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Agriculture, Fisheries and
Conservation Department

Consultancy Ref.: AFCD/FIS/02/19 Consultancy Service for Environmental Impact Assessment Study for Designation of New Fish Culture Zones


Environmental Monitoring and Audit Manual
for Establishment of Fish Culture Zone at
Wong Chuk Kok Hoi

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Environmental Monitoring and Audit Manual for Establishment of Fish
Culture Zone at Wong Chuk Kok Hoi



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1. INTRODUCTION

1.1 Purpose of the Manual

This ***Environmental Monitoring and Audit (EM&A) Manual*** (“the Manual”) is a supplementary document to the Environmental Impact Assessment (EIA) Report for Establishment of Fish Culture Zone at Wong Chuk Kok Hoi (hereafter referred to as the Project).

The Manual has been prepared in accordance with the EIA Study Brief (No. ESB-324/2019) and the *Technical Memorandum of the Environmental Impact Assessment Process (EIAO-TM)*. The purpose of the Manual is to provide information, guidance and instruction to personnel charged with environmental duties and those responsible for undertaking EM&A work during construction and operation of the Project. It provides systematic procedures for monitoring and auditing the environmental performance of the Project.

This Manual contains the following information:

- Responsibilities of the Agriculture, Fisheries and Conservation Department (AFCD), Contractor(s) for Project construction and operation, the Environmental Team (ET) and the Independent Environmental Checker (IEC) with respect to the EM&A requirements during the course of the Project;
- Project organisation;
- Requirements with respect to the construction and operational programme schedule and the necessary EM&A programme to track the environmental performance of the Project;
- Details of the methodologies to be adopted including field, laboratory and analytical procedures, and details on quality assurance and quality control programme;
- Requirements for reviewing pollution sources and working procedures required in the event of exceedances of applicable environmental criteria and / or receipt of complaints;
- Requirements for presentation of EM&A data and appropriate reporting procedures; and
- Requirements for review of EIA predictions and the effectiveness of the recommended mitigation measures / environmental management systems and the EM&A programme.

1.2 Structure of the Manual

The remainder of the Manual is set out as follows:

- **Section 1** describes the scope and location of the Project, as well as the objective, scope and organisation of the EM&A programme;
- **Section 2** details the EM&A requirements for water quality monitoring, and lists relevant monitoring equipment, compliance and Event and Action Plans (EAPs);
- **Section 3** describes the EM&A requirements for marine ecology;
- **Section 4** describes the EM&A requirements for fisheries;
- **Section 5** sets out the auditing requirements for waste management;
- **Section 6** describes the EM&A requirements for visual;
- **Section 7** describes the EM&A requirements for noise;
- **Section 8** sets out the EM&A requirements for cultural heritage;
- **Section 9** describes the scope and frequency of site environmental inspection;

- **Section 10** details the reporting requirements for the EM&A;
- **Appendix A** contains the implementation schedule summarising all mitigation measures recommended in the EIA Report; and
- **Appendix B** provides a sample of the regular water quality monitoring data record sheet.

1.3 Project Description

1.3.1 Project Background

Marine fish culture has been an important activity for fisheries production in Hong Kong over decades. Mariculture activities are required to operate under licence in designated Fish Culture Zones (FCZs) under the *Marine Fish Culture Ordinance (MFCO) (Cap. 353)*. In view of the environmental impact resulting from mariculture, there has been a moratorium on the issue of new marine fish culture licences (MFCLs) and licensed raft area extensions in the existing FCZs since 1990, as well as on the designation of new FCZs, except for a limited number of forced re-sites necessitated by public works. Given the technical advances in fish-farming techniques and strengthening of regulatory measures together with the changes in the operation of the sector over the years, the environment of FCZs and marine environment in the vicinity have improved significantly in the past two decades.

In 2010, the Committee on Sustainable Fisheries (CSF), which was established by the Government to study the long-term goals, direction and feasible options for the sustainable development of local fisheries industry, recommended a review of the moratorium to facilitate fishermen to switch from capture fisheries to mariculture. Mariculture is considered a practical alternative for capture fishermen to make a living as their knowledge on marine environment and fish would be useful in farming marine fish.

To pave the way for facilitating the sustainable development of the local mariculture sector, AFCD proposed to lift the moratorium by designating new FCZs and issuing new MFCLs to create room for the mariculture sector to grow further, including allowing capture fishermen to switch to this sustainable mode of operation, and attracting new entrants. In 2014, the AFCD commissioned a consultancy study ⁽¹⁾ to explore suitable sites as new FCZs on the basis of a list of social and environmental criteria with reference to the latest international culture practices, and the potential of these sites in accommodating modernised fish farms for culturing in sheltered areas as well as farms adopting more advanced-technology for operation in open-sea. Relevant stakeholders, including Government bureaux / departments and mariculture representatives, have been consulted to gauge their views on site selection. The mariculture sector in general supported the designation of new FCZs and agreed that the sector should be modernised. Wong Chuk Kok Hoi FCZ (hereafter referred to as “the Project”) has been identified as one of the proposed FCZ Sites (i.e. other Shortlisted Sites include Outer Tap Mun FCZ, Mirs Bay FCZ and Po Toi (Southeast) FCZ). The location plan of the Project is shown in **Figure 1.1**.

The Chief Executive announced in the 2018 Policy Address that the Government would recommend designating new FCZs at suitable locations, which would create room for the mariculture sector to grow further, including allowing capture fishermen to switch to this sustainable mode of operation, making it possible for the development of newer type of deep-water mariculture in the open sea, and attracting new entrants.

1.3.2 Project Location and Scope

The Project site is within the waters of the Northeast New Territories and is located within the Geopark (Northeast New Territories Sedimentary Rock Region) (**Figure 1.1**). The Project area is

(1) Consultancy Ref. AFCD/FIS/01/14 Consultancy Services for Identification of New Fish Culture Zones in Hong Kong – Feasibility Study

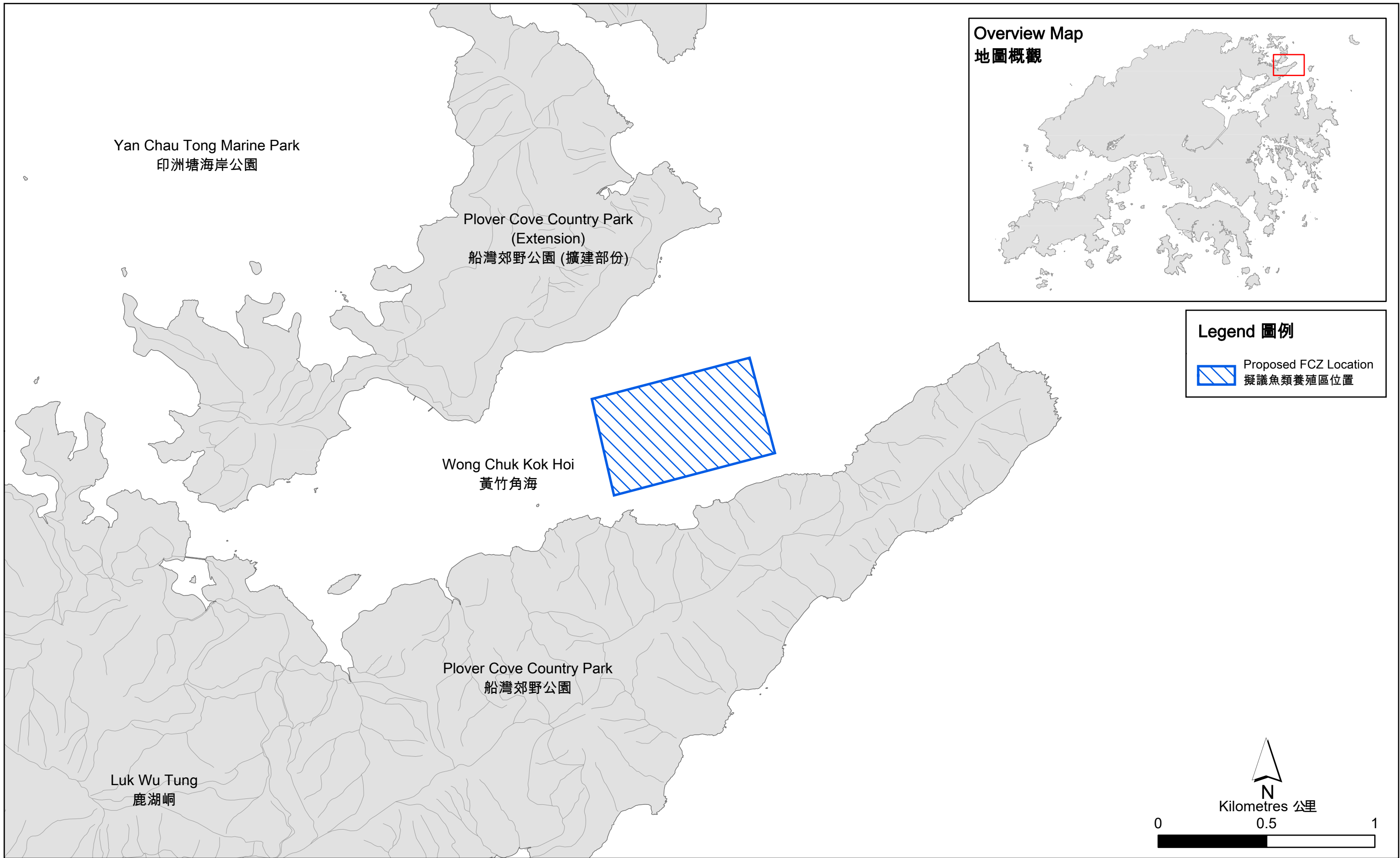


Figure 1.1
圖 1.1

Location Plan for the Establishment of Fish Culture Zone (FCZ) at Wong Chuk Kok Hoi
在黃竹角海設立魚類養殖區的位置圖

approximately 35 hectares (~750 m long and ~450 m wide) in size. The scope of the Project includes:

- Assembly and anchorage of fish farm structures which are manufactured off-site, including fish rafts / cages, auxiliary facilities and mooring system, within the Project site; and
- Marine fish culture activities within the Project site regulated under the *Marine Fish Culture Ordinance (Cap. 353)*.

The Project is a designated project by virtue of Item M.1(a) of Part I of Schedule 2 of the *EIAO*, which specifies “A fish culture zone more than 5 ha in size” and requires an Environmental Permit (EP) under the *EIAO* for its construction and operation.

In accordance with the requirements of Section 5(1) of the *EIAO*, a Project Profile for application for an Environmental Impact Assessment (EIA) Study Brief has been prepared and submitted to Environmental Protection Department (EPD) on 15 October 2019. The EIA Study Brief (ESB-324/2019) (hereafter referred to as “the Study Brief”) was issued by EPD on 27 November 2019.

1.3.3 Work Programme and Works Locations

Construction activities by licensees are expected to commence in Year 2024, subject to the timing of application and approval of the new marine fish culture licence. The construction period of the Project, i.e. from the commencement of the on-site construction and installation works until the new FCZ has reached its design capacity, will be subjected to future application and approval process. Typically, the construction, transfer, and on-site assembly and anchorage of a modern fish raft / cages with ancillary facilities will take a few weeks to complete. All Project works will be conducted within the Project site (**Figure 1.1**).

