

9.2.3.9 Mitigation measures for flight paths from the egret are further described in **Section 9.2.5**.

Minimising Construction Phase Impacts on Egreties

9.2.3.10 Considering the close proximity between the proposed development and both MPLV Egret and MPV Egret, encroachment into the trees at both egretries shall be strictly avoided during construction phase (except for the minor encroachment of the MPLV egret as discussed in **Section 9.2.3.2**). The latest boundary, condition, flight paths of both MPLV Egret and MPV Egret and the associated mitigation measures should be confirmed by pre-construction surveys before commencement of the construction works.

9.2.3.11 Potential disturbance impact on the breeding ardeids shall be further minimised by establishing a buffer area 100 m from the footprint of both egretries (**Figure 9.2** refers). In addition, the boundary of the 100 m buffer area should be updated subject to findings of pre-construction survey. Stringent seasonal control would be implemented within the buffer area, where construction activities shall be avoided during the ardeid breeding period (i.e. from March to August). Construction activities shall be conducted from September to February in the following year, unless AFCD’s prior approval on construction method has been obtained and appropriate mitigation measures have been proposed and adopted. Tree crown pruning works at the egretries shall be avoided as best as possible, and where necessary, shall also be conducted and completed outside the ardeid breeding season to minimise disturbance to any breeding ardeids that may be present. Method Statement on construction activities near the egretries and necessary tree crown pruning works shall be submitted to AFCD in advance of the works.

9.2.3.12 Other stringent control measures shall also be implemented (e.g. establishment of hoarding and regular auditing). Aside from the construction activities, any associated temporary works areas (e.g. site office, stockpiling / material storage area, etc.) shall be strictly restricted outside the footprint of the egretries as well. Potential pruning works shall only

be conducted where necessary, limited at overgrown tree branches that may affect construction activities.

9.2.4 Impact on Night Roosts

Minimising Construction Phase Direct / Indirect Impacts on Night Roost

9.2.4.1 The Ha Wan Tsuen Night Roost and San Tin Open Storage Area Night Roost would be subjected to the unavoidable direct loss during construction phase. In order to minimise the potential direct injury / mortality to the roosting ardeids and Great Cormorants, the construction activities and tree falling in Ha Wan Tsuen Night Roost and San Tin Open Storage Area Night Roost should be allowed only in wet season (April - September) which no roosting individual was recorded in current survey. As the condition, location and extent of the night roosts may fluctuate naturally, pre-construction surveys are necessary to confirm the latest boundary and condition of the night roosts before commencement of the construction works.

9.2.4.2 Re-provision planting of the roosting substratum both night roosts should also be commenced as early as possible before the commencement of construction activities that may result in the loss of both night roosts.

Re-provision of Roosting Substratum for Ha Wan Tsuen Night Roost

9.2.4.3 Ha Wan Tsuen Night Roost was located near the northern boundary of the Project footprint (refer to **Figure 9.4a**). Great Cormorants and some ardeids were recorded at this night roost, roosting on mature trees along a pond bund. These roosting avifauna were only recorded during dry season, using this area as an overwintering night roost. Potential direct impact on this night roost may be anticipated.

9.2.4.4 To minimise and compensate for the potential impact from the inevitable loss of the night roost, a re-provision of roosting area which comprises water features and riparian vegetation shall be provided upon the completion of the construction phase, adjacent to the proposed fisheries office under the Revised RODP. This re-provided roosting area would be approximately 230 m southeast of the existing Ha Wan Tsuen Night Roost and the exact extent would be subject to detail design in the future (refer to **Figure 9.4a**). The re-provided roosting area would comprise mature individuals of native tree species that are currently used as a roosting substratum (**Table 9.2** refers). The incorporation of these features (water features and associated roosting trees) shall be completed before dry season (October to March), prior to the arrival of the overwintering birds, in order to provide suitable roosting opportunities. This site would be located along a proposed flight corridor, and would be adjacent to existing water bodies (LMC meander and ponds), potentially providing enhanced connectivity with wetland habitats. Prior to the tree removal at the existing Ha Wan Tsuen Night Roost, noisy construction activities within 100 m of the existing Ha Wan Tsuen Night Roost would be subject to timing control during dry season (October to March) to minimise indirect disturbance impacts; while upon the tree removal at Ha Wan Tsuen Night Roost (and the re-provision of roosting substratum at the Fisheries Research Centre), the same timing control would be implemented within 100 m of the re-provided night roost. During dry season (October to March), noisy construction activities (with the use of PME) should cease at least an hour before sunset, and shall commence at least an hour after sunrise on the following day, making reference to the time of sunrise and sunset from the Hong Kong Observatory.

Re-provision of Roosting Substratum for San Tin Open Storage Area Night Roost

9.2.4.5 Ardeids were recorded roosting on a mature India-rubber Tree (*Ficus elastica*) along pond bund in San Tan (refer to **Figure 9.4b**). This night roost was active only in dry season. As the roosting site is encroached by the OU(I&T) under the Project, the roosting tree would be subject to direct loss. To compensate for the unavoidable loss of the night roost, roosting opportunity shall be provided at the "Open Space" along the bank of the diverted and revitalised WC-N8 (San Tin Western Main Drainage Channel (STWMDC)),

approximately 110 m east of the original night roost (exact extent would be subject to detailed design in the future). While India-rubber Tree was currently used as the roosting substratum, this species is not feasible for re-planting due to its growth form. The re-provided roosting area should instead include mature native tree species recorded in other night roost, including but not limited to mature *Ficus* spp. (**Table 9.2** refers).

9.2.4.6 Similar to Ha Wan Tsuen Night Roost, the re-provision of roosting area should be provided before removal of night roost and completed before dry season (October to March), prior to the arrival of the overwintering birds, in order to provide suitable roosting opportunities; while timing control shall be imposed for noisy construction activities within 100 m of the night roosts. Prior to the tree removal at the existing roosting site, noisy construction activities within 100 m of the existing San Tin Open Storage Area Night Roost would be subject to timing control during dry season (October to March) to minimise indirect disturbance impacts; while upon the tree removal (and the re-provision of roosting substratum along the revitalised STWMDC), the same timing control would be implemented within 100 m of the re-provided night roost. During dry season (October to March), noisy construction activities (with the use of PME) within the 100 m Buffer Area should cease at least an hour before sunset, and shall commence at least an hour after sunrise on the following day, making reference to the time of sunrise and sunset from the Hong Kong Observatory.

Table 9.2 Tree Species to be Considered for Re-provision of Roosting Substratum

Tree Species	Common Name	Native / Exotic	Recommended for Night Roost Planting
<i>Celtis sinensis</i>	Chinese Hackberry	Native	Yes ²
<i>Ficus microcarpa</i>	Chinese Banyan	Native	Yes ¹
<i>Ficus virens</i>	Big-leaved Fig	Native	Yes ²
<i>Macaranga tanarius</i> var. <i>tomentosa</i>	Elephant's Ear	Native	Yes ¹

Notes:

- 1 Tree species recorded as roosting substratum in night roosts under this Project.
- 2 Tree species recorded as roosting substratum in egretries under this Project.

9.2.4.7 With the implementation of aforementioned measures and seasonal control, construction activities are not anticipated to impose significant indirect disturbance on the egretry during breeding season or direct injury / mortality on Ha Wan Tsuen Night Roost and San Tin Open Storage Area Night Roost. As discussed above, in the case where construction activities or temporary works near the re-provided night roosts cannot be avoided during the overwintering season (October to March), noisy construction works within 100 m of both re-provided night roosts (exact area would be subject to the pre-construction survey finding and detailed design in the future) should cease before the peak returning time (an hour before sunset) of the ardeids and Great Cormorants, and shall commence at least an hour after sunrise on the following day, making reference to the time of sunrise and sunset from the Hong Kong Observatory.

9.2.5 Impact on Flight Paths

Mai Po Lung Village Egretty

9.2.5.1 Under the current ecological surveys, a large proportion (>65%) of the ardeids in MPLV Egretty flew towards the northwest (Flight Paths 1, 2, and 5); more than 25% of the ardeids flew towards the north (Flight Paths 3 and 4); while small proportion of ardeids were recorded flying westward along Castle Peak Road (San Tin section) and towards southwest (Flight Paths 6 and 7, totalling to less than 5%) (refer to **Figure 10.6A** in the **EIA report**). In addition, pre-construction surveys are necessary to confirm the latest boundary, condition, flight paths of both MPLV Egretty and MPV Egretty and the associated mitigation measures before commencement of the construction works.

9.2.5.2 A Non-Building Area (NBA) of about 70 m wide is proposed to the northwest from the existing MPLV Egretty, which connects to a proposed “Open Space” and “eco-interface” areas along the north of the Project boundary. The orientation and location of this proposed NBA largely coincides with Flight Paths 1 and 2, hence allowing a movement corridor for about 60% of the ardeids from the Egretty. Building structures would be avoided in this NBA, while green space would also be incorporated, subject to further design. This NBA aims to provide a relatively open corridor with minimal aboveground structure, and incorporation of natural elements to provide a flight corridor connecting the MPLV Egretty towards the wetland habitats in the “Open Space”, “eco-interface” area, and eventually to the wider pond areas in San Tin and Sam Po Shue, thus minimising flight path obstruction during the operation phase of the proposed development. Under the Project, obstruction of flight paths will also be further minimised by maintaining flight corridors along the proposed Road D3, allowing connection of flights between the MPLV and the diverted WC-N8 located towards the northeast, and along the proposed Road L11 towards the west. No tall structures are anticipated above the proposed Road D3 and Road L11, thus expected to allow flight to and from the MPLV Egretty, partially coinciding with the Flight Paths 4 and 6. These measures (NBA, proposed Road D3 and Road L11) will provide movement corridors for the existing Flight Paths 1, 2, 4, and 6 (>75% of ardeids). Heights of associated structures on these corridors shall be limited in order to allow flight movement.

9.2.5.3 In order to minimize the disturbance on the flight path along the NBA during breeding period of the egretty (i.e. from March to early September) and encourage ardeid usage, the noisy construction works (with the use of PME) within the 70 m wide NBA should cease at least an hour before sunset, and shall commence at least two hours after sunrise on the following day, making reference to the time of sunrise and sunset from the Hong Kong Observatory), to avoid the period of highest utilisation of flight path. Further disturbances shall be minimised along the proposed flight paths, by incorporation of greening features of suitable heights, where appropriate, to minimise visual disturbance on the ardeids from human activities and further encourage flight usage.

Mai Po Village Egretty

9.2.5.4 Under the Revised RODP, the Flight Path 5 from the MPV Egretty was observed to overlap with the proposed “eco-interface” along the boundary of the proposed development, which eventually connects to the wider pond areas and wetland habitats in San Tin and Sam Po Shue (refer to **Figure 10.6A** in the EIA report). Within this “eco-interface”, provision of buffer area with greening and wetland habitats are being considered, thus promoting the connectivity and movement corridor of the MPV Egretty and the wider wetland habitats. This “eco-interface” would be anticipated to allow and encourage flight movement, thus minimising impact from the partial obstruction.

Maintaining Flight Corridor Across LMC BCP

9.2.5.5 A flight corridor was also observed to the south of Ha Wan Tsuen Night Roost, supporting various east-west flight paths across LMC BCP and over to the Loop, used by other cormorants and ardeids within the Assessment Area which were not roosting in the Ha Wan Tsuen night roost (refer to **Figures 10.6C and 10.6D** in the **EIA report**). A large proportion of cormorants and ardeids along this flight corridor were recorded flying at heights of 21-30m or >30m above ground (refer to **Section 10.6.2.64** in the **EIA report**).

9.2.5.6 The Project would incorporate a flight corridor with width of about 300m. This flight corridor would comprise the proposed AFCD Fisheries Research Centre (near the Loop), “GIC” sites (reserved for a pumping station, HKPF Weigh Station and Customs dog base) and the proposed NBAs within I&T sites near STEMDC to preserve a corridor for flight movement between the east and the west (refer to **Figure 10.6C and 10.6D** in the **EIA report**). Minimal building structure with small area is anticipated at the AFCD Fisheries Research Centre and the “GIC” sites, with maximum building height of 15 mPD. No aboveground building structures would be established above the STEMDC and the NBA.

- 9.2.5.7 According to the recorded flight paths in current survey, 73.2% (Flight Paths B, C, D) and 43.4% (Flight Path G) of the flight paths could be preserved through the incorporation of this 300 m flight corridor in dry season and wet season respectively. Details of the recorded flight paths and flight heights are presented in **Appendix 10.5** and **Figure 10.6** in the **EIA Report**. The proposed flight corridor and the NBA also provide a wider connectivity with wetland habitat in the vicinity, connecting to the LMC meander on the east, and the proposed “Ecological Area” under the Loop. Noisy construction works (with the use of PME) within the 300 m wide flight corridor should cease at least an hour before sunset, and shall commence at least two hours after sunrise on the following day, making reference to the time of sunrise and sunset from the Hong Kong Observatory) during dry season (October to March) to avoid the period of highest utilisation of the flight corridor.
- 9.2.5.8 To further promote flight movement, stepping height of the building structures adjacent to the flight corridor would also be implemented, with building height of not more than +35mPD also proposed on both north and south sides of the flight corridor to encourage usage of this corridor and minimize potential obstruction impact.

