

Proposed Comprehensive Development at Wo Shang Wai, Yuen Long

Environmental Monitoring & Audit Manual

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1. INTRODUCTION

1.1 Purpose of the Manual

1.1.1 The purpose of this Environmental Monitoring and Audit (EM&A) Manual (hereafter referred to as the Manual) is to guide the setup of an EM&A programme to ensure compliance with the Environmental Impact Assessment (EIA) study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme proposed for the Comprehensive Development at Wo Shang Wai, Yuen Long.

1.1.2 For the purpose of this Manual, the "Engineer" shall refer to the Engineer as defined in the Contract and the Engineer's Representative (ER), in cases where the Engineer's powers have been delegated to the ER, in accordance with the Contract. The Environmental Team (ET) Leader, who shall be responsible for and in charge of the Environmental Team, shall refer to the person delegated the role of executing the environmental monitoring and audit requirements.

1.2 Review of the EM&A Manual

1.2.1 It shall be noted that this EM&A Manual is subject to changes. The Manual shall be reviewed and updated later, where necessary, prior to the commencement of construction of the Project.

1.3 Background

1.3.1 In April 2005, **Mott Connell Ltd** was commissioned to undertake an Environmental Impact Assessment (EIA) for the Comprehensive Development of a currently vacant area at Wo Shang Wai as the Project was classified as Designated Project according to the Environmental Impact Assessment Ordinance (*Cap. 499*). The Project comprises two major purposes:

- residential development and associated infrastructure; and
- wetland restoration.

1.3.2 From the EIA, the recommendations for monitoring contained herein, are made.

1.4 Location of Project Area

1.4.1 The proposed development is encompassed by the residential uses (Palm Springs, Wo Shang Wai Village Houses, Royal Palms), fish ponds adjoining the south and north of the project area respectively. It is situated at the Deep Bay Wetland Buffer Area and close to the Conservation Area at the north. The location of the project is illustrated in **Figure 1.1**.

1.5 Sensitive Receivers

1.5.1 Sensitive receivers have been identified in the EIA and are shown on **Figures 1.2a, 1.2b and 1.2c**. Representative Sensitive Receivers (SRs) used for air quality, noise and water quality

are selected according to the criteria set out in the Technical Memorandum on Environmental Impact Assessment Ordinance (TMEIA) and listed as follows:

- Royal Palms (ASR and NSR);
- Palm Springs (ASR and NSR);
- Wo Shang Wai Tsuen (ASR and NSR);
- Village House of Mai Po San Tsuen (ASR and NSR);
- Proposed Comprehensive Development at Wo Shang Wai (Subject Project Area) (ASR);
- Fishponds in active use in the Conservation Area (CA) adjacent to the project area (WSR);
- Drainage channel at the north of the project area (WSR);
- The Deep Bay Water Control Zone (WSR);
- Ramsar Site (WSR); and
- Mai Po Nature Reserve (WSR)

1.6 Environmental Monitoring and Audit Requirements

1.6.1 The EIA study identified the likely environmental impacts during construction and operational phases. These impacts can be minimised to acceptable levels with the implementation of environmental mitigation measures and environmental monitoring and audit requirements. An Implementation Schedule of the environmental mitigation measures recommended in the EIA Report is described in **Annex A**. To ensure the environmental acceptability of the proposed development, monitoring and audit requirements have been identified and are described in details in the subsequent sections. Below is the summary of the EM&A requirements extracted from the EIA study:

Air Quality

1.6.2 Although the proposed Project is not expected to generate excessive dust levels, an environmental monitoring and audit programme is recommended to ensure the compliance of construction dust with the criteria and the proper implementation of mitigation measures.

Noise

1.6.3 Full compliance with the noise criteria will be achieved at all NSRs with the implementation of mitigation measures during construction phase. Environmental monitoring and audit is however recommended to ensure that the noise levels do not exceed the criteria during the construction phase. No operational noise monitoring is proposed as full compliance with the noise standards is predicted.

Water Quality

1.6.4 A water quality monitoring and site auditing programme is proposed, to ensure mitigation measures during construction phase will be implemented to protect the water bodies in the sensitive area from being further degraded. A water quality monitoring programme for the created wetland during operational phase is also recommended, to ensure the effectiveness of the water circulating system and the self sustainability of the wetland. The monitoring and audit details are given in a later section and in Appendix H of the Wetland Restoration Management Plan.

Sewerage and Sewage Treatment

- 1.6.5 There is no requirement for formal monitoring to be undertaken for this Project as all sewage generated at the proposed development will be discharged into the planned public sewer. Confirmation has been received from both the Environmental Protection Department and Drainage Services Department in respect of discharging the domestic effluent into the planned trunk sewer along Castle Peak Road. Therefore, the sewage generated from the development will be collected through the internal sewerage network and then discharged to this planned trunk sewer. There is therefore no (net) discharge from the project area. No sewage effluent will be discharged into the nearby water bodies even during the construction phase as the sewage generated from the on-site workers will be collected in chemical toilets and disposed off-site.

Waste Management

- 1.6.6 Auditing of each waste stream is recommended to be carried out periodically during the construction phase to determine if wastes are being managed in accordance with approved procedures. A site waste management plan will need to be prepared by the Contractor to define the waste management procedures and protocols. The audits will examine all aspects of waste management including waste generation, storage, recycling, treatment, transport and disposal and would be conducted on a monthly basis or more frequently if required.

Ecology

- 1.6.7 The implementation of the ecological mitigation measures stated in Section 8 of the final EIA report should be checked as part of the environmental monitoring and audit (EM&A) procedures during the construction period. Furthermore, the target species identified in the Ecological Impact Assessment (EcoIA) should be monitored according to the wetland mitigation performance targets stated in Appendix H of the final EIA report, to ensure effectiveness of the proposed mitigation measures. The details of the recommended monitoring and audit programmes are presented in the later section.

Fisheries

- 1.6.8 With the implementation of proper site practices to control site runoff and dust control during construction, no impact is expected. No fisheries-specific EM&A requirement will be required during the construction phase. No operational impact is anticipated after the completion of the proposed project and therefore no EM&A requirement will be required during the operation phase.

Cultural Heritage

- 1.6.9 Neither construction nor operational impact is anticipated and hence no EM&A will be required during the construction and operational phases.

Landscape and Visual

- 1.6.10 With the implementation of the recommended mitigation measures, no residual landscape and visual impacts are anticipated. Details of the recommended monitoring and audit programme are presented in a later section.

1.7 Project Organisation

1.7.1 The proposed project organisation is shown in **Figure 1.3**. The responsibilities of respective parties are:

The Contractor

- provide assistance to the ET in carrying out monitoring;
- submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;
- implement measures to reduce impact where Action and Limit levels are exceeded, and
- adhere to the procedures for carrying out complaint investigation in accordance with *Section 11.3*.

The Engineer or Engineers Representative

- supervise the Contractor's activities and ensure that the requirements in the Manual are fully complied with;
- inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- employ an IEC to audit the results of the EM&A works carried out by the ET; and
- adhere to the procedures for carrying out complaint investigation in accordance with *Section 11.3*.

The Environmental Team

- monitor the various environmental parameters as required in the Manual;
- analyse the EM&A data and review the success of EM&A programme to cost effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- carry out site inspections to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues for proactive action before problems arise;
- audit and prepare audit reports on the environmental monitoring data and the site environmental conditions;
- report on the EM&A results to the Independent Environmental Checker (IEC), Contractor, the ER, and the EPD;
- recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans; and
- adhere to the procedures for carrying out complaint investigation in accordance with *Section 11.3*.

1.7.2 The ET leader shall have relevant professional qualifications and at least 7 years of experience in environmental monitoring and audit (EM&A) or environmental management subject to approval of the ER and the Environmental Protection Department (EPD).

Independent Environmental Checker (IEC)

- check, review, verify the EM&A works performed by the ET;
- audit the monitoring activities and results;
- evaluate the EM&A reports submitted by the ET;
- review the proposals for mitigation measures submitted by the Contractor in accordance with the Event and Action Plans; and

- adhere to the procedures for carrying out complaint investigation in accordance with *Section 11.3*.
- 1.7.3 The IEC shall have relevant professional qualifications and at least 7 years of experience in environmental monitoring and audit (EM&A) or environmental management subject to approval of the ER and the EPD.
- 1.7.4 Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibility, as required under the EM&A programme for the duration of the project. The ET shall not be in any way an associated body of the Contractor and the IEC. The IEC shall not be in any an associated body of the Contractor or the ET.

1.8 Construction Programme

- 1.8.1 A preliminary project programme is shown in **Figure 1.4**.
- 1.8.2 The major construction activities are installation of vertical band drains, filling works, preloading, substructure works, pile cap/ footing works, superstructure works and excavation works for wetland construction.

Construction of the proposed residential development with wetland restoration are planned to commence in 2008 for completion by 2012.

2. AIR QUALITY

2.1 Introduction

2.1.1 The Contractor shall follow the Air Pollution Control (Construction Dust) Regulation to implement dust mitigation measures during construction to minimise the dust impact to the nearby air sensitive receivers and to ensure the effectiveness of the implementation of dust mitigation measures recommended in the final EIA report.

2.2 Air Quality Parameters

2.2.1 Monitoring and audit of the Total Suspended Particulate (TSP) levels shall be carried out by the ET to ensure that any deteriorating air quality could be readily detected and timely actions taken to rectify the situation.

2.2.2 1-hour and 24-hour TSP levels shall be measured to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval of the ER, 1-hour TSP levels can be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method to indicate short event impacts.

2.2.3 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, other special phenomena and work progress of the concerned project area etc. shall be recorded in details. A sample data sheet is shown in **Annex B**.

2.3 Monitoring Equipment

2.3.1 The ET Leader is responsible for provision of the monitoring equipment. He shall ensure that sufficient number of equipment with appropriate calibration kits are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment shall be clearly labelled.

2.3.2 HVS in compliance with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:

- 0.6 - 1.7 m³/min (20 - 60 standard cubic feet per minute) adjustable flow range;
- equipped with a timing / control device with ± 5 minutes accuracy for 24 hours operation;
- installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
- capable of providing a minimum exposed area of 406 cm² (63 in²);
- flow control accuracy: $\pm 2.5\%$ deviation over 24-hour sampling period;
- equipped with a shelter to protect the filter and sampler;
- incorporated with an electronic mass flow rate controller or other equivalent devices;
- equipped with a flow recorder for continuous monitoring;

- provided with a peaked roof inlet;
- incorporated with a manometer;
- able to hold and seal the filter paper to the sampler housing at horizontal position;
- easy to change the filter, and
- capable of operating continuously for 24-hour period.

2.3.3 Calibration of dust monitoring equipment shall be conducted as specified by the manufacturer. Initial calibration of the dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals (one-point calibration). Five-point calibration shall be carried out every six months. The calibration data shall be properly documented for future reference. All the data shall be converted into standard temperature and pressure condition.

2.3.4 Wind data monitoring equipment shall also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the ER in consultation with the IEC. In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from the IEC.

2.4 Monitoring Locations

2.4.1 Four air quality monitoring locations are proposed and summarised in **Table 2-1** as shown in **Figure 2.1**. As approval is needed from the premises landlord for dust monitoring equipment installation, it is not certain that a suitable location will be approved. The status and locations of dust sensitive receivers may change after issuing this manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek agreement from ER, IEC and EPD.

Table 2-1 Air Quality Monitoring Stations

ID	Description	Monitoring Location
ASR 1	Royal Palms	To the southeast of the project area
ASR 2A	Palm Springs	To the southwest of the project area
ASR 3	Wo Shang Wai Tsuen	To the south of the project area
ASR 4	Village House of Mai Po San Tsuen	To the east of the project area

2.4.2 When alternative monitoring locations are proposed, the following criteria, as far as practicable, shall be followed:

- a) at the project area boundary or such locations close to the major dust emission source;
- b) close to the sensitive receptors; and
- c) take into account the prevailing meteorological conditions.

2.4.3 When positioning the samplers, the following points shall be noted:

- a) only one at each location;
- b) the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- c) a minimum of 2 metres of separation from walls, parapets and penthouses is required;
- d) a minimum of 2 metres separation from any supporting structure, measured horizontally is required;
- e) no furnace or incinerator flue or building vent is nearby;
- f) airflow around the sampler is unrestricted;
- g) the sampler is more than 20 metres from the dripline;
- h) any wire fence and gate, to protect the sampler, shall not cause any obstruction during monitoring;
- i) permission must be obtained to gain access to the monitoring stations; and
- j) if needed, a secured supply of electricity shall be obtained to operate the samplers.

2.5 Baseline Monitoring

- 2.5.1 The ET shall carry out baseline monitoring at all designated monitoring locations for at least 14 consecutive days prior to the commencement of the construction works to obtain daily 24-hr TSP samples. 1-hour sampling shall also be done at least 3 times per day while the highest dust impact is expected.
- 2.5.2 During the baseline monitoring, there shall not be any construction or dust generation activities in the vicinity of the monitoring stations. A schedule for the baseline monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.
- 2.5.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the ER and agreed with IEC prior to commencement of baseline monitoring.
- 2.5.4 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit these to the ER for approval.
- 2.5.5 Ambient conditions may vary seasonally and shall be reviewed as required. If the ET considers that the ambient conditions have been changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring shall be at times when the contractor's activities are not generating dust, at least

in the proximity of the monitoring stations. Should a change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, shall be revised. The revised baseline levels and air quality criteria shall be agreed with EPD and IEC.

2.6 Impact Monitoring

2.6.1 The ET is responsible for impact monitoring during the course of the works. For regular impact monitoring, 24-hr TSP monitoring shall be in the sampling frequency of at least once in every six-days. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days shall be undertaken when the highest dust impact occurs.

2.6.2 In case of non-compliance with the air quality criteria, more frequent monitoring exercise, as specified in the Action Plan in Section 2.7, shall be conducted within 24 hours after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

2.7 Event and Action Plan for Air Quality

2.7.1 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP level. Table 2-2 shows the air quality criteria, namely Action and Limit (AL) Levels to be used. Should non-compliance of the air quality criteria occurs, actions in accordance with the Event and Action Plan in Table 2-3 shall be carried out.

Table 2-2 Action and Limit Levels for Air Quality

Parameters	Action Level	Limit Level
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 200 \mu\text{g}/\text{m}^3$, Action level = (130% of baseline level + Limit level)/2 For baseline level $> 200 \mu\text{g}/\text{m}^3$, Action level = Limit Level	260
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 384 \mu\text{g}/\text{m}^3$, Action level = (130% of baseline level + Limit level)/2 For baseline level $> 384 \mu\text{g}/\text{m}^3$, Action level = Limit Level	500

Table 2-3 Event and Action Plan for Air Quality

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform IEC and ER. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET. 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice. 2. Amend working methods if appropriate.

Event	Action			
	ET Leader	IEC	ER	Contractor
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify the source. 2. Inform IEC and ER. 3. Advise ER on the effectiveness of the proposed remedial measures 4. Repeat measurements to confirm findings. 5. Increase monitoring frequency to daily. 6. Discuss with IEC and the Contractor on remedial actions required. 7. If exceedance continues, arrange meeting with IEC and ER. 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET. 2. Check the Contractor's working method. 3. Discuss with ET Leader and the Contractor on possible remedial measures. 4. Advise ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Submit proposals for remedial actions to IEC within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposal if appropriate.
Limit Level				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform ER and EPD. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET. 2. Check the Contractor's working method. 3. Discuss with ET Leader and the Contractor on possible remedial measures. 4. Advise ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IEC, ER, EPD and the Contractor. 2. Identify the source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary and advise ER accordingly. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. In consultation with IEC, agree with the remedial measures to be implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the

Event	Action			
	ET Leader	IEC	ER	Contractor
	implemented. 6. Arrange meeting IEC and ER to discuss the remedial actions to be taken. 7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	3. Supervise the implementation of remedial measures.	4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by ER until the exceedance is abated.

3. NOISE

3.1 Introduction

- 3.1.1 The monitoring programme shall be carried out by the ET to ensure that the noise level of construction works complies with the 75dB(A) criterion for domestic premises, with 70 dB(A) for schools and with a further reduction to 65dB(A) during examination periods.

3.2 Noise Parameters

- 3.2.1 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30\text{ min})}$ shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays.
- 3.2.2 Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference. A sample data record sheet is shown in **Annex B** for reference.

3.3 Monitoring Equipment

- 3.3.1 As refer to the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level metres in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The calibration of the sound level meters and their respective calibrators shall be carried out in accordance with the manufacturer's requirements.
- 3.3.2 Noise measurements shall not be made in the presence of fog, rain, wind with a steady speed exceeding 5 ms^{-1} or wind with gusts exceeding 10 ms^{-1} .
- 3.3.3 The ET Leader is responsible for the provision and maintenance of the monitoring equipment. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled. The location of equipment installation should be proposed by the ET Leader and agreed with the ER and EPD in consultation with the IEC.

3.4 Monitoring Locations

- 3.4.1 The noise monitoring locations (Refer to **Figure 3.1**) are summarised in **Table 3-1**. The status and locations of noise sensitive receivers may change after issuing this manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek agreement from ER, IEC and EPD.

Table 3-1 Noise Monitoring Stations

Monitoring Station	Description
NSR 1	House No. 5, Cherry Path, Palm Springs
NSR 3	House No. 17, Wo Shang Wai Village
NSR 5	House No. 1, Ventura Avenue, Royal Palms
NSR 7	Mai Po San Tsuen

When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:

- a) at locations close to the major project activities which are likely to have noise impacts;
- b) close to the noise sensitive receivers (any domestic premises, temporary housing accommodation, educational institution, place of public worship, shall be considered as a noise sensitive receiver); and
- c) for monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.

3.4.2 The monitoring station shall normally be at a point 1m from the exterior of the sensitive receivers building facade and be at a position 1.2m above the ground. If there is a problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3dB(A) shall be made to the free field measurements. The ET Leader shall agree with the IEC on the monitoring positions and the correction adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

3.5 Baseline Monitoring

3.5.1 The ET shall carry out baseline noise monitoring prior to the commencement of the construction works. There shall not be any construction activities in the vicinity of the stations during the baseline monitoring. Continuous baseline noise monitoring for the A-weighted levels L_{Aeq} , L_{A10} and L_{A90} shall be carried out daily for a period of at least two weeks in a sample period of 30 minutes between 0700 and 1900. A schedule on the baseline monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.

3.5.2 In exceptional case, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to the ER for approval.

3.6 Impact Monitoring

3.6.1 During normal construction working hour (0700-1900 Monday to Saturday), monitoring of $L_{Aeq, 30min}$ noise levels (or as six consecutive $L_{Aeq, 5min}$ readings) shall be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM.

3.6.2 Other noise sources such as road traffic may make a significant contribution to the overall noise environment. Therefore, the results of noise monitoring activities will take into account such influencing factors, which may not be presented during the baseline monitoring period.

3.6.3 In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Event and Action Plan in *Section 3.7* shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

3.7 Event and Action Plan for Noise

3.7.1 The AL Levels for construction noise are defined in **Table 3-2**. Should non-compliance of the criteria occurs, action in accordance with the Event and Action Plan in **Table 3-3** shall be carried out.

Table 3-2 Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received.	75* dB(A)

Note:

* 70 dB(A) for schools and 65 dB(A) during school examination periods.

Table 3-3 Event and Action Plan for Construction Noise

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IEC and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to IEC and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation measures. 	<ol style="list-style-type: none"> 1. Review with analyzed results submitted by ET. 2. Review the proposed remedial measures by the Contractor and advise ER accordingly. 3. Supervise the implement of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analyzed noise problem. 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC. 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Identify the source. 2. Notify IEC, ER, EPD and the Contractor. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analyzed noise 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days

Event	Action			
	ET Leader	IEC	ER	Contractor
	implemented. 6. Inform IEC, ER, and EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	advise ER accordingly. 3. Supervise the implementation of remedial measures.	problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the ER until the exceedance is abated.

4. WATER QUALITY

4.1 Introduction

4.1.1 Under the Water Pollution Control Ordinance (WPCO) (Ch. 358), the proposed development locating in the Deep Bay Water Control Zone shall follow the relevant Water Quality Objectives (WQOs) in assessing compliance of any effects from the construction and operation of the Project.

4.1.2 A water quality monitoring and site auditing programme is proposed to set out the guideline of monitoring in construction phase to be taken in order to protect the water bodies in the sensitive area from being degraded. A water quality monitoring programme is also developed for the created wetland in operation phase.

4.2 Water Quality Parameters

4.2.1 Monitoring for Dissolved Oxygen (DO), temperature, pH, suspended solids (SS) and Biological Oxygen Demand (BOD) shall be undertaken at designated monitoring locations. The purpose of which is to ensure that any deterioration in water quality can be readily detected and timely action can be taken to resolve any problems. Changes in water quality which may affect the suitability of conditions for aquatic life can be detected by changes in parameters such as DO, SS and temperature. Change in pH value will indicate the possibility of acidification events and certain types of pollution while BOD could indicate the level of organic matter in the water bodies.

4.2.2 It should be noted that DO, temperature and pH should be measured in-situ whereas SS and BOD should be analysed in a laboratory. In association with the water quality parameters, other relevant data shall also be measured, such as monitoring location/position, time, weather conditions, and any special phenomena and description of work underway at the construction site etc.

4.3 Sampling Procedures and Monitoring Equipment

4.3.1 (N.B. Water samples for all monitoring parameters shall be collected, stored, preserved and analysis according to Standard Methods, APHA 19 ed. and/or methods agreed by the Director of Environmental Protection. *In-situ* measurements at monitoring locations including DO, temperature and pH shall be collected by equipment with the characteristics and functions listed in the following sections).