1.4 Objective of the EM&A

The broad objective of this Manual is to define the procedures of the EM&A programme for evaluating the environmental performance of the Project. The construction and operational impacts arising from the implementation of the Project are described in the EIA Report. The EIA Report has also recommended mitigation measures and good construction practices to avoid or minimise the potential environmental impacts associated with the Project and comply with the appropriate environmental criteria. These mitigation measures and their implementation requirements are presented in the Implementation Schedule of Mitigation Measures (**Appendix A**).

The main objectives of the EM&A programme are to:

- provide a database of environmental parameters against which to determine any short-term or long-term environmental impacts;
- provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;
- confirm that the mitigation measures recommended in the EIA Report are properly included in the design of the Project;
- clarify and identify potential sources of pollution, impact and nuisance arising from the works for the responsible parties;
- confirm compliance with regulatory requirements, contract specifications and EIA study recommendations;
- confirm compliance of environmental designs during the design phase of the Project with the specifications stated in the EIA Report and the Environmental Permit (EP);
- monitor performance of the mitigation measures and to assess their effectiveness;

- take remedial action(s) if unexpected issues or unacceptable impacts arise;
- verify the environmental impacts predicted in the EIA; and
- audit environmental performance.

This EM&A Manual is a working document which will be reviewed periodically and updated if necessary during the implementation of the Project.

1.5 Scope of the EM&A Programme

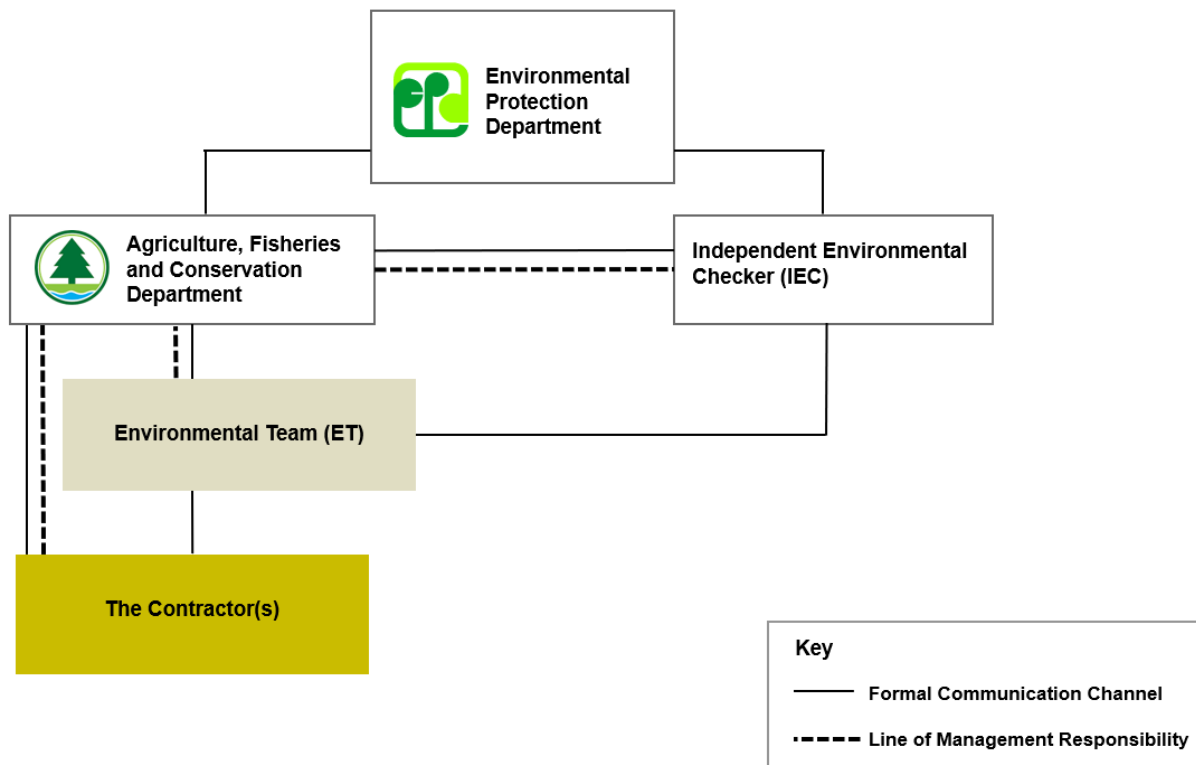
The scope of this EM&A programme is to:

- establish baseline water quality levels at specified locations and implement monitoring requirements for water quality monitoring programme;
- implement inspection and audit requirements for waste management;
- liaise with, and provide environmental advice (as requested or when otherwise necessary) to construction site staff on the significance and implications of the environmental monitoring data (if any);
- identify and resolve environmental issues and other functions as they may arise from the works;
- check and quantify the Contractor(s)'s overall environmental performance, implementation of Event and Action Plans (EAPs), and remedial actions taken to mitigate adverse environmental effects as they may arise from the works;
- conduct regular reviews of monitored impact data / information as the basis for assessing compliance with the defined criteria and to verify that necessary mitigation measures are identified and implemented, and to undertake additional *ad hoc* monitoring (if required) and / or auditing as required by special circumstances;
- evaluate and interpret environmental monitoring data (if any) to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards, and to verify the environmental impacts predicted in the EIA;
- manage and liaise with other individuals or parties concerning other environmental issues deemed to be relevant to the construction process;
- conduct site inspections and audits of a formal or informal nature to assess:
 - (i) the level of the Contractor(s)'s general environmental awareness;
 - (ii) the Contractor(s)'s implementation of the recommendations in the EIA and their contractual obligations;
 - (iii) the Contractor(s)'s performance as measured by the EM&A;
 - (iv) the need for additional mitigation measures to be implemented or the continued implementation of those recommended in the EIA Report;
 - (v) to advise the site staff of any identified potential environmental issues; and
- produce monitoring reports and / or audit records which summarise Project monitoring (if any) and / or auditing data, with full interpretation illustrating the acceptability or otherwise of any environmental impacts and identification or assessment of the implementation status of recommended mitigation measures.

1.6 Organisation & Structure of the EM&A

The EM&A will require the involvement of AFCD (as Project Proponent), an Environmental Team (ET), an Independent Environmental Checker (IEC) and the Contractor(s) (i.e. licensee(s) and the contractor(s) supporting the construction of fish raft structures). The roles and responsibilities of the various parties involved in the EM&A process are further expanded in the following sections and in **Figure 1.2**.

Figure 1.2 Indicative Project Organisation Chart



AFCD will appoint an ET for duties defined in the EM&A Manual, including implementation of the EM&A programme in accordance with the EM&A requirements as contained in the EM&A Manual of the Project; and site inspections to audit the Contractor's site practice with respect to environmental mitigation measures contained in the EM&A Manual of the Project. The ET will be led and managed by the ET Leader. The ET Leader shall not be in any way an associated body of the Contractor(s) or the IEC for the Project and shall be a person who has at least 7 years of experience in EM&A or environmental management. Suitably qualified staff will be included in the ET. For the purpose of this Manual, the ET Leader, who will be responsible for, and in charge of, the ET, is referred to as the person delegated the role of executing the EM&A requirements.

To maintain strict control of the EM&A process, AFCD will appoint an independent environmental consultant to act as an IEC to verify and validate / audit the environmental performance of the Project and effectiveness of ET. The IEC shall be a person who has at least 7 years of experience in EM&A or environmental management. The IEC shall be an independent party from the Contractor(s) and the ET for the Project. Sufficient and suitably qualified professional and technical staff will be employed by the IEC, as required under the EM&A programme for the duration of the Project.

1.6.1 Roles and Responsibilities

AFCD will:

- appoint an ET as described above;

- appoint an IEC as described above;
- review the Contractor(s)'s working programme and fish farm operational plan from the Contractor(s) (i.e. licensee(s)), and comment as necessary;
- oversee/ supervise the Contractor(s)' activities and confirm that the requirements in the Environmental Permit, approved EIA Report, EM&A Manual are fully complied with;
- inform the Contractor(s) on the appropriate mitigation measures to be taken in case of environmental incidents.

The ET will:

- monitor various environmental parameters as required in this EM&A Manual;
- assess the EM&A data (if any) and review the success of the EM&A programme determining the adequacy of the mitigation measures implemented and the validity of the EIA predictions as well as identify any adverse environmental impacts before they arise;
- review and prepare reports on the environmental monitoring data (if any) and site environmental conditions;
- report on the environmental monitoring results (if any) and conditions to the IEC, Contractor(s), EPD and AFCD;
- identify and recommend suitable mitigation measures in consultation with the Contractor(s), IEC and AFCD in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- inform the Contractor(s) when action is required to reduce impacts in accordance with the Event and Action Plans;
- adhere to the procedures for carrying out complaint investigation; and
- conduct site inspections to investigate the Contractor(s)'s site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt issues.

The Contractor(s) for Project construction and operation will:

- implement the EIA recommendations and requirements, where applicable;
- provide assistance to the ET in carrying out water quality monitoring and site inspections;
- implement measures to reduce impact where Action and Limit levels are exceeded;
- implement the corrective actions instructed by ET / IEC;
- participate in the site inspections undertaken by the ET / IEC, as required, and undertake any corrective actions instructed by the ET / IEC; and
- adhere to the procedures for carrying out complaint investigation.

The IEC will:

- review and audit the implementation of the EM&A programme and the overall level of environmental performance being achieved;
- arrange and conduct independent site audits of the works;
- validate and confirm the accuracy of monitoring results (if any), monitoring equipment, monitoring stations, monitoring procedures and locations of sensitive receivers;

- audit the EIA recommendations and requirements against the status of implementation of environmental protection measures on site;
- adhere to the procedures for carrying out complaint investigation;
- review the effectiveness of environmental mitigation measures and project environmental performance including the proposed corrective measures;
- review monitoring reports and / or audit records submitted by the ET and feedback audit results to the AFCD by signing off relevant EM&A proformas; and
- report the findings of site audits and other environmental performance reviews to the AFCD, EPD, ET and the Contractor(s).

2. WATER QUALITY

2.1 Introduction

Potential water quality impacts arising from the construction and operation of the Project were assessed in Section 3 of the EIA Report. A number of mitigation measures and standard site practice measures for construction and operation activities of the Project have been recommended to reduce potential impacts to water quality sensitive receivers (WSRs).

With the implementation of proposed mitigation / precautionary measures, the construction and operation of the Project would not result in unacceptable change water quality at and around the proposed site at Wong Chuk Kok Hoi.

2.2 Mitigation Measures

The mitigation measures are summarised in the Implementation Schedule provided in **Appendix A**. As the authority of MFCO, AFCD will ensure the proper implementation of the mitigation measures listed in the Implementation Schedule of Mitigation Measures through fish farm operation and licensing control under MFCO.