9.2.6 Impact on Woodland Habitat

Woodland Compensation

- 9.2.6.1 To compensate for the unavoidable loss of woodland, woodland compensation would be provided based on “no net loss” and “like for like” basis or by providing a compensation area with equivalent or higher ecological function. Compensatory planting would be performed for the loss of the 1.64 ha woodland of moderate value. Suitable sites were identified mainly based on its present ecological value and connectivity with present wooded area. Other factors that were taken into consideration included topography, soil condition and the risk of hill fire.
- 9.2.6.2 In light of a paucity of suitable area for on-site compensation within the Project Area, off-site woodland compensation is considered instead. A suitable area was identified near the compensatory woodland for the Loop Project (**Figure 9.3** refers). This compensatory woodland is situated within the Green Belt zone and was originally of grassland habitat of low ecological value (ibid.). The establishment of a compensatory woodland therein could increase the total area of the compensatory woodland and strengthen ecological connectivity with adjacent wooded area. A compensatory woodland with an extensive area and integrity could foster natural succession and enhance habitat quality, which could potentially raise the overall ecological value of the area. Besides, as the existing grassland was of low ecological value, the impact of tree planting and maintenance works are anticipated to bring only minor impacts.
- 9.2.6.3 Native species of different growth form with high market availability are preferred for compensatory planting (refer to **Table 9.3**). At maturity, the compensatory woodland would create a habitat with multiple layers, including a canopy, a middle layer and an understory. Such habitat complexity would enhance overall ecological value. Compensatory planting would be provided sequentially upon the completion of works within the Project Area. To facilitate successful establishment of the compensatory woodland, a detailed Woodland Compensation Plan should be prepared by local ecologists / botanist with at least 5 years of relevant experience. The Woodland Compensation Plan should include implementation details, management requirement and monitoring requirements (e.g., methodology, schedule, and frequency of monitoring). The Woodland Compensation Plan should be submitted to relevant Government departments (including AFCD and EPD) for approval at least two months before commencement of planting. Upon the completion of planting, monitoring and maintenance works (e.g., irrigation, weeding, pruning, control of pests and diseases, replacement planting and repair of damage) of the compensatory woodland should be implemented.

Table 9.3 Flora Species to be Considered for Woodland Compensatory Planting

Flora Species	Growth Form
<i>Acronychia pedunculata</i>	Tree
<i>Alangium chinense</i>	Tree or shrub
<i>Aquilaria sinensis</i>	Tree
<i>Bischofia javanica</i>	Tree
<i>Bridelia tomentosa</i>	Shrub or small tree
<i>Canthium dicoccum</i>	Tree or shrub
<i>Celtis sinensis</i>	Tree
<i>Cinnamomum camphora</i>	Tree
<i>Cleistocalyx nervosum</i>	Tree
<i>Daphniphyllum calycinum</i>	Tree
<i>Elaeocarpus chinensis</i>	Tree or small tree
<i>Ficus microcarpa</i>	Tree
<i>Garcinia oblongifolia</i>	Tree
<i>Litsea glutinosa</i>	Tree
<i>Machilus pauhoi</i>	Tree
<i>Mallotus paniculatus</i>	Tree or shrub
<i>Phyllanthus emblica</i>	Tree or shrub
<i>Schefflera heptaphylla</i>	Tree
<i>Schima superba</i>	Tree
<i>Sterculia lanceolata</i>	Semi-deciduous tree
<i>Viburnum odoratissimum</i>	Shrub or small tree

9.2.7 Impact on Species of Conservation Importance

Avoiding Direct Loss of Species of Conservation Importance

- 9.2.7.1 As described in **Section 10.8.1** in the **EIA report**, some species of conservation importance were recorded within the Project boundary which may be subject to direct impacts, particularly species with relatively low mobility (e.g. flora, nesting avifauna / chicks, amphibians, and freshwater fauna species) which may be more susceptible to injury / mortality from proposed works.
- 9.2.7.2 A few individuals of the flora species of conservation importance Incense Tree, were recorded at a patch of woodland (between Chau Tau and Lok Ma Chau Tsuen) and at mixed woodland and plantation habitats on Kam Kwai Leng, which would be zoned as “Green Belt” under the Project. As habitat and vegetation would be preserved at these GB zones, direct impact to the Incense Trees would be avoided. Direct impact on other flora species of conservation importance shall be further avoided / minimised by mitigation measures such as pre-construction surveys and transplantation of the species, further discussed below.
- 9.2.7.3 Breeding / nesting behaviour of Little Ringed Plover, White-shouldered Starling and White-throated Kingfisher were recorded within the Project site. Potential direct injury / mortality on the breeding pairs and chicks shall be avoided by pre-construction surveys and nest control, further discussed below. Some amphibian and freshwater fauna species of conservation importance were also recorded within the Project site (amphibians Chinese Bullfrog and Spotted Narrow-mouthed Frog, freshwater fish Rose Bitterling, and two freshwater crab *Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon*), recorded from recent surveys and from previous study under CEDD & PlanD (2021a). Potential

direct injury / mortality on the community of these species shall be avoided by pre-construction surveys and translocation of these species, further discussed below.

Flora Species of Conservation Importance

- 9.2.7.4 Three flora species of conservation importance namely Cycad-fern, Incense Tree and Luofushan Joint-fir were recorded within Project Area which would be subjected to direct loss. Transplantation is recommended as far as possible for Cycad-fern and Incense Tree to minimize the direct impact to this species. Prior to the commencement of the construction phase, a detailed vegetation survey would be conducted by a qualified botanist / ecologist to confirm the locations and health condition of Cycad-fern and Incense Tree. All the healthy individuals suitable for transplantation would be identified and rescued. They would be transplanted to suitable receptor site outside Project Area, ideally at wooded habitats such as mixed woodland, plantation, shrubland or woodland outside the Project Area, including the proposed location for woodland compensation as described in **Section 9.2.6**. Pre-construction survey, screening / selection of receptor site(s) and preparation of a Protection and Transplantation Proposal describing details of the transplantation methodologies would be prepared by qualified botanist / ecologist and submitted for approval prior to transplantation.
- 9.2.7.5 Transplantation of Luofushan Joint-fir is not recommended because it is impractical to segregate the species (a woody climber) from adjacent plants individuals for transplantation. Transplantation of this species may induce severe shading stress to the existing vegetation in receptor site if massive mature clusters are transplanted. Nonetheless, mitigation for Luofushan Joint-fir is recommended in compensation manner. Seedling planting of Luofushan Joint-fir is recommended in receptor site(s). However, it should be planted in low density to reduce its shading stress to the receptor site(s) in future. The shading stress would be acceptable as Luofushan Joint-fir is a common native species in Hong Kong which do not show any aggressiveness or adverse impact to local ecosystem. Prior to the commencement of the construction phase, a detailed vegetation survey, collection of seeds, screening / selection of receptor site(s) and preparation of a Protection and Seedling Planting Proposal should be prepared by qualified botanist / ecologist for approval.

Fauna Species of Conservation Importance

- 9.2.7.6 Fauna species of conservation importance were recorded within the footprint of Project Area. While no adverse direct impacts are expected on fauna groups with relatively high mobility (e.g. avifauna, mammals, butterflies and odonates), direct injury / mortality to slow-moving fauna or aquatic fauna (e.g. nesting avifauna, freshwater fauna and herpetofauna) is anticipated. Mitigation measures such as nest control for avifauna and translocation for other fauna groups should be implemented, further discussed below.

Breeding Ground of Avifauna Species of Conservation Importance

- 9.2.7.7 Breeding / nesting behaviour of Little Ringed Plover, White-shouldered Starling and White-throated Kingfisher were recorded within the Project Area during survey period. Both Little Ringed Plover and White-shouldered Starling were recorded near pond habitats, which may be subject to potential impact from pond filling; while White-throated Kingfisher were recorded using the mud wall tunnels on Ngau Tam Shan, which may be subject to potential impact from the construction of the water reservoirs and associated site formation works. Although avifauna are highly mobile and are not expected to be injured by construction works, the nesting pairs, chicks and eggs are more susceptible to construction works. The breeding season vary among these three avifauna species but are all typically within spring and summer (March to July). In order to avoid direct injury to the breeding pairs, chicks and eggs, nest control measures should be implemented in non-breeding season (late August to early February) to discourage breeding behaviour within Project Area prior to construction works.
- 9.2.7.8 To avoid nesting of Little Ringed Plover in drained ponds, drained ponds should be covered by black pond liner immediately to discourage Little Ringed Plover from nesting on the

drained ponds. To discourage nesting of White-shouldered Starling, box attached to electric pole should be sealed / removed in non-breeding season. To discourage nesting of White-throated Kingfisher, the mud wall and mud wall tunnels within Project Area on Ngau Tam Shan should be sealed in non-breeding season. Prior to nest control measures, the drained pond, box and mud wall tunnel should be checked carefully by qualified ecologists to ensure no avifauna / eggs are present. Preparation of Nest Control Proposal, pre-construction survey, and the nest control measures mentioned should be conducted by qualified ecologist with at least 10 years relevant experience to ensure the control measures and the subsequent works would not injure any breeding pairs, chicks or eggs.

Freshwater Fauna Species of Conservation Importance

- 9.2.7.9 A population of Rose Bitterling was recorded in ponds and adjacent semi-natural watercourse in Lok Ma Chau, located within the Project boundary. These habitats of Rose Bitterling would be subject to unavoidable direct loss. Pre-construction survey would be conducted for this species of conservation importance, followed with measures to capture and translocate individuals of Rose Bitterling to nearby suitable habitat(s) which are free from development pressure. Existing examples of Rose Bitterling translocation include the Development of Kwu Tung North and Fanling North New Development Areas, Phase 1, the subsequent EM&A Reports (CEDD, 2022; CEDD, 2020), and unpublished Rose Bitterling Monitoring Reports under the project (CEDD, Unpublished Data). Long-term survival of the translocated Rose Bitterling individuals was observed at the receptor sites, described in the unpublished Rose Bitterling Monitoring Reports, suggesting the feasibility of translocation as mitigation measure for this species.
- 9.2.7.10 Qualified ecologist with at least 5 years relevant experience (on freshwater fauna) should prepare a detailed Translocation Proposal for approval. The plan should include, but not limited to, the methodology of capture, translocation, and details of receptor sites, making reference to the aforementioned examples. For example, considering the Rose Bitterling has a spawning symbiosis relationship with Chinese Pond Mussel, translocation of Chinese Pond Mussel should also be included in the scope of translocation; while mud should also be deposited to support the mussel, etc. Wetland compensation area in Hoo Hok Wai (CEDD, 2019) or other nearby inactive / abandoned fishponds in Lok Ma Chau and Hoo Hok Wai which are located away from development could be considered as potential receptor sites. The potential receptor sites should be in similar size compared to the original fishponds (approximately 0.42 ha / pond). The abiotic (temperature, pH, salinity, level of dissolved oxygen, turbidity and pollution) and ecological (vegetation, presence of invasive fish / predators) parameters of receptor site(s) should be examined prior to translocation. Screening and selection of potential receptor sites would be included in the Translocation Proposal, conducted by qualified ecologist before the commencement of construction phase.
- 9.2.7.11 Moreover, two freshwater crab species of conservation importance (*Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon*) recorded in current survey and literature review would be directly affected by the Project. Capture and translocation are recommended for both crab species. Pre-construction survey focusing the locations where they were previously recorded in Project Area should be conducted, identified individuals should be captured and translocate to suitable receptor sites. Hillside unpolluted natural / semi-natural watercourses south of Pang Loon Tei, east of Saddle Pass and north of Chau Tau might be potential receptor sites. Preparation of Translocation Proposal, screening / selection of receptor sites and capture – release process should be conducted by qualified ecologist with relevant experience.

Herpetofauna Fauna Species of Conservation Importance

- 9.2.7.12 Several herpetofauna species of conservation importance were recorded in Project Area and would be subjected to habitat loss and potentially direct injury / mortality. Translocation is suggested for amphibian species of conservation importance; however, it is impractical for the reptiles which are highly mobile, cryptic and potential dangerous such as venomous snakes and skinks. Chinese Bullfrog and Spotted Narrow-mouthed Frog were recorded in

current survey and literature review, they were scattered in wetland habitats across the Project Area. Similar capture – release approach described above would also be adopted for amphibians. Both adults and tadpole shall be included in the scope of translocation. The pre-construction survey, capture and release should be conducted during night-time in wet season when amphibian is relatively active to maximise capture rate. Amphibian could be identified and spotted by their calls and secondarily by active searching. Potential suitable receptor site(s) include wetlands in Lok Ma Chau Tsuen and wetlands in Hoo Hok Wai. Preparation of Translocation Proposal, screening / selection of receptor sites and capture – release process should be conducted by qualified ecologist with relevant experience.

- 9.2.7.13 Post-transplantation, post-plantation and post-translocation monitoring programs for the mentioned flora / fauna species are required for determining the success of mitigation. Direct observation and counting, mark-recapture and active search would be potential methodology for the monitoring programs depend on the target species. Detailed methodology, schedule and frequency of monitoring program would be provided in the corresponding Translocation Proposal.

Other Fauna Species of Conservation Importance

- 9.2.7.14 The mammal species Eurasian Otter was of particular interest due to the small and scattered populations of this species, while their declining populations are also considered to be on the verge of local extinction (Li & Chan, 2017). No record of this species was made within the Assessment Area from the 12-month ecological survey, and from joint-monitoring conducted in recent years (WWF and KFBG, pers. comm.). Nonetheless, a recent literature has revealed record of otter sightings made in 2018 / 2019, suggesting its historical presence and potential activity range across the Project area (McMillan et al., 2023) (**Section 10** of the EIA Report refers). While no significant ecological impacts are anticipated on the low occurrence of this species, a conservative approach has been adopted, and this potential movement corridor across the Project area was considered under the Revised RODP with the inclusion of a wildlife corridor (further detailed in **Section 10** of the EIA Report). Further pre-construction site check will be included under a conservative approach on this highly elusive species.