4.3.2 The following equipment and facilities shall be provided by the ET and used for the monitoring of water quality impacts:

Dissolved Oxygen and Temperature Measuring Equipment

4.3.3 DO and water temperature shall be measured in-situ by a DO/ temperature meter. The instrument should be portable and weatherproof using a DC power source. It should have a membrane electrode with automatic temperature compensation complete with a cable. The equipment should be capable of measuring:

- a DO level in the range of 0-20 mg/l and 0-200% saturation; and
- a temperature of between 0 and 45 degree Celsius.

pH value Measuring Equipment

- 4.3.4 Measurement of pH level will be recorded in-situ by a pH meter which shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. The range of pH value shall be 0 to 14 with 0.1 as the base unit.

Suspended Solids and BOD Measurements (Sample Containers and Storage)

- 4.3.5 Water samples for SS analysis should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen), delivered to the laboratory, and analysed as soon as possible after collection. Analysis shall be carried out in a HOKLAS or other international accredited laboratory.

Calibration of In-Situ Instruments

- 4.3.6 All pH meters, DO/ temperature meters shall be checked and calibrated prior to use.
- 4.3.7 Standard buffer solution of at least 2 pH levels (either pH 4 and pH 7 or pH 7 and pH 10) shall be used for calibration of the instrument before and after use.
- 4.3.8 DO meters shall be calibrated by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes shall be checked with certified standard solutions before each use. Wet bulb calibrations for all DO meters shall be carried out before measurement at each monitoring location. For the on site calibration of field equipment, BS 127:1993, "Guide to field and on-site test methods for the analysis of waters" should be observed.

Laboratory Measurement/Analysis

- 4.3.9 Each sample shall be analysed in accordance with the APHA Standard Methods for the Examination of Water and Wastewater, 19th edition, or an equivalent method approved by the EPD. If an in-house or non-standard method is proposed, details of the method verification may require to be submitted to the EPD. In any circumstance, the sample testing shall comply with a comprehensive quality assurance and quality control programme. The laboratory should be prepared to demonstrate the quality programmes to the EPD when requested.

4.4 Monitoring Locations

- 4.4.1 The water quality monitoring points as presented in this EM&A Manual shall be reviewed and additional monitoring locations shall be considered with the exception of monitoring points located inside the project area boundary. Referring to **Table 4-1**, **Figures 4.1** and **4.2**, it is suggested that the monitoring points MP1 to 6 shall be adopted during construction phase while monitoring points WM1 to 4 located inside the wetland area and along the water ditch shall be adopted during operation phase. The final locations and number of the monitoring points shall be agreed with EPD at least 2 weeks before undertaking any works. The status and locations of water quality sensitive receivers may change after issuing this

manual. If such cases exist, the ET leader shall propose updated monitoring locations and seek approval from the IEC and EPD.

Table 4-1 Water Quality Monitoring Stations

ID	Description	Easting	Northing
MP1	For Construction Phase	838 730.50	822 862.25
MP2	For Construction Phase	838 933.26	823 247.41
MP3	For Construction Phase	839 107.17	823 596.84
MP4	For Construction Phase	839 286.14	823 638.55
MP5	For Construction Phase	839 134.35	823 722.99
MP6	For Construction Phase	839 063.02	823 842.25
WM1	For Operation Phase	Not Applicable	Not Applicable
WM2	For Operation Phase	Not Applicable	Not Applicable
WM3	For Operation Phase	Not Applicable	Not Applicable
WM4	For Operation Phase	Not Applicable	Not Applicable

4.4.2 When alternative monitoring locations are proposed, they shall be chosen based on the following criteria:

- (a) at locations close to and preferably at the boundary of the mixing zone of the major project activities as indicated in the EIA report, which are likely to have water quality impacts;
- (b) close to the sensitive receptors which are directly or likely to be affected;
- (c) for monitoring locations located in the vicinity of the sensitive receptors, care shall be taken to cause minimal disturbance during monitoring;

4.4.3 Measurement shall be taken at 3 water depths, namely, 1m below water surface, mid-depth and 1m above stream bed/pond bed, except where the water depth less than 6m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station will be monitored. The ET Leader shall seek approval from the IEC and EPD on all the monitoring stations.

4.4.4 Replicates in-situ measurements and samples collected from each independent monitoring event are required for all parameters to ensure a robust statistically interpretable dataset.

4.5 Baseline Monitoring

4.5.1 Baseline conditions for the water quality of the sensitive ditches/drainage channels shall be established and agreed with the EPD and AFCD prior to the commencement of works. The purposes of the baseline monitoring are to establish ambient conditions prior to the commencement of the construction works and to demonstrate the suitability of the proposed impact and reference monitoring points.

4.5.2 The baseline conditions shall normally be established by measuring the water quality parameters specified in *Section 4.2*. The measurements shall be taken at all designated monitoring stations including control points, 3 days per week, for at least 4 weeks prior to the commencement of construction works.

- 4.5.3 There shall not be any construction activities over water in the vicinity of the points during the baseline monitoring.
- 4.5.4 In exceptional case when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall seek approval from the IEC and EPD on an appropriate set of data to be used as baseline reference.
- 4.5.5 Baseline monitoring schedule shall be faxed to EPD 1 week prior to the commencement of baseline monitoring. The interval between 2 sets of monitoring shall not be less than 36 hours.

4.6 Impact Monitoring

- 4.6.1 During the course of the construction works, monitoring shall be undertaken 3 days per week, with sampling at the designated monitoring points. The interval between 2 sets of monitoring shall not be less than 36 hours except where the Action and/or Limit levels is/are exceeded, in which case the monitoring frequency will be increased. The frequency of monitoring shall be agreed with EPD at least 2 weeks before undertaking any works.
- 4.6.2 Proposed water quality monitoring schedule shall be faxed to EPD on or before the first day of the monitoring month, EPD shall be notified immediately of any change in the schedule by fax.

4.7 Operation Monitoring

- 4.7.1 During the course of the operation of the restored wetland, monitoring shall be undertaken once per month, with sampling at the designated monitoring points. The frequency of monitoring shall be agreed with EPD at least 2 weeks before undertaking any works. Details of monitoring requirements and methodology are specified in *Section 7.3.3*.

4.8 Event and Action Plan for Water Quality

- 4.8.1 The Action and Limit (AL) Levels for water quality for construction and operation phases are defined in **Tables 4-2** and **4-3** respectively. The actions in accordance with the Action Plan in **Tables 4-4** and **4-5** shall be carried out if the water quality assessment criteria are exceeded at any designated monitoring points.

Table 4-2 Action and Limit Levels for Construction Phase Water Quality

Parameters	Action Level	Limit Level
DO in mg/l	5 percentile of baseline data	≤ 2 or 1 percentile of baseline data
pH	< 5.5 or > 7.5	< 4.0 or > 8.0
Turbidity in NTU	95 percentile of baseline data	99 percentile of baseline data
SS in mg/l	95 percentile of baseline data	99 percentile of baseline data
BOD	For Surveillance only.	For Surveillance only.

Table 4-3 Action and Limit Levels for Operation Phase Water Quality

Parameters	Action Level	Limit Level
DO in mg/l	≤ 2	≤ 1
pH	< 6.5 or > 8.0	< 6.0 or > 8.5
Salinity in ppt	> 2	> 5
Ammoniacal nitrogen in mg/l	> 3	> 6
BOD	For surveillance	For surveillance
Total oxidized nitrogen (nitrite and nitrate) in mg/l	> 5	> 10
Total Phosphorus in mg/l	> 5	> 10
Orthophosphate	For surveillance	For surveillance

Notes: All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.

Table 4-4 Event and Action Plan for Water Quality for Construction Phase

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level				
1. Exceedance for one sample	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm finding; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; and Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Inform EPD and AFCD and confirm notification of non-compliance in writing; Discuss with IEC on the proposed mitigation measures; and Make agreement on the mitigation measures to be implemented. 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER; and Implement the agreed mitigation measures.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm finding; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER 	<ol style="list-style-type: none"> Inform EPD and AFCD and confirm notification of non-compliance in writing; Discuss with IEC on the proposed mitigation measures; 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working

Event	Action			
	ET Leader	IEC	ER	Contractor
	5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; and 8. Repeat measurement on next day of exceedance.	accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	3. Make agreement on the mitigation measures to be implemented; and 4. Assess the effectiveness of the implemented mitigation measures.	methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; and 6. Implement the agreed mitigation measures.
Limit Level				
1. Exceedance for one sample	1. Repeat in-situ measurement to confirm finding; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; and 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform EPD and AFCD and confirm notification of non-compliance in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; and 3. Request Contractor to critically review the working methods; 4. Make agreement on the mitigation measures to be implemented; and 5. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days; and 6. Implement the agreed mitigation measures.
2. Exceedance for two or more consecutive samples	1. Repeat in-situ measurement to confirm finding; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and	1. Inform EPD and AFCD and confirm notification of non-compliance in writing; 2. Discuss with IEC, ET and Contractor on the proposed	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes

Event	Action			
	ET Leader	IEC	ER	Contractor
	methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; and 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	mitigation measures; and 3. Request Contractor to critically review the working methods; 4. Make agreement on the mitigation measures to be implemented; 5. Assess the effectiveness of the implemented mitigation measures; and 6. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level.	of working methods; 5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures; and 7. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities.

Table 4-5 Event and Action Plan for Water Quality for Operation Phase

Exceedance for pH, DO and SS sample	Action Level	Limit Level
Actions to be taken	1. Double the monitoring frequency; 2. Identify and review the problem; and 3. Carryout the actions for limit level exceedance should the problem is likely to deteriorate.	1. Water exchange / add water/ remove identified contamination source/ propose and implement other measures.

5. SEWERAGE AND SEWAGE TREATMENT

5.1 Introduction

- 5.1.1 An assessment of potential impacts due to the sewage arising from the proposed residential development has been assessed in Section 6 of the final EIA report. The sewage generated from the development is proposed to be discharged to the future public trunk sewer along Castle Peak Road, no sewerage and sewage impacts are anticipated from the proposed development and monitoring and audit of the sewerage system is considered not required.

5.2 Mitigation Measures

- 5.2.1 It is understood that a new trunk sewer will be constructed along Castle Peak Road and will be available for use in 2012. This trunk sewer will connect into the existing Yuen Long Sewage Treatment Works. The tentative sewage disposal scheme for the Development is to discharge the sewage to this planned trunk sewer via the sewer system. The proposed network comprises sewers to be laid under the future internal roadwork which will convey the sewage generated within the development to the future trunk sewer in Castle Peak Road. Gravity sewers will be used to collect the sewage as far as possible. However, should there be any discharge level constraints imposed by the future trunk sewer, a local pumping station will be provided within the development, at a location before the terminal manhole of the development, to lift up the sewage to a level that can be connected to the trunk sewer. The sewers will be protected by concrete surrounds to minimize the risk of sewer bursts. All the sewers and sewerage facilities within the proposed development before the terminal manhole will be operated and maintained by the owner. The gravity sewer outside the development connecting the terminal manhole to the future public sewer will be maintained by DSD subject to their agreement in the detailed design stage.
- 5.2.2 As all the sewage generated will be discharged away from the proposed development and conveyed to public sewage treatment plant, there will be no net discharge from this project area. This scheme has been discussed with EPD and DSD and they have expressed no objection in principle on the option, however, the arrangement will need to be further discussed with DSD and EPD during the detailed design stage. It has been estimated that a 300mm diameter sewer will have adequate flow capacity to handle the sewage arising from the proposed development. As EPD and DSD have both confirmed that their proposed upgrading/new sewers at Castle Peak Road in North West New Territories will be adequate to receive the sewage arising from the proposed development, the use of computerized analysis techniques to assess the impact on the public sewer is not considered to be required. Close monitoring of the implementation programme will be undertaken to ensure the sewage generated from the proposed development can discharge to the planned trunk sewer at the planned design horizon.
- 5.2.3 The construction of the sewers and manholes (general civil works), and the pumping station if required, will be carried out in line with the construction of the substructure and superstructure works for the proposed development. Installation of electrical and mechanical equipment will follow, with testing and commissioning being carried out after the successful installation of the required electrical and mechanical equipment.

6. WASTE MANAGEMENT

6.1 Introduction

6.1.1 The Contractor shall prepare a plan to control the waste generated from the construction activities. Besides removal of waste material produced and implementation of recommended mitigation measures to minimise waste problems arising, a site waste inventory record should be maintained. The Contractor shall mention good site practice to ensure that the waste impacts are minimised and shall make sure that relevant disposal permits are obtained.

6.1.2 For the waste to be disposed appropriately, it is recommended that, if practical, the waste should be separated by category on-site by the Contractor. The following categories shall be adopted:

- Site clearance waste
- Excavated materials
- Construction and Demolition (C&D) waste
- Chemical waste
- General refuse

6.2 Audit Requirements

6.2.1 It is recommended that auditing of each waste stream should be carried out periodically by the contractor to determine if wastes are being managed in accordance with approved procedures and the site waste management plan. The audits should look at all aspects of waste management including waste generation, storage, recycling, treatment, transport and disposal. An appropriate audit programme would be to undertake the first audit at the commencement of the construction works, and then to audit weekly thereafter.

6.3 Good Site Practices

6.3.1 Good site practice shall be maintained and specific procedures in dealing with different kind of wastes shall be followed during construction. The Contractor shall make a thorough reference from the relevant Legislations (such as the *Waste Disposal Ordinance (Cap 354)*) and guidelines (such as the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992)* by EPD).

Waste Management Hierarchy

6.3.2 Various waste management options are as follows:

- avoidance and minimisation, i.e. not generating waste through changing or improving practices and design;
- reuse of materials, thus avoiding disposal (generally with only limited reprocessing);
- recovery and recycling, this avoiding disposal (although reprocessing may be required);
and
- treatment and disposal, according to relevant laws, guidelines and good practice.

6.3.3 This hierarchy should be used to evaluate waste management options, thus allowing waste reduction measures to be introduced at the detailed design stage and carried through to the construction phase.

6.3.4 Training and instruction of construction staff should be given at the project area to increase awareness and draw attention to waste management issues and the need to minimise waste generation. The training requirement should be included in the site waste management plan.

Storage, Collection and Transport of Waste

6.3.5 Permitted waste haulers should be used to collect and transport wastes to the appropriate disposal points. Measures to minimise adverse impacts should be instigated as appropriate practical for example:

- handle and store wastes in a manner which ensures that they are held securely without loss or leakage, thereby minimising the potential for pollution.
- use waste haulers authorised or licensed to collect specific category of waste;
- remove wastes on a daily basis;
- maintain and clean waste storage areas daily;
- minimise windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers;
- obtain the necessary waste disposal permits from the appropriate authorities if they are required, in accordance with Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), the Land (Miscellaneous Provisions) Ordinance (Cap 28);
- Dispose of the waste at licensed waste disposal facilities
- Develop procedures such as ticketing system to facilities tracking of loads, particularly for chemical waste, and to ensure that illegal disposal of wastes does not occur, and
- Maintain records of the quantities of wastes generated, recycled and disposal.

Excavated/Imported Filling Material

6.3.6 The excavated/imported filling material may have to be temporarily stockpiled on-site. Control measures should be taken at the stockpiling area to prevent the generation of dust and pollution of stormwater channels. However, to eliminate the risk of blocking drains in the wet season, it is recommended that stockpiling of excavated materials during wet season should be avoided as far as practicable.

Dust:

- wetting the surface of the stockpiled soil with water when necessary especially during the dry season;
- covering the stockpiled soil with sheets;
- minimising disturbance of the stockpiled soil; and
- enclosure of stockpiling area.

Water Quality:

- installation of silt traps for the surface water drainage system; and
- covering stockpiled material with tarpaulin during heavy rainstorm.

6.3.7 In addition, potential dust impacts due to the haulage of excavated/imported filling materials should be minimised by undertaking the following control measures:

- dropping heights for those materials should be controlled to a practical height to minimise the fugitive dust arising from unloading;
- materials should not be loaded to a level higher than the side and tail boards, and should be dampened or covered before transport.
- the travelling speed should be reduced to 10 km hr⁻¹ to reduce dust dispersion and re-suspension from the operating haul trucks;
- wheel washing facilities should also be installed and used by all vehicles leaving the project area.

Construction & Demolition Materials

6.3.8 In order to minimise waste arisings and to keep environmental impacts within acceptable levels, environmental control measures are recommended.

- Careful design, planning and good site management can minimize over-ordering and generation of waste materials such as concrete, mortars and cement grouts. The design of formwork should maximize the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.
- The Contractor should recycle as much of the C&D material as possible on-site. Proper segregation of wastes on site will increase the feasibility of certain components of the waste stream by the recycling contractors.
- Government has established a charging scheme for the disposal of waste to landfill. This will provide additional incentives to reduce the volume of waste generated and to ensure proper segregation of wastes to allow free disposal of inert material to public filling areas.

Chemical Waste

6.3.9 For those processes which generate chemical waste, it may be possible to find alternatives which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste.

6.3.10 Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handed in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste as follows:

6.3.11 Containers used for the storage of chemical wastes should:

- 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 litres unless the specification 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.

6.3.12 The storage area for chemical wastes should:

- 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 as chemical waste if necessary); and
- be arranged so that incompatible materials are adequately separated.

6.3.13 Disposal of chemical waste should:

- be via a licensed waste collector; and
- be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers, or
- to be re-user of the waste, under approval from the EPD.

6.3.14 The Centre for Environmental Technology operates a Waste Exchange Scheme which can assist finding receivers or buyers for the small quantity of chemical waste to be generated from the project.

General Refuse

6.3.15 General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical wastes. The Contractor should employ a reputable waste collector to remove general refuse from the project area, separate from C&D materials and chemical wastes, on a regular basis to minimise odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law.

Construction Waste Management Plan

6.3.16 A construction waste management plan (CWMP) will need to be developed by the contractor to ensure proper collection, treatment and disposal of waste on site. This CWMP will also take into account the requirement to provide chemical soil onsite which will need to be managed by a licensed waste collection contractor.

7. ECOLOGY

7.1 Introduction

7.1.1 Apart from the residential development, a major objective of the Project is to restore wetland habitats within the project area. A Wetland Restoration Area (WRA) has been designated within the project area and the long-term management requirement have been detailed in the Wetland Restoration Plan. The ecological assessment carried out in the EIA study has addressed the ecological consequences of the development and concluded that the overall impacts would be minor with a net ecological gain following completion of the project. Although some negative impacts are expected during the construction phase, with the early construction of the Wetland Restoration Plan (detailed in Appendix H in the final EIA report), these impacts shall be minimized.

7.2 Mitigation Measures for Construction Phase

7.2.1 Mitigation measures were designed in accordance with Annex 16 of the TM on EIAO which states the general policy and guidance in planning of ecological mitigation measures. In particular, the following mitigation measures will be taken during construction and operation phases:

Mitigation Measures for Construction Phase

7.2.2 As the main ecological impacts are predicted to be wetland habitat loss and disturbance to wildlife during construction, the following mitigation measures would be implemented:

Clear Definition of Project Area Limit (Avoidance and Minimizing)

7.2.3 Clear definition of the project area limit should be provided in order to minimize and confine the disturbance during the construction period, especially the northern limit of the Project Area which is adjacent to fishponds within the Conservation Area (CA) zone and are considered to be ecological sensitive receivers.

7.2.4 During wetland construction stage the WRA boundary will be delineated using a temporary hoarding in order to reduce disturbance to off-site habitats and wildlife. During the establishment phase this hoarding will be replaced with a 1 m high chain-link fence in order to reduce disturbance to the WRA through access by humans and dogs.

Dust and Noise Suppression and Avoidance of Water Pollution (Minimizing)

7.2.5 Good site practices of dust and noise suppression should be strictly implemented to ensure that disturbance is minimized to acceptable levels. Mitigation measures for the off-site disturbance impacts on the fishponds in the CA include hoarding at the northern project area boundary during construction of the WRA to reduce noise and dust impacts to the adjacent habitats. Through the use of quieter plant and temporary/movable noise barriers, the noise level would be reduced significantly to an acceptable level. Hoarding at the northern boundary should be replaced with a 1 m high chain-link fence following construction and the WRA will then act as a buffer between the existing wetland areas and the residential part of the project area until construction is completed. Hoarding will be retained between the

WRA and ongoing construction work to avoid visual disturbance and reduce noise and dust emissions. Pollution of watercourses and sedimentary runoff will be minimized by good site practice, especially the containment of water and sediment within the site for removal.

- 7.2.6 These standard noise and air and water quality site practices are considered to be effective measures for minimizing the disturbance impact during the construction period. Details of these mitigation measures are presented in *Sections 2, 3 and 4* respectively.

Phasing of Construction Programme (Minimizing)

- 7.2.7 The construction of the proposed project should be scheduled in phases. Because mitigation is preferably carried out in advance of the main works rather than after the completion of works, the construction of the WRA will commence at the start of the project. During the wetland establishment period, no noisy work will be undertaken within the WRA to minimize the disturbance to off-site habitats and wildlife.

- 7.2.8 According to the proposed implementation programme (**Figure 1.4**), the construction of the WRA would be completed in the wet season of the first year, and a further one and a half years will be required to being full functioning. Construction work for the WRA will be conducted during the wet season to avoid the period of greatest abundance of disturbance-sensitive waterbirds. During the establishment period, hoarding around the WRA will be removed so that the WRA will be able to integrate with adjacent wetlands and will provide a buffer from ongoing construction work. Although construction work on other parts of the Project Area would give rise to some disturbance to the WRA, which may mean that the WRA is not functioning at full capacity (especially for waterbirds) during the establishment period, the WRA will still provide a level of ecological value for wildlife.