2.3 Monitoring Requirements

In accordance with the recommendations of the EIA, no unacceptable water quality impacts would be anticipated during operation of the Project at full scale (i.e. at the estimated carrying capacity). Carrying capacity estimation at the Project site has been conducted in the EIA Report to determine the carrying capacity (i.e. maximum standing stock) that would not result in an unacceptable change in water quality. To verify EIA prediction, marine water quality monitoring at selected WSRs is recommended as part of the EM&A during the operation phase of the Project when the standing stock of the FCZ is expected to achieve 75% of estimated carrying capacity (i.e. $755.2 \text{ ton} \times 75\% = 566.4 \text{ ton}$)⁽²⁾, or when the standing stock is expected to achieve 95% of the carrying capacity (i.e. $755.2 \text{ ton} \times 95\% = 717.4 \text{ ton}$) for at least a month in a fish farming cycle. The objective of the water quality monitoring is to investigate potential water quality impacts to the surrounding sensitive receivers due to the operation of the Project. The recommended details of the water quality monitoring under EM&A are presented in the following sections, which comprises baseline water quality monitoring and operational water quality monitoring. The status and locations of water quality sensitive receivers and the monitoring sites may change after issuing this Manual. If such cases exist, updated monitoring locations will be proposed by the ET in consultation with the IEC and approval from EPD will then be sought.

When alternative monitoring locations are proposed, they shall 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

(2) From the modelling results, the 95th-percentile safety margin of the carrying capacity, which is a conservative estimate taking into account possible fluctuations in the weather, hydrodynamic and environmental conditions as well as the farming practices, is about 75% of the estimated carrying capacity under typical average condition. Therefore, it is considered representative to conduct operational water quality monitoring at 75% of the maximum allowable standing stock level to monitor potential water quality at the surrounding sensitive receivers during project operation.

- control stations which are at locations representative of the project site in its undisturbed condition.

2.3.1 Monitoring Locations

Locations of the monitoring stations for the marine water quality monitoring are presented in **Figure 2.1** and the coordinates are shown in **Table 2.1**. In case of any changes to the monitoring locations, the ET shall propose with justification in consultation with the IEC and seek approval from EPD before commencement of monitoring.

Table 2.1 Coordinates of Marine Water Quality Monitoring

Monitoring Stations*	Monitoring Station ID	Easting	Northing
Control Station during Ebb Tide	CE	851931	843319
Control Station during Flood Tide	CF	854036	840736
Sensitive Receiver Station for Wong Wan Fish Culture Zone	IM1	849689	840881
Sensitive Receiver Station to the North of the Wong Chuk Kok Hoi Embayment	IM2	851109	842169
Sensitive Receiver Station to the South of the Wong Chuk Kok Hoi Embayment	IM3	852733	841110
Gradient Station at west of the Project	G1	850274	840906
Gradient Station at east of the Project	G2	851504	841317

*Gradient station(s) is proposed to be located between water sensitive receivers and the Project to gather additional water quality monitoring data for investigation of the cause of Action/Limit Level exceedances.

2.3.2 Monitoring Parameters

The monitoring parameters as presented in **Table 2.2** should be measured for baseline and operation phase marine water quality monitoring at all monitoring stations.

Table 2.2 Monitoring Parameters for all Water Quality Monitoring Stations

Parameters	Unit	Standard Method	Detection Limit
In-situ Parameters			
Dissolved oxygen	mg L ⁻¹	Instrumental, CTD	0.1
Temperature	°C	Instrumental, CTD	0.1
pH	-	Instrumental, CTD	0.1
Turbidity	NTU	Instrumental, CTD	0.1
Salinity	ppt	Instrumental, CTD	0.1
Laboratory Analysis			
Suspended Solids (SS)	mg L ⁻¹	APHA 2540D	0.5
Unionized Ammonia (NH ₃)	mg L ⁻¹	By calculation (APHA 22ed 4500-NO ₂ ⁻ B (FIA), APHA 22ed 4500-NO ₃ ⁻ I (FIA), ASTM D3590-11 B (FIA))	0.001
Total Inorganic Nitrogen (TIN)	mg L ⁻¹		0.01
Chlorophyll-a	µg/L	APHA 20ed 10200H 2 (spectrophotometric)	0.2

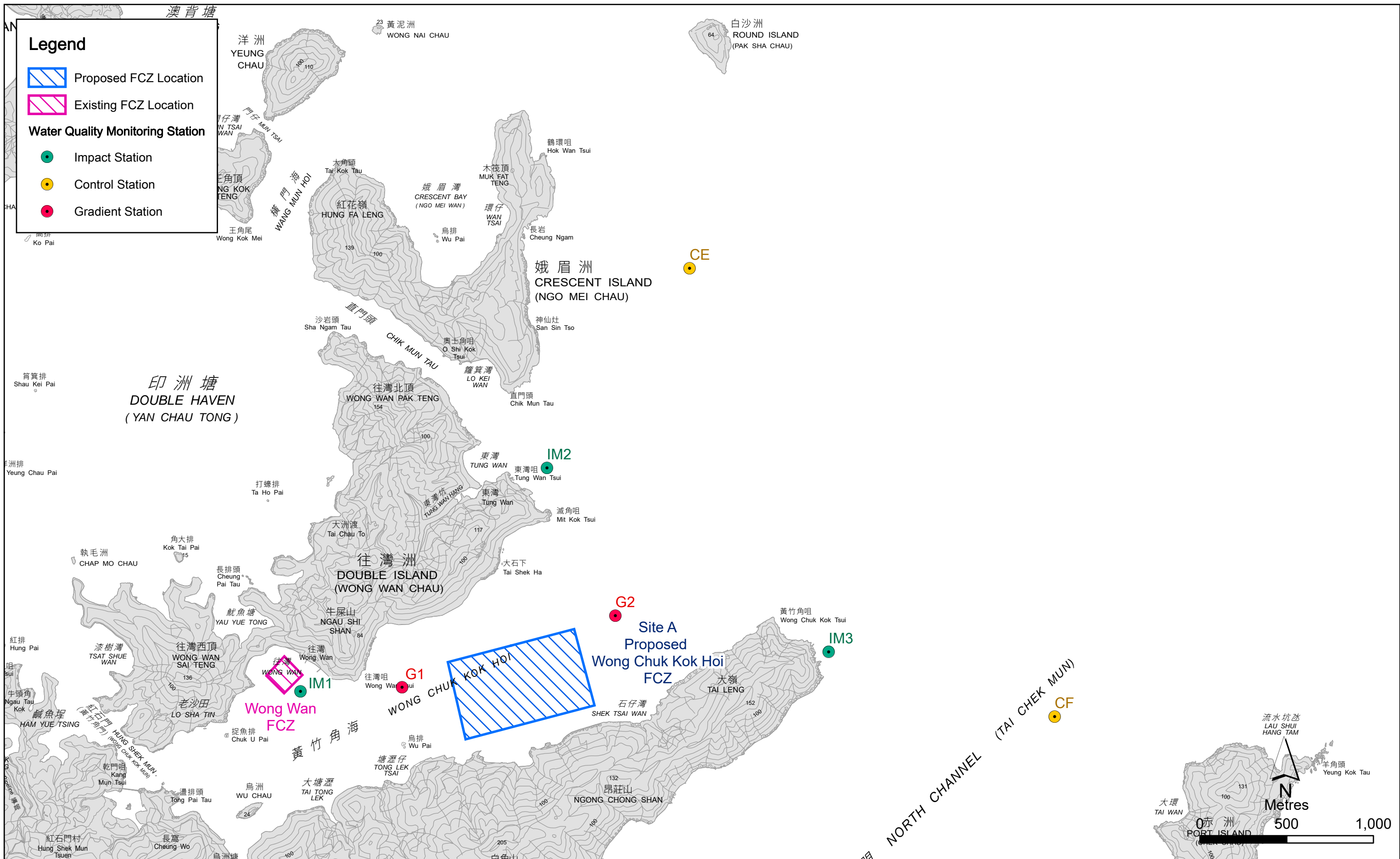


Figure 2.1

Water Quality Monitoring Stations at Site A (Wong Chuk Kok Hoi)

In addition to the water quality parameters, other relevant data will also be measured and recorded in water quality monitoring logs, including the location of the monitoring stations, water depth, time, weather conditions, sea conditions, tidal state, special phenomena and work activities undertaken around the monitoring that may influence the monitoring results. A sample data record sheet is shown in **Appendix B** for reference.

2.3.3 Monitoring Equipment

For water quality monitoring, the following equipment will be used:

- **Dissolved Oxygen and Temperature Measuring Equipment** - The instrument will be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and will be operable from a DC power source. It will be capable of measuring: dissolved oxygen levels in the range of 0 - 20 mg L⁻¹ and 0 - 200% saturation; and a temperature of 0 - 45 degrees Celsius. It will have a membrane electrode with automatic temperature compensation complete with a cable of not less than 35 m in length. Sufficient stocks of spare electrodes and cables will be available for replacement where necessary. Should salinity compensation not be built-in in the DO equipment, *in-situ* salinity shall be measured to calibrate the DO equipment prior to each DO measurement.
- **Turbidity Measurement Equipment** - The instrument will be a portable, weatherproof turbidity-measuring unit complete with cable, sensor and comprehensive operation manuals. The equipment will be operated from a DC power source, it will have a photoelectric sensor capable of measuring turbidity between 0 - 1000NTU and will be complete with a cable with at least 35 m in length.
- **pH Measurement Instrument** - A portable pH meter capable of measuring a range between 0.0 and 14.0 will be provided for measuring pH.
- **Salinity Measurement Instrument** - A portable salinometer capable of measuring salinity in the range of 0 - 40‰ will be provided for measuring salinity of the water at each monitoring location.
- **Water Depth Gauge** – A portable, battery-operated echo sounder will be used for the determination of water depth at each designated monitoring station. This unit will preferably be affixed to the bottom of the work boat if the same vessel is to be used throughout the monitoring programme.
- **Positioning Device** – A hand-held Global Positioning System (GPS) or boat-fixed type differential Global Positioning System (dGPS) with way point bearing indication or other equivalent instrument of similar accuracy will be used to check that the monitoring vessel is at the correct location before taking measurements.
- **Water Sampling Equipment** - A water sampler, consisting of a PVC or glass cylinder of not less than two litres, which can be effectively sealed with cups at both ends, will be used. The water sampler will 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. A rosette multi-bottle (each bottle with no less than two litres volume) array water sampler could be used for the monitoring. With the use of this equipment, the sonde for measuring *in situ* water quality parameters could be attached together and the closure of each water sampler could be controlled remotely at the required sampling depth without the need to release messenger physically. This could enhance safety of the water quality monitoring especially at offshore locations where the sea condition could be rough.

2.3.4 General Monitoring Requirements

The following general monitoring requirements are applicable to baseline and operation phase marine water quality monitoring.

2.3.4.1 Sampling / Testing Protocols

Each station will be sampled and measurements will be taken at three depths, 1 m below the sea surface, mid depth and 1 m above the seabed. Where the water depth is less than 6 m the mid-depth station may be omitted. If the water depth is less than 3 m, only the mid-depth station will be monitored. The interval between two sets of monitoring shall not be less than 36 hours.

For *in situ* measurements, duplicate measurements shall be made at each water depth at each station. Duplicate water samples shall be collected at each water depth at each station for laboratory measurements.