9.2.8 Potential Injury / Mortality on Other Wildlife

Minimising Direct Injury / Mortality of Wildlife

- 9.2.8.1 Other than the avifauna species recorded mainly near the northern portion of the Project site, other fauna species were mostly widespread and common in Hong Kong. These species were recorded to be subject to existing regular disturbance from nearby developed area / wasteland (e.g. heavy road traffic and highway, open storage, workshops, and brownfield). Species with high mobility were anticipated to disperse upon construction activities. Furthermore, proper screening (e.g. hoarding or barrier) would be provided to restrict construction activities within the Project sites, to minimise potential direct injury to nearby wildlife by confining the construction activities, and to avoid the wildlife from accidentally entering the Project sites.

Minimising Bird Collision

- 9.2.8.2 Considering the commuting activity of birds in the vicinity, the potential bird collision should be avoided by using non-transparent panels as the noise enclosure, as well as adopting non-glaring tinted materials, or superimposing dark patterns at the majority of glazing along barriers and station structures, as per *Guidelines on Design of Noise Barriers* (EPD & HyD, 2003) and *Practice Notes No. BSTR/PN/003 (Revision E) Noise Barriers with Transparent Panels* (HyD, 2020), to avoid and minimise bird mortality from collision.

9.2.9 Habitat Fragmentation and Impact on Animal Movement Corridor

Wildlife Corridor

- 9.2.9.1 An existing wildlife corridor was constructed under the Sheung Shui to Lok Ma Chau Spur Line project, allowing free movement of mammals underneath San Sam Road (EPD, 2015). However, the existing wildlife corridor is within Project footprint which would be lost upon the commencement of construction activities. In order to maintain the movement corridor of non-flying mammal species of conservation importance (e.g. East Asian Porcupine, Red Muntjac and Small Indian Civet), wildlife corridors are proposed in the Revised RODP in both northern and southern portions of the Project area to mitigate for the habitat fragmentation. Moreover, movement of Eurasian Otter is taken into consideration in the proposed wildlife corridor, where water feature would be incorporated on the northern portion). A preliminary design is recommended based on existing baseline conditions (**Figure 9.5A** refers). Details of the design may be subject to change during the future detailed design stage.

Northern Portion

- 9.2.9.2 Under the Revised RODP, wildlife corridors have been incorporated to provide opportunity for ecological linkage between STEMDC, Ha Wan Tsuen and Lok Ma Chau. This wildlife corridor should comprise underground sections (concrete underpasses across proposed roads) and aboveground sections which would be provided within the AFCD Fisheries Research Centre to provide connection between the AFCD Fisheries Research Centre and the STEMDC. Indicative locations of these proposed wildlife corridors are presented in **Figure 9.5A**.

Underpass connecting the separated "OU(I&T) 6.1.1" and "OU(I&T) 1.1.1"

- 9.2.9.3 The underpasses are proposed to link the segregated parcels of "OU(I&T) 6.1" (proposed AFCD Fisheries Research Centre) and further west towards "OU(I&T) 1.1.1" adjacent to the STEMDC. These underpasses will be situated across Ha Wan Tsuen East Road and San Sham Road respectively. It is projected to be a concrete box culvert and have a length of approximately 30 and 75 meters respectively, subject to detailed design.

Wildlife Corridor (aboveground) at OU(I&T) 6.1.1

- 9.2.9.4 The "OU(I&T) 6.1.1" is composed of two separated land parcels (western and eastern side). Both parcels would form the AFCD Fisheries Research Centre, with the eastern parcel situated adjacent to the LMC Meander.

- 9.2.9.5 Along the northern boundary of the Fisheries Research Centre, a 10 m wide buffer area should be retained as an aboveground wildlife corridor and connecting the underpasses, and to the LMC Meander. The width of the wildlife corridor has been determined by referencing to the relevant mitigation guidelines for otters concerning development pressure (NIEA, 2011). Potential design of this 10 m wide wildlife corridor (at the Fisheries Research Centre) should include suitable design and material (e.g. cobblestone road), with landscaping features (e.g. dense shrubs and trees) on both sides to provide vegetation that can serve as a form of soft fencing and to minimise disturbance (such as human activities, glare from artificial lights, noise) from the surrounding environment, subject to detailed design.

Wildlife Corridor (aboveground) adjacent to STEMDC

- 9.2.9.6 A 10 m wide buffer area is proposed as the aboveground wildlife corridor situated along the northern boundary of NBA at "OU(I&T).1.1.1" and the "Amenity" land use adjacent to STEMDC. Recommended design at this section of the aboveground corridor could include a watercourse, with gabion riverbank and ledges installed along the two sides of the watercourse (which would be favourable for wildlife movement use), subject to detailed

design. Aside from serving as a wildlife corridor, water feature in this section would be beneficial to overall wildlife use such as avifauna and potentially encourage the movement of Eurasian Otter. For further optional enhancement, landscape planting of dense shrubs and trees and other water features (e.g. pond and reedbed) is also recommended at the NBA adjacent to the 10 m wide wildlife corridor to attract wildlife and act as soft fencing (subject to detail design of the future land use).

Fencing

- 9.2.9.7 Continuous fencing of suitable height should be installed to prevent roadkill of target species and other wildlife near San Sham Road and Ha Wan Tsuen East Road. Fencing could also funnel wildlife toward the underpass. The proposed extent of the fencing is presented in **Figure 9.5A**.

Southern Portion

- 9.2.9.8 Under the Project, wildlife corridors have been incorporated to provide opportunity for ecological linkage between wooded habitats preserved with proposed “Green Belt”. This wildlife corridor would be comprised of underground sections (two underpasses under proposed roads) and aboveground sections. The proposed wildlife corridor is presented in **Figure 9.5B**.

Underpass

- 9.2.9.9 Both underpasses are proposed to be a concrete box culvert., connecting “GB 5.3” and “GB 5.2” and approximately 30 m in length, while the underpass connecting the “GB 5.2” and “GB 5.1” would be approximately 45 m in length.

Aboveground wildlife corridor

- 9.2.9.10 In order to maintain ecological linkage between “GB 5.4” and “GB 5.3”, a 6 m wide corridor would be retained. This aboveground wildlife corridor would be vegetated either by retaining the original vegetation or through landscape planting of native flora species, depending on the detailed design in later stage.

Green Belt

- 9.2.9.11 The proposed “GB” would retain the original vegetated habitats including mixed woodland, woodland, plantation, grassland and shrubland. Mammal species of conservation importance were recorded in some of the “GB” zone. No further construction of corridor is required in the “GB” zone.

Fencing

- 9.2.9.12 Continuous fencing should be installed to prevent roadkill of target species and other wildlife near traffic roads. Fencing could also funnel wildlife toward the underpass. The proposed extent of the fencing is presented in **Figure 9.5B**.

9.2.10 Other Potential Impact from Construction Disturbance

Minimising Construction Disturbance to Habitats and Wildlife

- 9.2.10.1 Mitigation measures should be implemented to minimise the disturbance impacts (e.g. noise, glare and dust) to the adjacent habitats and their associated wildlife arising from the construction activities, including but not limited to the following:

- Noise mitigation measures by effective placing of site hoarding, temporary noise barriers and material stockpiles where practicable as screening, shut down of machines and plants that are in intermittent use, and the use of quality power

mechanical equipment (PME) to limit noise emissions at source. Machines and plant known to emit strong directional noise should, wherever practicable, be orientated so that the noise is directed away from the nearby habitats. QMP and other machines and plants should be covered by noise enclosure to further reduce noise impact (**Section 4** in the EIA report refers).

- A balance between lighting for safety, and avoiding excessive lighting can be achieved through the use of directional lighting to avoid light spill into sensitive areas (e.g. construction activities near the egrettries and ardeid night roosts), hoarding provision, and control night-time lighting periods, particularly for the works site(s) located in proximity, and during peak season of activities (e.g. breeding season of the egrettries, peak roosting season of ardeids at night roosts during dry season), hence minimising the potential indirect impact on the community of the breeding and night-roosting ardeids.
- Dust suppression measures (such as regular spraying of haul roads, proper storage of construction materials, covering trucks or transporting waste in enclosed containers, and environmental control measures as stipulated in the Air Pollution Ordinance (Construction Dust) Regulation) to avoid and minimise emission and dispersal dust, which would cover vegetation and potentially discourage usage of nearby wildlife.
- For construction activities at pond habitats within the Wetland Conservation Area, percussive piling works and demolition using excavator mounted breakers should be avoided from November to March. Where such construction activities are unavoidable, additional agreement with relevant Government departments (including EPD and AFCD) should be sought prior to the commencement of works.

9.2.10.2 Some works area in northern portion are within / adjacent to wetlands (ponds and watercourses) with high bird usage. With particular focus to minimise disturbance to the wetlands and waterbirds, site hoarding of about 3 m high should be erected along the works site and works area before commencement of construction activities. The hoarding shield the avifauna in the nearby wetlands from the disturbance of human activities during construction phase. Such hoarding would be non-transparent and superimposing dark patterns or stripes to avoid the risk of potential bird collision.

Good Site Practice

9.2.10.3 Good site practices should be strictly followed to avoid / minimise adverse impacts arising from the construction activities. Recommendations for good site practices during the construction phase include:

- Nomination of approved personnel, such as a site manager, to be responsible for implementation of good site practices, arrangements for waste collection and effective disposal to an appropriate facility;
- Training of site personnel in site cleanliness, concepts of waste reduction, reuse and recycling, proper waste management and chemical waste handling procedures;
- Provision of sufficient waste reception/ disposal points, and regular collection of waste;
- Adoption of appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Provision of regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
- Adoption of a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites); and
- Preparation of Waste Management Plan (WMP), as part of the Environmental Management Plan (EMP).

Minimising Water Quality Impacts

9.2.10.4 As stated in the Water Quality section, good site practices during the construction phase should be adopted to avoid any pollution entering any nearby watercourses. Practices to minimise surface run-off and to reduce suspended solid levels should be undertaken during construction (**Section 5** in the EIA report refers):

- Surface run-off from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sedimentation basins;
- Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms;
- General refuse and construction waste should be collected and disposed of in a timely and appropriate manner;
- Drainage arrangements should include sediment traps to collect and control construction run-off;
- Silt removal facilities, channels and manholes should be maintained, and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding;
- All works and storage areas should be restricted to the site boundary;
- All vehicles and plant should be cleaned before they leave a construction site to minimise the deposition of earth, mud, debris on roads; and
- Regular check of the construction boundary to avoid unmitigated impacts imposed on nearby watercourse.

9.2.11 Enhancement Measures

Eco-Interface

9.2.11.1 Under the Revised RODP, “eco-interface” area was proposed along the northwestern boundary of the ROPD, between the proposed land uses “OU(I&T).1.1.2” “OU(I&T).1.1.3” and the wider pond habitats in San Tin and Sam Po Shue, and also at the existing LMC BCP, between the land use “OU(I&T).1.1.1” and STEMDC. The “eco-interface” would provide minimisation measure between the Project and the wider pond habitats in San Tin and Sam Po Shue, while also providing opportunities for further enhancement measure to promote wildlife usage. Installation of artificial nest boxes and bat boxes are recommended in both “eco-interface” areas (including the 35 m wide “eco-interface” along Project area in San Tin and near Sam Po Shue, and the 20 m wide “eco-interface” along the east of STEMDC) to attract avifauna and bat species including species of conservation importance such as White-shouldered Starling and Japanese Pipistrelle. Location and selection of nest box and bat box would be subject to detailed design.

River Revitalisation

9.2.11.2 Under the Revised RODP, major watercourse including WC-N3 and WC-S3 (i.e. STEMDC) and WC-N8 (i.e. STWMDC) would be reinstated and revitalised, while details of the revitalisation would be available after detailed design. Opportunities for ecological enhancement (e.g. bioengineering, creating meanders) would be explored to improve its ecological value. Provision of natural substrate that would encourage colonisation of flora and freshwater fauna in the bottom and banks of the revitalised watercourses would be considered, subject to detailed design of the proposed revitalisation measures. Vegetation species to be planted along the riparian zone would be selected on the basis that it would benefit the wildlife recorded in the vicinity. Fauna species recorded from recent surveys and previous studies would be potentially benefit from the revitalised watercourse (e.g. foraging ground for avifauna species, drinking site for bat species). Maintenance works

(e.g. weeding, de-silting, replacement planting, repair of damage, etc.) should also be conducted as necessary.

Enhanced Connectivity at Green Belts

- 9.2.11.3 With the inclusion of the proposed wildlife corridors, enhanced connectivity is anticipated between Green Belts to benefit wildlife usage (detailed in **Section 10** of the EIA Report). Other Green Belts were also retained under the Revised RODP (**Figure 10.7B** refers). While some Green Belts on the southern portion of the Project area was not recorded with particular mammal species of conservation importance (e.g. GB.3.1 and GB.5.5), similar underpass structures are proposed to connect these Green Belts in order to provide enhanced connectivity for general wildlife (e.g. future urban wildlife within the Revised RODP). No specific ecological monitoring would be required for this enhancement feature.

Greening Opportunity

- 9.2.11.4 Greening opportunities should be explored to promote the overall habitat quality and ecological connection. Native tree, shrub and herb species should be considered as far as possible, with consideration of market availability, for landscape planting and buffer planting in the Project Area and Project boundary. Furthermore, native host plants and nectar plants should preferentially be considered in the planting plan to provide a butterfly-friendly environment. Beside planting host and nectar plant for attracting butterfly, *Livistona chinensis* could also be planted to create favorable roosting habitat for Short-nosed Fruit Bats recorded in the present study, and native fruits trees with food sources (e.g. *Ficus microcarpa*, *F. subpisocarpa*, *F. variegata*, *Dimocarpus longan*, *Clausena lansium*) be planted to attract birds. Buffer planting together with nectar plants and host plants is highly recommended especially in the south of Pang Loon Tei, close to CA in the hillside, where a high diversity of butterfly species was recorded.