Reusing On-site Material (Minimizing)

- 7.2.9 Soil and plants on-site should be reused (e.g. used as fill material) as far as practical. Stock piles of these reusable materials should be stored in an appropriate area on-site to prevent sediment runoff into nearby watercourses. In particular, the re-use of the wetland soils and topsoil should be considered.
- 7.2.10 Taking into account the presence of the exotic weed species, which may serve as a seed bank for undesirable species, the topsoil from the main grassland area is not recommended for use in the Wetland Restoration Area for planting. This measure would help avoid adverse impacts from the colonization of undesirable plant species during the initial establishment of the vegetation in the WRA. However, the topsoil may be stored for use on the residential landscape areas, thus reducing the need to import materials from outside and reducing lorry miles.
- 7.2.11 Topsoil from the existing marsh, which contains a lower proportion of weed species, could be used on the proposed WRA, but this should be covered by a layer of imported clean planting soil to ensure the negative impact of these weed species to be minimized.

Construction of the Wetland Restoration Area (Compensation)

- 7.2.12 The WRA should be fully operational within 2.5 years of commencement of construction (1 year for site formation, followed by 1.5 years for establishment and stabilization) and will then act as a buffer to screen the residential area from the Conservation Area to the north

and also indirectly enhance the ecological function of the fishponds area in the CA zone by permanently removing those ecologically incompatible land uses such as open storage and lorry parking area adjoining the fishponds from the Project Area. Moreover, the habitats in the proposed WRA will provide roosting and feeding ground for not only the target species, but also a suite of species of conservation importance with similar habitats preferences. No operational impact on the offsite fishponds in the CA will therefore be identified.

Mitigation Measures for Operation Phase

Establishment of Wetland Restoration Area (Minimizing)

- 7.2.13 As discussed in Section 8 of the final EIA report, operational impacts include disturbance to wildlife and loss of habitat. Species that potentially receive significant impacts from the proposed development are Little Egret, Cattle Egret and Chinese Pond Heron.
- 7.2.14 The recommended mitigation measure to reduce/eliminate the impacts on these species is the provision of the **WRA**. The location of the WRA at the northern portion of the Project Area is selected in part to minimize impacts on bird flight paths and to buffer the existing wetland areas from the proposed residential areas, and also to allow better integration of the WRA with other wetland habitats.
- 7.2.15 The prime **objectives** of the proposed mitigation are to:
- (i) Protect the offsite wetland habitats in WCA / CA by avoiding a direct interface between these habitats and the proposed residential areas;
 - (ii) Buffer off-site wetland habitats from the residential area and
 - (iii) Provide suitable habitats of enhanced quality for the target species.
- 7.2.16 These objectives can best be achieved by locating the WRA between the WCA/CA and residential areas to separate the two types of land use. In addition, the area of the existing lorry park site will be incorporated into the WRA to further enhance the buffer function.
- 7.2.17 The Wetland Restoration Area of a minimum size of 4.74 ha will be established as presented in **Figure 7.1**, to mitigate the loss of 4.69 ha of wetland habitats. In addition to the habitat loss, the WRA is designed to mitigate for on-site and/or off-site disturbance during construction and operational phases as identified in Section 8 of the final EIA report. The habitats within the WRA will be designed specifically to meet the habitat requirements of the target species rather than simply restore specific habitats of ecological value.
- 7.2.18 Species considered to be targeted for the WRA have been selected by the following criteria: **species of conservation importance which are utilizing the existing Project Area and where significant impacts are predicted in the absence of mitigation** (species only recorded on occasion and with low to negligible impact are not included). Under these criteria, the target species are:
- Little Egret, Cattle Egret and Chinese Pond Heron (total 3 bird species).
- 7.2.19 The following micro-habitats will be provided within the wetland restoration area to meet the requirements for the target species:

- Open water up to 2.5 m in depth with shallow water margins (0-20 cm depth);
- reedbed with shallow water margins (0-20 cm depth) and deeper water areas up (to 1 m depth);
- vegetated and non-vegetated islands and shallow water margins (0-20 cm depth);
- trees/tall shrubs overhanging parts of the main water body;
- short grass; and
- a mixture of tall grass and shrubs.

Open water

- 7.2.20 The project area will be formed to create a freshwater wetland comprising of four cells in order to facilitate water management, increase shallow water margins and allow access for management and monitoring. Maximum operational water depths will be approximately 2.5 m, and about 75% of the open water areas will be less than 1.5 m.

Reedbed

- 7.2.21 Reedbed on the project area will form the majority of the vegetated area and will comprise areas with a maximum water depth of 1 m and extensive areas where water depths are less than 20 cm; these areas will be adjacent to, and continuous with, areas of open water which will have a maximum water depth on 2.5 m. The distribution of reeds on site will be controlled to prevent the entire wetland body becoming a single reedbed. This will be achieved by a rapid increase in water depth at the margins of the reeds to achieve a water depth of approximately 1.5 m – the depth at which reeds fail to grow. Without such deeper areas reeds would rapidly colonise the entire wetland at the expense of open water areas, thus reducing habitat diversity.

Vegetated and non-vegetated islands

- 7.2.22 Four islands will be constructed, one in each of the cells; two of these will be planted with tall trees and shrubs and two will be lined and covered with gravel to create non-vegetated islands (and to reduce colonisation by terrestrial vegetation). All islands will be gently sloping and surrounded by shallow water less than 20 cm deep.

Trees/tall shrubs

- 7.2.23 Woodland areas will be located mostly along the southern boundary of the wetland to form a buffer along the edge of the development area; these areas will be planted with tree and shrub species which are adapted to flooded conditions and waterlogged soils.

Tall grass/shrubs

- 7.2.24 Such areas will be hydro-seeded and planted with low shrubs. The grasses will be cut on a regular basis to maintain vegetation height at a suitably low level (< 0.5 m) and to prevent the colonisation of unwanted exotics.

Short grass

- 7.2.25 Such areas will be hydro-seeded. The grasses will be cut on a regular basis to maintain

vegetation height at a suitably low level (< 0.2 m) and to prevent the colonisation of unwanted exotics.

Building Height with Consideration of Birds' Flight Paths

- 7.2.26 Under the OZP for the area (OZP No. S/YL-MP/6) the maximum permitted height for buildings within the Project Area is six storeys. This is considerably higher than the buildings at Palm Springs and Royal Palms residential estates, and would potentially impact the flight paths of birds over the Project Area. To minimise such impacts the maximum height of buildings within the Project Area will be four storeys; such buildings will be generally three metres higher than existing buildings in adjacent residential estates. Furthermore, the development has been zoned in such a way that the WRA is located adjacent to surrounding wetlands, and the lowest buildings on site will be those closest to the WRA. This part of the project area is the most likely to be used by low-flying birds, and the reduction in building height will minimise potential impacts to flight paths.
- 7.2.27 There will be some residual impact to flight paths in the northern part of the Project Area during the construction phase of the WRA, resulting from the presence of construction machinery and from site fencing (required to avoid visual disturbance impacts to foraging waterbirds) and potentially also from noise disturbance. These impacts will be limited in duration to the construction period of the WRA (scheduled to be completed in a single wet season), and the timing of the WRA formation at the start of the construction period will ensure that the duration of these construction-phase impacts to flight paths will be minimised.

7.3 Monitoring Requirements

Baseline Ecological Monitoring

- 7.3.1 Baseline Ecological Monitoring was conducted during the preparation of the EcoIA for the proposed development; data collected during these surveys will provide the baseline for evaluation of the success in achieving numerical targets for the Target Species of the WRA.

Construction Phase Ecological Monitoring

- 7.3.2 Target species and certain other fauna will be monitored within the Project Area and Assessment Area during the wetland and residential construction phase. This will be important to ensure that any unexpected events or impacts either on- or off-site are quickly identified so that remedial action can be taken. The groups to be monitored and frequency of monitoring are shown in **Table 7-1**, and the methodology for each survey is detailed below under Operation Phase Monitoring.

Table 7-1 Summary of Construction and Operational Phase Ecological Monitoring for the Wo Shang Wai WRA.

	Construction Phase Ecological Monitoring	Operational Phase Ecological Monitoring
Birds	Weekly (including Assessment Area).	Monthly (excluding Assessment Area).
Dragonflies and Butterflies	Once per month during March and September to November, and twice per month during April to August.	Once per month during March and September to November, and twice per month during April to August.
Herpetofauna	Once per month during April to November.	Once per month during April to November.
Aquatic invertebrates	Not required.	At six monthly intervals at the end of the wet season (September) and the end of the dry season (March).
Benthic Invertebrates	Not required.	At six monthly intervals at the end of the wet season (September) and the end of the dry season (March).
Freshwater fish	Not required.	At six monthly intervals at the end of the wet season (September) and the end of the dry season (March).
Habitat types	Not required.	At six monthly intervals at the end of the wet season (September) and the end of the dry season (March).
Vegetation cover	Not required.	At six monthly intervals at the end of the wet season (September) and the end of the dry season (March).
Pedology	Not required.	Yearly in the early wet season.
Water Quality	After filling of WRA with water, monthly for <i>in situ</i> water quality and every six months (end of the wet season and end of the dry season) for laboratory testing.	Monthly for <i>in situ</i> water quality and every six months (end of the wet season and end of the dry season) for laboratory testing.
Site Inspections	Weekly.	Twice per month.

Operation Phase Ecological Monitoring

Monitoring will be conducted to cover the ecological attributes detailed below:

Monitoring of target bird species

- 7.3.3 Monitoring of the 3 target bird species is required in order to demonstrate success in reaching the target of the recreated wetland supporting, as a minimum, the number of birds recorded during the Baseline Survey.

Site transects

- 7.3.4 Surveys will be undertaken monthly. During each survey visit, the surveyor will walk slowly around the perimeter of the wetland and along each bund, and identify all birds to species level. Surveys will commence within one hour of sunrise and last for approximately two hours.

Monitoring of Dragonflies and Butterflies

- 7.3.5 Transect surveys for dragonflies and butterflies will be undertaken once per month during March and September to November and twice per month during the peak period of dragonfly emergence in April to August. Survey duration will be approximately 2 hours, commencing at 08.00 hours.
- 7.3.6 During the surveys a fixed survey route will be followed. All dragonfly species observed will be identified and all sexually mature male and ovipositing female individuals counted. Dragonfly exuviae will be recorded qualitatively. Habitat use and breeding activity will be recorded, as well as evidence of breeding success in the form of final instar larval exuviae, which will be collected and identified. All butterfly species will be identified and numbers estimated quantitatively or semi-quantitatively.
- 7.3.7 For dragonflies, transect surveys will be supplemented by quantitative monitoring of emergence using exuviae emergence traps. Six traps will be used and inspected one per week between March and August.

Monitoring of Herpetofauna

- 7.3.8 Herpetofauna surveys focus on breeding amphibians and the reptile community. One half-day day-time survey (primarily aimed at detecting reptiles) will be conducted each month between April and November. Surveys will take place during 10.00 – 14.00 hours, the peak period of reptile activity. One half-day night-time survey (primarily aimed at detecting breeding amphibians) will be conducted each month during the period from March to August. Night time surveys will be undertaken during 18.00 – 22.00 hours and focus on the detection of vocalising amphibians. During the surveys a fixed survey route will be walked. All reptiles and amphibians observed or heard will be identified, and their abundance estimated. Habitat use and breeding activity will be recorded.

Monitoring of Aquatic Invertebrates

- 7.3.9 Monitoring of aquatic invertebrates will be conducted at six monthly intervals at the end of the wet season (September) and the end of the dry season (March). Sweep-netting will be used to sample aquatic species in the water column and clinging to vegetation at the water-bund interface. The sweep-net will be a D-shaped net of 30 cm diameter with a 1 mm mesh. Each sample will comprise two 2-metre sweeps of the net from which all captured specimens will be removed. The first sweep will be carried out at the water surface and the second as close to the wetland bed as possible. Each set of sweeps will be taken along the water-bund interface. Two randomly-located replicate samples will be taken from each cell (giving eight samples in total).
- 7.3.10 Samples will be placed in labelled containers together with preservative for transporting to the laboratory. Once in the laboratory, specimens will be rinsed in water, placed on a white sorting tray and sorted for identification to highest practical taxonomic level using a binocular microscope. Where partial body parts are identified, only heads will be counted.
- 7.3.11 The number of individuals of each macro-invertebrate taxon will be ascertained for each replicate sample for all taxa groups. A total dry weight biomass will be determined for each of the above groups.

- 7.3.12 The number and species of any fish captured incidentally during the sampling will be recorded.

Methodology for monitoring benthic invertebrates

- 7.3.13 Monitoring of benthic invertebrates will be conducted at six monthly intervals at the end of the wet season (September) and the end of the dry season (March). Cylindrical benthic cores 10 cm in diameter and 10 cm in depth will be taken from the substrate at the base of the wetland to obtain quantitative data on benthic invertebrate populations. Five randomly located replicate cores will be collected from the shallows of each cell (with a total of 20 cores samples being collected). Core contents will be bagged and stored in a cooler for subsequent sorting. Samples will analysed in the same way as for sweep netting.

Methodology for monitoring freshwater fish and crustaceans

- 7.3.14 Monitoring of freshwater fish and crustaceans will be conducted at six monthly intervals at the end of the wet season (September) and the end of the dry season (March). Throw and drag-netting will be undertaken in each cell. A fishing throw-net with a mesh size of 30 mm, a diameter of about 4 m and a surface area of about 14 m² will be used to catch larger fish and a drag net of mesh size < 10 mm will be used to sample smaller fish and shrimps. Five randomly-placed replicates with each net will be conducted in each cell. Fish will be identified to species and the weight and length recorded (if fish length is greater than 10 cm). All fish will be released back into the wetland.

Monitoring of habitats types

- 7.3.15 Habitat monitoring will be conducted at six monthly intervals at the end of the wet season (September) and the end of the dry season (March).

Monitoring of vegetation cover

- 7.3.16 Detailed floristic surveys will be conducted in each habitat type (reedbed, vegetated islands, tall trees/shrubs, tall grass/shrubs and short grass) at six monthly intervals at the end of the wet season (September) and the end of the dry season (March). Transects will run through each habitat area with a fixed number of quadrats in each. 10m x 10m quadrats will be used vegetated islands, in areas of tall trees/shrubs and tall grass/shrubs, while 2m x 2m quadrats in the habitats of reedbed and short grass.
- 7.3.17 Within each 10m x 10m quadrat, all plant species, including both planted and naturally-invaded species, will be identified to species level. Height, growth form and conditions of all woody plants will be measured and recorded. Any rare or protected species will also be identified.
- 7.3.18 Within each 2m x 2m quadrat, all plant species and their densities will be identified to species level and estimated respectively. The percentage cover of bare ground, leaf litter and each plant species within the quadrat will also be measured. The tallest height of each plant species will be measured to be the nearest cm. Any rare or protected species will also be identified within the quadrats.

Pedology Monitoring

7.3.19 Sediment in each cell will be monitored yearly in the early wet season. Three sediment samples will be collected from each cell and sent to a HOKLAS-accredited laboratory for analysis. The following parameters will be monitored:

- % volatile solids
- Oxidation/Reduction (Redox) potential
- pH
- Total nitrogen
- Total oxidized carbon
- Total phosphorus
- Total reactive phosphorus

Monitoring of Water Quality

7.3.20 *In-situ* water quality will be measured in each cell once per month. The following parameters will be monitored:

- Temperature
- pH
- Salinity
- Turbidity
- Dissolved oxygen

7.3.21 Additional measurements of these parameters should also be made as necessary in order to inform management decisions (e.g. fish re-stocking programme) and in response to unexpected events (e.g. algal blooms or fish die-offs).

7.3.22 In addition, every six months (end of the wet season and end of the dry season) water samples will be sent to a HOKLAS-accredited laboratory for analysis. The following parameters will be monitored:

- Ammoniacal nitrogen
- Biochemical oxygen demand
- Total oxidized nitrogen
- Total phosphorus
- Total reactive phosphorus (orthophosphate)

General Condition Monitoring

7.3.23 Visual monitoring of habitat condition, flooding issues and significant litter or vandalism problems should be carried out during the daily security check and recorded in log books. This information should be summarised in periodic monitoring reports and the appropriate action taken.

Resource Requirements Monitoring and Maintenance

7.3.24 Resources required should include qualified ecologists with professional qualifications in terrestrial ecology, a wetland ecology background, specialist identification skills in Hong Kong fauna and flora, and experience in ecological monitoring programmes.

7.4 Wetland Quality Performance Limits and Action Plans

7.4.1 Proposed Wetland Quality Performance Limits and the corresponding Contingency Plans are presented in **Table 7-2**.

Table 7-2 Wetland Quality Performance Limits and Contingency Plan

Parameters	Action Level	Limit Level	Action
Flooding/storm damage	N.A.	N.A.	Review damage in conjunction with short-term weather forecast. Shed water from project area if necessary or transfer internally if possible using combination of sluices, pipes and pumps. Review damage, determine severity and undertake repairs/modifications to the design.
Area of water in the open water pond – wet season levels	< 70 & > 95%	< 60 & > 100 %	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: adjust water level by pumping to reinstate the area/ re-profiling/ other measures.
Area of water in the open water pond – dry season levels	< 50 & >95%	<40 & >95%	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: adjust water level by pumping to reinstate the area/ re-profiling/ other measures.
Emergent or floating vegetation in the open water pond (although it is not proposed to plant emergent or floating vegetation as part of the restoration process, it is to be expected that these will colonise the wetland over time)	> 10 %	> 20 %	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: manual or mechanical vegetation clearance; check nutrient levels and fish stocks; adjust water quality and fish numbers (in case water quality is affecting herbivorous fish stock levels or there are low levels of herbivorous fish).
Wooded island tree canopy cover	< 70%	< 50%	Action level exceedance: review tree status and growth. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: undertake supplemental tree planting.
Gravel island vegetation cover	> 20%	> 30%	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to

Parameters	Action Level	Limit Level	Action
			deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: manual or mechanical vegetation clearance.
Reedbed reed cover	< 80%	< 60%	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: carry out weeding or planting.
Reedbed water cover	< 25% & > 80%	<15% & > 95%	Action level exceedance: pump to restore water levels. Limit level exceedance: pump to restore water levels; review water management regime in medium term.
Undesirable plant species (all wetland)	> 10% of vegetation in WRA or in any cell	> 20% of vegetation in WRA or in any cell	Action level exceedance: removal by weeding. Limit level exceedance: removal by weeding, if problem is likely to return/deteriorate review design and management regime.
Undesirable fauna including invasive/exotic aquatic invertebrates	Presence	Negatively impacting wetland function	Action level exceedance: treatment or removal (or other method if suitable). Limit level exceedance: increase frequency of treatment or removal (or other method if suitable), review management protocols and design.
Salinity	> 2 ppt	> 5 ppt	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: water exchange/ add water/ remove identified contamination source/ other measures.
pH	pH outside the range between 6.5 – 8.0	pH outside the range between 6.0 – 8.5	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: lime/ add peanut residue/ mix with other water sources/ drain and lime/ other measures.
Dissolved oxygen	< 2 mg/l	< 1 mg/l	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: pump and mix water/ aerate water/ remove identified contamination source/ other measures.
Total oxidized nitrogen (nitrite and nitrate) concentration	> 5 mg/l	> 10 mg/l	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: exchange water/ add water/ remove identified contamination source/ other measures.

Parameters	Action Level	Limit Level	Action
Total phosphorus concentration	> 5 mg/l	> 10 mg/l	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: exchange water/ add water/ remove identified contamination source/ other measures.
Total ammonia concentration	> 3 mg/l	> 6 mg/l	Action level exceedance: double the monitoring frequency, identify and review the problem. If the problem is likely to deteriorate, the action plan for limit level exceedance should be implemented. Limit level exceedance: exchange water/ add water/ remove identified contamination source/ other measures.
Target species abundance	Abundances of all target species < specified target levels in two successive monitoring periods	Abundances of all target species < specified target levels in four successive monitoring periods	Action level exceedance: Review the monitoring data and reasons for low numbers of target species. If the reduction in abundance is attributable to activities within the project area, stop/ reduce such activity or carry out other measures (e.g. erect buffering screen or buffer planting). If the reduction in abundance is attributable to disturbance from outside the project area (e.g. intense construction activity outside the project area), increase buffering screen (short-term) and/or buffer planting (long-term) or carry out other measures. If the reduction in abundance is attributable to external factors (e.g. natural population fluctuation) or other man-made factors increase the monitoring frequency, identify and review the problem, and review the management regime. If the problem is likely to worsen, the action plan for limit level exceedance should be carried out. Limit level exceedance: Review the management regime and carry out restocking/ increase draining period and/or frequency/ erect buffering screen (short-term)/ increase buffer planting (long-term)/ other measures

8. FISHERIES

- 8.1.1 The Project will result in no temporary or permanent loss of fishponds. However, four actively managed fishponds adjoin the project area along the northern boundary. Protection of these fishponds during construction phase will be controlled by good site practices as discussed in the recommended mitigation measures for air and water quality in *Annex A*. The assessment concluded that the construction and operation of the Project will not give rise to impacts to fisheries, as there is no predicted adverse impact to water quality or habitat loss.
- 8.1.2 The implementation of the air and water quality mitigation measure stated in *Section 5* of the final EIA report should be checked as part of the environmental monitoring and audit procedures during the construction period. No other fisheries-specific measures or Environmental Monitoring and Audit Programme are considered necessary.

9. CULTURAL HERITAGE

- 9.1.1 From the surveys and examination of the records it was identified that no declared or deemed monuments or graded historical buildings were identified in the Assessment Area. Most houses within the Mai Po Village and Wo Shang Wai Village are modern houses and their ancestral halls are located at least 100m from the development project area. Fishpond features adjacent to the project area are of low landscape sensitivity. No construction activity which could result in vibration effects are planned for this Project. Given the distance between the development project area and the Villages there is no anticipated effect on cultural heritage resources.
- 9.1.2 No impact (both construction and operation phase) on the villages was anticipated due to the large separation distance and thus no corresponding measures are required.