In situ monitoring equipment for the measurement of temperature, dissolved oxygen, turbidity, pH and salinity will be checked, calibrated and certified by a laboratory accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or any other international accreditation scheme before use. The *in situ* monitoring equipment for the measurement of temperature, dissolved oxygen, turbidity, pH and salinity will be subsequently re-calibrated every three months throughout the stages of the water quality monitoring. Responses of sensors and electrodes will be checked with certified standard solutions before each use. Wet bulb calibration for dissolved oxygen meter will be carried out before commencement of monitoring and after completion of all measurements each day.

The monitoring team will record all data from *in situ* testing and from any analysis carried out on the boat in a field log. All samples will be identified with a unique date / time / location / depth / sample type code which will be attached to the sample container or written in indelible ink directly on the container. In order to avoid contamination of the samples, all containers will be new and unused and of analytical grade quality. Sources of contamination will be isolated from the working area (for example, vessel fuel and exhaust fumes) and any sample contaminated by local material (such as printed circuit boards) will be discarded and the sampling repeated.

On-site calibration of field equipment will follow the “*Guide to On-Site Test Methods for the Analysis of Waters*”, BS 1427: 2009. Sufficient stocks of spare parts will be maintained for replacements when necessary. Backup monitoring equipment will also be made available so that monitoring can proceed uninterrupted even when equipment is under maintenance, calibration etc.

As the QA / QC procedures for the *in-situ* measurement of DO and turbidity, where the difference in value between the first and subsequent measurements at a certain depth is more than 25% of the value of the first measurement, the measurements should be discarded and further measurements should be taken to confirm the values.

Water samples for laboratory measurement will be collected in high density polythene bottles or other suitable containers as advised by the HOKLAS accredited laboratory, packed in ice (cooled to 4° C without being frozen), and delivered to a HOKLAS laboratory as soon as possible after collection.

2.3.4.2 Laboratory Measurement and Analysis

All laboratory work shall be carried out in a HOKLAS accredited laboratory. Sufficient volume of each water sample shall be collected at the monitoring stations for carrying out the laboratory analyses. Using chain of custody forms, collected water samples will be transferred to an HOKLAS accredited laboratory for immediate processing. The determination work for SS, ammonia and TIN and chlorophyll-a shall start within 24 hours after collection of the water samples. Analytical methodology and sample preservation of monitoring parameters will be based on the latest edition of Standard Methods for the Examination of Waste and Wastewater published by American Public Health Association (APHA), American Water Works Association (AWWA) and methods by USEPA, or suitable method in accordance with requirements of HOKLAS or another internationally accredited scheme. The submitted information should include 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. The QA / QC details shall be in accordance with requirements of HOKLAS or another internationally accredited scheme.

2.3.5 Specific Monitoring Methodology for the EM&A Programme

2.3.5.1 Baseline Marine Water Quality Monitoring

The measurements shall be taken at all designated monitoring stations including control stations, for a minimum of three days per week for four weeks prior to the commencement of the construction of any licenced fish raft for the Project.

No construction activities of the Project shall be on-going in the vicinity of the stations during the baseline monitoring. The ET shall be responsible for undertaking the baseline monitoring and shall consider if baseline monitoring needs to be extended or repeated to take into account the seasonal variations in water quality, and seek agreement with the IEC and EPD. In exceptional cases when insufficient baseline monitoring data or questionable results are obtained, agreement shall be sought with the IEC and the EPD on an appropriate set of data to be used as baseline reference.

The baseline monitoring schedule shall be issued to the IEC and EPD at least 2 weeks before the first day of the monitoring event for agreement. The baseline water quality conditions shall be established and agreed with EPD before commencement of the construction and operation activities of the Project. EPD shall also be notified immediately for any changes in schedule.

2.3.5.2 Marine Water Quality Monitoring for Construction Phase

No marine water quality monitoring is required during construction phase.

2.3.5.3 Marine Water Quality Monitoring for Operation Phase

AFCD is responsible for reviewing the business / operation plan from each licensee from time to time and estimating the expected production levels for the Project. Marine water quality monitoring for operation phase is recommended to investigate potential water quality impacts to the surrounding sensitive receivers due to the operation of the Project. To ensure the water quality monitoring would be representative to demonstrate the environmental acceptability of the Project at full scale, it is proposed to conduct a set of operation phase marine water quality monitoring when any of the following situations occur.

- When mariculture operation of the FCZ is expected to achieve a standing stock of 75% of the estimated carrying capacity, i.e. $755.2 \text{ ton} \times 75\% = 566.4 \text{ ton}$, in a fish farming cycle.
- When mariculture operation of the FCZ is expected to achieve a standing stock of 95-100% of the estimated carrying capacity, i.e. $717.4 - 755.2 \text{ ton}$, for at least a month in a fish farming cycle.

A set of operation phase marine water quality monitoring shall consist of a 1-year monitoring at a frequency of once per week taking into account seasonal variation of water quality in the vicinity of the Project. The monitoring will be conducted continuously for a whole year (i.e. 52 monitoring days) once AFCD confirms the expected production levels for the Project will achieve any of the abovementioned situations. The measurements shall be taken at all designated monitoring stations including control stations.

AFCD and EPD will review whether it is necessary to conduct further operation phase water quality monitoring after completion of a set of operation phase water quality monitoring. Suspension of Marine Water Quality Monitoring for Operation Phase shall only be considered upon demonstration of no adverse water quality impact due to the Project at both situations.

2.3.6 Water Quality Compliance

Water quality monitoring for operation phase will be generally evaluated against Action and Limit Levels determined from the baseline marine water quality monitoring or against the relevant water quality objectives (WQOs). The proposed Action and Limit Levels are shown in **Table 2.3**.

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 2.4**) should be undertaken and a review of works will be carried out by the Contractor(s). Due to the fact that seasonal variation in water quality would occur during the operation of the Project, the change in water quality recorded in a single monitoring might not imply potential impacts from the FCZ operation. The suitability of Action and Limit levels and Event and Action Plan will be reviewed, in consultation with IEC, during the operational water quality monitoring on an as-needed basis.

Any noticeable change to water quality will be recorded 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 2.3 Action and Limit Levels for Marine Water Quality Monitoring for Operation Phase

Parameter	Sensitive Receiver Monitoring Stations – IM1		Other Sensitive Receiver Monitoring Stations – IM2, IM3	
	Action Level	Limit Level	Action Level	Limit Level
DO in mg L ⁻¹ ^a	<u>Depth-averaged</u> 5 th %-ile of baseline data	<u>Depth-averaged</u> 5 mg L ⁻¹ or 1 st %-ile of baseline data, whichever is lower	<u>Surface and Middle</u> 5 th %-ile of baseline data for surface and middle (S&M) layers <u>Bottom</u> 5 th %-ile of baseline data for bottom layer	<u>Surface and Middle</u> 4 mg L ⁻¹ or 1 st %-ile of baseline for S&M layers, whichever is lower <u>Bottom</u> 2 mg L ⁻¹ or 1 st %-ile of baseline for bottom layer, whichever is lower
Turbidity in NTU (Depth-averaged) ^b ^c	95 th %-ile of baseline data, or 120% of the relevant control station's turbidity of the same day, whichever is higher	99 th %-ile of baseline data, or 130% of the relevant control station's turbidity of the same day, whichever is higher	95 th %-ile of baseline data, or 120% of the relevant control station's turbidity of the same day, whichever is higher	99 th %-ile of baseline data, or 130% of the relevant control station's turbidity of the same day, whichever is higher
SS in mg L ⁻¹ (Depth-averaged) ^b ^c	95 th %-ile of baseline data, or 120% of the relevant control station's SS of the same day, whichever is higher	99 th %-ile of baseline data, or 130% of the relevant control station's SS of the same day, whichever is higher	95 th %-ile of baseline data, or 120% of the relevant control station's SS of the same day, whichever is higher	99 th %-ile of baseline data, or 130% of the relevant control station's SS of the same day, whichever is higher
Unionized Ammonia (UIA) in mg L ⁻¹ (Depth-averaged) ^b ^c	95 th %-ile of baseline data, or 120% of the relevant control station's UIA of the same day, whichever is higher	0.021 mg/L	95 th %-ile of baseline data, or 120% of the relevant control station's UIA of the same day, whichever is higher	0.021 mg/L
Total Inorganic Nitrogen (TIN) in mg L ⁻¹ (Depth-averaged) ^b ^c	95 th %-ile of baseline data, or 120% of the relevant control station's TIN of the same day, whichever is higher	0.3 mg/L	95 th %-ile of baseline data, or 120% of the relevant control station's TIN of the same day, whichever is higher	0.3 mg/L
Chlorophyll-a in µg L ⁻¹ (Depth-averaged) ^b ^c	95 th %-ile of baseline data, or 120% of the relevant control station's chlorophyll-a of the same day, whichever is higher	99 th %-ile of baseline data, or 130% of the relevant control station's chlorophyll-a of the same day, whichever is higher	95 th %-ile of baseline data, or 120% of the relevant control station's chlorophyll-a of the same day, whichever is higher	99 th %-ile of baseline data, or 130% of the relevant control station's chlorophyll-a of the same day, whichever is higher

Notes:

- For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
- For turbidity, SS, unionized ammonia, total inorganic nitrogen and chlorophyll-a, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table 2.4 Event and Action Plan for Marine Water Quality Monitoring for Operation Phase

Event	Action			
	ET	IEC	Contractor(s)	Project Proponent
Action Level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat <i>in-situ</i> measurement on the same sampling day to confirm findings; Check monitoring data and Contractor(s)'s operation method / arrangement; Identify source(s) of impact and record in notification of exceedance; Inform IEC, Contractor(s), Project Proponent and EPD within 1 working day. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor(s)'s operation method / arrangement. 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Check operation method / arrangement and rectify unacceptable practice. 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing.
Action Level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> Repeat <i>in-situ</i> measurement on the same sampling day to confirm findings; Check monitoring data and Contractor(s)'s operation method / arrangement; Identify source(s) of impact and record in notification of exceedance; Inform IEC, Contractor(s), Project Proponent and EPD within 1 working day; Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor(s)'s operation method / arrangement; Discuss with ET and Contractor(s) on additional mitigation measures and advise Project Proponent accordingly; Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Check operation method / arrangement and rectify unacceptable practice; Consider changes of operation method / arrangement; Discuss with ET and IEC on additional mitigation measures and propose them to Project Proponent within 3 working days; Implement the agreed mitigation measures. 	<ol 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.
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat <i>in-situ</i> measurement on the same sampling day to confirm findings; Check monitoring data, plant, equipment and Contractor(s)'s 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor(s)'s operation method / arrangement; Discuss with ET and Contractor(s) on additional 	<ol style="list-style-type: none"> Confirm receipt of notification of exceedance in writing; Check operation method / arrangement and rectify unacceptable practice; 	<ol 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

Event	Action			
	ET	IEC	Contractor(s)	Project Proponent
	operation method / arrangement;	mitigation measures and advise Project Proponent accordingly;	3. Critically review the need to change operation method / arrangement;	mitigation measures to be implemented;
	3. Identify source(s) of impact and record in notification of exceedance;	3. Assess the effectiveness of the implemented mitigation measures.	4. Discuss with ET and IEC on additional mitigation measures and submit a mitigation measure proposal to Project Proponent within 3 working days;	3. Ensure additional mitigation measures are properly implemented;
	4. Inform IEC, Contractor(s), Project Proponent and EPD within 1 working day;		5. Implement the agreed mitigation measures.	4. Request Contractor(s) to critically review the operation method / arrangement.
	5. Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented.			
Limit Level being exceeded by two or more consecutive sampling days	1. Repeat <i>in-situ</i> measurement on the same sampling day to confirm findings;	1. Check monitoring data submitted by ET and Contractor(s)'s operation method / arrangement;	1. Confirm receipt of notification of exceedance in writing;	1. Confirm receipt of notification of exceedance in writing;
	2. Check monitoring data, plant, equipment and Contractor(s)'s operation method / arrangement;	2. Discuss with ET and Contractor(s) on additional mitigation measures and advise Project Proponent accordingly;	2. Check operation method / arrangement and rectify unacceptable practice;	2. Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented;
	3. Identify source(s) of impact and record in notification of exceedance;	3. Assess the effectiveness of the implemented mitigation measures.	3. Critically review the need to change operation method / arrangement;	3. Ensure additional mitigation measures are properly implemented;
	4. Inform IEC, Contractor(s), Project Proponent and EPD within 1 working day;		4. Discuss with ET and IEC on additional mitigation measures and submit a mitigation measure proposal to Project Proponent within 3 working days;	4. Request Contractor(s) to critically review the operation method / arrangement.
	5. Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented.		5. Implement the agreed mitigation measures.	
			6. Resubmit proposals if problem still not under control.	