9.3 Monitoring and Audit Measures

9.3.1 Overview

- 9.3.1.1 Recommended mitigation measures described above (e.g. wetland compensation, mitigation for egrettries, mitigation for night roosts, inclusion of flight corridor, woodland compensation, transplantation / nest control / translocation of species of conservation importance, and establishment of wildlife corridor) should be monitored and audited by local ecologist(s) with relevant experience throughout the construction phase and during the operation phase to ensure proper implementation, and where appropriate, to monitor the performance of the proposed mitigation measures (e.g. monitoring upon the establishment of compensation areas may extend into operation phase).

9.3.2 Wetland Compensation Monitoring

Monitoring on Construction Phase Disturbance

- 9.3.2.1 During the construction phase of the Project, ecological monitoring should be conducted to monitor the ecological disturbance arising from the construction activities under the Project, to verify the assumption adopted under the ecological assessment, including the assumption of Exclusion Zone (EZ) and Reduced Density Zone (RDZ). In turn, the effectiveness of the proposed minimisation measures should also be reviewed under part of the ecological monitoring on construction phase disturbance. Where necessary, the need for further or more effective mitigation measures shall be considered. The target indicator waterbird species that were adopted during formulation of mitigation measures (refer to **Section 10 of the EIA report**) shall be focused during ecological monitoring.
- 9.3.2.2 Monitoring survey should be conducted by qualified ecologist with at least 5 years relevant experience. The abundance of the target indicator waterbird species (i.e., Black-faced Spoonbill, Great Cormorant, Great Egret, Grey Heron) shall be monitored at representative

locations within the disturbance zones (including both EZ and RDZ), outside the disturbance zone within 500 m of the Project boundary, and outside the 500 m of the Project boundary, in order to enable comparison of ecological conditions within and outside disturbance zones. Indicative locations of these areas (including the EZ, RDZ, and the 500 m Assessment Area from the Project boundary) are presented in **Figure 9.6**, with exact monitoring locations subject to detailed design and agreement with relevant Government departments (including EPD and AFCD) during the design and construction stage. The ecological monitoring shall be conducted (1) before construction phase to establish baseline conditions, and (2) when construction activities occur within 400m from the contiguous pond / wetland habitats on the northern portion of the Project area, to monitor the disturbance impact. Frequency of this monitoring shall be twice a month during dry season (September to March) and once a month during wet season (April to August).

- 9.3.2.3 In the scenario where abundances of the target avifauna decrease significantly as compared with the baseline conditions, the cause of decrease shall be investigated. The proposed mitigation measures shall be reviewed, and the need for additional mitigation measures (e.g. strengthening of disturbance minimisation via noise barrier, review phasing of pond-filling progress) shall be investigated and implemented, where necessary.

Monitoring on Wetland Enhancement

- 9.3.2.4 Enhanced wetland of 288 ha in the proposed SPS WCP would be established as a mitigation measure for the unavoidable loss of wetland habitats under the Project. A working group will be formed between CEDD (as San Tin Technopole's works agent) and AFCD (as SPS WCP's sponsoring department) to coordinate the progress of pond filling and SPS WCP implementation. With the coordination of the working group, ecological monitoring will be conducted to monitor the effectiveness of the proposed mitigation measures (i.e., ecological function enhancement measures).

- 9.3.2.5 The implementation details of the enhanced wetland, the associated management and monitoring requirements (e.g. monitoring location, frequency and parameters) would be provided in a subsequent HCMP, subject to detailed design. The ecological monitoring shall focus on the abundance of the target indicator waterbird species (i.e., Black-faced Spoonbill, Great Cormorant, Great Egret, Grey Heron) at representative locations within the impacted area under the Project, and the enhancement area. The ecological monitoring shall be conducted (1) before construction phase to establish baseline conditions, (2) at certain milestones between the commencement of pond filling and the full operation of San Tin Technopole, details to be formulated under the HCMP.

- 9.3.2.6 The working group shall consult and regularly report to relevant stakeholders. Further enhancement measures shall be conducted under the coordination of the working group, where necessary, such as when the proposed ecological function enhancement measures show lower abundance and/or density of target indicator waterbird species than the mitigation target. Follow-up actions shall be investigated and implemented in liaison with the working group, where necessary. The follow-up actions associated with the ecological monitoring shall be provided in detail in the subsequent HCMP. The HCMP should be submitted for approval from relevant Government departments (including AFCD and EPD), at least three months before the commencement of pond filling works.

9.3.3 Egretty Monitoring

Pre-construction Egretty Survey

- 9.3.3.1 Two egrettries (MPLV Egretty and MPV Egretty) were recorded within / adjacent to Project boundary during recent ecological survey (2022) and buffer area(s) of 100 m from the footprint of both egrettries were proposed (**Figure 9.2** refers). It is noted that the condition, location and extent of egretty could change periodically even without additional human disturbance. Thus, pre-construction surveys are necessary to confirm the latest boundary of the egrettries before commencement of the construction works, and the 100 m buffer area should be verified according to the latest site observation on the egrettries. The Pre-

construction Egretty Survey shall be conducted once per month during breeding season (between March and September) by qualified ecologist with 5 years relevant experience. The species, abundance, number of nests, and associated flight paths of the breeding ardeids should be recorded, whilst the latest boundary of the egrettries shall be updated during pre-construction survey, where appropriate. A Pre-construction Egretty Survey Report including the results from this Project and the Pre-construction Egretty Survey should be submitted to relevant Government departments (including AFCD and EPD) for approval no later than two months before the commencement of works within the buffer area. The Pre-construction Egretty Survey Report should list out details of all measures to minimize the potential impacts on the egrettries during the construction of the Project (including the proposed seasonal control of construction activities within the 100 m buffer area), and set out the baseline data for subsequent egretty monitoring.

- 9.3.3.2 As discussed in **Section 0** of this EM&A Manual, an “Open Space” with enhancement features was proposed to preserve the MPLV Egretty. Upon the Pre-construction Egretty Survey, an Egretty Habitat Enhancement and Management Plan including the details of design plan, site preparation works, works schedule and management plan should be prepared by qualified ecologist with 5 years relevant experience and submitted to relevant Government departments (including AFCD and EPD) for approval no later than two months before the commencement of works within the buffer area. The enhancement features suggested above (e.g. preservation and planting of egretty substratum, incorporation of water features, maintaining buffer area, and seasonal control of construction activities) should be provided in the plan, while maintenance of these features shall be implemented by the Project Proponent and Contractor during the period of egretty monitoring, as described below.

Egretty Monitoring Survey

- 9.3.3.3 During construction phase, egretty monitoring survey should be conducted monthly for both MPLV Egretty and MPV Egretty during breeding season (between March and early September). Upon the completion of enhancement work at the “Open Space”, egretty monitoring survey should be continued monthly for the first three breeding seasons (between March and early September, for three years).
- 9.3.3.4 The monitoring survey should be conducted by qualified ecologist with 5 years relevant experience, recording the condition, location and extent of egrettries, the species, abundance, number of nests, and associated flight paths. During the construction phase, the surveyor should confirm the implementation of seasonal control within the 100 m buffer area, and confirm that no direct impact to the egrettries were induced by construction works (except for the small area of encroachment as stated in the EIA Report). A stringent seasonal control should be implemented within the buffer area, where construction activities shall be avoided during the ardeid breeding period (i.e., from March to early September). Construction activities shall be conducted from late-September to February in the following year, unless AFCD’s prior approval on construction method has been obtained and appropriate mitigation measures have been proposed and adopted. Tree crown pruning works at the egrettries shall be avoided as best as possible, and where necessary, shall also be conducted and completed outside the ardeid breeding season to minimise disturbance to any breeding ardeids that may be present. A further Method Statement on construction activities near the egrettries and necessary tree crown pruning works shall be submitted to AFCD in advance of the works.
- 9.3.3.5 Any changes in site condition or disturbances detected or observed at the monitoring locations, including both construction and non-construction related activities, during each monitoring visit should also be recorded. If number of breeding ardeid decrease significantly during construction phase compared to previous record, remedial action should be taken as best as possible (such as verifying the implementation of mitigation measures such as proper site hoarding, noise, dust and glare control measures, increasing monitoring frequency to potentially weekly monitoring survey, and where necessary, expanding the buffer zone as appropriate), depending on actual situation, and in consultation with IEC and relevant Government departments (including AFCD and EPD).

The egret monitoring survey should be undertaken by experienced ecologist(s) with at least 5 years of relevant working experience. The monitoring results should be reported in the monthly EM&A Reports.

9.3.4 Night Roost Monitoring

Pre-construction Night Roost Survey

- 9.3.4.1 Two night roosts (Ha Wan Tsuen Night Roost and San Tin Open Storage Area Night Roost) were identified within the Project boundary during recent ecological survey (2022) and encroachment into the footprint of night roosts is unavoidable (**Figures 9.4a** and **9.4b** refer). As such, compensation measure via the re-provision of roosting substratum have been proposed for both night roosts, to be located within the Project area.
- 9.3.4.2 As the condition, location and extent of the night roosts may fluctuate naturally even without additional human disturbance, pre-construction surveys are necessary to confirm the latest boundary, species, abundance, returning time and active period of the night roosts before commencement of the construction works. The pre-construction survey shall be conducted once per month between September and March by qualified ecologist with 5 years relevant experience. A Pre-construction Night Roost Survey Report including the results from this Project and pre-construction survey should be submitted to relevant Government departments (including AFCD and EPD) for approval no later than two months before the commencement of works within the buffer area. Subject to the findings of the Pre-construction Night Roost Survey, the Pre-construction Survey Report should set out the appropriate mitigation measures as proposed under the EIA Report, where tree felling at the night roosts should be conducted in wet season (April to September) where roosting individuals were absent.
- 9.3.4.3 Further to the Pre-Construction Night Roost Survey, minimisation measures were proposed to minimise the disturbance on the existing night roosts. Prior to the tree removal at both night roosts, a buffer area of 100 m should be implemented, where noisy construction activities should be subject to timing control. During dry season (October to March), noisy construction activities (with the use of PME) within the 100 m Buffer Area should cease at least an hour before sunset, and shall commence at least an hour after sunrise on the following day, making reference to the time of sunrise and sunset from the Hong Kong Observatory.

Night Roost Monitoring

- 9.3.4.4 While roosting substratum at the two night roosts would be felled during construction phase, re-provision of roosting substratum at the proposed Fisheries Research Centre (**Figure 9.4a** refers) and along STWMDC (**Figure 9.4b** refers) would be completed before dry season, prior to the arrival of the overwintering ardeid and Great Cormorant. Under the EIA report, felling of trees at both night roosts should only be conducted in wet season (April – September) when no roosting individuals are not expected.
- 9.3.4.5 Night roost monitoring survey should be conducted at the original roosting sites until commencement of tree felling works, and upon re-provision of roosting substratum, conducted in the night roost re-provision sites and nearby area to investigate the effect of night roost re-provision site and confirm the locations of roosting ardeid and Great Cormorant, if any. Upon the successful establishment of the re-provided night roosts, a similar buffer area of 100 m should also be implemented at the footprint of the re-provided night roosts, where noisy construction activities should be subject to timing control. During dry season (October to March), noisy construction activities (with the use of PME) should cease at least an hour before sunset, and shall commence at least an hour after sunrise on the following day, making reference to the time of sunrise and sunset from the Hong Kong Observatory.
- 9.3.4.6 If significantly low abundance or no roosting ardeid / Great Cormorant are recorded at / near the re-provision site, potential remedial measures (e.g., review conditions of the re-

provided roosting substratum, review of buffer area during construction phase) should be proposed, in consultation with IEC and relevant Government departments (including AFCD and EPD). Upon the completion of re-provision of roosting substratum, night roost monitoring survey at the re-provision site should be conducted monthly during dry season, in the first three years of the completion of re-provision. The monitoring results and evaluation of the usage of the night roosts should be reported in the monthly EM&A Reports. Monitoring of the re-provided roosting sites (e.g. conditions of the re-provided tree individuals) shall also be conducted, with maintenance conducted by the Project Proponent and Contractor during the period of night roost monitoring.

9.3.5 Flight Corridor Monitoring

9.3.5.1 A 300 m wide flight corridor across the LMC BCP would be retained, while noisy construction activities (with the use of PME) within this flight corridor would also be subject to timing control during dry season (October to March). Given the potential importance of this flight corridor, its bird usage should be monitored to ensure no adverse impacts arises from construction activities. Construction phase monitoring should be conducted, focusing on the composition of bird species and their abundance using the flight corridor, observed from suitable vantage point(s) such as the LMC Lookout. The flight line monitoring survey should be conducted during hours of peak usage, about 30 minutes before sunrise, and conducted for at least two hours. This flight line monitoring shall be conducted monthly when construction activities occur within this flight corridor. Where significant decrease of bird usage was observed at this flight corridor, construction activities and the associated proposed minimisation measures (e.g. timing control) along this flight corridor and its vicinity shall be reviewed, with additional measures considered where necessary.

9.3.6 Woodland Compensation Monitoring

9.3.6.1 As discussed in the EIA Report, the Project would result in the loss of 1.64 ha woodland (of moderate ecological impact) in the northern portion of the Project area. Compensatory planting based on a “no net loss” and “like for like” basis would be provided at the Green Belt zone at Lok Ma Chau, adjacent to the proposed compensatory woodland for the Loop Project (**Figure 9.3** refers). A detailed Woodland Compensation Plan should be prepared by local ecologist / botanist with at least 5 years relevant experience to form the basis of the proposed compensatory planting. The Woodland Compensation Plan should include implementation details, management requirement, as well as monitoring requirements (e.g. methodology, schedule, frequency of monitoring, and monitoring parameters) of the compensatory planting area. The Woodland Compensation Plan should be submitted for approval from relevant Government departments (including AFCD and EPD) at least two months before commencement of compensatory woodland planting.