10. LANDSCAPE AND VISUAL

10.1 Introduction

10.1.1 The potential impacts on landscape and visual amenity come from construction works (including materials stockpiling, excavation, and other construction activities) as well as from built structures. As the identified impacts are of limited significance, the recommended mitigation measures would be sufficient in rectifying the effects due to the development of the Project. Details of the mitigation measures suggested are listed below.

10.1.2 It is recommended that EM&A for landscape and visual resources is undertaken during the design, construction and operational phases of the Project. The design, implementation and maintenance of landscape mitigation measures is a key aspect of this and should be checked to ensure that they are fully realised and that potential conflicts between the proposed landscape measures and any other project works and operational requirements are resolved at the earliest possible date and without compromise to the intention of the mitigation measures. In addition, implementation of the mitigation measures recommended by the EIA shall be monitored through the site audit programme.

10.2 Mitigation Measures

10.2.1 The Landscape and Visual Impact Assessment recommended a series of mitigation measures to ameliorate the landscape and visual impacts of the Project.

10.2.2 The measures for both the construction and operation stage as recommended in the EIA report are summarized in **Tables 10-1** and **10-2** below:

Table 10-1 Proposed Construction Phase Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure	Funding Agency	Implementation Agency
CM1	The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.	Developer	Developer (via Contractor)
CM2	Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colours, to screen Works.	Developer	Developer (via Contractor)
CM3	Reduction of construction period to practical minimum.	Developer	Developer (via Contractor)
CM4	Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where the soil material meets acceptable criteria and where practical. The Contract Specification shall include storage and reuse of topsoil as appropriate.	Developer	Developer (via Contractor)
CM5	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone).	Developer	Developer (via Contractor)
CM6	Advance screen planting to noise barriers.	Developer	Developer (via Contractor)

ID No.	Landscape and Visual Mitigation Measure	Funding Agency	Implementation Agency
CM7	Control night-time lighting and glare by hooding all lights.	Developer	Developer (via Contractor)
CM8	Ensure no run-off into streams adjacent to Project Area.	Developer	Developer (via Contractor)
CM9	Protection of existing trees on boundary of project area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at S16 and Tree Removal Application stage).	Developer	Developer (via Contractor)
CM10	Trees unavoidably affected by the works shall be transplanted where practical. Trees should be transplanted straight to their destinations and not held in a nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.	Developer	Developer (via Contractor)

Table 10-2 Proposed Operation Phase Mitigation Measures

ID No.	Landscape Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
OM1	Compensatory Tree Planting for all felled trees shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006.	Developer	Developer	Incorporated Owners	Management Co.
OM2	A continuous belt of screen planting along southern perimeter of project area with fast growing tree species. At least 450 trees capable of reaching a height > 10m within 10 years should be planted. Planting of the belt of trees shall be carried out as advance works ahead of other site formation and building works.	Developer	Developer	Incorporated Owners	Management Co.

ID No.	Landscape Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
OM3	Maximise soft landscape and amenity water bodies in residential areas of the development. Approximately 750 of trees (of Heavy Standard size) should be planted. Where space permits, roadside berms should be created. Street trees should be of species that reach a mature height of no less than 15m.	Developer	Developer	Incorporated Owners	Management Co.
OM4	Maximise freshwater habitat wetland creation consistent with achieving other parameters. Min 4.74 ha to be provided. Wetlands must have natural edge profiles with >1m wide emergent zone. No access to the wetland by residents and all wetlands must be screened from residential development by a continuous tree screen at interface with residential development or earth mounding such that disturbance is minimised. Implementation of the wetland shall be carried out as advance works.	Developer	Developer	Wetland Management Trust/Project Proponent/Incorporated Owners	Wetland Management Trust/Project Proponent/Incorporated Owners
OM5	Use appropriate (visually unobtrusive and non-reflective) building materials and colours in built structures.	Developer	Developer	Private Owners	Private Owners
OM6	During detailed design, refine building layout to create a min 10m wide gap between buildings north of Wo Shang Wai pond and also two min 10m wide gaps in the row of buildings adjacent to Royal Palms.	Developer	Developer	Incorporated Owners	Management Co.
OM7	Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the local context, and minimises potential negative landscape and visual impacts. Lighting units should be directional and minimise unnecessary light spill.	Developer	Developer	Incorporated Owners	Management Co.

10.3 Design Phase Audit

10.3.1 The landscape measures proposed in the EIA report to mitigate the landscape and visual impacts of the scheme should be embodied into the detailed landscape design drawings and contract documents including the protection of existing trees, the transplanting of existing trees, the creation of new wetland and the planting of new trees and shrubs. Designs should be checked to ensure that the measures are fully incorporated and that potential conflicts with civil engineering, structures, lighting, signage, drainage, underground utilities and

operational requirements are resolved prior to construction.

10.3.2 The design phase EM&A requirements for landscape and visual resources comprise the audit of the detailed landscaping drawings and specifications to be prepared during the detailed design together with ensuring that the design is sensitive to landscape and visual impacts as required under mitigation measures. Monitoring of design works against the recommendations of the landscape and visual impact assessments within the EIA should be undertaken when the designs are produced to ensure that they fulfil the intentions of mitigation measures.

10.3.3 Audits shall be carried out by a Registered Landscape Architect. The landscape auditor shall review the designs at two points in time:

- when the first draft of design drawings is prepared;
- draft Tender documents.

10.3.4 The auditor shall liaise with the Landscape Architect and design Engineer to ensure all measures have been incorporated in the design in a format that can be specified to the Contractor for implementation. In the event of a non-conformity, the Event and Action Plan as detailed in **Table 10-3** below should be followed.

Table 10-3 Event and Action Plan for Landscape for Design Phase

Action Level	Landscape Auditor	Project Engineer (PE)	Project Landscape Architect (PLA)
Non Conformity (with Design Standards and Specification)	<ul style="list-style-type: none"> • Identify Source • Inform PE and PLA • Discuss remedial actions with PE, PLA • Verify remedial actions when complete 	<ul style="list-style-type: none"> • Notify PLA • Discuss remedial actions with PLA • Ensure remedial designs are fully incorporated 	<ul style="list-style-type: none"> • Amend designs • Discuss remedial actions with PE

10.4 Baseline Monitoring

10.4.1 Baseline monitoring for the landscape and visual resources will comprise checking and updating of:

10.4.2 The landscape resources identified in the EIA report and elements of particular concern are to be re-checked and any changes identified;

- any Tree Survey Report prepared;
- habitat maps in the EIA and
- landscape and visual impact assessments included in the EIA Report, to include updated photos of each LCA and landscape resources which have changed since the EIA was carried out.

10.4.3 The landscape and visual baseline will be confirmed with reference to the above.

10.5 Construction and Operation Phase Audit

- 10.5.1 A specialist Landscape Sub-Contractor (on the approved Government list) shall be employed by the Contractor for the implementation of landscape construction works and subsequent maintenance operations during the establishment period. Advance planting and wetland formation will be conducted within the first half of the construction contract. Thus, the establishment works will be undertaken through the latter half of the construction contract and extend throughout the Contractor's one year maintenance period which will be within the first operational year of the project. The intention is to provide at least 12 months establishment period for the majority of the landscape works.
- 10.5.2 All measures undertaken by both the Contractor and the specialist Landscape Sub-Contractor during the construction phase and first year of the operational phase shall be audited by a Registered Landscape Architect, as a member of the ET, on a regular basis to ensure compliance with the intended aims of the measures. Site inspections should be undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase.
- 10.5.3 The broad scope of audit is detailed below but should also be undertaken with reference to the more specific checklists provided in **Tables 10-1, 10-2 and 10-4**. Operational phase auditing will be restricted to the last 12 months of the establishment works of the landscaping proposals and thus only the items below concerning this period are relevant to the operational phase.
- The extent of the agreed works area should be regularly checked during the construction phase. Any trespass by the Contractor outside the limit of the works, including any damage to existing trees and woodland shall be noted;
 - The progress of the engineering works should be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken;
 - All existing vegetation, streams and other features within the study area which are not directly affected by the works are retained and protected;
 - The methods of protecting existing vegetation proposed by the Contractor are acceptable and enforced;
 - Preparation, lifting transport and re-planting operations for any transplanted trees;
 - The layout, design and construction of buildings conforms to requirements specified in the EIA report;
 - All landscaping works are carried out in accordance with the EIA recommendations and with specifications;
 - The planting of new trees, shrubs, groundcover, climbers, grasses and other plants, together with the replanting of any transplanted trees are carried out properly and within the right season;
 - All necessary horticultural operations and replacement planting are undertaken throughout the Establishment Period to ensure the healthy establishment and growth of both transplanted trees and all newly establishment plants.

Table 10-4 Construction and Operation Phase Audit Checklist

Area of Works	Items to be Monitored
Works Area	Check the extent of the Works to ensure that the Works Area is not exceeded
Protection of all trees and woodland blocks to be retained	Identification and demarcation of trees / vegetation to be retained, erection of physical protection (e.g. fencing), monitoring against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Streams	Ensure no run-off into existing streams
Clearance of existing vegetation	Identification and demarcation of trees / vegetation to be cleared, checking of extent of works to minimize damage, monitoring of adjacent areas against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Transplanting of trees	Identification and demarcation of trees / vegetation to be transplanted, monitoring of extent of pruning / lifting works to minimize damage, timing of operations implementation of all stages of preparatory and translocation works, and maintenance of transplanted vegetation, etc.
Topsoil stripping	Ensuring existing topsoil is stripped and stored under recognized good practice and is hydroseeded and regularly turned to prevent anaerobic conditions
New buildings	Ensure that building finishes accord with mitigation proposals with regard to colour and albedo.
Boundaries	Ensuring hoarding are erected as required
Noise Barrier	Ensure noise barrier design accords with the mitigation proposals with regard to location, materials and finishes.
Night-time lighting	Ensuring night-time lighting is directional, hooded and shielded away from VSRs
Plant supply	Monitoring of operations relating to the supply of specialist plant material (including the collecting, germination and growth of plants from seed) to ensure that plants will be available in time to be used within the construction works.
Landscape and wetland treatments generally	Check that wetland, and hard / soft landscape designs conform to intent of mitigation measures and agreed designs
Soiling, planting, etc.	Monitoring of implementation and maintenance of soiling and planting works against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Establishment Works	Monitoring of implementation of maintenance operation during Establishment Period

10.5.4 In the event of non compliance the responsibilities of the relevant parties is detailed in the Event and Action Plan provided on **Table 10-5**.

Table 10-5 Event and Action Plan for Construction and Operational Phases

Action level	ET	IEC	ER	Contractor
Non-conformity on one occasion	<ol style="list-style-type: none"> 1. identify Source 2. Inform the IEC and the ER 3. Discuss remedial actions with the IEC, the ER and the Contractor 4. Monitor remedial actions until rectification has been completed 	<ol style="list-style-type: none"> 1. check report 2. check the Contractor's working method 3. discuss with the ES and the contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures. 5. Check implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Notify Contractor 2. ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Amend working methods 2. Rectify damage and undertake any necessary replacement
Repeated Non-conformity	<ol style="list-style-type: none"> 1. Identify Source 2. Inform the Project Proponent, IEC and the ER. If serious non-compliance inform EPD. 3. Increase monitoring frequency 4. Discuss remedial actions with the IEC, the ER and the Contractor 5. Monitor remedial actions until rectification has been completed 6. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Check monitoring report 2. Check the Contractor's working method 3. Discuss with the ES and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures 5. Supervise implementation of remedial measures 	<ol style="list-style-type: none"> 1. Notify the Contractor 2. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Amend working methods 2. Rectify damage and undertake any necessary replacement

11. SITE ENVIRONMENTAL AUDIT

11.1 Introduction

- 11.1.1 Site Inspections provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They shall be undertaken routinely by the ET Leader to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. With well defined pollution control and mitigation specifications and a well established site inspection, deficiency and action reporting system, the site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.
- 11.1.2 The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspection works. He shall submit a proposal on the site inspection, deficiency and action reporting procedures within 21 days of the construction contract commencement to the Contractor for agreement and to the ER for approval.
- 11.1.3 Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the pollution control and mitigation measures within the project area; it shall also review the environmental situation outside the project area which is likely to be affected, directly or indirectly, by the site activities. The ET Leader shall make reference to the following information when conducting the inspection:
- a) the EIA recommendations on environmental protection and pollution control mitigation measures;
 - b) works progress and programme;
 - c) individual works methodology proposals (which shall include proposal on associated pollution control measures);
 - d) the contract specifications on environmental protection;
 - e) the relevant environmental protection and pollution control laws; and
 - f) previous site inspection results.
- 11.1.4 The Contractor shall update the ET Leader with all relevant information of the construction contract for him to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the IEC and the Contractor within 24 hours, for reference and for taking immediate action. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET Leader to report on any remedial measures subsequent to the site inspections.
- 11.1.5 Ad hoc site inspections shall also be carried out if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the Action Plan for

environmental monitoring and audit.

11.2 Compliance with Legal and Contractual Requirements

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

11.3 Environmental Complaints

- 11.3.1 Handling of environmental complaints should follow the environmental complaint flow diagram and reporting channel as presented in **Figure 11.1**.
- 11.3.2 During the complaint investigation work, the Contractor and Engineer shall cooperate with the IEC and ET Leader in providing all necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation works. The Engineer shall ensure that the measures have been carried out by the Contractor. Sample of the complaint log is shown in **Annex C**.

12. REPORTING

12.1 General

12.1.1 The reporting requirements of EM&A information are based upon a paper-documented approach. However, the same information can be provided in an electronic medium upon agreeing the format with the ER and EPD. This will enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach.

12.1.2 Types of reports that the ET Leader shall prepare and submit include baseline monitoring report, monthly EM&A report, quarterly EM&A summary report and final EM&A review report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly summary and final review EM&A reports shall be made available to the Director of Environmental Protection. The exact details of the frequency, distribution and time frame for submission shall be agreed with EPD prior to commencement of works.

12.2 Electronic Reporting

12.2.1 To facilitate the public inspection of the Baseline Monitoring Report and monthly EM&A Reports, via the EIAO Internet Website and at the EIAO Register Office, electronic copies of these Reports shall be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by EPD and shall 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 EM&A Reports shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EM&A Reports shall be provided in the main text from where the respective references are made. All graphics in the report shall be in interlaced GIF format unless otherwise agreed by the EPD. The content of the electronic copies of the EM&A Reports must be the same as the hard copies.

12.2.2 All environmental monitoring data as described in the EM&A Manual shall be made available to the public via internet access in the form of a website, in the shortest possible time and in no event later than two weeks after the relevant environmental monitoring data are collected or become available, unless otherwise agreed with EPD. EPD shall be notified in writing within 6 weeks after the commencement of works, the Internet address where the environmental monitoring data are to be placed. The Internet address and the environmental monitoring data shall be made available to the public via the EIAO Internet Website and the EIAO Register Office.

12.2.3 The internet website as described above shall enable user friendly public access to the monitoring data and with features capable of:

- providing access to all environmental monitoring data collected since the commencement of works
- searching by data
- searching by types of monitoring data (air quality and noise)

- hyperlinks to relevant monitoring data after searching
- or otherwise as agreed by the EPD.

12.3 Baseline Monitoring Report

12.3.1 The ET Leader shall prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Report shall be submitted to all parties: the Contractor, the IEC, the ER, EPD and AFCD. The ET Leader shall liaise with the relevant parties on the exact number of copies they want. The format and content of the report, and the representation of the baseline monitoring data shall be in a format to the satisfaction of EPD and include, but not be limited to the following:

- a) up to half a page executive summary;
- b) brief project background information;
- c) drawings showing locations of the baseline monitoring stations;
- d) monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency and duration;
 - QA/QC results and detection limits;
- e) details on influencing factors, including
 - major activities, if any, being carried out on the Project Area during the period;
 - weather conditions during the period;
 - other factors which might affect the results.
- f) determination of the Action and Limit Levels (AL Levels) for each monitoring parameter and statistical analysis of the baseline data; the analysis shall conclude if there is any significant difference between control and impact stations for the parameters monitored, and the following information shall be recorded:
 - graphical plots of monitored parameters in the month annotated against;
 - the major activities being carried out on site during the period;
- g) revisions for inclusion in the EM&A Manual; and
- h) comments and conclusions.

12.4 EM&A Reports

12.4.1 The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET Leader. The EM&A report shall be prepared by the ET Leader, endorsed by IEC and submitted to the ER, EPD and AFCD within 10 working days of the end of each reporting month, with the first report due in the month after construction commences. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium requirement. The ET Leader shall review the number and location of monitoring stations and parameters to monitor every 6 months or on as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

i. First Monthly EM&A Report

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

- a) 1-2 pages executive summary;
 - Breaches of AL levels;
 - Complaints Log;
 - Notifications of any summons and successful prosecutions;
 - Reporting Changes; and
 - Future key issues.
- b) Basic Project Information
 - Project organisations including key personnel contact names and telephone numbers;
 - Programme;
 - Management structure; and
 - Works undertaken during the month.
- c) Environmental Status
 - Work undertaken during the month with illustrations (such as location of works daily dredging/filling rates percentage fines in the fill material used); and
 - Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- d) Summary of EM&A requirements
 - All monitoring parameters;
 - AL Levels;
 - Event-Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA Report; and
 - Environmental requirements in contract documents.
- e) Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA Report, summarised in the updated implementation schedule (see **Annex A**).

f) Monitoring Results

To provide monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations;
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

g) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

- Record of all non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

h) Others

- An account of the future key issues as reviewed from the works programme and work method statements; and
- Advice on the solid and liquid waste management status.

ii. Subsequent Monthly EM&A Reports

The subsequent Monthly EM&A Reports shall include the following:

a) Executive Summary (1-2 pages)

- Breaches of AL levels;

- Complaint Log;
- Notifications of any summons and successful prosecutions;
- Future key issues.

b) Environmental Status

- Works undertaken during the month with illustrations including key personnel contact names and telephone number; and
- Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.

c) Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures for air, noise, water quality and ecological impacts etc, as recommended in the EIA Report, summarised in the updated implementation schedule (see **Annex A**).

d) Monitoring Results

To provide monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations (and depth);
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

e) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

- Record of all non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- 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.

f) Others

- An account of the future key issues as reviewed from the works programme and work method statements; and
- Advice on the solid and liquid waste management status.

g) Appendix

- AL levels
- Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - i) major activities being carried out on site during the period;
 - ii) weather conditions during the period; and
 - iii) any other factors which might affect the monitoring results
- Monitoring schedule for the present and next reporting period
- Cumulative statistics
- On complaints, notifications of summons and successful prosecutions
- Outstanding issues and deficiencies

iii. Quarterly EM&A Summary Reports

The Quarterly EM&A Summary Report which shall generally be around 5 pages (including about 3 of text and tables and 2 of figures) shall contain at least the following information:

- a) up to half a page executive summary;
- b) basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
- c) a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (AL Levels); and
 - environmental mitigation measures, as recommended in the EIA Report;
- d) advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;
- e) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- f) graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against;
 - the major activities being carried out on site during the period;

- weather conditions during the period; and
- any other factors which might affect the monitoring results;
- g) advice on the solid and liquid waste management status;
- h) a summary of non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
- i) an quarterly assessment of constructional impacts on water quality at the project area including but not limited to comparison of the difference between the quarterly mean and 1.3 times of the ambientment which is defined as 30% increase of the baseline data or EPD data of the related parameters by using appropriate statistical procedures. Suggestion of appropriate mitigation measures if the quarterly assessment analytical results demonstrate that the quarterly mean is significantly higher than the liaison water quality times of the ambient mean ($p < 0.05$);
- j) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- k) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- l) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- m) comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
- n) proponents' contacts and any hotline telephone number for the public to make enquiries.

iv. Final EM&A Review Report

The Final EM&A Report shall contain at least the following information:

- a) Executive Summary (1-2 pages);
- b) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- c) basic project information including a synopsis of the project organisation contacts of key management, and a synopsis of work undertaken during the course of the project or past twelve months;
- d) a brief summary of EM&A requirements including:
 - (i) environmental mitigation measures, as recommended in the project EIA Report;
 - (ii) environmental impact hypotheses tested;
 - (iii) AL Levels;
 - (iv) all monitoring parameters; and
 - (v) Event-Action Plans;

- e) a summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report summarized in the updated implementation schedule;
- f) graphical plots and the statistical analysis of the trends of monitored parameters over the course of the project, including the post project monitoring (for the past twelve months for annual report) for all monitoring stations against:
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results;
- g) a summary of non-compliance (exceedances) of the environmental quality performance limits (AL Levels);
- h) a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- i) a description of the actions taken in the event of non-compliance;
- j) a summary record of all complaints received (written or verbal) for each media liaison and consultation undertaken, action and follow-up procedures taken;
- k) a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection pollution control legislations locations and nature of the breaches, investigation, follow-up actions taken and results;
- l) a review of the validity of EIA Report predictions and identification of shortcomings in EIA Report recommendations;
- m) a review of the effectiveness and efficiency of the mitigation measures; and
- n) a review of success of the EM&A programme to cost effectively identify deterioration and to initiate prompt effective mitigation action when necessary.

12.5 Operation Phase Wetland Monitoring Reports

12.5.1 The data obtained from the monitoring programme will be used to inform adaptive management measures. Monitoring data and information regarding adaptive management measures undertaken will be submitted to relevant authorities, i.e. the stakeholders and relevant Government Departments e.g. AFCD and EPD. The frequency of reporting will conform to the requirements of the Environmental Permit..