2.4 Audit Requirements

Site inspections at the Project site (on marine vessels) are recommended on a regular basis at bi-weekly interval by the ET to check if the recommended mitigation measures are properly implemented during the construction phase as part of the audit. The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project.

During operation phase, the recommended mitigation measures of the Project will be controlled by licensing under the Marine Fish Culture Ordinance (Cap. 353). Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project.

3. MARINE ECOLOGY

3.1 Introduction

Potential marine ecological impact arising from the construction and operation of the Project were assessed in Section 4 of the EIA Report. The EIA Study concluded that unacceptable construction and operation phase impacts are not expected to occur to marine ecological resources. Consequently, no marine ecology-specific EM&A measures are considered necessary.

3.2 Mitigation Measures

The mitigation measures are summarised in the Implementation Schedule provided in **Appendix A**. As the authority of MFCO, AFCD will ensure the proper implementation of the mitigation measures listed in the Implementation Schedule of Mitigation Measures through fish farm operation and licensing control under MFCO.

3.3 Monitoring Requirements

Monitoring activities designed to detect and mitigate impacts to water quality during operation activities are expected to serve to protect against impacts to marine ecological resources. Details of the water quality monitoring programme are presented in this EM&A Manual (**Section 2.3**). No marine ecology-specific monitoring is required during construction and operation phases.

3.4 Audit Requirements

Site inspections at the Project site (on marine vessels) are recommended on a regular basis at bi-weekly interval by the ET to check if the recommended mitigation measures are properly implemented during the construction phase as part of the audit. The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project.

During operation phase, the recommended mitigation measures of the Project will be controlled by licensing under the Marine Fish Culture Ordinance (Cap. 353). Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project.

4. FISHERIES

4.1 Introduction

Potential fisheries impact arising from the construction and operation of the Project were assessed in Section 5 of the EIA Report. The EIA Study concluded that unacceptable construction and operational phase impacts are not expected to occur to fisheries. Consequently, no fisheries-specific EM&A measures are considered necessary for the construction and operation phases.

4.2 Mitigation Measures

The mitigation measures are summarised in the Implementation Schedule provided in **Appendix A**. As the authority of MFCO, AFCD will ensure the proper implementation of the mitigation measures listed in the Implementation Schedule of Mitigation Measures through fish farm operation and licensing control under MFCO.

4.3 Monitoring Requirements

Monitoring activities designed to detect and mitigate impacts to water quality during operation activities are also expected to serve to protect against impacts to fisheries. Details of the water quality monitoring programme are presented in this EM&A Manual (**Section 2.3**). No fisheries-specific monitoring is required during construction and operation phases.

4.4 Audit Requirements

Site inspections at the Project site (on marine vessels) are recommended on a regular basis at bi-weekly interval by the ET to check if the recommended mitigation measures are properly implemented during the construction phase as part of the audit. The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project.

During operation phase, the recommended mitigation measures of the Project will be controlled by licensing under the Marine Fish Culture Ordinance (Cap. 353). Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project.

5. WASTE MANAGEMENT

5.1 Introduction

Potential waste management implications arising from the construction and operation of the Project were assessed in Section 6 of the EIA Report. The EIA study concluded that with the implementation of good site practices, adverse environmental impacts arising from the management and disposal of waste during the construction and operation phases are not anticipated.

5.2 Mitigation Measures

Waste management mitigation measures as required under the relevant regulations and those recommended in Section 6.5 of the EIA Report should be implemented where appropriate throughout the construction and operation phases of the Project. These measures are summarised in the Implementation Schedule provided in **Appendix A**.

5.3 Audit Requirements

To ensure the waste management performance during construction phase of the Project, site inspections at the Project site (on marine vessels) are recommended on a regular basis at bi-weekly interval during the time of construction activities by the Environmental Team (ET) to check if wastes are being managed in accordance with good site practices and the recommended mitigation measures during the construction phase. The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project.

The suggested waste management inspection checklist is shown in **Table 5.1**. If non-compliance noted, AFCD will inform the contractors to undertake corrective / remedial actions. Warning may be given to the contractors if the corrective / remedial actions are not taken within the agreed timeline.

Table 5.1 Waste Management Inspection Checklist

Activities	Actions to be taken by the ET (for Construction Phase) / AFCD (for Operation Phase) during inspection
<u>Construction Phase:</u>	
Necessary waste disposal permits or licences have been obtained (e.g. registration as a chemical waste producer).	Check that the necessary permits or licences have been obtained.
General refuse and floating refuse are stored in enclosed bins, and are delivered to the on-shore refuse collection points on a regular basis.	Check if general refuse and floating refuse have been properly disposed in the enclosed bins and are delivered to the on-shore refuse collection points accordingly.
Designated garbage bags are procured to store general refuse and floating refuse that require disposal after the official implementation of MSW charging scheme.	Check if the waste materials are stored in the designated bags.
Recycling bins are provided at appropriate locations within the Project Site to facilitate recovery of recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) from the Project Site.	Check if recycling bins are used to collect recyclable materials in the appropriate containers.
Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance. Appropriate measures to reduce windblown litter and dust nuisance of waste will be adopted, e.g. by either covering vessels or by transporting wastes in enclosed containers.	Check if the storage areas are properly cleaned and if appropriate measures have been implemented to reduce windblown litter and dust nuisance of waste.

Activities	Actions to be taken by the ET (for Construction Phase) / AFCD (for Operation Phase) during inspection
<u>Operation Phase:</u>	
General refuse, floating refuse and organic waste are stored in enclosed bins, and are delivered to the on-shore refuse collection points on a regular basis.	Check if general refuse, floating refuse and organic waste have been properly disposed in the enclosed bins and are delivered to the on-shore refuse collection points accordingly.
Designated garbage bags are procured to store general refuse, floating refuse and organic waste that require disposal after the official implementation of MSW charging scheme.	Check if the waste materials are stored in the designated garbage bags.
Recycling bins are provided at appropriate locations within the Project Site to facilitate recovery of recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) from the Project Site.	Check if recycling bins are used to collect recyclable materials in the appropriate containers.
Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance. Appropriate measures to reduce windblown litter and dust nuisance of waste will be adopted, e.g. by either covering vessels or by transporting wastes in enclosed containers.	Check if the storage areas are properly cleaned and if appropriate measures have been implemented to reduce windblown litter and dust nuisance of waste.
Chemical wastes are stored, handled and disposed of in accordance with the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i> , published by the EPD. Chemical wastes are separated for special handling and appropriate treatment at the Chemical Waste Treatment Centre at Tsing Yi.	Check if chemical wastes are properly managed. Warning will be given to the contractor(s) if corrective actions are not taken within 24 hrs.
Fish pellets are stored in covered areas to prevent unnecessary spoilage and spillage to adjacent waters.	Check if fish pellets are stored in a covered area.

During operation phase, the waste management issues of the Project will be controlled by licensing under the Marine Fish Culture Ordinance (Cap. 353). Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project. AFCD will conduct regular inspections at monthly interval and review on FCZ operation to check if wastes are being managed in accordance with good site practices and the recommended mitigation measures.

6. VISUAL

6.1 Introduction

Potential visual impacts arising from the construction and operation of the Project were assessed in Section 7 of the EIA Report. The EIA Study concluded the visual impacts from the Project are acceptable with mitigation measures.

6.2 Mitigation Measures

The VIA recommended a series of measures for the design, construction and operation phase to further enhance the visual impacts of the Project. Details of all the recommended mitigation measures are summarised in the Implementation Schedule provided in **Appendix A**.

6.3 Monitoring Requirements

No environmental monitoring for visual is required during construction and operation phases of the Project.

6.4 Audit Requirements

Site inspections at the Project site (on marine vessels) are recommended on a regular basis at bi-weekly interval by the ET to check if the recommended mitigation measures are properly implemented during the construction phase as part of the audit. The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project.

During operation phase, the recommended mitigation measures of the Project will be controlled by licensing under the Marine Fish Culture Ordinance (Cap. 353). Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project.

7. NOISE

7.1 Introduction

Potential noise impacts arising from the construction and operation of the Project were assessed in Section 8 of the EIA Report. The EIA Study concluded that no adverse noise impacts are anticipated during construction and operation of the Project.

7.2 Mitigation Measures

No specific noise mitigation measures are required during construction and operation phases of the Project. Nevertheless, good construction site practice and noise management could be considered to reduce the noise nuisance from the construction activities as follows:

- Only well-maintained plant will be operated on-site and plant will be serviced regularly during the construction phase;
- Silencers or mufflers on construction equipment will be utilised and will be properly maintained during the construction phase;
- Mobile plant, if any, will be sited as far away from noise sensitive receivers (NSRs) as possible;
- Machines and plant that may be in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- Plants known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- Other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Details of these measures are summarised in the Implementation Schedule provided in **Appendix A**.

7.3 Monitoring Requirements

No noise monitoring is required during construction and operation phases of the Project.

7.4 Audit Requirements

Site inspections at the Project site (on marine vessels) are recommended on a regular basis at bi-weekly interval by the ET to check if the recommended mitigation measures are properly implemented during the construction phase as part of the audit. The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project.

During operation phase, the recommended mitigation measures of the Project will be controlled by licensing under the Marine Fish Culture Ordinance (Cap. 353). Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project.

8. CULTURAL HERITAGE

8.1 Introduction

Potential cultural heritage impacts arising from the construction and operation of the Project were assessed in Section 9 of the EIA Report. The EIA Study identified no sites of archaeological interest, declared monuments, proposed monuments, graded historic sites/buildings/structures; and government historic sites identified by AMO within the assessment area and therefore no impact to these cultural heritage resources are expected. No construction and operation phase mitigation measure for terrestrial cultural heritage is required.