9.3.6.2 Upon the completion of compensatory planting, a three-year monitoring by local ecologist / botanist with at least 5 years relevant experience is recommended to ensure proper establishment of this compensatory woodland. The monitoring frequency should be monthly within the first year upon the establishment of the compensatory planting, and bi-monthly in the next two years of the monitoring. Parameters, such as health condition and survival rate of the plant, presence of weedy plant, should be monitored. Maintenance works (e.g. irrigation, weeding, pruning, control of pests and disease, replacement planting, repair of damage, etc.) should also be conducted by the Project Proponent and Contractor as necessary during the period of the monitoring.

9.3.7 Transplantation / Seedling Planting of Flora Species of Conservation Importance

9.3.7.1 Some individuals of flora species of conservation importance (e.g. Incense Tree *Aquilaria sinensis*, Cycad Fern *Brainea insignis* and Luofushan Joint-fir *Gnetum luofuense*) were recorded within the footprint of the development, and may be subject to direct loss. All of these individuals should be protected as far as practicable. As a mitigation measure, all the unavoidably affected individuals of Incense Tree and Cycad Fern should be preserved on-site, or transplanted to nearby suitable habitat(s) prior to the commencement of site clearance as a last resort. Seedling planting of Luofushan Joint-fir in nearby suitable

habitat(s) prior to the commencement of site clearance is recommended if on-site preservation is not feasible. A detailed Pre-construction Vegetation Survey should be conducted by a suitably qualified botanist / ecologist with at least 5 years relevant experience to identify and record the affected individuals prior to the commencement of any site clearance works. A Protection and Transplantation / Seedling Planting Proposal including the methodology, screening / selection of receptor sites (e.g. at the proposed woodland compensation area, or other suitable locations as identified in later studies), and post-transplantation / post-seedling planting monitoring for the affected individuals should be prepared and conducted by a suitably qualified local ecologist / horticulturist with at least 10 years relevant experience. The Proposal should be submitted for approval from relevant Government departments (including AFCD and EPD) at least two months before works commencement.

- 9.3.7.2 Upon the transplantation / seedling planting of the identified individuals, a three-year post-transplantation / post-seedling planting monitoring should be implemented to monitor the health conditions and survival of the transplanted individuals. The suggested monitoring frequency should be monthly within the first year upon the establishment of the transplantation, and bi-monthly in the next two years of the monitoring. Parameters, such as health condition and survival rate of the plant, presence of other weedy plants, should be monitored. The details of monitoring programme such as monitoring frequency, parameters, maintenance works and remedial actions shall be also recommended in the Protection and Transplantation / Seeding Planting Proposal for approval.

9.3.8 Translocation of Fauna Species of Conservation Importance

- 9.3.8.1 Fauna species of conservation importance with low mobility should also be preserved as far as practicable, including two amphibian species Chinese Bullfrog and Spotted Narrow-mouthed Frog, one freshwater fish species Rose Bitterling (with the symbiotic freshwater Chinese Pond Mussel for the fish species), and two freshwater crab species *Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon*. These species should be translocated to nearby suitable habitat(s) prior to the commencement of site clearance, while preliminary receptor sites are suggested in **Section 9.2.7**. A detailed pre-construction survey should be conducted by suitably qualified ecologist(s) to identify and record the affected individuals prior to the commencement of any site clearance works. A Translocation Proposal including methodology, screening / selection of receptor sites, capture – release process and the post-translocation monitoring for the affected individuals should be prepared and conducted by a suitably qualified ecologist with at least 5 years relevant experience. The Proposal should be submitted for approval from relevant Government departments (including AFCD and EPD) at least two months before works commencement.

- 9.3.8.2 Upon the translocation of the identified individuals, a three-year post-translocation monitoring should be implemented to investigate the survival of translocated individuals as best as possible. The suggested monitoring frequency should be monthly within the first year upon translocation, and bi-monthly in the next two years of the monitoring. Parameters, such as health condition and survival rate of the species, conditions of the receptor sites, should be monitored. Mark-release-recapture should be conducted to evaluate the success of translocation. The details of monitoring programme such as monitoring frequency, parameters and remedial actions shall be also recommended in the Translocation Proposal for approval. No further maintenance is anticipated upon the proposed translocation.

9.3.9 Pre-construction Site Check and Nest Control

- 9.3.9.1 Breeding / nesting behaviour of Little Ringed Plover, White-shouldered Starling and White-throated Kingfisher were recorded within the Project Area during the survey period (2022). As a mitigation measure, nest control measures should be implemented to avoid direct injury / impact on breeding / nesting behaviour of the three avifauna species of conservation importance observed in Project area. Specific nest control measures for the species are discussed in **Section 9.2.7**. Pre-construction survey should be conducted in breeding

season (March to July), with attention should be given to the specific breeding habitats of these species, to identify the locations and condition of the nest of Little Ringed Plover, White-shouldered Starling and White-throated Kingfisher within Project area, attention should be given to the specific breeding habitats of these species, such as drained ponds for Little Ringed Plover, electric distribution box for White-shouldered Starling, and mud wall tunnel on Ngau Tam Shan for White-throated Kingfisher, where nesting behaviour of these species were previously recorded. The associated nest control measures would be conducted in non-breeding season (August to February) after pre-construction survey. All breeding / nesting behaviour of any avifauna species of conservation importance identified and associated detailed nest control measures should be presented in the Pre-construction Survey Report, which shall be submitted for approval from relevant Government departments (including AFCD and EPD) no later than two months before commencement of work that involves the removal the breeding / nesting locations. The preparation of Nest Control Proposal, the pre-construction survey, and subsequent nest control measures should be conducted by qualified local ecologist with at least 10 years relevant experience to avoid injuring any breeding pairs, chicks and eggs. The detailed schedule of specific nest control measures would be subject to the findings of pre-construction survey and Nest Control Proposal. No further maintenance is anticipated upon for the proposed nest control measures.

9.3.10 Wildlife Corridor

9.3.10.1 Wildlife corridors are proposed in northern portion (between Ha Wan Tsuen and STEMDC, across LMC BCP) and in southern portion (near Shek Wu Wai Village, connecting future Green Belts) to minimize habitat fragmentation (**Figures 9.5a** and **9.5b** refer), while the detailed design of the wildlife corridor would be provided separately in design phase. To maintain the function of the wildlife corridor, monitoring of the wildlife corridor shall be conducted during the first three years upon establishment. The conditions of the constructed wildlife corridor (e.g. structural integrity, vegetation overgrown, any observable usage) shall be monitored bi-monthly, while any potential usage of the wildlife corridor by mammal species (e.g. Eurasian Otter and Small Indian Civet) should also be recorded (e.g. with the use of camera traps). Maintenance work such as weeding, screening, and repairing broken fencing / structure should be conducted by the Project Proponent and the Contractor, where necessary, during the period of monitoring of the wildlife corridor conditions.

9.3.11 Pre-Construction Site Check for Eurasian Otter

9.3.11.1 Considering the elusive nature of this species, pre-construction site check(s) for this species shall be considered under a conservative approach. Pre-construction site check(s) for signs of otter usage (e.g. presence of scats, and in particular, presence of otter holts or dens) shall be conducted prior to the commencement of construction activities at the wetland habitats on the northern portion of the Project site (e.g., San Tin, Sam Po Shue, and Lok Ma Chau). Where signs of otters were observed from pre-construction site checks or during construction, construction activities in the area shall be ceased, and the need for further mitigation measures shall be considered in liaison with relevant departments (e.g., AFCD).

9.3.11.2 On top of the pre-construction site check at representative locations, usage of camera trap (i.e., infra-red flash camera) shall be included to supplement information on potential otter usage. In particular, these site checks with camera traps shall be conducted at pond and other wetland habitats within the Project site prior to pond filling in order to ascertain the potential usage by otters.

9.3.12 Other Minimisation Measures

9.3.12.1 EM&A programmes were recommended to ensure compliance in regard of the potential air quality and noise impacts (e.g. potential dust emission during construction phase, and potential noise exceedance from construction noise). Monitoring requirements for construction dust emission and construction noise monitoring are further stated at **Section**

2 and **Section 3 of this** EM&A Manual respectively. Regular site environmental audit during construction phase is also recommended to ensure proper implementation of mitigation measures and good site practices.

- 9.3.12.2 Water quality monitoring and regular site inspections would be undertaken during the construction to ensure that the recommended mitigation measures for water quality are properly implemented. Details on monitoring requirement for water quality is further stated in the **Section 4** of this EM&A Manual

10. FISHERIES IMPACT

10.1 Introduction

10.1.1.1 As assessed in the Environmental Impact Assessment (EIA), impact on fisheries resources is anticipated from the Project, including the loss of active fishponds and inactive fishponds within the Project boundary. Mitigation measure for the loss of fisheries resources was proposed in the EIA, in the form of fisheries enhancement area (about 40 ha), and other mitigation measures as discussed below. No adverse residual impact on fisheries resources would be expected from the Project.

10.2 Mitigation Measures

10.2.1 Minimisation

Maintaining Bund Stability

10.2.1.1 During the construction stage, all ponds to be removed (including ponds partially encroached by the Project boundary) shall be isolated and not connected to any existing watercourse. The pond would then be drained before filling up these areas or before commencement of any excavation and construction works. To maintain bund stability of remaining adjacent ponds, a layer of shoring or sheet pile wall should be erected along the site boundary adjacent to fishponds. In addition, the shoring / sheet pile wall should have grouting or a grout curtain to avoid water seepage from the fishpond to the excavation area. With the implementation of shoring / sheet pile, the stability of the fishpond bund shall be preserved, and significant impacts on fisheries resources shall be minimised.

Minimisation of Potential Water Quality Impacts

10.2.1.2 As described in **Section 11.5 in the EIA report**, impact on cultured fish due to the potential deterioration of water quality are not anticipated. Mitigation measures and good site practices should be implemented during the construction phase, as proposed in **Section 5 in the EIA report** (e.g. proper covering of construction debris and stockpiling of material to avoid runoff into the ponds), to further minimise potential water quality impact on the ponds adjacent to the Project boundary. Surface drainage system shall also be provided to collect road run-off during the operation phase of the Project. Examples of mitigation measures for potential water quality impact include:

Control of Site Run-off

- Implementation of Best Management Practices (BMPs), following the guidelines for handling and disposal of construction site discharges detailed in ProPECC PN 2/23 "Construction Site Drainage";
- Controlling surface run-off from construction site into storm drains via adequately designed channels, earth bunds or sand bag barriers, directing the runoff to sand / silt removal facilities such as sand traps, silt traps and sedimentation basins;
- Minimising soil excavation in wet season (April to September), or where impracticable, proper covering of temporarily exposed slope surfaces, while intercepting channels should be provided along the crest / edge of excavation;
- Proper covering of open stockpiles of construction materials during rainstorms (e.g. with tarpaulin or similar fabric).

Control of Other Construction-Related Activities

- All vehicles and plants should be cleaned before they leave the construction site to minimise the deposition of earth, mud and debris in surrounding areas;

- Acidic wastewater generated from acid cleaning, etching, pickling and similar activities should be neutralised to within the pH range of 6 to 10 before discharging into foul sewers. If there is no public foul sewer in the vicinity, the neutralized wastewater should be tankered off site for disposal into foul sewers or treated to a standard acceptable to storm drains and the receiving waters;
- The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation, should be observed and complied with for control of chemical wastes. The Contractor is also recommended to develop management procedures for chemicals used and prepare an emergency spillage handling procedure to deal with chemical spillage in case of accidents.

10.2.1.3 With the implementation of the above mitigation measures and the mitigation measures as described under the Water Quality Impact Assessment (refer to **Section 5** in the EIA report), no adverse impact on fisheries resources and aquaculture activities is anticipated from the Project.

10.2.2 Compensation

Direct Loss of Fisheries Resources

10.2.2.1 Under the Project, there will be unavoidable loss of fishponds, mainly at San Tin and Lok Ma Chau areas, and a small area of fishponds near Shek Wu Wai area. As discussed in Section 11.5 and Table 11.3 – Table 11.5 in the **EIA report**, moderate and minor impacts on fisheries resources are anticipated from the direct loss of active fishponds (about 53ha) and inactive fishponds (about 30 ha) respectively, under the Revised RODP. Considering the concurrent projects and the potential cumulative impact on aquaculture activities in the wider San Tin and Lok Ma Chau area, the loss of active and inactive fishponds (about 83 ha) will be compensated within the proposed SPS WCP. The Government aims to start the development of SPS WCP in around 2026/2027 for completion by 2039 or earlier to tie in with the full operation of San Tin Technopole. For the site formation works of the first batch of land at San Tin Technopole targeted for commencement in late 2024, no pond filling will be involved. On current planning, pond filling works will not start until 2026/27, and the pace of pond filling will tie in with the development progress of the SPS WCP. To this end, a working group will be formed between CEDD (as San Tin Technopole's works agent) and AFCD (as SPS WCP's sponsoring department) to coordinate the progress of pond filling and SPS WCP implementation.

Secondary Impact from Wetland Enhancement at the proposed SPS WCP

10.2.2.2 Existing fishponds areas within the proposed SPS WCP would be subject to active conservation management measures under the wetland compensation framework (through enhancement of ecological functional value) to compensate for the loss in wetland habitats arising from the development of San Tin Technopole, resulting in some potential decrease in aquaculture production and minor impact on aquaculture activities. Nonetheless, these "ecologically enhanced fishponds" are anticipated to continuously support aquaculture activities and pond fish culture, thus serving dual functions alongside wetland enhancement. On the other hand, upon the establishment of the proposed SPS WCP, aquaculture production would also be increased from the conversion of existing inactive and abandoned fishponds, as well as brownfield areas into "ecologically enhanced fishponds". As these ponds will be under coordinated management in the proposed SPS WCP, no further compensation area would be required.

Fisheries Compensation

10.2.2.3 The requirement of fisheries compensation mainly arises from the direct permanent loss of active fishponds (which support existing aquaculture activities and fisheries production), and the permanent loss of inactive fishponds (with potential value to support future aquaculture activities upon conversion). The Government will introduce a suite of mitigation measures to enhance the fisheries resources (e.g. fisheries activities and

production, culture area and aquaculture potential etc.) of the proposed SPS WCP with a view to compensate for the loss of fishponds arising from the development of the San Tin Technopole as well as making an overall improvement to the utilisation of fisheries resources for aquaculture and promoting sustainable development of the industry in the long run. The Government will enhance the fisheries resources of 40 ha of land in the SPS WCP, including incorporation of modernised aquaculture, to compensate for the loss in fisheries resources arising from the development of San Tin Technopole.

Fisheries Enhancement Area in the proposed SPS WCP

- 10.2.2.4 The Government will reserve 40 ha of land in the proposed SPS WCP as a fisheries enhancement area, in which the fisheries resources will be enhanced by incorporation of modernised aquaculture and proper planning and management of aquaculture activities therein. The fisheries enhancement area shall be delineated separately from the “ecologically enhanced fishponds”, of which the purpose would conflict with aquaculture activities for food fish production since the “ecologically enhanced fishponds” mainly serve to provide ecological enhancement and attract foraging birds and other wildlife.

Development of Modernised Aquaculture

- 10.2.2.5 The proposed fisheries enhancement area shall utilise existing fishponds, abandoned fishponds, and brownfield areas within the proposed SPS WCP as far as possible, and shall be actively managed for modernised aquaculture, comprising both indoor and outdoor facilities, where aquaculture activities and fisheries production are generally anticipated to be multiplied upon establishment. The aforementioned measures would improve both the yield and the quality of aquaculture production, promoting the sustainable development and modernization of the fisheries industry.
- 10.2.2.6 Modernised aquaculture generally refers to intensive high-density aquaculture activities, indoor or outdoor, with the adoption of innovative green technologies, such as recirculating aquaculture system (RAS), compartmentalisation, remote real-time environmental monitoring, species selection, ecological polyculture, nutrition management, disease prevention and health management, etc., that create water bodies and environmental conditions suitable for fish growth under high-density stocking conditions.
- 10.2.2.7 Compared to traditional pond fish farming practices, the introduction of modernised aquaculture technology and management would enable fisheries operation in a compact area while achieving a higher level of aquaculture production. For example, RAS in China has achieved more than double aquaculture production (Li and Zhang, 2011); while the Grass Carp individuals produced with RAS were reported to be of better sizes and quality, thus more popular with consumers (Zhou et al., 2019). Other example of modernised aquaculture in China was reported to involve constructed aquaculture tanks of 3 m tall, 12 m wide, and was reported to result in 15-fold fisheries production in Jiangmen (XinHui, 2023). Another example in Shaoguan has also report production of Sweetfish with improved quality and market price (Hong Kong Commercial Daily, 2023). Overseas examples of RAS have also suggested better control over environmental parameters, and reduced water consumption (EUMOFA, 2020). Compartmentalisation in aquaculture production systems has been suggested to provide better control and management of aquaculture disease emergencies (Zepeda et al., 2008). These applications would improve both the yield and the quality of aquaculture production, providing an overall improvement in the aquaculture industry.
- 10.2.2.8 Specifically, the application of RAS has been suggested as the way-forward in the future of aquaculture (Wu et al., 2017). In light of the increased requirement to effectively regulate water quality to ensure sustainable development of aquaculture, RAS has gained momentum and increased in its application. With the application of RAS, stocking density was highly increased with enhanced overall production, such as a maximum yield of 100 kg/m³ in Europe, and in some cases, up to 300 kg/m³ (pikeperch production in the Netherlands). In France, almost all fingerling production and rearing of turbot and sole are carried out using RAS, while about 70% of aquaculture production is achieved through RAS

in Spain and Portugal. Rearing of salmon fry has increased via the application of RAS in Norway, from 350,000 individuals in 2005 to 3.8 million individuals in 2009, suggesting 11-fold increase. Aside from increase production, increased aquaculture diversity was observed, where RAS has started its application to various aquaculture species, now encompassing shrimp, shellfish, and algae farming. In North America, RAS models are highly developed for culturing cold-water species such as salmon and trout. RAS is the development direction for land-based aquaculture in mainland China, and it can only be achieved through large-scale and high-efficiency farming. In 2014, the scale of industrial aquaculture in China approached nearly 60 million m², with a production of 367,000 tonnes. Among them, the scale of industrial marine aquaculture accounted for over 25.645 million m², with a production of 170,000 tonnes. The combined marine industrial aquaculture areas of Shandong and Fujian provinces accounted for more than half of the national total. The marine industrial aquaculture areas in Tianjin and Hainan provinces are quite similar, both exceeding 400,000 m² (Wu et al., 2017).

- 10.2.2.9 Modernisation of aquaculture practices was well-received from interview and discussion with the local fish farmers. With the incorporation of modernised aquaculture, and with multiplied fisheries production anticipated, the enhancement of fisheries resources at the proposed fisheries enhancement area would be adequate to compensate for the loss of active and inactive fishponds. No unacceptable impact on fisheries resource would be anticipated upon the implementation of fisheries enhancement area. Detailed design of the fisheries enhancement area would be further formulated in later detailed studies of the proposed SPS WCP project.

Establishing the AFCD Fisheries Research Centre

- 10.2.2.10 While modernised aquaculture (such as compartmentalisation) has been practised in Hong Kong in some extent (SkyPost, 2019), these aquaculture activities have not been well-documented and lacks technical support, hence are yet to be widespread and well-established within the industry. Proper technical support would ensure the proper implementation of these practices to enhance actual fisheries aquaculture production. As such, under the Project, an AFCD Fisheries Research Centre shall be established at a location near the Loop (**Figure 11.3** refers) to bridge the technical gap by providing support to the modernised aquaculture that is currently practised only in a limit extent in Hong Kong. Details of layout and design are subject to AFCD's approval on the site requirement in the design and construction stage.

- 10.2.2.11 The proposed AFCD Fisheries Research Centre shall be implemented with accorded priority under the initial phase of the Project, for it is indispensable in serving a vital role in the provision of mitigation measures by promoting modernised aquaculture, conducting aquaculture research, and transferring modernised aquaculture techniques to local fish farms, thus facilitating the transformation and upgrading of the industry through technological advancement and improving aquaculture activities in the area.

- 10.2.2.12 Furthermore, the proposed AFCD Fisheries Research Centre would be implemented under the initial phase of the Project, while the majority of the fishpond loss in San Tin and Sam Po Shue would occur during the main phase of the Project. With the early establishment of the Fisheries Research Centre, early enhancement of aquaculture production and activities would be possible, thus minimising fisheries impact before the establishment of fisheries enhancement area in the proposed SPS WCP.

Proper Planning of Aquaculture Activities in the proposed SPS WCP

- 10.2.2.13 In order to enhance efficiency of the overall aquaculture activities and fisheries production, a compensation strategy shall be implemented at the fisheries enhancement areas, and at the overall fishponds within the proposed SPS WCP. The compensation strategy shall include proper replanning of fishpond areas and wetland habitats within the SPS WCP, incorporating suitable modernised aquaculture technology and management practice in accordance with the environmental constraints and the purpose of aquaculture operation, and centralising the same types of aquaculture activities in the same area, etc. Details of

the compensation strategy would be further formulated in later detailed studies of the proposed SPS WCP project.

Other Benefits from Fisheries Compensation Area with Modernised Aquaculture

- 10.2.2.14 In addition to achieving a higher level of aquaculture production with less space, modernised aquaculture can achieve other value-added effects to the aquaculture industry and the environment such as time and energy saving, reduction in aquaculture sewage and carbon emissions, and income improvement. For example, RAS would achieve an ecological aquaculture system with zero wastewater discharge, and advantageous to the protection of surrounding water bodies; while compartmentalised aquaculture production systems would exert better environmental control and minimise outbreak of disease. These factors (improved culture environment and minimisation of disease) would result in a better yield and income due to improved quality and potential market price of the aquaculture production. Other value-added effect such as time and energy saving would also suggest reduced cost of the aquaculture activities, but improved yield and income. As such, the implementation of modernised aquaculture would not only increase the aquaculture production, but would also improve the environmental sustainability and social economy of aquaculture activities, subsequently contributing to the sustainable development of the industry in the long run.
- 10.2.2.15 All of the above measures would also compensate for the loss of aquaculture opportunities and fisheries production due to the concurrent development projects; as well as provide affected fish farmers with land for rehabilitation of fish farming business and create a positive synergistic effect on conservation of wetland and aquaculture activities.
- 10.2.2.16 Upon the implementation of the essential mitigation measures at the proposed SPS WCP, it is anticipated that the fisheries resources (including aquaculture area, activities, and potential, etc.) of the industry could be enhanced, and the potential impact on aquaculture activities arising from the project would be mitigated to an acceptable level.

10.3 Monitoring and Audit Measures

- 10.3.1.1 With the implementation of mitigation and precautionary measures proposed in **Section 5** in the EIA report, potential water quality impacts arising from the Project would be minimised. The water quality mitigation measures will be audited as part of the EM&A procedures, presented in **Section 4** of this EM&A Manual. The loss of fishpond (i.e. loss of aquaculture area), aquaculture activities and potential will also be compensated by the 40 ha of area within the SPS WCP reserved solely for aquaculture, through measures described in **Section 10.2.2** in the EIA report (including incorporation of modernised aquaculture and the development of Fisheries Research Centre, etc.), while the location and detailed design would be subject to subsequent study. The implementation details of the fisheries enhancement area, the associated management, the supervision, and the maintenance works at the operation stage would be included during the detailed design. As the overall enhancement of fisheries resources brought about by the mitigation measures is qualitative in nature and non-measurable, no further specific monitoring and audit programme for fisheries resources and aquaculture activities would be necessary.

11. CULTURAL HERITAGE

11.1 Introduction

11.1.1.1 A total of 176 built heritage and other items are identified within the 500m Assessment Area in the Environmental Impact Assessment (EIA) Report. Among them, five other identified items are located within (or encroached by) the STLMC DN, while the remaining 171 built heritage and other identified items are located outside STLMC DN. A total of eight archaeologically sensitive areas are identified within the Project Boundary. Mitigation measures during construction phase and operation phase are summarised below.

11.2 Mitigation Measures

11.2.1 Construction Phase

Built Heritage and Other Identified Items

(1) Cartographic and Photographic Record

11.2.1.1 Tin Tak Heroes Temple (MPL01), Mai Po Lung Vegetable Marketing Co-operative Society Ltd. (MPL02) and Sun Tin Vegetable Marketing Co-operative Society Ltd. (SHT01) should be preserved by record if direct impact of demolition is imminent. A comprehensive record through 3D scanning, video recording and cartographic and photographic recording should be conducted by the project proponent of subsequent developer(s) prior to any construction works. A copy of these records should be provided to Antiquities and Monuments Office (AMO) for record purpose and future use, such as research, exhibition and educational programmes.

(2) Monitoring of ground-borne vibration, tilting and ground settlement

11.2.1.2 Monitoring of ground-borne vibration, tilting and ground settlement, shall be employed for Entrance Gate, Enclosing Walls and Shrine, Yan Shau Wai (HBN186) during the site formation and construction phases. The monitoring should be incorporated with a set of Alert, Alarm and Action (3As) system strictly following AMO's monitoring requirements for grade 3 historic building. The 3As levels for grade 3 historic building recommended by AMO are presented in **Table 11.1**.

11.2.1.3 The actual 3As criteria should be agreed with the AMO prior to the commencement of construction works. A monitoring proposal, including checkpoint locations, installation details, response actions to be taken when reaching each of the Alert/ Alarm/ Action (3As) levels and frequency of monitoring should be submitted to AMO and relevant stakeholder(s) for consideration before commencement of the works. Prior agreement and consent should be sought from the owner(s), stakeholder(s) and relevant Government department(s) for the installation of monitoring points on the built heritage before commencement of the works. Record of monitoring should be submitted regularly to AMO during the construction. AMO should be alerted in case any irregularities are observed.

11.2.1.4 Monitoring of ground-borne vibration, tilting and ground settlement is also proposed to be employed for Yeung Hau Temple (San Tin) (MPT01) and Structure between No. 5 and No. 7, Shek Wu Wai (SWW01) during the site formation and construction phases under Buildings Ordinance.

11.2.1.5 The monitoring should be incorporated with a set of Alert, Alarm and Action (3As) system strictly following the requirements set out in Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers - Ground-borne Vibrations and Ground Settlements Arising from Pile Driving and Similar Operations (PNAP APP-137) on vibration-sensitive and dilapidated buildings. If the alert level is exceeded, the monitoring frequency should be increased. If the alarm level is exceeded, the design of

the construction may have to be amended. If the action level is exceeded, all works should be stopped. Empirical guidelines on the 3As criteria provided in PNAP APP-137 during construction phase are quoted in **Table 11.2**. The actual 3As criteria shall be further confirmed via an assessment on the effects of ground-borne vibrations, settlements and tilting on MPT01 and SWW01.

- 11.2.1.6 Prior agreement and consent should be sought from the owner(s), stakeholder(s) and relevant Government department(s) for the installation of monitoring points on the building before commencement of the works. Record of monitoring should be submitted regularly to the Buildings Department during the construction under Buildings Ordinance. Buildings Department should be alerted in case any irregularities are observed.
- 11.2.1.7 Seven other identified items may experience impacts of ground borne vibration, tilting and settlement, namely Gurkha Cemetery (BH03), Mans' Boundary Stone (BH06), Grave of Man Lun Fung ("麒麟吐玉書") (BH07), Grave of Man Chung Luen (BH08), Grave of Man Chu Shui (BH10), Grave of Mrs Man Leung (BH11) and Grave of Chong Yin Kei (BH12). With an aim to define the vibration limit and to evaluate if ground-borne vibration, tilting and ground settlement monitoring and structural strengthening measures are required during construction phase, a baseline condition survey and baseline vibration impact assessment should be conducted for these non-building structures by a qualified building surveyor or qualified structural engineer during pre-construction stage of the proposed developments. This is to ensure the construction performance meets with the vibration standard stated in the EIA report. Should monitoring of ground-borne vibration, tilting and ground settlement be required, the monitoring procedures shall refer to **Section 11.2.1.5** and **Section 11.2.1.6**.

(3) Safe Access

- 11.2.1.8 The entrance door of Yeung Hau Temple (San Tin) (MPT01) leads directly to the Project boundary. A safe access route shall be maintained for visitors during the construction stage.

- 11.2.1.9 There would be a temporary change of access to Gurkha Cemetery (BH03), Grave of Man Lun Fung ("麒麟吐玉書") (BH07), Grave of Man Chung Luen (BH08), Grave of Man Chu Shui (BH10) and Grave of Mrs Man Leung (BH11) during the construction phase. A safe access route to these burial grounds should be maintained for conducting any mitigation measures, in particular during *Ching Ming Festival*, *Chung Yeung Festival* and *Purkha Divas*.

(4) Protective Barrier

- 11.2.1.10 The contractors should enforce protocol to forbid any light machinery, such as handheld jackhammer, or heavy machinery to come into direct contact with Yeung Hau Temple (San Tin) (MPT01), which is located right next to the Project boundary. Physical protective barriers/ covers or intervention/cushioning materials, including but not limited to covering or sheltering, shall be provided during the proposed construction works to separate the works areas from the structure. No piling works shall be allowed within the protective zone. No worker or any construction related equipment(s) and material(s) should trespass the protective zone. The contractor should propose the actual extent of the protective zone and suitable protective covering materials to the satisfaction of AMO prior to the commencement of the proposed construction works.

(5) Dust Suppression

- 11.2.1.11 Implementation of mitigation measures in the *Air Pollution Control (Construction Dust) Regulation*, dust suppression measures and good site practice should be observed by the

project proponent during the construction phase in order to avoid dust accumulation on the Yeung Hau Temple (San Tin) (MPT01) and Grave of Chong Yin Kei (BH12).

- 11.2.1.12 The locations of the abovementioned built heritage and other identified items are presented in **Figure 11.1**.

Archaeology

Shek Wu Wai ASA and Mai Po Lung (South) ASA

- 11.2.1.13 Archaeological Watching Brief is recommended to be carried out in Shek Wu Wai Archaeologically Sensitive Area (ASA) and Mai Po Lung (South) ASA should works involve soil disturbance occurred (such as site formation) during the construction phase (see **Figure 11.2**). The objective of the Archaeological Watching Brief is to ensure the protection and preservation of any potential archaeological deposits, particularly those from Song and Ming-Qing dynasties, that may exist within the Shek Wu Wai ASA and Mai Po Lung (South) ASA. The project proponent or future subsequent developer(s) should employ an archaeologist who must obtain a *Licence to Excavate and Search for Antiquities* from the Antiquities Authority prior the commencement of the fieldworks. The scope, methodology and programme of the archaeological survey shall be agreed with AMO.

Hop Shing Wai ASA, Mai Po ASA, Siu Hum Tsuen (West) ASA, Siu Hum Tsuen (East) ASA and Pang Loon Tei ASA

- 11.2.1.14 These ASAs are either occupied privately as buildings, paved car parks and open storages or have their accessibility restricted by security measures such as fencing. These areas cannot be accessed, thus lack archaeological information from this survey. Further archaeological survey at later stages after land resumption but before site formation works is recommended. The survey shall be conducted by an archaeologist who must obtain a *Licence to Excavate and Search for Antiquities* from the Antiquities Authority prior the commencement of the fieldworks. The scope, methodology and programme of the archaeological survey shall be agreed with AMO. The locations of these five areas are presented in **Figure 11.2**.

- 11.2.1.15 In particular, Mai Po ASA includes Mai Po Site of Archaeological Interest, which holds significant archaeological potential. Previous archaeological discovery indicated the discovery of jars of coins dating back to the Song dynasty in this area. Given the exceptional nature of these archaeological findings, the objective of the archaeological survey should take into account the unique context of these discoveries. The survey team should thoroughly review the available finding reports to determine if any specific conditions regarding the burial of these jars of coins exist.

- 11.2.1.16 Opportunity to conduct archaeological fieldwork as soon as possible after land resumption would be considered by the Project Proponent.

Mai Po Lung (North) ASA

- 11.2.1.17 The area of Mai Po Lung (North) ASA is reserved for an egret (Section 9 on Ecology refers). No impact on archaeology is anticipated, no mitigation measure is required, subjected to the detailed design of this area. Should construction works involving soil disturbance are anticipated during the detailed design stage, project proponent should review the impact assessment and propose adequate mitigation measures to AMO for approval.

For areas within the Project Boundary

- 11.2.1.18 If antiquities or supposed antiquities under the Antiquities and Monuments Ordinance (Cap. 53) are discovered, the project proponent is required to inform AMO immediately for

discussion of appropriate mitigation measures to be agreed by AMO before implementation by the project proponent to the satisfaction of AMO.

11.2.2 Operation Phase

Built Heritage and Other Identified Items

11.2.2.1 As no adverse impacts to all the built heritage and other identified items in concern during the operation phase, no mitigation measure is required.

Archaeology

11.2.2.2 No impact to archaeology is anticipated in the operation phase as archaeological impact, if any, would have been mitigated before or during the construction phase. Hence no mitigation measure is required.

Table 11.1 Proposed 3As Limiting Criteria for Vibration, Settlement, Tilting Monitoring for Grade 3 Historic Building

Type of Monitoring for	Alert	Alarm	Action
Vibration (PPV)	5mm/s	6mm/s	7.5mm/s
Settlement	6mm	8mm	10mm
Tilting	1/2000	1/1500	1/1000

Note:

1 Monitoring criteria would be subjected to review upon updates of grading status of heritage sites.

Table 11.2 Guidelines on 3As Criteria Recommended in PNAP APP-137

Building Type	Guide values of maximum ppv (mm/sec)	
	Transient Vibration	Continuous Vibration
Vibration-sensitive/ dilapidated buildings	7.5	3.0

Instrument	Criterion	Alert	Alarm	Action
Ground settlement marker	Total settlement	12mm	18mm	25mm
Services settlement marker	Total settlement & Angular distortion	12mm or 1:600	18mm or 1:450	25mm or 1:300
Building tilting marker	Angular distortion	1:1000	1:750	1:500

12. HAZARD TO LIFE

12.1 Introduction

12.1.1.1 Hazard to Life impact assessments in association with High Pressure (HP) underground town gas transmission pipeline, proposed effluent polishing plant and two proposed green filling stations were performed. The EIA study concluded that no unacceptable risk is anticipated during both construction and operation phases of the Project, and hence no mitigation measure would be required.

12.2 EM&A Requirement

12.2.1.1 No environmental monitoring and audit requirements would be required.

13. LANDSCAPE AND VISUAL IMPACT

13.1 Introduction

13.1.1.1 The Environmental Impact Assessment (EIA) has recommended landscape and visual mitigation measures to be undertaken during both the construction and operation phases of the Project. The design, implementation and maintenance of landscape and visual mitigation measures should be checked to ensure that any potential conflicts between the proposed landscape and visual measures and any other works of the Project would be resolved as early as practicable without affecting the implementation of the mitigation measures.

13.2 Mitigation Measures

13.2.1.1 The proposed mitigation measures of landscape and visual impacts are summarised in **Appendix C**. The landscape and visual mitigation measures proposed should be incorporated in the detailed landscape and engineering design. The construction phase mitigation measures should be adopted from the commencement of construction and should be in place throughout the entire construction period. Mitigation measures for the operation phase should be adopted during the detailed design and be built as part of the construction works so that they are in place on commissioning of the Project.

13.2.1.2 Any potential conflicts among the proposed mitigation measures, the Project works, and operational requirements should also be identified and resolved at early stage. Any changes to the mitigation measures should be incorporated in the detailed design.

13.3 Baseline Monitoring

13.3.1.1 Monitoring for the landscape and visual resources identified within the Project area is recommended to be carried out during both the construction and operation phases. It is recommended that regular site inspections during the construction phase should be undertaken to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are properly implemented.

14. ELECTRIC AND MAGNETIC FIELD

14.1 Introduction

- 14.1.1.1 Based on Section 15 of the EIA Report, the results indicated the electric and magnetic field strength generated from the existing 400kV overhead cables on the proposed development areas were well below the stipulated guidelines issued by ICNIRP. No adverse impacts to the proposed development of the Project due to the electric and magnetic field would be anticipated. No specific monitoring programme for electric field and magnetic field is required.

15. SITE ENVIRONMENTAL AUDIT

15.1 Site Inspections

- 15.1.1.1 Site inspection provides a direct means to trigger and enforce specified environmental protection and pollution control measures. These shall be undertaken regularly and routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. The site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.
- 15.1.1.2 The Environmental Team (ET) Leader shall be responsible for formulating the environmental site inspection, the deficiency and remedial action reporting system, and for carrying out the site inspection works. He shall submit a proposal for site inspection and deficiency and remedial action reporting procedures to the Contractor for agreement, and to the Engineer's Representative (ER) for approval. The ET's proposal for rectification would be made known to the Independent Environmental Checker (IEC).
- 15.1.1.3 Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site; it should also review the environmental situation outside the works area which is likely to be affected, directly or indirectly, by the site activities. The ET shall make reference to the following information in conducting the inspection:
- the Environmental Impact Assessment (EIA) and Environmental Monitoring and Audit (EM&A) recommendations on environmental protection and pollution control mitigation measures;
 - ongoing results of the EM&A program;
 - works progress and programme;
 - individual works methodology proposals (which shall include proposal on associated pollution control measures);
 - contract specifications on environmental protection and pollution prevention control;
 - relevant environmental protection and pollution control laws; and
 - previous site inspection results undertaken by the ET and others.
- 15.1.1.4 The Contractor shall keep the ET Leader updated with all relevant information on the construction contract necessary for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works shall be submitted to the IEC and the Contractor within 24 hours for reference and for taking immediate remedial action. The Contractor shall follow the procedures and time-frame stipulated in the environmental site inspection, and the deficiency and remedial action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections.
- 15.1.1.5 The ET shall also carry out ad hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

15.2 Compliance with Legal and Contractual Requirements

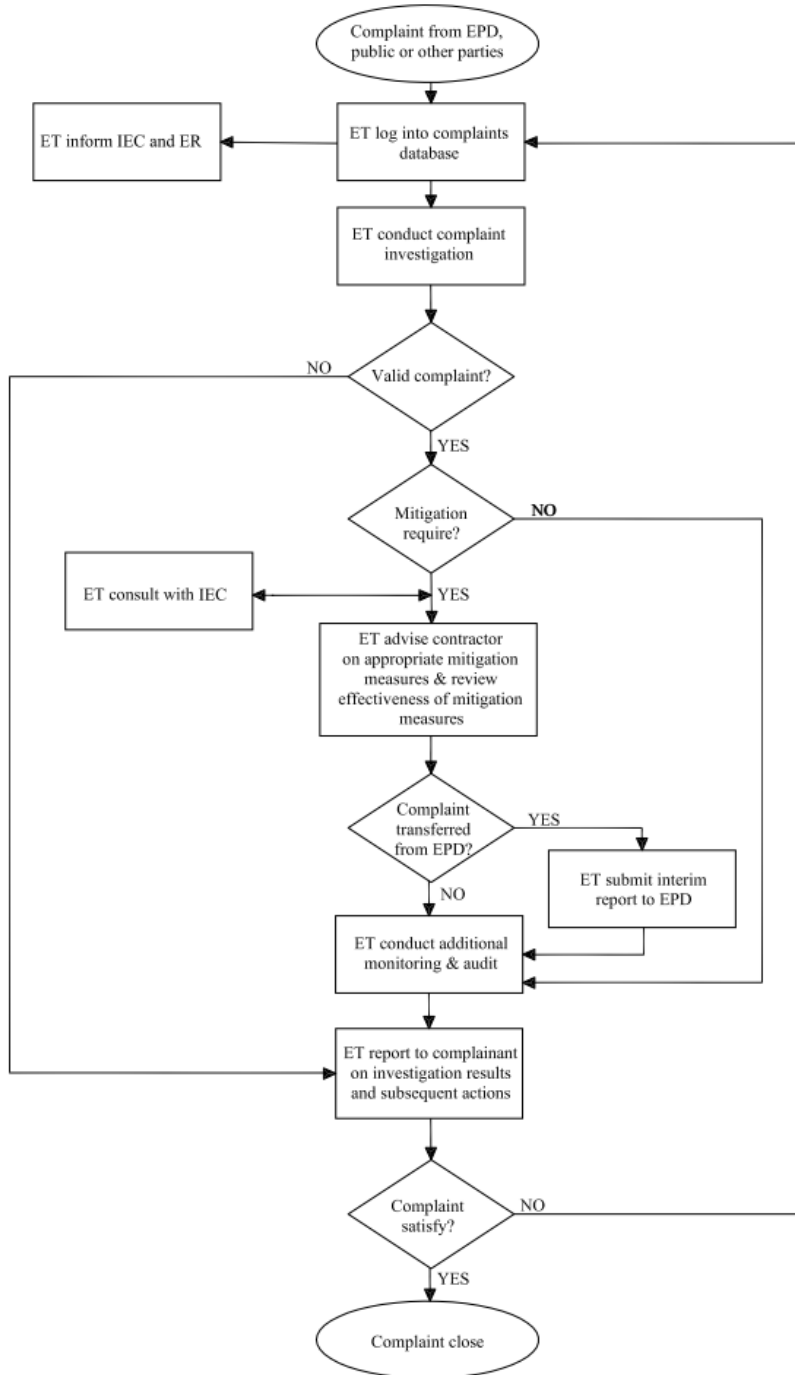
- 15.2.1.1 There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong with which construction activities must comply.
- 15.2.1.2 In order that the works are in compliance with the contractual requirements, all works method statements submitted by the Contractor to the ER for approval shall be sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included. The implementation schedule of mitigation measures is summarised in **Appendix B**.
- 15.2.1.3 The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating laws can be prevented.
- 15.2.1.4 The Contractor shall regularly copy relevant documents to the ET Leader so that works checking could be carried out effectively. The document shall at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licence / permits under the environmental protection laws, and copies of all valid licences / permits. The site diary shall also be available for the ET Leader's inspection upon his request.
- 15.2.1.5 After reviewing the documentation, the ET Leader shall advise the Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence / permit application and any environmental protection and pollution control preparation works may result in potential violation of environmental protection and pollution control requirements, he shall also advise the Contractor accordingly.
- 15.2.1.6 Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The ER shall follow up to ensure that appropriate action has been taken in order to satisfy contractual and legal requirements.

15.3 Environmental Complaints

- 15.3.1.1 Complaints shall be referred to the ET Leader for action. The ET Leader shall undertake the following procedures upon receipt of any complaint:
- (i) log complaint and date of receipt onto the complaint database and inform the IEC immediately;
 - (ii) investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;
 - (iii) identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;
 - (iv) advise the Contractor if mitigation measures are required;
 - (v) review the Contractor's response to identified mitigation measures, and the updated situation;
 - (vi) if the complaint is transferred from the Environmental Protection Department (EPD), submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;
 - (vii) undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;

- (viii) report investigation results and subsequent actions to complainant (if the source of complaint is identified through EPD, the results should be reported within the timeframe assigned by EPD); and
- (ix) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

15.3.1.2 A flow chart of the complaint response procedure is shown below:



16. REPORTING

16.1 General

16.1.1.1 Reports can be provided in an electronic medium upon agreeing the format with the Engineer's Representative (ER) and Environmental Protection Department (EPD). This would enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach. All the monitoring data (baseline and impact) shall also be submitted in electronic format. The formats for air quality, noise, water quality and landfill gas monitoring data to be submitted are shown in **Appendix D**.

16.1.1.2 Types of reports that the Environmental Team (ET) Leader shall submit include baseline monitoring report, monthly Environmental Monitoring and Audit (EM&A) report, quarterly EM&A summary report and final EM&A review report. In accordance with Annex 21 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), a copy of the monthly, quarterly summary and final review EM&A reports shall be made available to the Director of Environmental Protection.

16.2 Electronic Reporting of EM&A Information

16.2.1.1 To facilitate public inspection of the baseline monitoring report and various EM&A reports via the Environmental Impact Assessment Ordinance (EIAO) Internet website and at the EIAO register office, electronic copies of these reports shall be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF Adobe 11 Pro version or later), unless otherwise agreed by EPD and shall be submitted at the same time as the hardcopies. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of these reports shall be included at the beginning of the document. Hyperlinks to all figures, drawings and tables in these reports shall be provided in the main text from where the respective references are made. All graphics in these reports shall be in interlaced GIF format unless otherwise agreed by EPD. The content of the electronic copies of these reports must be the same as the hard copies. The summary of the monitoring data taken shall be included in the various EM&A Reports to allow for public inspection via the EIAO Internet website.

16.3 Baseline Monitoring Report

16.3.1.1 Baseline Environmental Monitoring Report(s) shall be prepared within 10 working days of completion of the baseline monitoring and then certified by the ET Leader. Copies of the Baseline Environmental Monitoring Report shall be submitted to the Contractor, the Independent Environmental Checker (IEC), the ER and the EPD. The ET Leader shall liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format shall be agreed with the EPD prior to submission.

16.3.1.2 The baseline monitoring report shall include, but not be limited to the following:

- i. up to half a page executive summary;
- ii. brief project background information;
- iii. drawings showing locations of the baseline monitoring stations;
- iv. an updated construction programme with milestones of environmental protection / mitigation activities annotated;
- v. monitoring results (in both hard and soft copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;

- monitoring locations (and depth);
 - monitoring date, time, frequency and duration; and
 - quality assurance (QA) / quality control (QC) results and detection limits.
- vi. details on influencing factors, including:
- major activities, if any, being carried out on the site during the period;
 - weather conditions during the period; and
 - other factors which might affect results.
- vii. determination of the Action and Limit Levels (AL levels) for each monitoring parameter and statistical analysis of the baseline data, the analysis shall conclude if there is any significant difference between control and impact stations for the parameters monitored;
- viii. revisions for inclusion in the EM&A Manual; and
- ix. comments, recommendations and conclusions.

16.4 Monthly EM&A Reports

16.4.1.1 The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET Leader. The EM&A report shall be prepared and submitted within 10 working days at the end of each reporting month, with the first report due the month after construction commences. Each monthly EM&A report shall be submitted to the following parties: the Contractor, the IEC, the ER and EPD. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

16.4.1.2 The ET leader shall review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

First Monthly EM&A Report

16.4.1.3 The first monthly EM&A report shall include at least but not be limited to the following:

- i. executive summary (1-2 pages):
- breaches of AL levels;
 - complaint log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - future key issues.
- ii. basic project information:
- project organisation including key personnel contact names and telephone numbers;
 - construction programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
 - management structure, and
 - works undertaken during the month.

- iii. environmental status:
 - works undertaken during the month with illustrations (such as location of works, daily dredging/filling rates, percentage of fines in the fill materials used, etc); and
 - drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co-ordinates of the monitoring locations).
- iv. a brief summary of EM&A requirements including:
 - all monitoring parameters;
 - environmental quality performance limits (AL levels);
 - Event-Action Plans;
 - environmental mitigation measures, as recommended in the Final Environmental Impact Assessment (EIA) report; and
 - environmental requirements in contract documents.
- v. implementation status:
 - advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the Final EIA report, summarised in the updated implementation schedule.
- vi. monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency, and duration;
 - weather conditions during the period;
 - graphical plots of the monitored parameters in the month annotated against:
 - o the major activities being carried out on site during the period;
 - o weather conditions that may affect the results; and
 - o any other factors which might affect the monitoring results;
 - any other factors which might affect the monitoring results; and
 - quality assurance (QA) / quality control (QC) results and detection limits.
- vii. report on non-compliance, complaints, notifications of summons and successful prosecutions:
 - record of all non-compliance (exceedances) of the environmental quality performance limits (AL levels);
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;

- review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- viii. others:
- an account of the future key issues as reviewed from the works programme and work method statements;
 - advice on the solid and liquid waste management status;
 - a forecast of the works programme, impact predictions and monitoring schedule for the next three months;
 - compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies; and
 - comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

Subsequent monthly EM&A Reports

16.4.1.4 Subsequent monthly EM&A reports shall include the following:

- i. executive summary (1 - 2 pages):
 - breaches of AL levels;
 - complaints log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - future key issues.
- ii. environmental status:
 - construction programme with fine tuning of construction activities showing the inter-relationship with environmental protection / mitigation measures for the month;
 - works undertaken during the month with illustrations including key personnel contact names and telephone numbers; and
 - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- iii. implementation status:
 - advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the Final EIA report, summarised in the updated implementation schedule.
- iv. monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency, and duration;
 - weather conditions during the period;

- graphical plots of the monitored parameters in the month annotated against;
 - o the major activities being carried out on site during the period;
 - o weather conditions that may affect the results; and
 - o any other factors which might affect the monitoring results.
 - any other factors which might affect the monitoring results; and
 - quality assurance (QA) / quality control (QC) results and detection limits.
- v. report on non-compliance, complaints, and notifications of summons and successful prosecutions:
- record of all non-compliance (exceedances) of the environmental quality performance limits (AL levels);
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- vi. others:
- an account of the future key issues as reviewed from the works programme and work method statements;
 - advice on the solid and liquid waste management status;
 - a forecast of the works programme, impact predictions and monitoring schedule for the next three months;
 - compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies; and
 - comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.
- vii. appendix
- AL levels;
 - graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - o major activities being carried out on site during the period;
 - o weather conditions during the period; and
 - o any other factors that might affect the monitoring results.
 - monitoring schedule for the present and next reporting period;
 - cumulative statistics on complaints, notifications of summons and successful prosecutions;
 - outstanding issues and deficiencies

16.5 Quarterly EM&A Summary Reports

- 16.5.1.1 A quarterly EM&A summary report of around five pages shall be produced by the ET Leader and shall contain at least the following information. Apart from these, the first quarterly summary report should also confirm that the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works. Each quarterly EM&A report shall be submitted to the following parties: the IEC, the ER and EPD.
- i. executive summary (1 - 2 pages);
 - ii. basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of works undertaken during the quarter;
 - iii. a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (AL levels); and
 - environmental mitigation measures, as recommended in the Final EIA report.
 - iv. advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the Final EIA report, summarised in the updated implementation schedule;
 - v. drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
 - vi. graphical plots of the trends of monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results.
 - vii. advice on the solid and liquid waste management status;
 - viii. a summary of non-compliance (exceedances) of the environmental quality performance limits (AL levels);
 - ix. a brief review of the reasons for and the implications of non-compliance, including a review of pollution sources and working procedures;
 - x. a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
 - xi. a summarised record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
 - xii. a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection / pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
 - xiii. comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and the performance of the environmental management system, that is, of the overall EM&A programme); recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and
 - xiv. proponents' contacts and any hotline telephone number for the public to make enquiries.

16.6 Final EM&A Review Reports for Construction Phase

- 16.6.1.1 The EM&A program shall be terminated upon completion of those construction activities that have the potential to result in a significant environmental impact.
- 16.6.1.2 Prior to the proposed termination, it may be advisable to consult relevant local communities (such as village representatives/communities and/or District Boards). The proposed termination should only be implemented after the proposal has been endorsed by the IEC, the Engineer and the Project proponent followed by final approval from the Director of Environmental Protection.
- 16.6.1.3 The final EM&A report should be prepared by the ET Leader and contain at least the following information. The Final EM&A Review report shall be submitted to the following parties: the IEC, the ER and EPD.
- i. executive summary (1 - 2 pages);
 - ii. basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the course of the project or past twelve months;
 - iii. a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (AL levels); and
 - environmental mitigation measures, as recommended in the Final EIA report.
 - iv. advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the Final EIA report, summarised in the updated implementation status proformas;
 - v. drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
 - vi. graphical plots of the trends of monitored parameters over the course of the project, including the post-project monitoring for all monitoring stations annotated against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period;
 - any other factors which might affect the monitoring results; and
 - the return of ambient environmental conditions in comparison with baseline data.
 - vii. compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies;
 - viii. provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis;
 - ix. advice on the solid and liquid waste management status;
 - x. a summary of non-compliance (exceedances) of the environmental quality performance limits (AL levels);
 - xi. a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
 - xii. a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
 - xiii. a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
 - xiv. review monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);

- xv. a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of breaches, investigation, follow-up actions taken and results;
- xvi. review the practicality and effectiveness of the EIA process and EM&A programme (for examples, a review of the effectiveness and efficiency of the mitigation measures and the performance of the environmental management system, that is, of the overall EM&A programme), recommendations (for example, any improvement in the EM&A programme); and
- xvii. a conclusion to state the return of ambient and / or the predicted scenario as per EIA findings.

16.7 EM&A Reports for Operation Phase

- 16.7.1.1 Unless otherwise agreed by EPD, quarterly EM&A reports shall be submitted to record the results and findings of the hydrogen sulphide monitoring for the first three years of EPP operation, odour patrol during the regular and ad hoc maintenance of the deodorization system, and the water quality monitoring during the first year of EPP operation.
- 16.7.1.2 A final EM&A review report for operation phase shall be submitted after completion of operation monitoring. The final EM&A review report for operation phase should contain at least the following information:
 - i. executive summary (1 - 2 pages);
 - ii. drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and/or control stations;
 - iii. basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the course of the project or past twelve months;
 - iv. a brief summary of EM&A requirements including:
 - Environmental mitigation measures for operation stage, as recommended in the project EIA Report;
 - environmental impact hypotheses tested;
 - environmental quality performance limits (Action and Limit levels);
 - all monitoring parameters;
 - Event and Action Plans;
 - v. a summary of the implementation status of environmental protection and pollution control / mitigation measures for operation stage, as recommended in the project EIA Report and summarised in the updated implementation schedule;
 - vi. graphical plots and the statistical analysis of the trends of monitoring parameters over the course of the project, including:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results;
 - vii. a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - viii. a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
 - ix. a description of the actions taken in the event of non-compliance;
 - x. a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up actions taken and results;

- xi. a review of the validity of EIA predictions for operation stage and identification of shortcomings in EIA recommendations;
- xii. comments (for example, a review of the effectiveness and efficiency of the mitigation measures, the performance of the environmental management system, and the overall EM&A programme for operation stage); and
- xiii. recommendations and conclusions (for example, a review of success of the overall EM&A programme for operational stage to cost-effectively identify deterioration and to initiate prompt effective mitigatory action when necessary).

16.8 Data Keeping

- 16.8.1.1 No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the monthly EM&A reports. However, any such document shall be well kept by the ET Leader and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. Monitoring data shall also be recorded in electronic format, and the software copy must be available upon request. Data format shall be agreed with the EPD. All documents and data shall be kept for at least one year following completion of the construction contract.

16.9 Interim Notifications of Environmental Quality Limit Exceedances

- 16.9.1.1 With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader shall immediately notify the IEC and EPD, as appropriate. The notification shall be followed up with advice to IEC and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications is presented in **Appendix F**.