12.6 Data Keeping

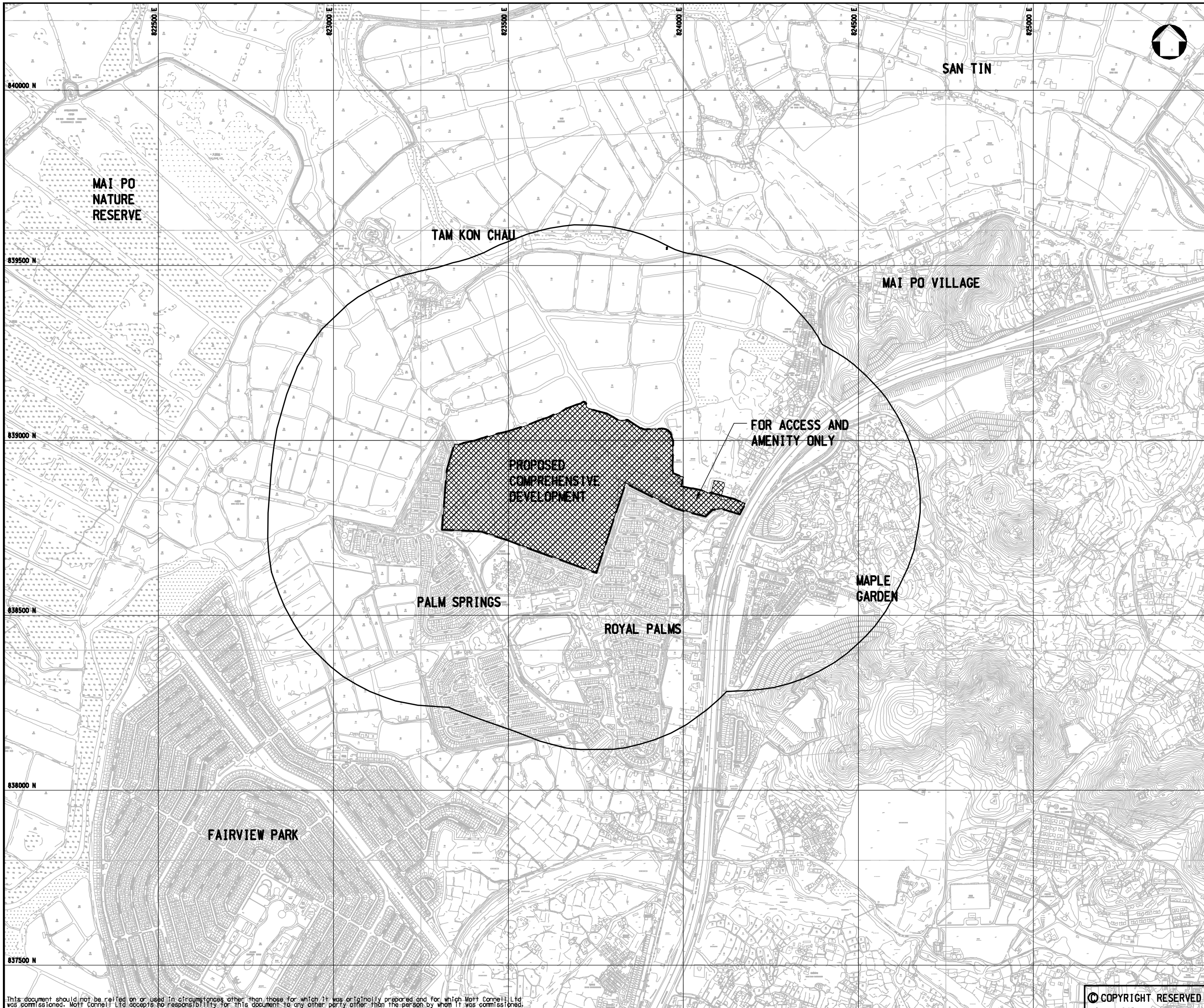
12.6.1 The site document such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, the document shall be well kept by the ET Leader and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. The monitoring data shall also be recorded in magnetic media

form, and the software copy can be available upon request. The water quality data software format shall be agreed with EPD. All the documents and data shall be kept for at least one year after completion of the construction contract.

12.7 Interim Notifications of Environmental Quality Limit Exceedances

- 12.7.1 With reference to Event and Action Plans in **Tables 2-3, 3-3, 4-2, 4-3, 7-2, 10-3 and 10-5**, when the environmental quality limits are exceeded, the ET Leader shall immediately notify the Contractor, IEC, ER, EPD and AFCD, as appropriate. The notification shall be followed up with advice to EPD on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in **Annex D**.

FIGURES



- LEGENDS:**
-  ASSESSMENT AREA (1500m FROM PROJECT AREA AND SITE OF CONSERVATION CONCERN)
 -  PROPOSED COMPREHENSIVE DEVELOPMENT

Rev	Date	Drawn/Description	Chk'd/App'd

Mott Connell
 Mott Connell Limited
 40/F Hopewell Centre
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 Web www.mottmac.com

Client
 PROFIT POINT ENTERPRISES LTD

Project
 PROPOSED COMPREHENSIVE DEVELOPMENT
 AT WO SHANG WAI, YUEN LONG

Title
 LOCATIONS AND ASSESSMENT AREA OF
 THE PROPOSED DEVELOPMENT SITE

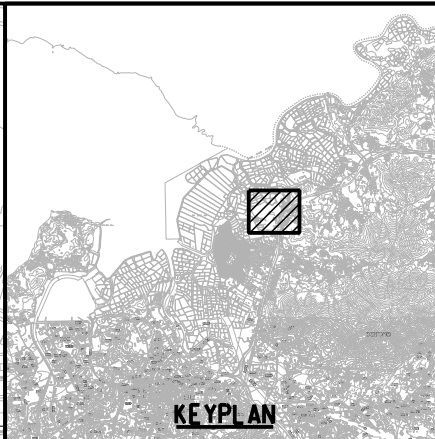
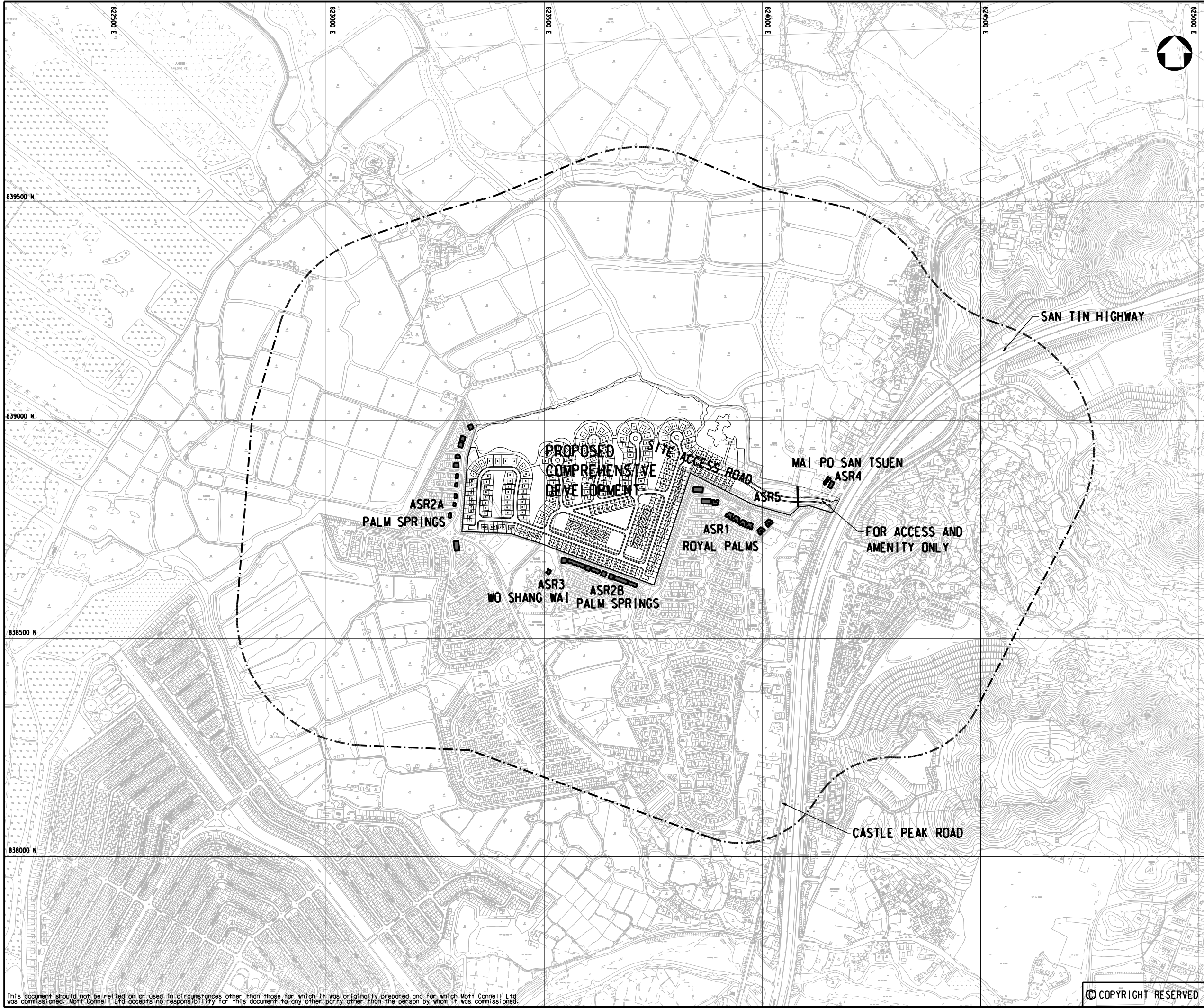
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Drawn	TSG	Coordination	
Dwg.Chk.	JC	Approved	AFK
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Drawing No.		Rev	1
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FIGURE 1.1



KEYPLAN

REPRESENTATIVE AIR SENSITIVE RECEIVERS
 - - - 500m STUDY BOUNDARY

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Project

**PROPOSED COMPREHENSIVE DEVELOPMENT
AT WO SHANG WAI, YUEN LONG**

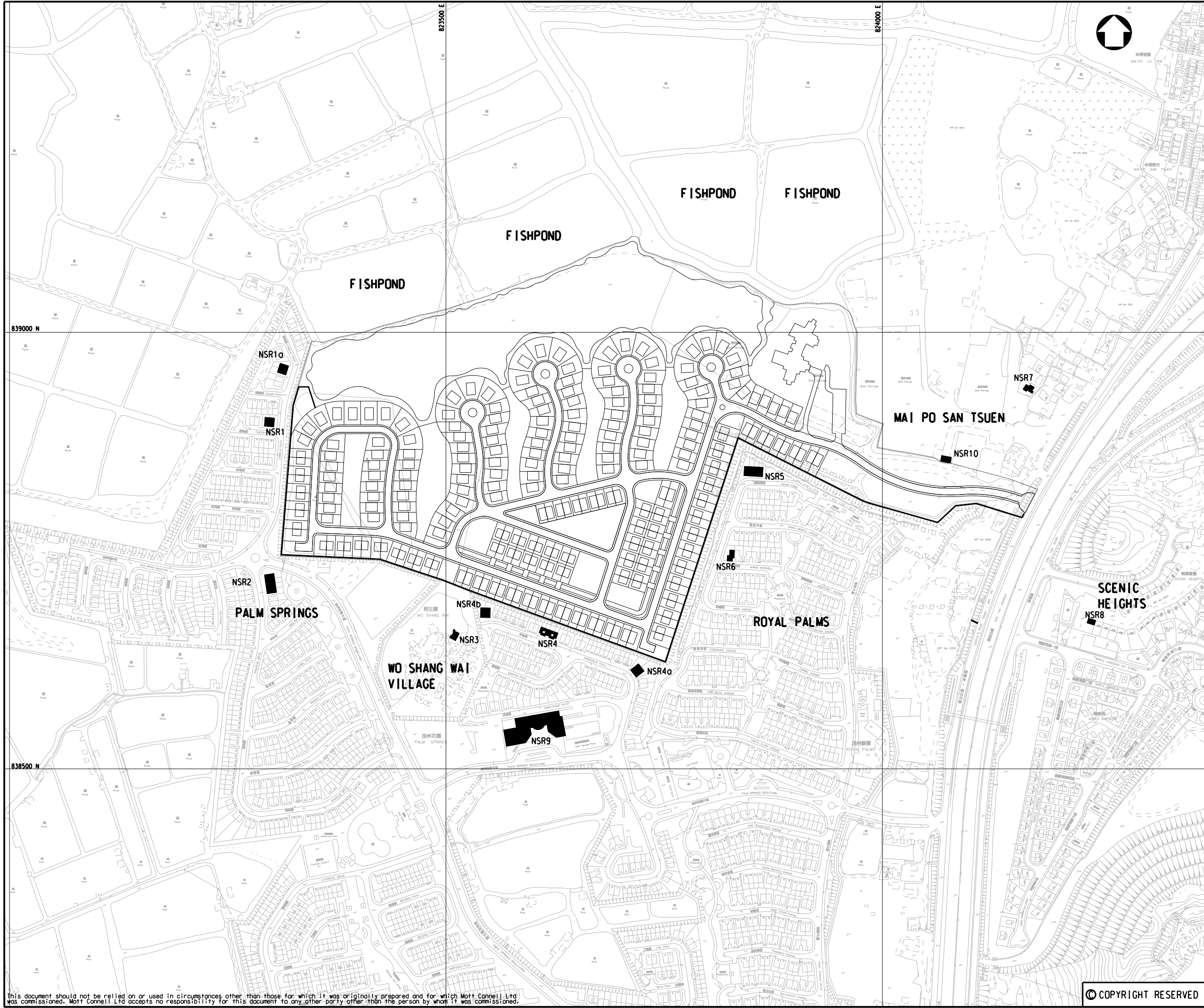
Title

**LOCATIONS OF THE REPRESENTATIVE
AIR QUALITY SENSITIVE RECEIVERS**

Designed	KW	Eng.Chk.	
Drawn		Coordination	
Dwg.Chk.	JC	Approved	AFK
Scale	1:4000@A1	Project	221005
Drawing No.		CAD File	j:\22005\report\env\env&a_manual\08030\env-fig_2a.dwg
		Rev	

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LEGEND
 ■ REPRESENTATIVE NOISE SENSITIVE RECEIVERS (NSRs) IN CONSTRUCTION PHASE

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Project
**PROPOSED COMPREHENSIVE DEVELOPMENT
 AT WO SHANG WAI, YUEN LONG**

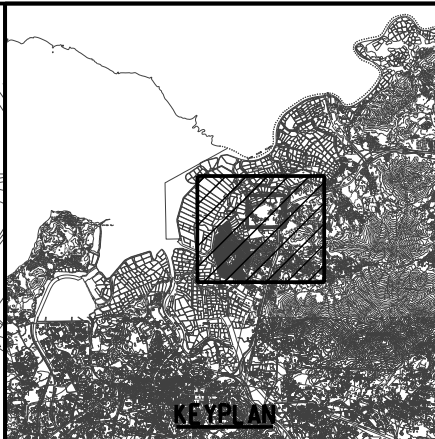
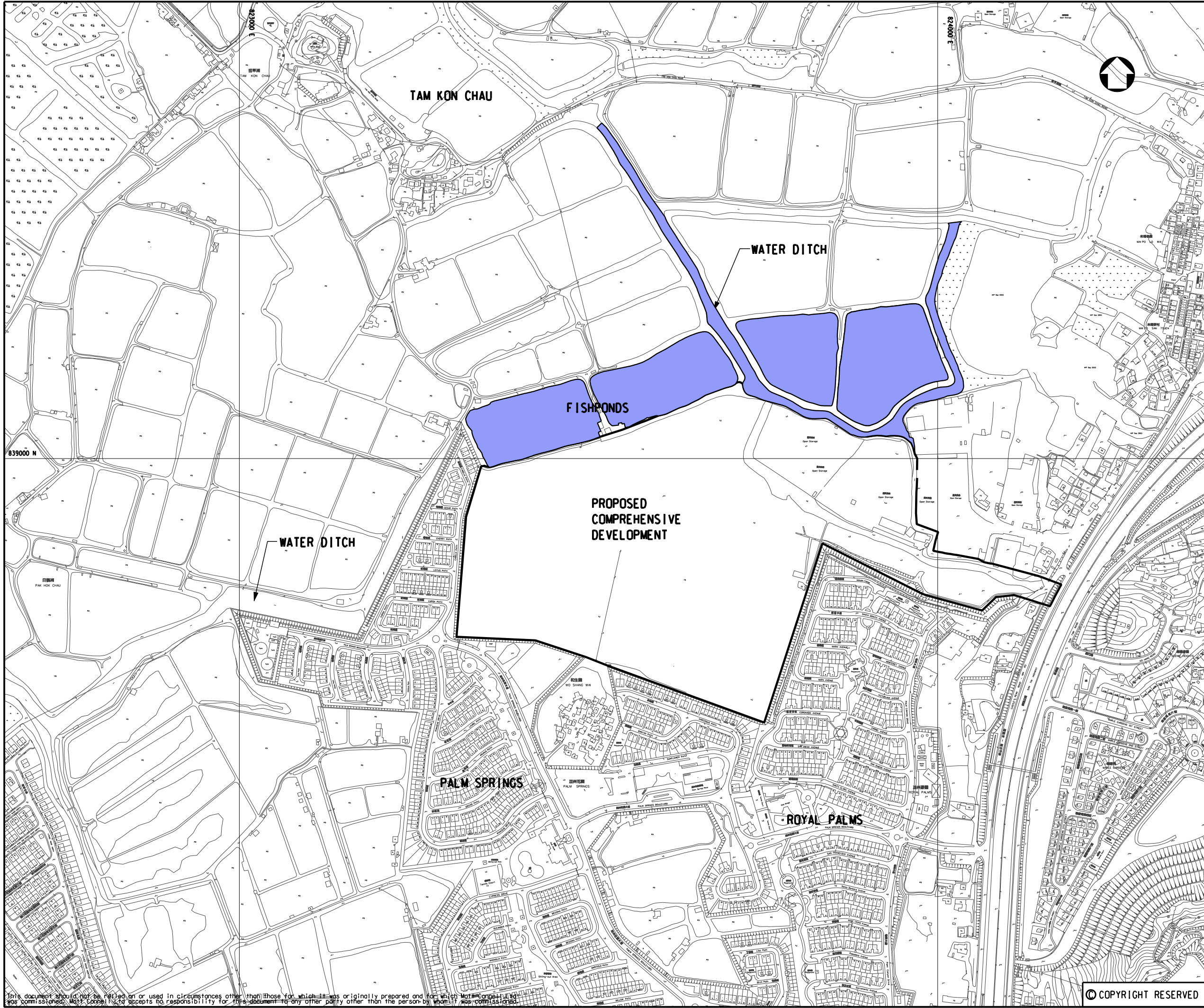
Title
**LOCATION OF REPRESENTATIVE NOISE
 SENSITIVE RECEIVERS**

Designed	CWK	Eng.Chk.	
Drawn		Coordination	
Dwg.Chk.	CWK	Approved	AFK
Scale	1:4000@A3	Project 221005	Status
Drawing No.		CAD File j:\22005\report\env\em&a_manual\08030\env-fig_2b.dwg	Rev
			1

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FIGURE 1.2b



NOTES:
 1. GRIDLINES REFER TO HONG KONG METRIC GRID (1980).