8.2 Mitigation Measures

Potential impact to a sonar contact A-SC001 that may have marine archaeological potential is identified. A buffer area of 20 m radius from A-SC001 is recommended to avoid any tug boat anchoring, and anchoring of the fish rafts in the area so as to avoid any impact to A-SC001 during both the construction and operation phases of the Project. The locations and relocations of fish rafts/cages are regulated by the *Marine Fish Culture Ordinance (Cap. 353)*, and AFCD will ensure the locations of anchoring of vessels and fish rafts/cages will not be located within the buffer area. These are summarised in the Implementation Schedule provided in **Appendix A**.

8.3 Monitoring Requirements

No environmental monitoring for cultural heritage is required during construction and operation phases of the Project.

8.4 Audit Requirements

Site inspections at the Project site (on marine vessels) are recommended on a regular basis at bi-weekly interval by the ET to check if any seabed disturbance work is conducted in the buffer area during construction phase of the Project. The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project.

During operation phase, the recommended mitigation measures of the Project will be controlled by licensing under the *Marine Fish Culture Ordinance (Cap. 353)*. Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project. AFCD will conduct regular inspections at monthly interval to check if any seabed disturbance work is conducted in the buffer area during operation phase of the Project.

9. ENVIRONMENTAL SITE INSPECTION

9.1 Site Inspections

Site inspections provide direct means to assess and confirm that the Contractor(s)'s environmental protection and pollution control measures are in compliance with the EIA recommendations. Bi-weekly site inspections will be conducted by the ET during the construction phase of the Project ⁽³⁾ to verify that appropriate environmental protection and pollution control mitigation measures are properly implemented in accordance with the EIA with reference to the Implementation Schedule provided in **Appendix A**. In addition, the ET will be responsible for defining the scope of the inspections, detailing any deficiencies that are identified, and reporting any necessary action or additional mitigation measures that were implemented as a result of the inspection.

The IEC will also undertake site audit to assess the performance of the Contractor(s) on a regular basis at no less than quarterly interval during the construction phase of the Project with reference to the Implementation Schedule provided in **Appendix A**. The areas of inspection will not be limited to the site area and should also include the environmental conditions outside the site which are likely to be affected, directly or indirectly, by the site activities. The ET will make reference to the following information while conducting the inspections:

- the EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
- ongoing results of the EM&A programme;
- work progress and programme;
- the relevant environmental protection and pollution control laws; and
- previous site inspection results.

The Contractor(s) will update the ET with relevant information on the works prior to carrying out the site inspections. The site inspection results will be submitted to the IEC in two working days. Should actions be necessary, the ET will follow up with recommendations on improvements to the environmental protection and pollution control works and will submit these recommendations in a timely manner to the AFCD, IEC and the Contractor(s). They will also be presented, along with the remedial actions taken, in the audit records. The Contractor(s) will follow the procedures and time frame stipulated in the environmental site inspection for the implementation of mitigation proposal. An action reporting system will be formulated and implemented to report on any remedial measures implemented subsequent to the site inspections.

Ad hoc site inspections will also be carried out by the ET and site audits by the IEC if significant environmental issues are identified. Inspections and audits 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.

During operation phase, the recommended mitigation measures of the Project will be controlled by licensing under the Marine Fish Culture Ordinance (Cap. 353). Site inspections and audits are not required to be conducted by the ET and IEC during operation phase of the Project.

(3) The construction phase of the Project is defined as the period from the commencement of the on-site construction activities including but not limit to anchorage and assembly of fish raft/cages or communal rafts, until the proposed FCZ is established up to the design carrying capacity.

9.2 Compliance with Legal & Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong with which the construction activities will comply.

In order that the works are in compliance with the regulatory requirements, the ET will review the progress and programme of the works of the Contractor(s) to check the regulatory compliance.

The Contractor(s) will regularly copy relevant documents to the ET so that the checking and auditing work can be carried out. After reviewing the document, the ET will advise AFCD, IEC and the Contractor(s) of any non-compliance from the contractual and legislative requirements on environmental protection and pollution control for follow-up actions.

Upon receipt of the advice, the Contractor(s) will undertake immediate action to remedy the situation.

The ET will follow up to confirm that appropriate action will be taken by the Contractor(s) in order to satisfy the environmental protection and pollution control requirements.

9.3 Environmental Complaints

The ET will undertake the following procedures (see **Figure 9.1**) upon receipt of a complaint:

- (1) log complaint and date of receipt into the complaint database and inform the IEC and AFCD immediately;
- (2) investigate the complaint and discuss with AFCD and the Contractor(s) to determine its validity and to assess whether the source of the issue is due to works activities;
- (3) if a complaint is considered valid due to the works, the ET will recommend and identify mitigation measures in consultation with AFCD, the Contractor(s) and IEC;
- (4) if mitigation measures are required, the ET will advise AFCD and the Contractor(s) accordingly;
- (5) review the Contractor(s)'s response on the identified mitigation measures and the updated situation;
- (6) undertake additional monitoring (if required) and audit to verify the situation if necessary and confirm that any valid reason for complaint does not recur;
- (7) if the complaint is referred by EPD, an interim report will be submitted to AFCD and EPD on the status of the complaint investigation and follow-up action within the time frame assigned by EPD;
- (8) report the investigation results and the subsequent actions on the source of the complaint for responding to complainant. If the source of complaint is EPD, the results should be reported within the time frame assigned by EPD; and
- (9) record the complaint, investigation, the subsequent actions and the results in the audit records.

During the complaint investigation work, the ET and Contractor(s) will cooperate with the IEC in providing the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor(s) will promptly carry out the mitigation measures and IEC will check that if the measures have been properly implemented by the Contractor(s).

9.4 Log-book

The ET will keep a contemporaneous log-book of each and every instance or circumstance or change of circumstances which may affect the EIA and every non-compliance from the recommendations of the EIA Report or the EP. The ET will notify the AFCD and IEC within one working day of the occurrence of any such instance or circumstance or change of circumstance. The log-book will be kept readily available for inspection by persons assisting in supervision of the implementation of the

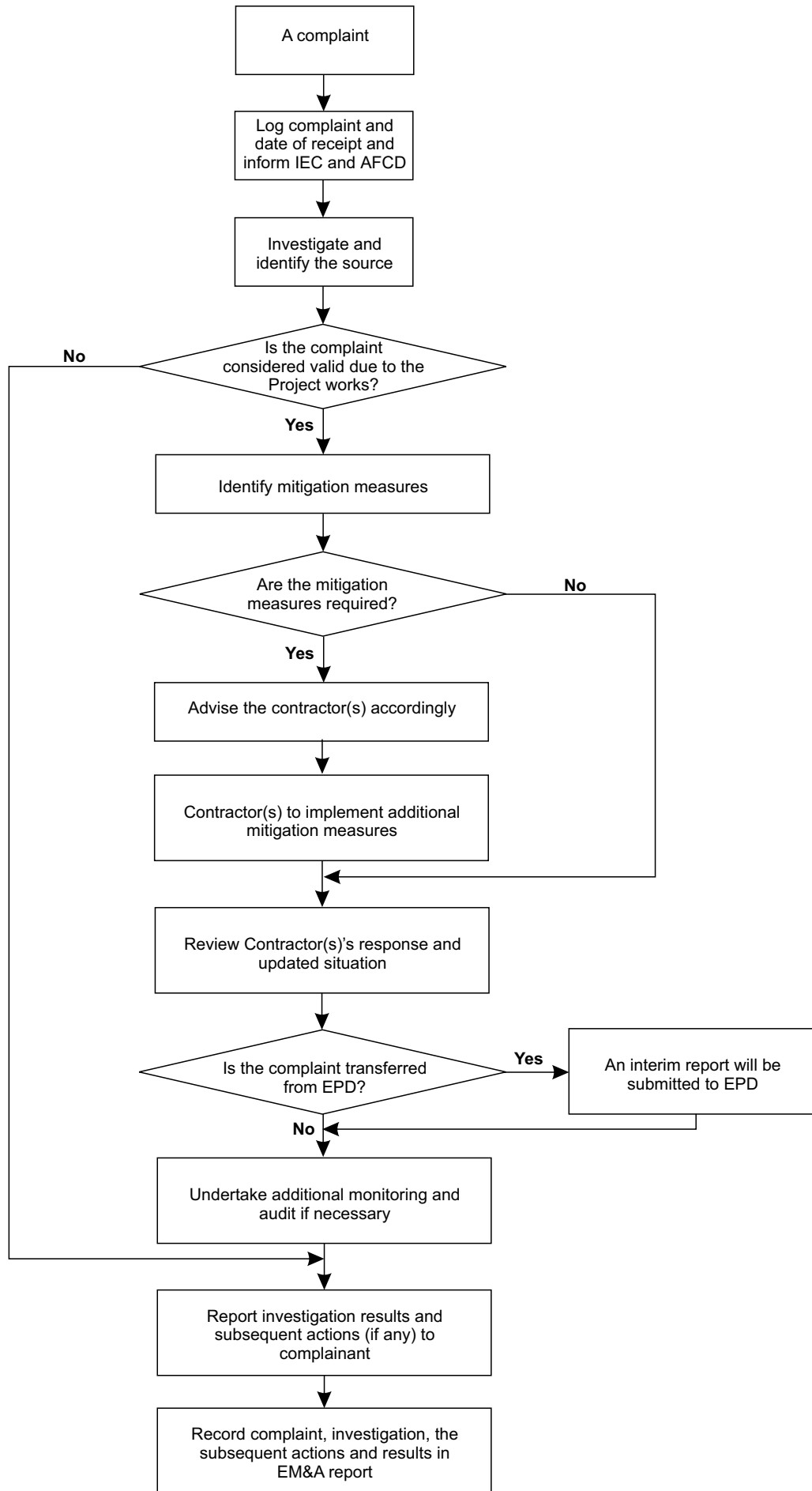


Figure 9.1

Flow Chart for Handling Environmental Complaints

EIA Report recommendations (such as the AFCD, IEC and Contractor(s)) or by EPD or his authorised officers.

10. REPORTING

10.1 General

Upon agreeing the format with EPD, reports can be provided in an electronic medium to be made available through a dedicated internet website under the EM&A programme.

Types of reports to be submitted include baseline water quality monitoring report, monthly EM&A report and operational water quality monitoring report. In accordance with *Annex 21* of the *EIAO-TM*, copies of the monitoring reports will be made available to the Director of Environmental Protection.

10.2 Baseline Water Quality Monitoring Report

For the baseline marine water quality monitoring described in *Section 2.6.1*, the ET will prepare and submit a Baseline Water Quality Monitoring Report no less than 2 weeks before commencement of the construction works of the Project to EPD for agreement on the Action / Limit Levels. The report shall be certified by the ET Leader and shall be verified by the IEC. Copies of the Baseline Environmental Monitoring Report will be submitted to the following: the AFCD, IEC and EPD as appropriate. The ET will liaise with the relevant parties on the exact number of copies required.

The Baseline Water Quality Monitoring Report will include at least the following:

- (1) Up to half a page executive summary.
- (2) Brief project background information.
- (3) Drawings showing locations of the baseline monitoring stations.
- (4) Monitoring results (in both hard and electronic 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.
- (5) 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 the results.
- (6) Determination of the Action and Limit Levels for each monitoring parameter with reference to *Table 2.3*;
- (7) Revisions for inclusion in the EM&A Manual; and
- (8) Comments, recommendations and conclusions.