LEGENDS :
 WATER SENSITIVE RECEIVER

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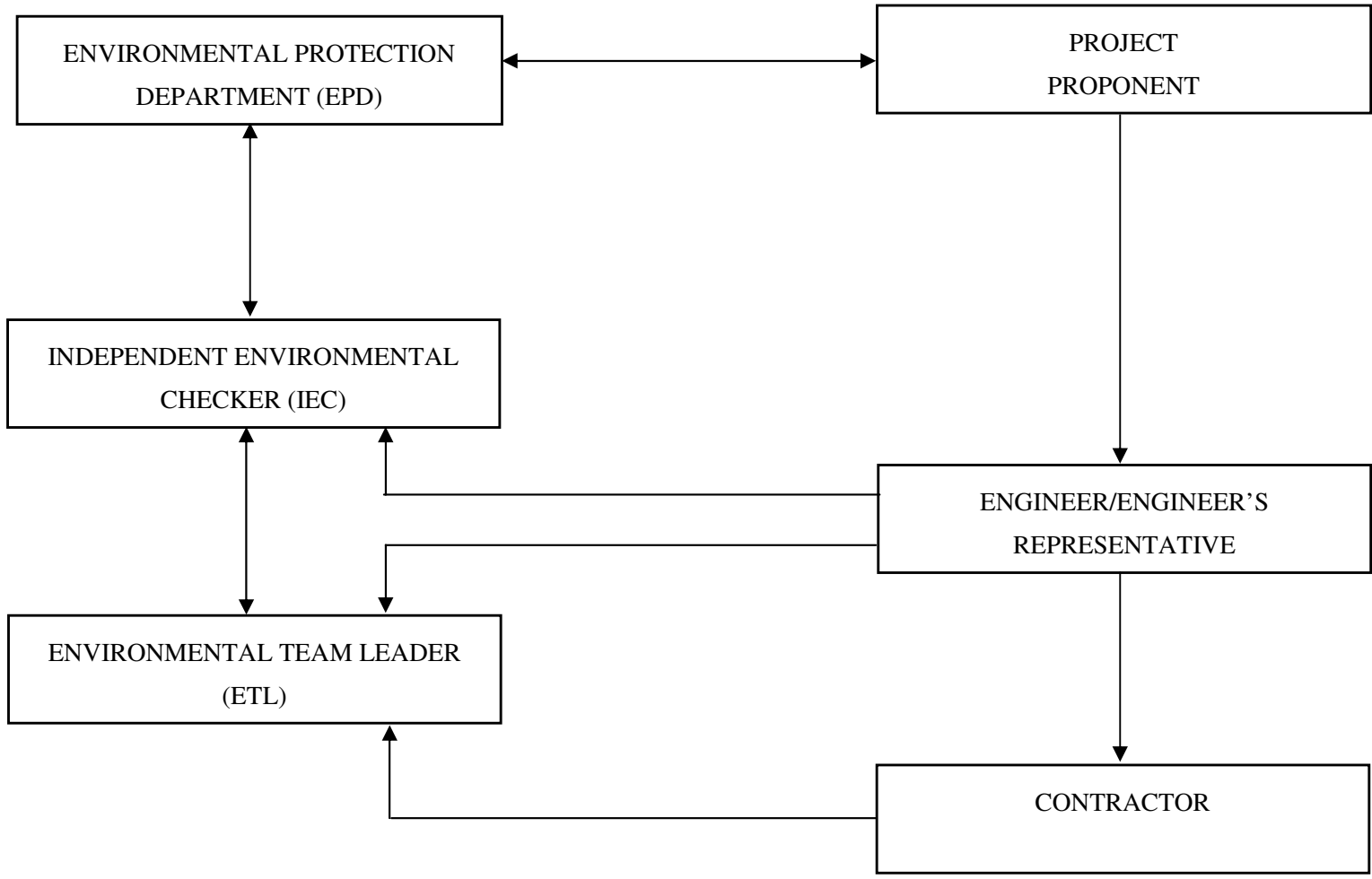
Project:
**PROPOSED COMPREHENSIVE DEVELOPMENT
 AT WO SHANG WAI, YUEN LONG**

Title:
**LOCATION OF REPRESENTATIVE
 WATER QUALITY SENSITIVE RECEIVERS**

Designed	MMA	Eng.Chk.	MMA
Drawn	KK	Coordination	
Dwg.Chk.	MMA	Approved	AFK
Scale	1:2500@A1	Project	Status

Drawing No. **FIGURE 1.2c**
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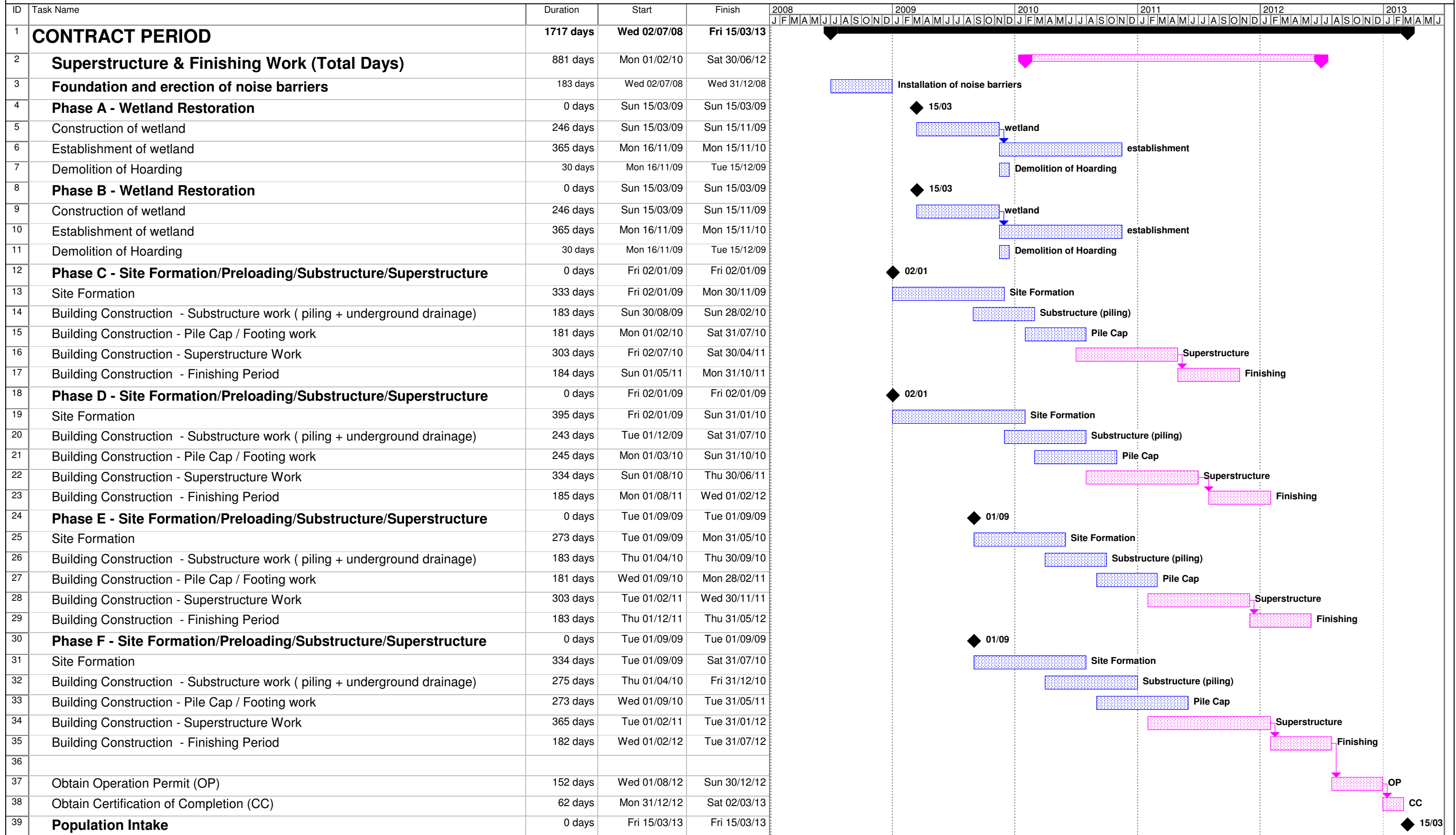
Project	Proposed Comprehensive Development at Wo Shang Wai, Yuen Long
Title	Project Organisation and Lines of Communication
Date Mar 2008	

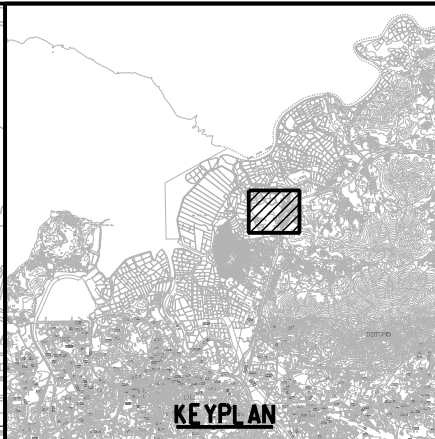
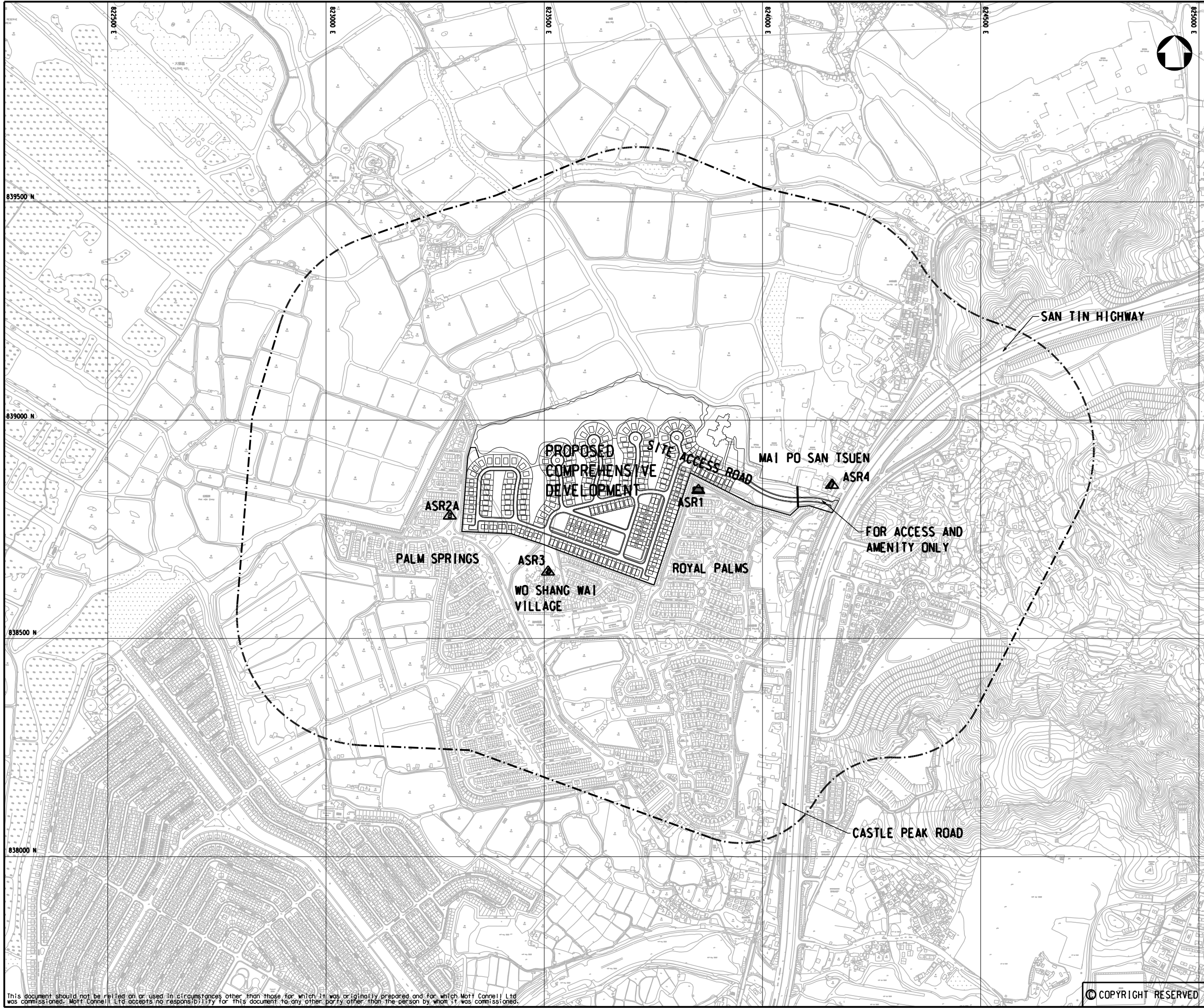


Figure 1.3

Proposed Comprehensive Development at Wo Shang Wai, Yuen Long

Figure 1.4 Implementation Programme





PROPOSAL AIR QUALITY MONITORING STATIONS
 500m STUDY BOUNDARY

TABLE 2.1 DUST MONITORING STATIONS

ID	DESCRIPTION	MONITORING LOCATION
ASR1	ROYAL PALMS	TO THE SOUTHEAST OF THE SITE
ASR2A	PALM SPRINGS	TO THE SOUTHWEST OF THE SITE
ASR3	WO SHANG WAI TSUEN	TO THE SOUTH OF THE SITE
ASR4	VILLAGE HOUSE OF MAI PO SAN TSUEN	TO THE EAST OF THE SITE

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Project
PROPOSED COMPREHENSIVE DEVELOPMENT AT WO SHANG WAI, YUEN LONG

Title
PROPOSED LOCATION OF AIR QUALITY MONITORING STATIONS

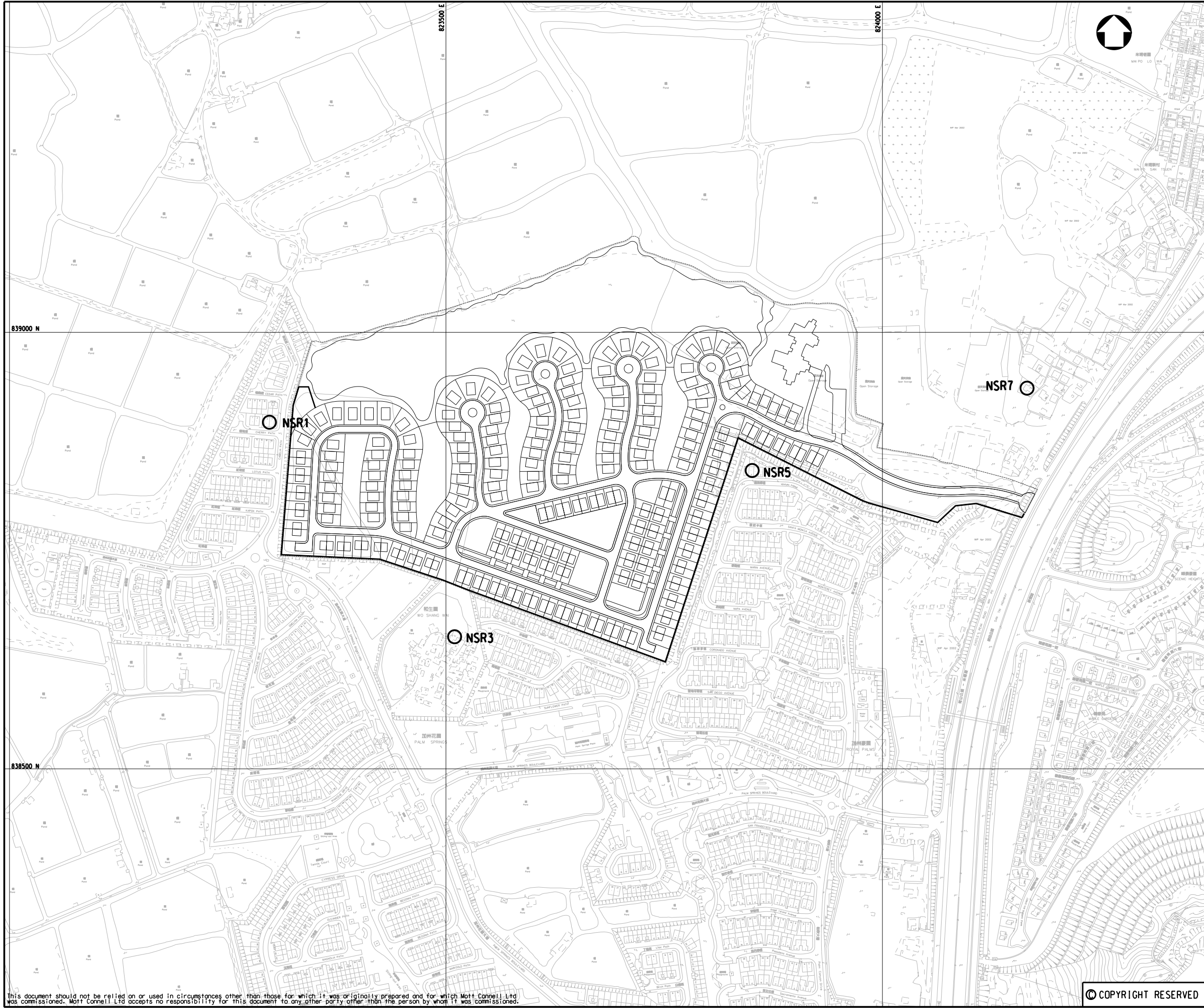
Designed	KW	Eng.Chk.	
Drawn		Coordination	
Dwg.Chk.	JC	Approved	AFK
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FIGURE 2.1

2

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LEGEND

	CONSTRUCTION PHASE NO.
○	PROPOSED NOISE MONITORING STATIONS

TABLE 3.1 NOISE MONITORING STATIONS

MONITORING STATION	DESCRIPTION
NSR1	HOUSE NO. 5, CHERRY PATH, PALM SPRINGS
NSR3	HOUSE NO. 17, WO SHANG WAI VILLAGE
NSR5	HOUSE NO. 1, CHERRY VENTURA AVENUE, ROVAL PALMS
NSR7	MAI PO SAN TSUEN

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Project

**PROPOSED COMPREHENSIVE DEVELOPMENT
AT WO SHANG WAI, YUEN LONG**

Title

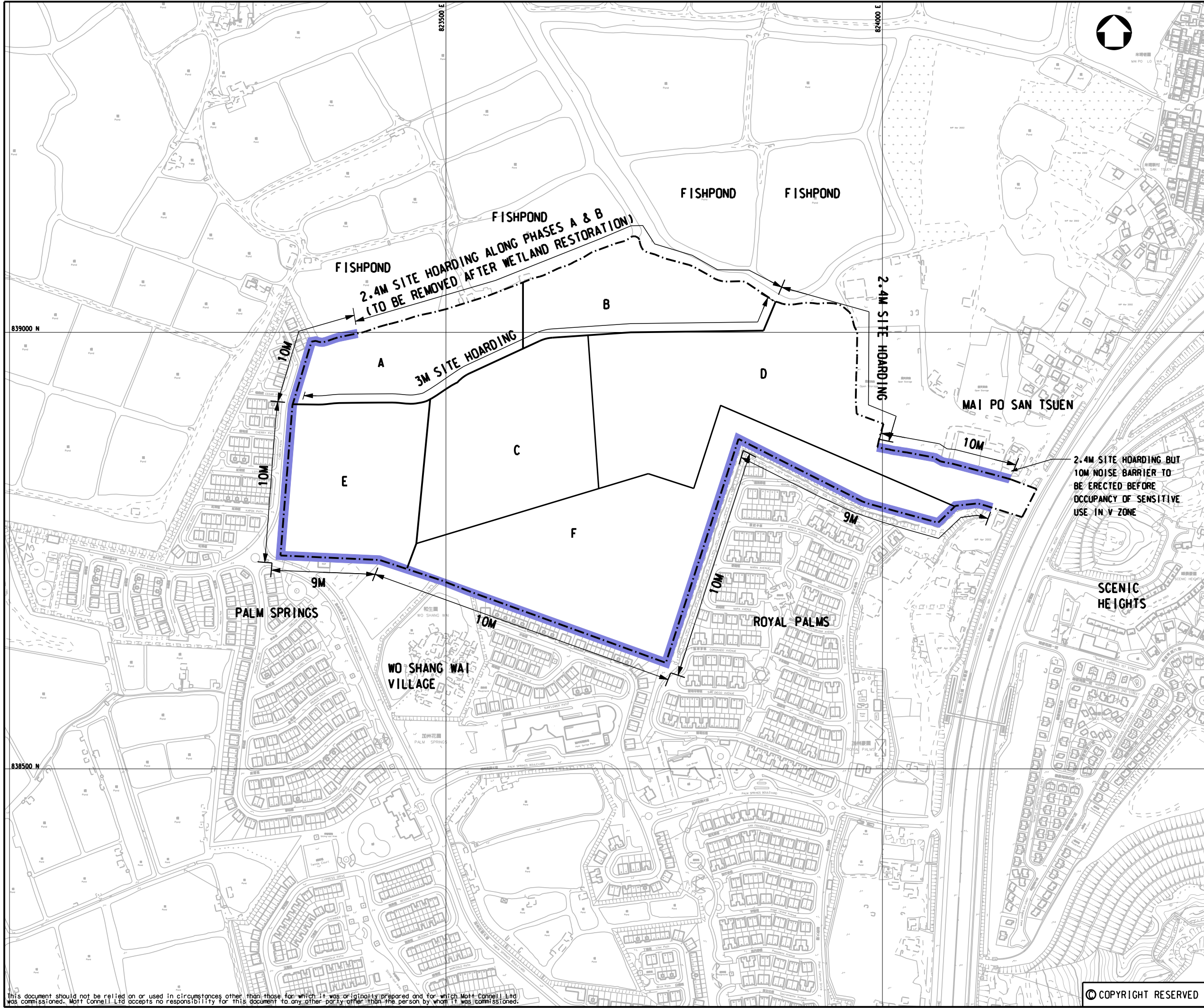
**PROPOSED LOCATION OF NOISE
MONITORING STATIONS**

Designed	CWK	Eng.Chk.	
Drawn		Coordination	
Dwg.Chk.	CWK	Approved	AFK
Scale	1:4000@A3	Project 221005	Status
		CAD File	
Drawing No.			Rev

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FIGURE 3.1



- LEGEND**
- SITE BOUNDARY
 - PHASE BOUNDARY
 - A CONSTRUCTION PHASE NO.
 - EXTEND OF NOISE BARRIERS
 - 10M 10m HIGH NOISE BARRIER

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Project
**PROPOSED COMPREHENSIVE DEVELOPMENT
 AT WO SHANG WAI, YUEN LONG**

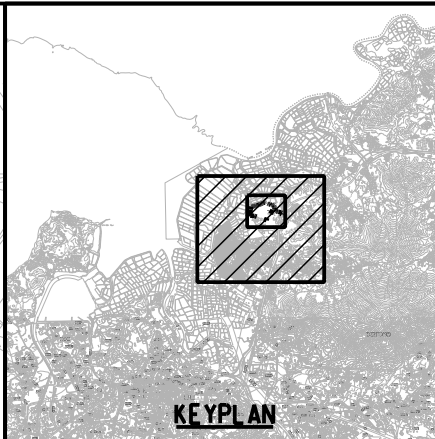
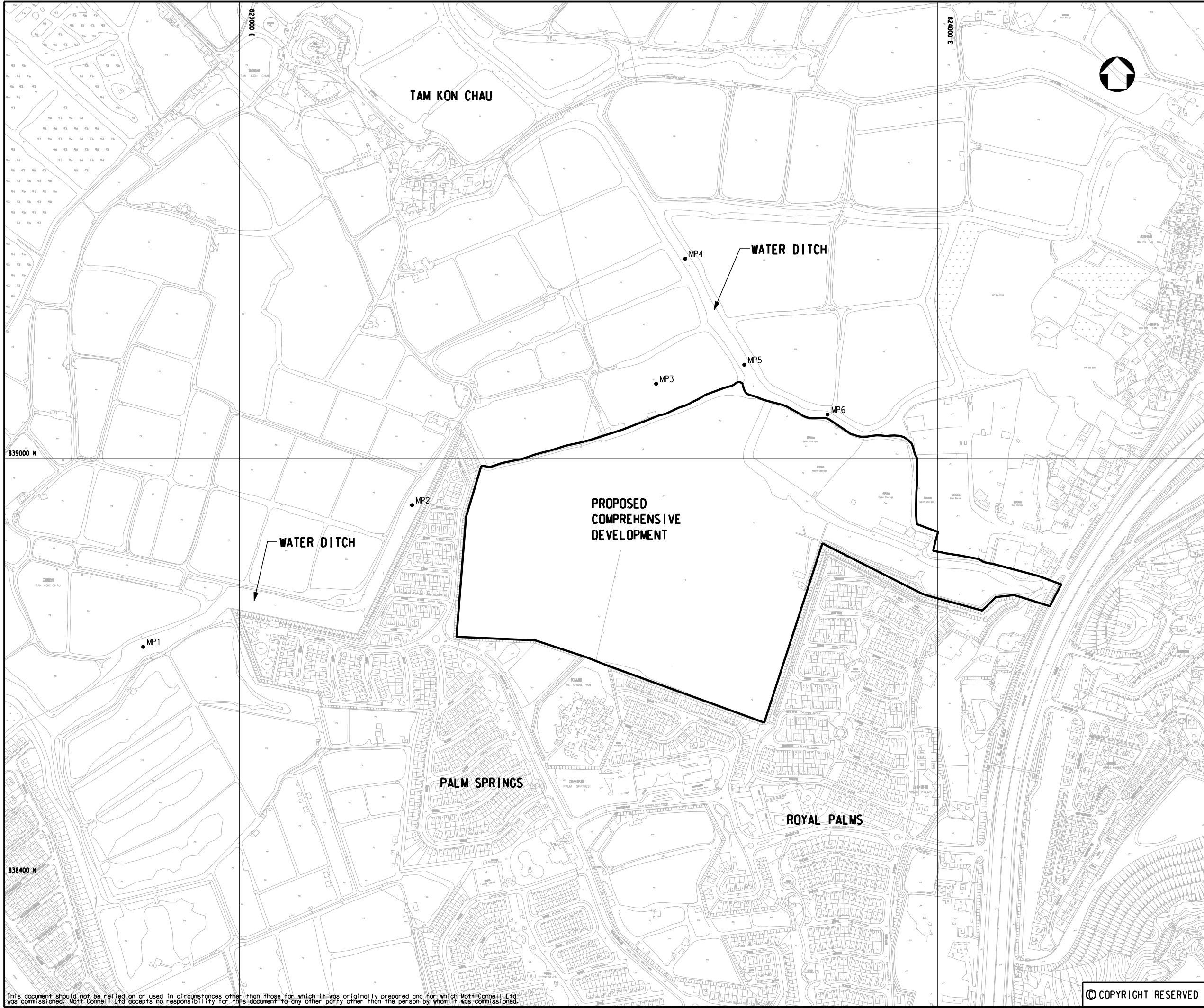
Title
**LOCATION OF NOISE BARRIERS
 AND SITE HOARDINGS**

Designed	CWK	Eng.Chk.	
Drawn		Coordination	
Dwg.Chk.	CWK	Approved	AFK
Scale	1:4000@A3	Project 221005	Status
		CAD File	
Drawing No.			Rev
			1

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FIGURE 3.2

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NOTES:
1. GRIDLINES REFER TO HONG KONG METRIC GRID (1980).

LEGENDS :
● MP1 PROPOSED WATER QUALITY SAMPLING LOCATION

NUMBER	NORTH	EAST
MP1	822862.25	838730.50
MP2	823247.41	838933.26
MP3	823596.84	839107.17
MP4	823638.55	839286.14
MP5	823722.99	839134.35
MP6	823842.25	839063.02

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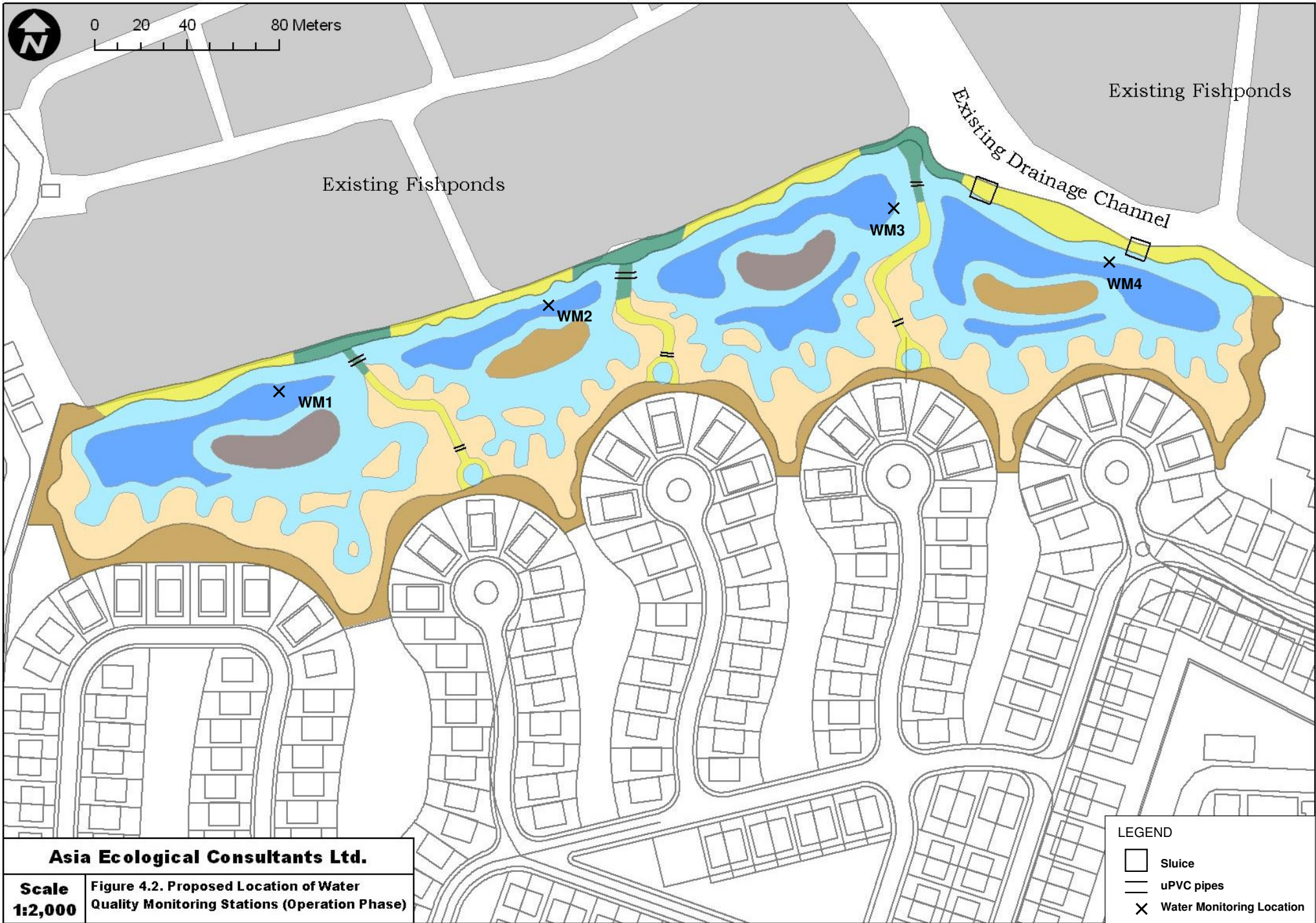
Project
**PROPOSED COMPREHENSIVE DEVELOPMENT
AT WO SHANG WAI, YUEN LONG**

Title
**PROPOSED LOCATION OF WATER QUALITY
MONITORING STATIONS
(CONSTRUCTION PHASE)**

Designed	JC	Eng.Chk.	MMA
Drawn	KK	Coordination	
Dwg.Chk.	MMA	Approved	AFK
Scale	Project	Status	
1:2500@A1			
Drawing No.	CAD File	Rev	
FIGURE 4.1	J:\22005\report\env\em&a_manual\08030\env-fig1.dgn		

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



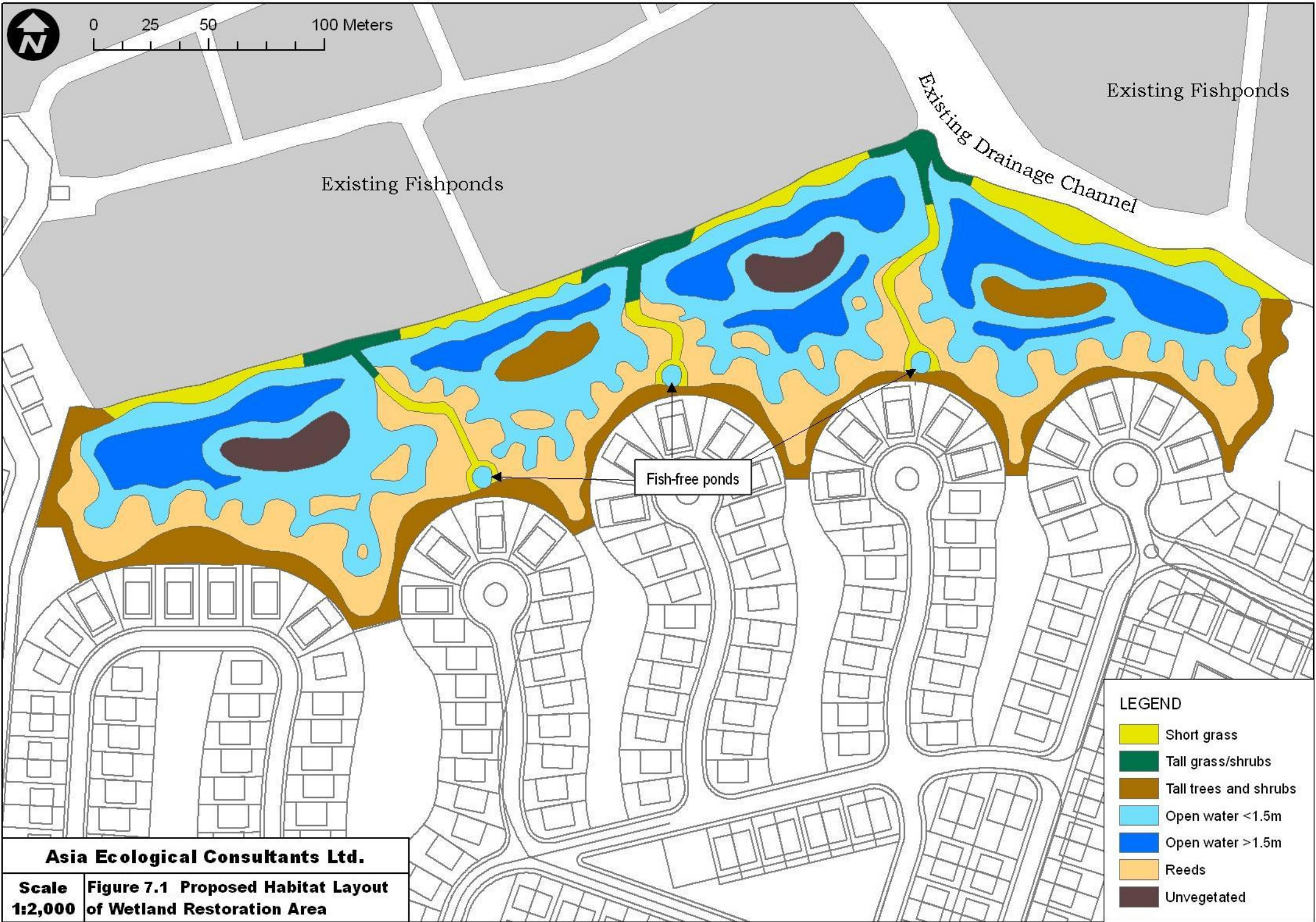
Asia Ecological Consultants Ltd.

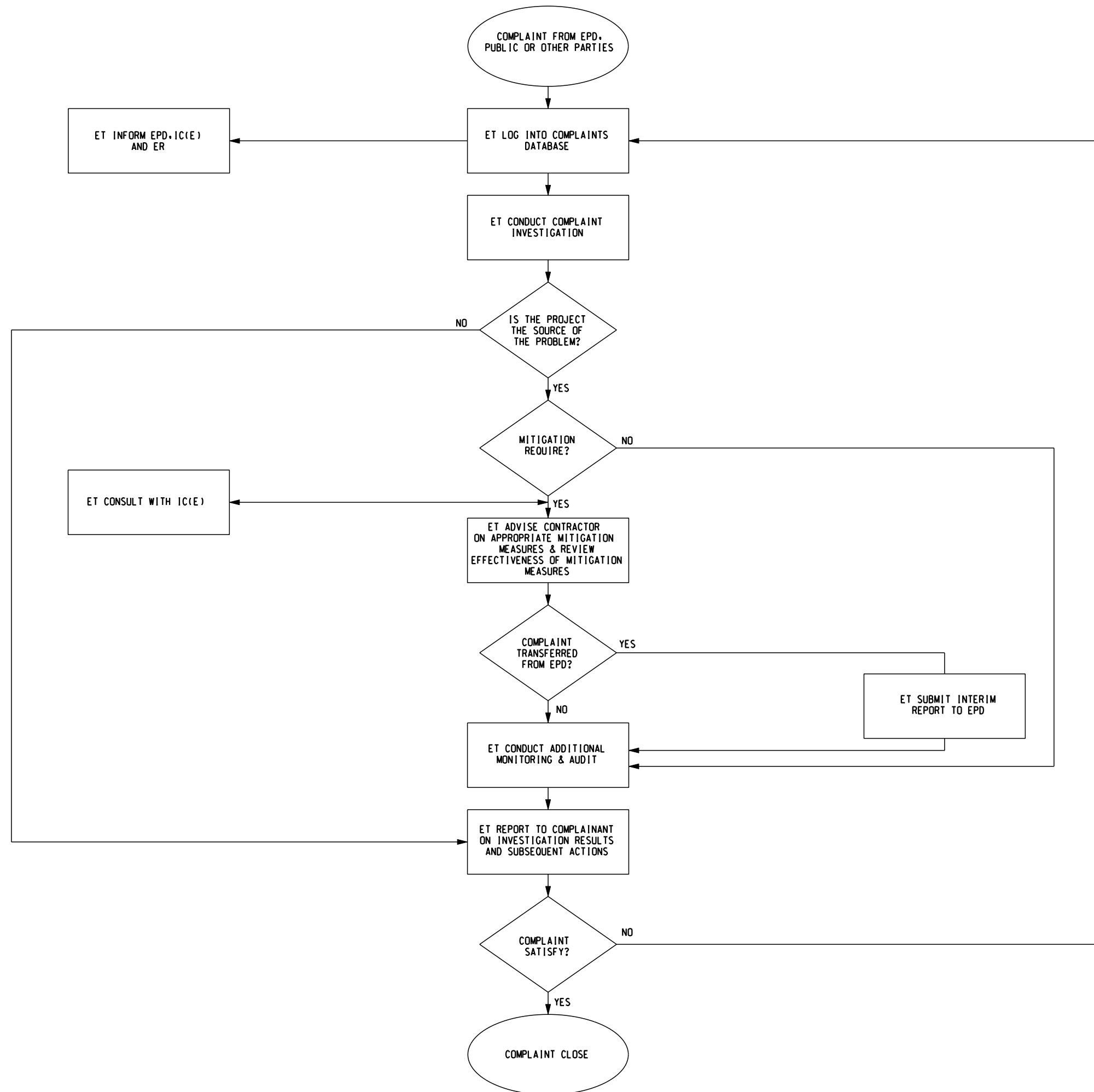
Scale
1:2,000

Figure 4.2. Proposed Location of Water Quality Monitoring Stations (Operation Phase)

LEGEND

-  Sluice
-  uPVC pipes
-  Water Monitoring Location





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Project
PROPOSED COMPREHENSIVE DEVELOPMENT AT WO SHANG WAI, YUEN LONG

Title
COMPLAINT RESPONSE PROCEDURES

Designed	MMA	Eng.Chk	MMA
Drawn	KK	Coordination	
Dwg.Chk	MMA	Approved	AFK
Scale	Project	Status	
CAD File	j:\22005\report\env\em&a_manual\08030\env-fig11.dgn		Rev
Drawing No.	FIGURE 11.1		Rev

ANNEXES

ANNEX A

Environmental Mitigation Implementation Schedule

ANNEX A IMPLEMENTATION SCHEDULE

Proposed Comprehensive Development at Wo Shang Wai, Yuen Long

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
Air Quality					
3.6.1	<p>During Construction</p> <p>Dust which may be generated during the construction of the proposed Comprehensive Development is expected to be released as a result of construction activities such as material handling, excavation, vehicle movement and erosion of unpaved area and stockpiles. The potential air quality impact is however anticipated to be short-term and be controlled through appropriate design and good site practice stipulated in the <i>Air Pollution Control (Construction Dust) Regulation</i>.</p> <p>To ensure compliance with the guidelines and AQOs at the ASRs all time, it is recommended to implement the <i>Air Pollution Control (Construction Dust) Regulation</i> and include good site practice in the contract clauses to minimize cumulative dust impact. In addition, a comprehensive dust monitoring and audit programme is recommended to ensure proper implementation of the identified mitigation measures. Details of the monitoring and audit requirements are provided in a separate EM&A Manual.</p> <ul style="list-style-type: none"> • use of effective dust screens, sheeting or netting to be provided to enclose dry scaffolding which may be provided from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level (maximum four floors for this Project) of the scaffolding where scaffolding is erected around the perimeter of a building under construction; • dump trucks for material transport should be totally enclosed using impervious sheeting; • any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated within 24 hours of the excavation or unloading; • dusty materials remaining after a stockpile is removed should be wetted with water; • the area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with eg concrete, bituminous materials or hardcore or similar; • the portion of road leading only to a construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials; 	Contractor	Construction Work Sites	During Construction	Air Pollution Control (Construction Dust) Regulation

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	<ul style="list-style-type: none"> stockpile of dusty materials to be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet; 	Contractor	Construction Work Sites	During Construction	Air Pollution Control (Construction Dust) Regulation
	<ul style="list-style-type: none"> all dusty materials to be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet; vehicle speed to be limited to 10 kph except on completed access roads; every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites; the load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; the working area of excavation should be sprayed with water immediately before, during and immediately after (as necessary) the operations so as to maintain the entire surface wet; all malodorous excavated material should be placed as far as possible from any ASRs; the stockpiled malodorous materials should be removed from site as soon as possible; and the stockpiled malodorous materials should be covered entirely by plastic tarpaulin sheets. 				
	<p>In order to minimise the potential odour nuisance arising from the excavation of pond deposit, the following control measures shall be implemented:</p> <ul style="list-style-type: none"> all malodorous excavated material should be placed as far as possible from any ASRs; the stockpiled malodorous material should be removed from site as soon as possible; and the stockpiled malodorous material should be covered entirely by plastic tarpaulin sheets. 	Contractor	Construction Work Sites	During excavation and dredging	
3.6.2	<p>During Operation</p> <p>The potential impacts on air quality during the operation phase are insignificant, therefore specific mitigation measures are not required.</p>	N/A	N/A	N/A	N/A

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
Noise					
4.8.1	<p>During Construction</p> <p>The noise impact of unmitigated construction activities for Wo Shang Wai together with the wetland restoration would cause exceedance of the daytime construction noise criterion at all the representative NSRs except NSR8 during the normal working hours. Mitigation measures for construction site are proposed and should be incorporated into the Contract Specifications.</p> <p>While it is recognised that the Contractor may develop a different package of mitigation measures to meet the required noise standards, the following suite of practical and implementable measures demonstrate an approach that would be feasible to reduce noise to acceptable levels.</p>	Contractor	Construction Work Sites	During Construction	PN 2/93 Noise from Construction Activities & EIAO
	<p><i>Good Site Practice</i></p> <p>Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during construction:</p> <ul style="list-style-type: none"> • only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction works; • machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs; • silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction period; • mobile plant should be sited as far away from NSRs as possible; • material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities; and • The Contractor shall at all times comply with all current statutory environmental legislation. 	Contractor	Construction Work Sites	During Construction	PN 2/93 Noise from Construction Activities & EIAO
	<p><i>Selection of quieter plant and working methods</i></p> <p>The Contractor shall obtain particular models of plant that are quieter than standards given in GW-TM. The list of assumed quieter plants can be found in the Table 4-14 of the EIA report. The Contractor shall select from the available models achieving the assumed sound levels while making reference to the GW-TM and BS5228: Part 1: 1997</p>	Contractor	Construction Work Sites	During Construction	PN 2/93 Noise from Construction Activities & EIAO