10.3 Monthly EM&A Reports

The results and findings of all EM&A work required in the Manual during construction phase shall be recorded in the Monthly EM&A Reports prepared by the ET. The results of marine water quality monitoring for operation phase shall also be recorded in the corresponding Monthly EM&A Reports. The EM&A report will be prepared and submitted to EPD within 10 working days of the end of each reporting month, with the first report due the month after construction commences. The report shall

be certified by the ET Leader and shall be verified by the IEC. Copies of the Monthly EM&A Report will be submitted to the following: the AFCD, IEC and EPD as appropriate. Before submission of the first EM&A Report, the ET will liaise with the relevant parties on the exact number of copies required.

The Monthly EM&A Report will include at least the following:

- (1) 1-2 pages executive summary, comprising:
 - breaches of Action and Limit levels;
 - complaint log;
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - forecast of impact predictions.
- (2) Basic project information including a synopsis of the project organisation, programme and management structure, and a drawing of the Project area showing the environmentally sensitive receivers and the locations of monitoring and control stations, programme, management structure and the work undertaken during the month.
- (3) Environmental status, comprising:
 - works undertaken during the month (such as location of works, quantities of waste generated); and
 - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (4) A brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (i.e. Action and Limit Levels);
 - Event and Action Plans;
 - environmental mitigation measures, as recommended in the Project EIA Report; and
 - environmental requirements in contract documents.
- (5) Advice on the implementation status of environmental protection, mitigation and pollution control measures as recommended in the Project EIA Report and summarised in the updated implementation schedule.
- (6) Monitoring results (in both hard and electronic copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth); and
 - monitoring date, time, frequency, and duration;
- (7) Graphical plots of trends of monitored parameters for representative monitoring stations annotated against the following:
 - 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;
- (8) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels).
 - (9) A review of the reasons for and the implications of non-compliance including a review of pollution sources and working procedures.
 - (10) A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
 - (11) A summary record of complaints received (written or verbal) for each media, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken and summary of complaints.
 - (12) A summary record of notifications of summons, successful prosecutions for breaches of environmental protection/pollution control legislation, and actions to rectify such breaches.
 - (13) A forecast of the works programme, impact predictions and monitoring schedule for the next one month.
 - (14) Comments, recommendations and conclusions for the monitoring period.

10.4 Operational Water Quality Monitoring Report

Upon completion of one set of the 12-month marine water quality monitoring for operation phase as described in *Section 2.6.2*, the ET will prepare and submit an operational water quality monitoring report to EPD within a month after completion of the 12-month operational water quality monitoring. The report will present the data obtained in the operational water quality monitoring and conclude the environmental acceptability of the Project. The report shall be certified by the ET leader and verified by the IEC. The Operational Water Quality Monitoring Report will contain at least the following information:

- (1) Up to half a page executive summary.
- (2) Brief project background information.
- (3) Drawings showing locations of the monitoring stations.
- (4) Water quality monitoring results (in both hard and electronic 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;
 - environmental quality performance limits (Action and Limit levels);
 - Event and Action Plans;
 - environmental mitigation measures, as recommended in the Project EIA;
 - graphical plots of trends of monitored parameters at key stations over the monitoring; and
 - quality assurance (QA) / quality control (QC) results and detection limits.

- (5) 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 the results.
- (6) Comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the 12-month marine water quality monitoring.

10.5 Suspension of the EM&A Programme

The EM&A programme for construction and operation phases should be terminated upon the completion of the construction activities and operational monitoring. The proposed termination should only be implemented after the proposal has been endorsed by the IEC and the Project Proponent followed by approval from EPD. Suspension of the EM&A programme for construction activities and operational monitoring shall be justified by the ET Leader and verified by the IEC before submission to the EPD for approval.

10.6 Final EM&A Report

The ET will prepare and submit a final EM&A Report to EPD within a month after completion of the construction activities and operational monitoring. The report shall be certified by the ET leader and verified by the IEC. The Final EM&A Report will contain at least the following information:

- (1) Executive summary (1-2 pages).
- (2) Basic project information including a synopsis of the project organization, contacts of key management, and a synopsis of work undertaken during the course of the project.
- (3) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (4) A brief summary of EM&A requirements including:
 - a summary of the implementation status of environmental protection / mitigation measures as recommended in the project EIA Report;
 - environmental impact hypotheses tested;
 - environmental quality performance limits (Action and Limit levels);
 - all monitoring parameters;
 - Graphical plots and the statistical analysis of the trends of monitoring parameters over the course of the project;
 - Event and Action Plans;
- (5) 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 the results.
- (6) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels).

- (7) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate.
- (8) A description of the actions taken in the event of non-compliance.
- (9) 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.
- (10) Comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations and conclusions (e.g. a review of success of the overall EM&A programme to cost-effectively demonstrate the environmental acceptability of the project and to initiate prompt effective mitigatory action when necessary).

10.7 Data Keeping

Documents such as the monitoring field records (if any), laboratory analysis records, etc. under the EM&A programme will be kept by the ET, and be ready for inspection upon request. Site inspection records will be kept by the ET. Relevant information will be clearly and systematically recorded in the documents. The monitoring data will also be recorded in digital format, and the software copy will be available upon request. The documents and data will be kept for at least one year after the completion of the EM&A programme.

10.8 Electronic Reporting of EM&A Information

To enable the public inspection of the baseline water quality monitoring report, monthly EM&A report and operational water quality monitoring report via the EIAO Internet Website and at the EIAO Register Office, electronic copies of reports will be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF, version 4.0 or later), unless otherwise agreed with EPD and will be submitted at the same time as the hard copies. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the reports will be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the reports will be provided in the main text where the respective references are made. Graphics in the reports will be in interlaced GIF format unless otherwise agreed with EPD. The content of the electronic copies of the reports must be the same as the hard copies.

The internet address and the environmental monitoring data will be made available to the public via the EIAO Internet Website and the EIAO Register Office.

APPENDIX A IMPLEMENTATION SCHEDULE OF RECOMMENDED ENVIRONMENTAL PROTECTION MEASURES / MITIGATION MEASURES

Appendix A - Implementation Schedule of Recommended Environmental Protection Measures / Mitigation Measures

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
Water Quality								
S3.9.1	S2	Any sewage / wastewater generated should be collected at the transportation / work vessel(s) for disposal at appropriate facilities on land.	All area / During construction	Contractor(s)		✓		Cap. 358 Water Pollution Control Ordinance
S3.9.2	S2	The licensees will adopt the operational measures and best practice for mariculture activities.	All area / During operation	Contractor(s)			✓	Cap. 353 Marine Fish Culture Ordinance
S3.9.2	S2	Standing stock should not exceed 755.2 ton at any given time. AFCD will ensure the production scale of the Project site will not exceed the maximum standing stock level by controlling the mariculture production scale permitted under individual license.	All area / During operation	AFCD			✓	Cap. 353 Marine Fish Culture Ordinance
S3.9.2	S2	AFCD and mariculturists should be aware of potential occurrence of low dissolved oxygen at the Project Site by self-monitoring and the mariculturists will apply suitable control measures (e.g. aeration) as necessary.	All area / During operation	Contractor(s) / AFCD			✓	Cap. 353 Marine Fish Culture Ordinance
S3.9.2	S2	In case of potential circumstances (e.g. red tide event, outbreak of fish disease), the licensees will review the need of fish raft relocation and propose the fish raft relocation plan as necessary for agreement with AFCD.	All area / During operation	Contractor(s) / AFCD			✓	Cap. 353 Marine Fish Culture Ordinance
S3.9.2	S2	Only pellet feed or alternative feed with better feed conversion ratio will be permitted within the proposed FCZ.	All area / During operation	AFCD			✓	Cap. 353 Marine Fish Culture Ordinance
S3.9.2	S2	No chemically-laden solution from culture gears disinfection should be discharged into the sea.	All area / During operation	Contractor(s)			✓	Cap. 358 Water Pollution Control Ordinance
S3.9.2	S2	Onsite storage of chemicals should be controlled and minimized as practicable. Excess chemicals as well chemical waste generated should be removed from the site at	All area / During operation	Contractor(s)			✓	Cap. 354C Waste Disposal (Chemical Waste) (General) Regulation

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
		appropriate facilities or by licensed contractor as soon as possible.						
S3.9.2	S2	Fuel storage onsite should be minimized, and if needed, be located at sheltered and secure location.	All area / During operation	Contractor(s)			✓	<i>Cap. 354C Waste Disposal (Chemical Waste) (General) Regulation</i>
S3.9.2	S2	Littering of the sea should be prohibited.	All area / During operation	Contractor(s)			✓	<i>Cap. 228 Summary Offences Ordinance</i>
S3.12	S2	Water quality monitoring for operation is recommended when the standing stock is expected to achieve 75% of the carrying capacity (i.e. 755.2 ton x 75% = 566.4 ton) or when the standing stock is expected to achieve 95% of the carrying capacity (i.e. 755.2 ton x 75% = 717.4 ton) for at least a month in a fish farming cycle.	All area / During operation	ET / IEC			✓	-
Marine Ecology								
S4.8	S3	The mitigation measures designed to mitigate water quality impacts through proper fish farm management shall be adopted.	All area / During operation	AFCD / Contractor(s)			✓	-
Fisheries								
S5.8	S4	The mitigation measures designed to mitigate water quality impacts and proper fish farm management designed to mitigate marine ecological impacts shall be adopted.	All area / During operation	AFCD / Contractor(s)			✓	-
Waste Management								
S6.5.1	S5	The contractor(s) / fish farmers shall implement the following control measures:	All area / during construction / during operation	Contractor(s)		✓	✓	<i>Marine Fish Culture Ordinance (Cap. 353)</i>

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
		<ul style="list-style-type: none"> ▪ Submit an Environmental Management Plan under the Fish Farm Operational Plan on the control of environmental impacts from the mariculture activities for agreement with AFCD; ▪ Disposal or destruction of any fish within any site found or suspected to be suffering from any infectious disease; ▪ Disposal of any noxious or waste matter resulting from the fish collection or fish harvest. 						
S6.5.1	S5	<p>The contractor(s) / fish farmers shall implement the following control measures:</p> <ul style="list-style-type: none"> ▪ Liquid oil waste or any other mixtures which contain oil and noxious liquid substances or any such residues shall not be discharged into the sea; ▪ Oily waste from vessels should be discharged to CWTC. 	All area / during construction / during operation	Contractor(s)		✓	✓	<i>Merchant Shipping (Prevention and Control of Pollution) Ordinance (Cap. 413)</i>
S6.5.1	S5	<p>The Contractor(s) will consult AFCD for the final disposal of wastes and, as appropriate, implement the good site practices and mitigation measures given below.</p> <ul style="list-style-type: none"> ▪ Nomination of approved personnel (e.g. environmental officer of the contractor(s), representative of the project proponent) to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site; ▪ Training of site personnel in proper waste management and handling procedures by AFCD; ▪ Provision of sufficient waste disposal points and regular collection for disposal; 	All area during contract mobilisation / during construction / during operation	Contractor(s)		✓	✓	<i>Marine Fish Culture Ordinance (Cap. 353)</i>

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
		<ul style="list-style-type: none"> ■ Appropriate measures to reduce windblown / floating litter and dust during transportation of waste by transporting wastes in enclosed containers; and ■ A recording system (e.g. log book for mariculture operation) for the amount of wastes generated, recycled and disposed of and the disposal sites for checking by AFCD. 						
S6.5.2	S5	The Contractor(s) must ensure that all the necessary waste disposal permits or licences (e.g. registration as a chemical waste producer) are obtained prior to the commencement of the construction works.	All area during contract mobilisation / during construction	Contractor(s)		✓		<i>Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C)</i>
S6.5.2.1	S5	General refuse and floating refuse will be stored in enclosed bins. The general refuse and floating refuse will be delivered to nearest accessible FEHD refuse collection points with public pier on a regular basis to reduce odour, pest and litter impacts following the existing practice under Cap. 353.	All area / During construction	Contractor(s)		✓		<i>Cap. 132BK Public Cleansing and Prevention of Nuisances Regulation Marine Fish Culture Ordinance (Cap. 353)</i>
S6.5.2.1 S6.5.3.1 S6.5.3.3	S5	General refuse, floating refuse and organic waste requiring disposal will be collected in designated garbage bags after the official implementation of MSW charging scheme.	All area / During construction / During operation	Contractor(s)		✓	✓	<i>Waste Disposal (Charging for Municipal Solid Waste) (Amendment) Ordinance 2021</i>
S6.5.2.1 S6.5.3.1 S6.5.3.3	S5	Public transport will not be used for handling (including stockpiling, labelling, packaging & storage), collection, transportation and re-use / disposal of wastes generated under the Project. Thus, impacts to public transport is not expected and specific mitigation measure for public transport is considered not necessary.	All area / During construction / During operation	Contractor(s)		✓	✓	-

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
S6.5.2.1 S6.5.3.3	S5	Recycling bins will be provided at appropriate locations to facilitate collection of recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) from the Project site.	All area / During construction / During operation	Contractor(s)		✓	✓	-
S6.5.2.1 S6.5.3.3	S5	To avoid entrapment of floating refuse within the Project site, the fish cages / rafts and vessels should be properly designed such that there are no sharp turns or abrupt indentation in order to avoid or minimise any trapped or accumulated refuse.	All area / During construction / During operation	Contractor(s)		✓	✓	-
S6.5.2.2	S5	Prior to the commencement of the construction works, AFCD will provide training to the construction workers on the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling. In particular, the training will emphasize no dumping of waste into the sea is allowed, particularly within the licensed area and on marine vessels.	All area / During construction	AFCD		✓		-
S6.5.3.1	S5	Good quality feed, such as pellet feed, should be used for feeding instead of trash fish as it effectively reduces the feed conversion ratio, and thus the quantity of uneaten feed wastage.	All area / During operation	Contractor(s)			✓	<i>Cap. 353 Marine Fish Culture Ordinance</i>
S6.5.3.1	S5	Optimal feed input should be implemented while the fish feed should be even distributed within the licensed area. The feed will also be sieved to remove broken pieces and dust before feeding.	All area / During operation	Contractor(s)			✓	<i>Cap. 353 Marine Fish Culture Ordinance</i>
S6.5.3.1	S5	The fish farmers will keep detailed operational records for each licensed area including the type and quantity of feed used, estimated number of fish stock and biomass, water temperature and growth rates of cultured organisms to allow more accurate estimation of fish feed input and to minimise unnecessary wastage of feeds.	All area / During operation	Contractor(s)			✓	<i>Cap. 353 Marine Fish Culture Ordinance</i>

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
S6.5.3.1	S5	The fish farmers and other personnel are required to take all precautions to prevent spillage during the delivery of feed to the Project site.	All area / During operation	Contractor(s)			✓	Cap. 353 Marine Fish Culture Ordinance
S6.5.3.1	S5	The uneaten feeds should be cleaned up immediately, especially during summer times when the decomposition of organic waste is more rapid, so as to minimise leaching to the adjacent water.	All area / During operation	Contractor(s)			✓	Cap. 353 Marine Fish Culture Ordinance
S6.5.3.1	S5	The quantity of feed delivered to the licensed area will also be recorded in order to ensure an appropriate quantity of feed stock is procured.	All area / During operation	Contractor(s)			✓	Cap. 353 Marine Fish Culture Ordinance
S6.5.3.1	S5	It is recommended that the fish pellets should be stored in covered areas to prevent unnecessary spoilage and spillage to adjacent waters.	All area / During operation	Contractor(s)			✓	Cap. 353 Marine Fish Culture Ordinance
S6.5.3.1 S6.5.3.3	S5	General refuse, floating refuse and organic waste will be stored in enclosed bins. The general refuse, floating refuse and organic waste will be delivered to the landside refuse collection points on a regular basis to reduce odour, pest and litter impacts.	All area / During operation	Contractor(s)			✓	Cap. 132BK Public Cleansing and Prevention of Nuisances Regulation Marine Fish Culture Ordinance (Cap. 353)
S6.5.3.1	S5	In case of large quantity of organic waste generated as a result of extensive fish deaths, for example, due to algal bloom or fish diseases, the fish farmers will report to AFCD in due course, and AFCD, Food and Environmental Hygiene Department (FEHD), Marine Department (MD) and other relevant departments will provide assistance to the fish farmers to transport the organic waste directly to NENT landfill for disposal.	All area / During operation	AFCD / Contractor(s)			✓	Cap. 353 Marine Fish Culture Ordinance
S6.5.3.2	S5	The fish farmers will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance	All area / During operation	Contractor(s)			✓	Waste Disposal (Chemical Waste) (General) Regulation; Code of

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
		with the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i> .						<i>Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>
S6.5.3.2	S5	Containers used for storage of chemical wastes will: <ul style="list-style-type: none"> ■ Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; ■ Have a capacity of less than 450 L unless the specifications have been approved by the EPD; and ■ Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations. 	All area / During operation	Contractor(s)			✓	<i>Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>
S6.5.3.2	S5	The storage area for chemical wastes will: <ul style="list-style-type: none"> ■ Be clearly labelled and used solely for the storage of chemical waste; ■ Be enclosed on at least 3 sides; ■ Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest; ■ Have adequate ventilation; ■ Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and ■ Be arranged so that incompatible materials are appropriately separated. 	All area / During operation	Contractor(s)			✓	<i>Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>
S6.5.3.2	S5	Chemical waste will be disposed of: <ul style="list-style-type: none"> ■ Via a licensed waste collector; and ■ To a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers 	All area / During operation	Contractor(s)			✓	<i>Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging,</i>

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
		a chemical waste collection service and can supply the necessary storage containers.						<i>Labelling and Storage of Chemical Wastes</i>
S6.5.3.4	S5	Prior to the commencement of the operation phase, AFCD will provide on-farm training to all staff working at the Project site on the concepts of sustainable mariculture practice, site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling.	All areas / During operation	AFCD			✓	-
S6.7	S5	Site inspections at the Project site (on marine vessels) are recommended on a regular basis at biweekly interval during the time of construction activities by the ET to check if wastes are being managed in accordance with good site practices and the recommended mitigation measures. The inspections will investigate all aspects of waste management including waste generation, storage, handling, recycling, transportation and disposal.	All area / During construction	ET / IEC		✓		-
S6.7	S5	AFCD will conduct regular inspections at monthly interval and review on FCZ operation to check if wastes are being managed in accordance with good site practices and the recommended mitigation measures. The inspections will investigate all aspects of waste management including waste generation, storage, handling, recycling, transportation and disposal.	All area / During operation	AFCD			✓	<i>Cap. 353 Marine Fish Culture Ordinance</i>
Visual								
S7.9	S6	Pre-construction and construction period for the Project site should be reduced as far as practical to lower visual impact	All area / Detailed design / During construction	Contractor(s)	✓	✓		-
S7.9	S6	The new structures will be designed in accordance with relevant marine safety standards and regulations. Sensitive architectural design will be considered where practicable. This should take into account material texture, colour, finishes to structures to ensure the fish rafts / cages blend into the	All area / Detailed design/ During construction	AFCD / Contractor(s)	✓	✓		-

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
		existing context, cause least disturbance to the existing seascape, and are the most visually appealing.						
S7.9	S6	After operation, the open water occupied by the Project site will be reinstated to their former state	All area / After operation	Contractor(s)			✓	-
S7.9	S6	Light intensity and beam directional angle should be controlled at the Project site at the design stage to reduce light pollution and glare (e.g. hooded lights, specific directional focus, etc.). In addition, lighting will be limited to auxiliary structures to reduce night-time impacts.	All area / Detailed design / During operation	AFCD / Contractor(s)	✓		✓	-
Noise								
S8.6	S7	<p>Good construction site practice and noise management could be considered to reduce the noise nuisance from the construction activities as follows:</p> <ul style="list-style-type: none"> ▪ Only well-maintained plant will be operated on-site and plant will be serviced regularly during the construction phase; ▪ Silencers or mufflers on construction equipment will be utilised and will be properly maintained during the construction phase; ▪ Mobile plant, if any, will be sited as far away from NSRs as possible; ▪ Machines and plant that may be in intermittent use will be shut down between work periods or will be throttled down to a minimum; 	All area / During construction	Contractor(s)		✓		<i>Cap. 400 Noise Control Ordinance</i>

EIA Reference	EM&A Reference	Recommended Environmental Protection Measures / Mitigation Measures	Location / duration of recommended measures & timing of completion of recommended measures	Implementation Agent ^(a)	Implementation Stage ^(b)			Relevant Legislation & Guidelines
					D	C	O	
		<ul style="list-style-type: none"> ■ Plants known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and ■ Other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities. 						
Cultural Heritage								
S9.7	S8.1	A buffer area of 20 m radius as shown in Figure 9.1 of the EIA Report from A-SC001 to avoid any tug boat anchoring and anchoring of the fish rafts/cages in the area.	A buffer area of 20 m radius from A-SC001 / during the construction and operation stage of the Project	Contractors / AFCD		✓	✓	-
S9.7	S8.1	Site inspections on a regular basis by the Environmental Team are recommended to check if any seabed disturbance work is conducted in the buffer area during construction phase of the Project.	Buffer area / during construction stage of the Project.	ET / IEC		✓		-
S9.7	S8.1	AFCD will conduct regular inspections to check if any seabed disturbance work is conducted in the buffer area.	Buffer area / during operation stages of the Project	AFCD			✓	-

(a) AFCD: Project Proponent; Contractor(s): Licensee(s) / the contractor(s) supporting the construction of fish raft structures; ET: Environmental Team; IEC: Independent Environmental Checker

(b) D: Design, C: Construction, O: Operation

APPENDIX B REGULAR WATER QUALITY MONITORING DATA RECORD SHEET

Regular Water Quality Monitoring Data Record Sheet

Location			
Date			
Start Time (hh:mm)			
Weather			
Sea Conditions			
Tidal Mode			
Water Depth (m)			
Monitoring Results		1 st reading	2 nd reading or Duplicate
Salinity	(mg/l)		
Temperature	°C		
pH			
DO Saturation	(%)		
DO	(mg/l)		
Turbidity	(NTU)		
SS Sample ID			
SS	(mg/l)		
Observed construction activities	<100m from location		
	>100m from location		
Other Observations			

Name & Designation

Signature

Date

Recorded by :

Checked by:

Note: The SS results are to be filled up once they are available from the laboratory.

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