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	<p><i>Use of Noise Barriers</i> Noise barriers are proposed along the site boundary to block the direct line of sight from the most affected NSRs to the major noise contribution construction phases as shown in Figures 4.6 and 4.7 of the EIA Report. The height of the noise barriers ranged from 9-10m. The noise barriers shall be built before the commencement of construction works in order to ensure protection to nearby NSRs. The noise barrier should have a surface density of at least 10kg/m² or material providing equivalent transmission loss. The noise barriers and hoardings should have no gaps and openings to avoid noise leakage.</p>	Contractor	Construction Work Sites	Before the commencement of construction works	PN 2/93 Noise from Construction Activities & EIAO
4.7.5	<p>During Operation <i>Fixed Noise Sources</i> Open storage site at the northeast corner of the Project Area and the sewage treatment plant in Royal Palms are potential fixed noise sources, the assessment result comply with both day and night time noise criteria. No mitigation measures are required.</p>	N/A	N/A	N/A	N/A
4.7.6	<p><i>Road Traffic Noise</i> During the operational phase, road traffic noise will be the dominant noise source within the Study Area, and will potentially affect the planned noise sensitive developments. This assessment has predicted that the traffic noise levels including the contribution from existing network at the year 2027 will comply with the road traffic noise criterion of L₁₀ (peak hour) 70 dB(A). The increased noise levels in 2028 are minimal and insignificant. No mitigation measures are required.</p>	N/A	N/A	N/A	N/A
Water Quality					
5.6.1	<p>During Construction Potential water quality impacts primarily relate to the un-controlled discharge of sediments/ silts during construction. Good site practices in addition to the implementation of mitigation measures would minimize the impact to the surrounding environment.</p> <p>General Precautions</p> <ul style="list-style-type: none"> • The site should be confined to avoid silt runoff to the site. • No discharge of silty water into the storm drain and drainage channel within and the vicinity of the site. • Any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials. • Stockpiles to be covered by tarpaulin to avoid spreading of materials during rainstorms; • Suitable containers shall be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport; 	Contractor	Construction Work Sites	During Construction	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	<ul style="list-style-type: none"> • Chemical waste containers shall be labelled with appropriate warning signs in English and Chinese to avoid accidents. there shall also be clear instructions showing what action to take in the event of an accidental; • Storage areas shall be selected at safe locations on site and adequate space shall be allocated to the storage area; • Any construction plant which causes pollution to the water system due to leakage of oil or fuel shall be removed off-site immediately; • Spillage or leakage of chemical waste to be controlled by using suitable absorbent materials; • Chemicals will always be stored on drip trays or in bunded areas where the volume is 110% of the stored volume; • Regular clearance of domestic waste generated in the temporary sanitary facilities to avoid waste water spillage. • Temporary sanitary facilities to be provided for on-site workers during construction. 	Contractor	Construction Work Sites	During Construction	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO
	<p>Diversion of Existing Water Ditches and Marsh Temporary drainage channel and associated facilities will be provided to collect the surface runoff generated within the Project Area during the construction phase.</p> <p>Draining of Existing Water Ditches Sandbags or silt traps will need to be placed to avoid silt runoff to the drainage channel draining the water in the northern ditch. Draining of the ditches should avoid rainy weather.</p> <p>Soil Excavation and Stockpiling Excavated soil which needs to be temporarily stockpiled should be stored in a specially designated area and provided with a tarpaulin cover to avoid runoff into the drainage channels.</p>	Contractor	Construction Work Sites	During Construction	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO
		Contractor	Construction Work Sites	During Construction	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO
5.6.2	<p>During Operation</p> <p>Provisional Measures to Emergency Sewage Discharges/Spillages</p>				

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	As described in Section 6, the sewage generated from the residents of this development will be discharged to the planned public sewer. For discharging the sewage to the public sewers in the permanent case, no special mitigation measures are required. In order to minimize the potential impacts arising from sewer bursting, concrete surround to the sewers is proposed within the proposed development as an additional protection measures for the pipelines. (Study Brief Section 3.9.3.4 (xxviii))	Residential Management Contractor	Project Area	During Operation	WPCO WQO
	Diversion of Existing Water Ditches and Marsh Future internal drainage network will have sufficient capacity to cater for the runoff generated from the proposed development, to replace the existing water ditches and marsh. The tentative drainage scheme is shown on Figure 5.3 . (Study Brief Section 3.9.3.4 (iv)).	N/A	N/A	N/A	N/A
	Provision of Soft-landscaping An internal drainage network will be provided to collect runoff from the residential development. Runoff from the developed areas will be diverted into the internal drainage system during storm and adverse weather conditions. Soft landscaping in between the boundary of the wetland and the residential area will be provided to act as a buffer zone to absorb any overflow or flood waters before enters into wetland area.	Residential Management Contractor	Interface of Residential Development and Restored Wetland	During Operation	N/A
Waste Management					
7.5.1	During Construction <i>Site Clearance Waste</i> The major construction works of Wo Shang Wai is in the development of residential buildings and other associated facilities (club house, tennis courts, etc). The amount of site clearance works will be limited with the exception of the excavated materials. The thin layer of vegetation removed can be stored and reused for landscaping.	Contractor	Construction Work Sites	During Construction	Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Wastes) (General) Regulation (Cap 354) and ETWBTC No. 15/2003, Waste Management on Construction Site
7.5.2	<i>Excavated Materials</i> The intention is to maximize the reuse of the excavated materials on-site as fill materials.				
7.5.3	<i>Imported Filling Material</i> The excavated/imported filling material may have to be temporarily stockpiled on-site for the construction of road embankment and foundation of viaduct substructure. Control measures should be taken at the stockpiling area to prevent the generation of dust and pollution of stormwater channels. However, to eliminate the risk of blocking drains in the wet season, it is recommended that stockpiling of excavated materials at during wet season should be avoided as far as practicable.				
7.5.4	<i>Construction and Demolition Materials</i> Careful design, planning and good site management can minimise over-ordering and generation of waste materials such as concrete, mortars and cement grouts. The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork of plastic facing should be considered to increase the potential for reuse.	Contractor	Construction Work Sites	During Construction Planning	Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Wastes) (General) Regulation (Cap 354) and ETWBTC No. 15/2003, Waste Management on

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	The Contractor should reuse any C&D material on-site. C&D waste should be segregated and stored in different containers to other wastes to encourage the re-use or recycling of materials and their proper disposal.	Contractor	Construction Work Sites	During Construction	Construction Site
7.5.5	<p><i>Chemical Waste</i> For those processes which generate chemical waste, it may be possible to find alternatives which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste.</p>				
	<p>Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handed in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste as follows: Containers used for the storage of chemical wastes should:</p> <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: 				
	<ul style="list-style-type: none"> • have a capacity of less than 450 litres unless the specification 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, <p>The storage area for chemical wastes should:</p> <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 as chemical waste if necessary); and 				
	<ul style="list-style-type: none"> • be arranged so that incompatible materials are adequately separated. <p>Disposal of chemical waste should:</p> <ul style="list-style-type: none"> • be via a licensed waste collector; and • be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers, or • to be reuser of the waste, under approval from the EPD. 				

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
7.5.6	<p>General Refuse Should be stored in enclosed bins or compaction units separate from C&D and chemical wastes. The Contractor should employ a reputable waste collector to remove general refuse from the site, separate from C&D and chemical wastes, on a regular basis to minimise odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law.</p>	Contractor	Construction Work Sites	During Construction	WDO (Cap.354) and ETWBTC No. 15/2003
7.8.13	<p>Disposal of Excavated Sediment at Sea The requirements and procedures for excavated sediment disposal are specified under the ETWB TCW No. 34/2002 and PNAP 252. The management of the excavation, use and disposal of sediment is monitored by Fill Management Committee, whilst the licensing of marine dumping is the responsibility of the Director of Environmental Protection (DEP).</p>	Contractor	Project Area	Construction	ETWB TCW No. 34/2002 and PNAP 252
	<p>The excavated sediment would be loaded onto barges or other appropriate vessel and transported to the designated marine disposal site. Category L sediment and Category M sediment passing the biological test would be suitable for disposal at a gazetted open sea disposal ground. Category M sediment failing the biological test and Category H sediment passing the biological test would require confined marine disposal.</p>	Contractor	Project Area	Construction	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO
	<p>During transportation and disposal of the dredged sediment, the following measures should be taken to minimize potential impacts on water quality: -</p> <ul style="list-style-type: none"> • Bottom opening transport vessels should be fitted with tight fitting seals to prevent leakage of material. Excess material should be cleaned from the decks and exposed fittings of vessels before the vessel is moved. • Monitoring of the barge loading should be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels should be equipped with automatic self-monitoring devices as specified by the DEP. 				
Ecology					
8.9.2	<p>During Construction</p> <p>Major potential impacts on ecology during the construction phase include habitat loss and disturbances to wildlife. These impacts were assessed in section 8.8.</p> <p>The following specific mitigation measures to minimise impacts and disturbance to the surrounding habitats, are recommended.</p> <p><i>Clear Definition of Site Limit</i></p>				

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
8.9.20-8.9.21	<p>Clear definition of the site limit should be provided in order to minimize and confine the disturbance during the construction period, especially the northern limit of the Site which is adjacent to fishponds within the Conservation Area (CA) zone and are considered to be ecological sensitive receivers.</p> <p>During wetland construction stage the WRA boundary will be delineated using a temporary hoarding in order to reduce disturbance to off-site habitats and wildlife. During the establishment phase this hoarding will be replaced with a 1 m high chain-link fence in order to reduce disturbance to the WRA through access by humans and dogs, and a hoarding will be established around the residential construction site.</p>	Contractor	Construction Work Sites	During Construction	EIAO
8.9.20-8.9.21	<p><i>Dust and Noise Suppression and Avoidance of Water Pollution</i></p> <p>Good site practices of dust and noise suppression should be strictly implemented to ensure that disturbance is minimized to acceptable levels. Mitigation measures for the off-site disturbance impacts on the fishponds in the CA include hoarding at the northern site boundary during construction of the WRA to reduce noise and dust impacts to the adjacent habitats. Through the use of quieter plant and temporary/movable noise barriers, the noise level would be reduced significantly to an acceptable level. Hoarding at the northern boundary should be replaced with a 1 m high chain-link fence following construction and the WRA will then act as a buffer between the existing wetland areas and the residential part of the site until construction is completed. Hoarding will be retained between the WRA and ongoing construction work to avoid visual disturbance and reduce noise and dust emissions. Pollution of watercourses and sedimentary runoff will be minimized by good site practice, especially the containment of water and sediment within the site for removal.</p> <p>These standard noise and air and water quality site practices are considered to be effective measures for minimizing the disturbance impact during the construction period.</p>	Contractor	Construction Work Sites	During Construction	EIAO and Deep Bay Guidelines (TPB PG – No.12B)
	<i>Planning of Construction Schedule</i>				

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	The construction of the proposed project should be scheduled in phases. Because mitigation is preferably carried out in advance of the main works rather than after the completion of works, the construction of the WRA will commence at the start of the project. Construction work within the WRA is scheduled to take place in a single wet season, followed by 1.5 years of wetland establishment. During the wetland establishment period no noisy work will be undertaken within the WRA to minimize the disturbance to off-site habitats and wildlife.	Contractor	Construction Work Sites	During Construction	EIAO and Deep Bay Guidelines (TPB PG – No.12B)
	<p>Reusing Onsite Materials</p> <p>Soil and plants on-site should be reused (e.g. used as fill material) as far as practical. Stock piles of these reusable materials should be stored in an appropriate area on-site. In particular, the re-use of the wetland soils and topsoil should be considered.</p>	Contractor	Construction Work Sites	During Construction	Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Wastes) (General) Regulation (Cap 354) and ETWBTC No. 15/2003, Waste Management on Construction Site
	Construction of the Wetland Restoration Area The WRA will be operational within 2.5 yrs from the commencement of construction (1 year for site formation and 1.5 years for establishment) and will compensate for the predicted ecological impacts of the proposed development.	Contractor to construct and Wetland Manager to manage	The defined area for the proposed Wetland Restoration Area	During construction phase prior to the construction of the residential area	EIAO and the proposed Wetland Restoration Plan (WRP)
8.9.3	<p>During Operation</p> <p>The major impact would be the habitat change resulting from the proposed project and disturbance from the proposed residential area.</p>				
	<p><i>Operational Phase</i></p> <p>Operational impacts include disturbance to wildlife and loss of habitat. Species that potentially receive significant impacts from the proposed development are Little Egret, Cattle Egret and Chinese Pond Heron.</p> <p>The recommended mitigation measure to reduce/eliminate the impacts on these species is the provision of the WRA. The location of the WRA at the northern portion of the Site is selected to minimise impacts on bird flight paths, to buffer the existing wetland areas from the proposed residential areas and to enhance integration with existing wetland habitats outside the Project Area.</p>	Contractor to construct and Wetland Manager to manage	The defined area for the proposed Wetland Restoration Area	During construction phase prior to the construction of the residential area	EIAO and the proposed Wetland Restoration Plan (WRP)

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	<p><i>Protect the Offsite Fishpond Habitats & Perform Buffer Function</i></p> <p>These objectives can best be achieved by locating the WRA between the WCA/CA and residential areas to separate the two types of land use. In addition, the area of the existing lorry park site will be incorporated into the WRA to further enhance the buffer function.</p>				
	<p><i>Provide Suitable Habitats of Enhanced Quality for the Target Species</i></p> <p>The Wetland Restoration Area of a minimum size of 4.74 ha will be established, to mitigate the loss of 4.69 ha of wetland habitats. In addition to the habitat loss, the WRA is designed to mitigate for on-site and/or off-site disturbance during construction and operational phases as identified in Section 8.8 of the final EIA report. The habitats in the WRA will be designed specifically to meet the habitat requirements of the target species rather than simply restore specific habitats of ecological value.</p>	Contractor to construct and Wetland Manager to manage	The defined area for the proposed Wetland Restoration Area	During construction phase prior to the construction of the residential area	EIAO and the proposed Wetland Restoration Plan (WRP)
	<p>The following micro-habitats will be provided within the wetland restoration area to meet the requirements for the target species:</p> <ul style="list-style-type: none"> • Open water up to 2.5 m in depth with shallow water margins (0-20 cm depth); • reedbed with shallow water margins (0-20 cm depth) and deeper water areas up to 1 m depth); • vegetated and non-vegetated islands and shallow water margins (0-20 cm depth); • trees/tall shrubs overhanging parts of the main water body; • short grass; and • a mixture of tall grass and shrubs. 				

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	<p><i>Building Height with Consideration of Bird Flight Path</i> Under the OZP for the area (OZP No. S/YL-MP/6) the maximum permitted height for buildings within the Project Area is six storeys. This is considerably higher than the buildings at Palm Springs and Royal Palms residential estates, and would potentially impact the flight paths of birds over the Project Area. To minimise such impacts the maximum height of buildings within the Project Area will be four storeys; such buildings will be generally three metres higher than existing buildings in adjacent residential estates. Furthermore, the development has been zoned in such a way that the WRA is located adjacent to surrounding wetlands, and the lowest buildings on site will be those closest to the WRA. This part of the site is the most likely to be used by low-flying birds, and the reduction in building height will minimise potential impacts to flight paths.</p> <p>There will be some residual impact to flight paths in the northwestern part of the Project Area during the construction phase of the WRA, resulting from the presence of construction machinery and from site fencing (required to avoid visual disturbance impacts to foraging waterbirds) and potentially also from noise disturbance. These impacts will be limited in duration to the construction period of the WRA (scheduled to take place in a single wet season), and the timing of the WRA formation at the start of the construction period will ensure that the duration of these construction-phase impacts to flight paths will be minimised</p>	Developer	The defined area for the proposed Wetland Restoration Area	During planning stage	Mai Po and Fairview Park OZP No. S/YL-MP/6
Fisheries					
9.7	With good site practices and implementation of dust and water quality control measures addressed in S.3.6 and S.5.6 of this EIA report (including site confinement with scaffolding erection around the perimeter of the construction site, covering of stockpile by impervious sheeting to avoid spread of dusty materials and proper storage and disposal of chemical waste to avoid discharge to the existing water system, etc.), the dust and water quality impacts on the adjacent fishponds are expected to be controlled to within acceptable levels, which will also protect the fisheries resources from being impacted. The moderate-low impacts for the event of high dose chemical waste pollution would also be avoided by the proper handling and disposal of chemical waste released from mechanical equipment during construction phase. All indirect off-site impacts on pond culture activities are expected to be negligible. Thus, no specific mitigation measure for fisheries impacts is required during the construction and operation phases.	Contractor	Construction Work Sites	During Construction	EIAO
Cultural Heritage					

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
10.5	<p>As no impacts on recorded archaeological sites or area with archaeological potential were identified within the Study Area, no mitigation measure for archaeological resources is considered necessary.</p> <p>The assessment results showed that neither declared / deemed monuments nor graded historical buildings were located within the study area. No impact on cultural heritage elements was anticipated and no associated mitigation measures therefore were considered necessary.</p>				
Landscape & Visual Impact					
11.6	<p>Overall, it is considered that, in the terms of Annex 10 of the EIAO-TM, the landscape and visual impacts are acceptable with the mitigation measures outlined below.</p> <p>During Construction Mitigation measures will comprise the following:</p>				
Table 11-3	CM1- The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM2 - Screening of construction works by hoarding / noise barriers.	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM3 - Reduction of construction period to practical minimum.	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM4 - Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where the soil material meets acceptable criteria and where practical. The Contract Specification shall include storage and reuse of topsoil as appropriate.	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM5 - Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone).	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM6 – Advance screen planting of noise barriers	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM7 - Control night-time lighting and glare by hooding all lights.	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM8 - Ensure no run-off into streams adjacent to the Project Area.	Developer via Contractor	Construction Work Sites	During Construction	EIAO
	CM9 - Protection of existing trees on boundary of site shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at S16 and Tree Removal Application stage).	Developer via Contractor	Construction Work Sites	During Construction	EIAO

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
	CM10 - Trees unavoidably affected by the works shall be transplanted where practical. Trees should be transplanted straight to their destinations and not held in a nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.	Developer via Contractor	Construction Work Sites	During Construction	EIAO
11.6 Table 11-4	During Operation				
	Mitigation measures will comprise the following: OM1 - Compensatory Tree Planting for all felled trees shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006.	Developer / Detailed Designer	Across Project Site	Before Day 1 of Opening	EIAO & ETWBTC 3/2006
	OM2 - A continuous belt of screen planting along southern perimeter of site with fast growing tree species. At least 450 trees capable of reaching a height > 10m within 10 years should be planted. Planting of the belt of trees shall be carried out as advance works ahead of other site formation and building works.	Contractor / Developer	Southern perimeter of Project Site	Immediately on completion of Site Formation Works	EIAO
	OM3 - Maximise soft landscape and amenity water bodies in residential areas of the development. Approximately 750 trees of Heavy Standard size should be planted. Where space permits, roadside berms should be created. Street trees should be of species that reach a mature height of no less than 15m.	Developer / Detailed Designer	Across Project Site	Before Day 1 of Opening	EIAO
	OM4 - Maximise wetland creation consistent with achieving other parameters. Minimum 4.74 ha will be provided. Implementation of the wetland shall be carried out as advance works.	Developer	Wetland areas, other than wetland purely for visual amenity.	Before Day 1 of Opening	EIAO
	OM5 - Use appropriate (visually unobtrusive and non-reflective) building materials and colours in built structures.	Developer / Detailed Designer	Across Project Site	Before Day 1 of Opening	EIAO
	OM6 - During detailed design, refine building layout to create a min 10m wider gap between buildings at Wo Shang Wai pond and also two min 10m wide gaps in the row of buildings adjacent to Royal Palms.	Developer / Detailed Designer	Across Project Site	Before Day 1 of Opening	EIAO
	OM7 - Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the rural context. Lighting units should be directional and minimise unnecessary light spill.	Developer / Detailed Designer	Across Project Site	Before Day 1 of Opening	EIAO

ANNEX B

Sample Environmental Monitoring Data Recording Sheets

ANNEX B

Data Sheet for 24-hr TSP Monitoring

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time	Start (hour)	
Meter Reading	Stop (hour)	
Total Sampling Time (min.)		
Weather Conditions		Fine / Sunny / Cloudy / Rainy
Site Conditions		
Initial Flow Rate, Qsi	Pi (hpa)	
	Ti (°C)	
	Hi (cfm)	
	Qsi (Std. m ³)	
Final Flow Rate, Qsf	Pf (hpa)	
	Tf (°C)	
	Hf (cfm)	
	Qsf (Std. m ³)	
Average Flow Rate (Std.m ³)		
Total Volume (Std.m ³)		
Filter Identification No.		
Initial Wt. of Filter (g)		
Final wt. of Filter (g)		
Measured TSP Level (µg/m ³)		
Observations / Remarks		

Name & Designation

Signature

Date

Field Operator:

Checked by:

Data Sheet for 1-hr TSP Monitoring

Monitoring Location				
Details of Location				
Sampler Identification				
Date of Sampling				
Time of Sampling		1	2	3
Elapsed-time	Start Time			
Meter Reading	End Time			
Total Sampling Time (min.)				
Measured TSP Level ($\mu\text{g}/\text{m}^3$)				
Weather Conditions		Fine / Sunny / Cloudy / Rainy		
Site Conditions				
Observations / Remarks				

Name & Designation

Signature

Date

Record by:

Checked by:

Noise Monitoring Field Record Sheet

Monitoring Location							
Details of Location							
Date of Monitoring							
Measurement Start Time (hh:mm)							
Measurement Time Length (min.)							
Weather Conditions	Fine / Sunny / Cloudy / Rainy						
Wind Speed (m/s)							
Noise Meter Model/Identification							
Calibrator Model/Identification							
Calibration Before Measurement (dB(A))							
Calibration After Measurement (dB(A))							
Measurement Result	5min	5min	5min	5min	5min	5min	30min
L ₉₀ (dB(A))							
L ₁₀ (dB(A))							
L _{eq} (dB(A))							
Major Construction Noise Source(s) During Monitoring							
Other Noise Source(s) During Monitoring							
Remarks							

Name & Designation

Signature

Date

Record by:

Checked by:

Water Quality Monitoring Data Record Sheet

Location				
Date				
Start Time (hh:mm)				
Weather				
Sea Conditions				
Tidal Mode				
Water Depth (m)				
Monitoring Depth		Surface	Middle	Bottom
Salinity				
Temperature				
DO Saturation				
DO				
Turbidity				
SS Sample Identification				
SS	(mg/l)			
	<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.

ANNEX C

Complaint Log

ANNEX C

COMPLAINT LOG

Log Ref.	Date / Location	Complainant / Date of Contract	Details of Complaint	Investigation / Mitigation Action	File Closed

Signed by Environmental Team Leader : _____ Date : _____

ANNEX D

Sample Interim Notification of Environmental Quality Limit Exceedances

ANNEX D

**Sample Template for Interim Notifications of
Environmental Quality Limits Exceedances**

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

Location Plan

Prepared by:

Designation:

Signature:

Date:

