RAMBOLL ENVIRON

Ref.: HYDHZMBEEM00_0_6020L.17

21 November 2017

By Fax (3468 2076) and By Post

AECOM Asia Co. Ltd.
The PRE's Office
5 Ying Hei Road, Tung Chung, Lantau
Hong Kong

Attention: Mr. Malcolm Sage

Dear Sir,

Re: Agreement No. CE 48/2011 (EP)
Environmental Project Office for the
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing Facilities, and Tuen Mun-Chek Lap Kok Link – Investigation

Contract No. HY/2014/05 – HZMB HKBCF – Remaining Ancillary Buildings and Facilities
Contract Specific EM&A Manual (Rev. 4)

Reference is made to the Environmental Team's submission of Contract Specific EM&A Manual (Rev. 4) certified by the ET Leader (ET's ref.: "5140819/18.30/OC043/KC/RL" dated 21 November 2017) and provided to us via e-mail on 21 November 2017.

We are pleased to inform you that we have no adverse comment on the captioned plan. We write to verify the captioned submission in accordance with Condition 1.9 of the Environmental Permit No. EP-353/2009/K.

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

Yours faithfully,
For and on behalf of
Ramboll Environ Hong Kong Limited

Raymond Dai
Independent Environmental Checker

c.c.	HyD	Mr. Vico Cheung	(By Fax: 3188 6614)
	HyD	Mr. Ken Woo	(By Fax: 3188 6614)
	ATKINS	Mr. Keith Chau	(By Fax: 2890 6343)
	LCWJV	Mr. Iain Hubert	(By Fax: 3621 0180)

Internal: DY, YH, ENPO Site

Q:\Projects\HYDHZMBEEM00\02_Proj_Mgt\02_Corr\HYDHZMBEEM00_0_6020L.17.doc

Ramboll Environ Hong Kong Limited 英環香港有限公司
Rm 2403, 24/F., Jubilee Centre, 18 Fenwick Street, Wanchai, Hong Kong Tel: 852.3465 2888 Fax: 852.3465 2899
www.Ramboll-Environ.com

ATKINS
Member of the SNC-Lavalin Group

香港九龍尖沙咀海港城
九倉電訊中心十三樓
13/F Wharf T&T Centre
Harbour City Tsim Sha Tsui
Kowloon Hong Kong

電話 Tel (852) 2972 1000
傳真 Fax (852) 2890 6343

info.hk@atkinsglobal.com
www.atkinsglobal.com

Your ref.
Our ref. 5140819/18.30/OC043/KC/RL

Date: 21 November 2017

By Post and e-mail (yk.wu@lcwjv.com)

Leighton – Chun Wo Joint Venture
39/F Sun Hung Kai Centre
30 Harbour Road
Hong Kong

Attn: Mr. Wu Yun Kau

Dear Mr. Wu,

Contract No. HY/2014/05
Hong Kong – Zhuhai – Macao Bridge
Hong Kong Boundary Crossing Facilities – Remaining Ancillary Buildings and Facilities
Contract Specific Environmental Monitoring and Audit (EM&A) Manual (Rev.4)

In accordance with Clause 25.29 in part 25 of the Particular Specification of this contract, we are pleased to submit the certified Contract Specific Environmental Monitoring and Audit (EM&A) Manual Rev. 4 dated 14 November 2017 for your onward submission to the Engineer and ENPO/IEC for approval.

Yours faithfully,
for and on behalf of
Atkins China Limited

Keith CHAU
Environmental Team Leader

Encl.
1. Contract Specific Environmental Monitoring and Audit (EM&A) Manual (Rev. 4) dated 14 November 2017 (hard copy)

cc.
1. AECOM – Mr. Malcolm Sage (By Fax.: 3468 2076) – w/o Encl.
2. ENPO/IEC – Mr. Raymond Dai & Mr. Y.H. Hui (By Fax.: 3465 2899) –w/o Encl.

Leighton - Chun Wo
Joint Venture

Contract No. HY/2014/05

Hong Kong – Zhuhai – Macao Bridge

Hong Kong Boundary Crossing Facilities – Remaining Ancillary Buildings and Facilities

Contract Specific Environmental Monitoring and Audit (EM&A) Manual

(Rev.4)

Reviewed by:

Stephen Tsang
Environmental Officer

Date ***14 November 2017***

Approved by:

Eric Wu
Project Manager

Date ***14 November 2017***

Certified by:

Keith Chau
Environmental Team Leader

Date ***14 November 2017***

Contents

Figures

Appendices

1. INTRODUCTION

1.1 Background

1.1.1 Not applicable.

Hong Kong Link Road

1.1.2 Not applicable.

1.1.3 Not applicable.

1.1.4 Not applicable.

Hong Kong Boundary Crossing Facilities

1.1.5 An application (No ESB-183/2008) for an Environmental Impact Assessment (EIA) Study Brief under Section 5(1) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by Highways Department (the Project Proponent) on 12 March 2008 with a Project Profile (No. PP-346/2008) for the Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities (the Project). EPD issued an EIA Study Brief (No: ESB-183/2008) on April 2008 to the Project Proponent to carry out an EIA study.

1.1.6 Ove Arup & Partners Hong Kong Limited (Arup) has been commissioned by the Highways Department to carry out the investigation and preliminary design study for the Project as well as an EIA according to the EIAO for identification and evaluation of the environmental impacts and the mitigation measures required.

1.1.7 Not applicable.

1.1.8A This Contract Specific Environmental Monitoring and Audit (EM&A) Manual is prepared for Contract No. HY/2014/05 Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities – Remaining Ancillary Buildings and Facilities (includes the construction works of Contract No. HY/2013/06 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Automatic vehicle Clearance Support System and Contract No. HY/2014/04 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Gantry Type X-ray Vehicle Inspection System within Contract No. HY/2014/05 works area) (hereafter referred to as "the Contract") for the Highways Department of Hong Kong Special Administrative Region (HKSAR). Contract No. HY/2014/05 was awarded to Leighton – Chun Wo Joint Venture (construction works of Contract No. HY/2013/06 was awarded to ATAL technologies Limited and Contract No. HY/2014/04 was awarded to Rapiscan System Pte Ltd within Contract No. HY/2014/05 works area) (hereafter referred to as "the Contractor") and Atkins China Limited was appointed as the Environmental Team (ET) by the Contractor.

1.1.8B Contract No. HY/2014/05 (includes the construction works of Contract No. HY/2013/06 and Contract No. HY/2014/04 within Contract No. HY/2014/05 works area) is part of Hong Kong – Zhuhai – Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities (HKBCF) which is "Designated Projects", under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499). An Environmental Impact Assessment (EIA) Report together with an EM&A Manual (hereafter referred to as approved EM&A Manual) (Register No. AEIAR-145/2009) was prepared for the Project and approved by Environmental Protection Department (EPD). These documents are available through the EIAO Register. The construction works of the Contract No. HY/2014/05 commenced on 29 February 2016 while the construction works of the Contract No. HY/2013/06 and Contract No. HY/2014/04 within Contract No. HY/2014/05 works area commenced on 3 January 2017 and 13 February 2017 respectively.

1.1.8C This Contract Specific EM&A Manual is to outline the monitoring and audit programme to be undertaken during the course of the construction works and provide systematic procedures for monitoring, auditing and minimization of the environmental impacts associated with the constriction. The site area of the Contract is shown in **Figure 1A**.

1.2 Purposes of this Manual

1.2.1 The purposes of this EM&A Manual are to:

- guide the set-up of an EM&A programme to ensure compliance with the EIA recommendations;
- specify the requirements for monitoring equipment;
- propose environmental monitoring points, monitoring frequency etc.;
- propose Action/Limit Level;
- propose Event/Action Plan; and
- assess the effectiveness of the recommended mitigation measures.

1.2.2 This Manual outlines the monitoring and audit programme for the construction of the Contract and provide systematic procedures for monitoring, auditing and minimising environmental impacts.

1.2.3 Hong Kong environmental regulations and the Hong Kong Planning Standards and Guidelines (HKPSG) have served as environmental standards and guidelines in the preparation of this Manual. In addition, this Contract Specific EM&A Manual has been prepared in accordance with the requirements stipulated in Annex 21 of the Technical Memorandum on the EIA Process (TM-EIAO).

1.2.4 This Manual contains of the following information:

- Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET), and the Independent Environmental Checker (IEC) under the context of the EM&A;
- Role of the Environmental Protection Office (ENPO);
- Project organization for the EM&A works;
- Programming of construction activities for the Contract;
- The basis for, and description of the broad approach underlying the EM&A programme;
- Details of the methodologies to be adopted, including all laboratories and analytical procedures, and details on quality assurance and quality control programme;
- The rationale on which the environmental monitoring data will be evaluated and interpreted;
- Definition of Action and Limit levels;
- Establishment of Event and Action plans;
- Requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints;
- Requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures; and
- Requirements for reviewing the EIA predictions and the effectiveness of mitigations measures, environmental management system and the EM&A programme.

1.2.5 For the purpose of this manual, the ER shall refer to the Engineer as defined in the Construction Contract, in cases where the Engineer's powers have been delegated to the ER, in accordance with the Construction Contract. The ET Leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the environmental monitoring and audit requirements.

2. PROJECT DESCRIPTION

2.1 Project Description

Hong Kong Link Road

2.1.1 Not applicable.

Hong Kong Boundary Crossing Facilities

2.1.2A The proposed works under this Contract comprise the following:

For Contract No. HY/2014/05

(i) Construction of the following ancillary buildings and facilities including architectural and builder works, structural steel canopy, reinforced concrete frames, foundations, curtain wall façade, building services and electrical and mechanical works:

- Public Toilets at Vehicle Clearance Plaza (VCP);
- Customs and Excise Department (C&ED) Dangerous Good Store (Building 021);
- Customs Detective Dog Base Building (Building 022);
- C&ED Outbound Cargo Examination Building and Examination Platform (Building 023);
- Inbound Private Car Annexure (Building 025);
- Outbound Private Car Annexure (Building 032);
- E&M maintenance Building (Building 044);
- Highways Depot & Administration Building (Building 045);
- Outbound X-ray Building (Building 053);
- Outbound X-ray Scan Tunnel (Building 058); and
- Inbound X-ray Scan Tunnel (Building 059).

(ii) Construction of civil provisions, cable containment and power supply for the following systems:

- Automatic Vehicle Clearance Support System (AVCSS) installed by Contract No. HY/2013/06; and
- Gantry Type X-ray Vehicle Inspection System installed by Contract No. HY/2014/04.

(iii) Supply and installation of Mobile X-ray Vehicle Inspection System and other standalone equipment;

(iv) Construction of minor civil engineering works at the periphery of buildings;

(v) Construction of minor Landscape hardworks and softworks; and

(vi) Other works which are shown on Drawings or specified in the Specification or which may be ordered in accordance with the Contract.

For Contract No. HY/2013/06 within Contract No. HY/2014/05 works area.

(i) The Automatic Vehicle Clearance Support System amid to increasing traffic flow for Hong Kong-Zhuhai-Bridge Hong Kong Boundary Crossing Facilities;

(ii) Responsible for designs and develops a set of tailor-made computer monitoring and control systems to for daily security operation; and

(iii) The Clearance Workstations at 72 vehicle clearance kiosks, Customs and Excise's

inbound and outbound traffic control centers as well as a Vehicle Tracking System.

For Contract No. HY/2014/04 within Contract No. HY/2014/05 works area

(i) The Gantry Type X-ray Vehicle Inspection System (GXRVIS) aims to provide an integrated, innovative, efficient and effective vehicle inspection system at the inbound and outbound boundary control points of Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) for supporting the operations of Customs & Excise Department (C&ED);

(ii) Design, supply, delivery to HKBCF, installation, test and commissioning and maintenance of two sets of Gantry Type X-ray Vehicle Inspection System and all related components necessary for the complete operation of the system; and

(iii) Design, supply, install, test, commission and maintain of the Radioactive Threat Detection Systems integrated into the Gantry Type X-ray Vehicle Inspection Systems.

2.2 Implementation Programme

2.2.1 Not applicable.

2.2.2 **Appendix A** illustrates the tentative construction programme for the Contract. All the key construction activities are shown with the tentative dates for commencement and completion.

2.2.3 Detailed EIA assessments have been conducted and presented in the EIA report. All necessary mitigation measures have been identified and recommended. The Environmental Mitigation Implementation Schedule (EMIS) is given in **Appendix B**. It specifies the extent, locations, time frame and responsibilities for the implementation of the environmental mitigation measures identified.

2.3 Concurrent Projects During Construction Phase

2.3.1 Not applicable.

2.3.2 Not applicable.

2.3.3 Not applicable.

2.3.4A The advance works of Tuen Mun Check Lap Kok Link (TMCLKL), i.e. reclamation works of the southern landfall of the TMCLKL sub-sea tunnel commenced in late 2011. The commission date of southern/northern connection of the TMCLKL is under review. The Construction of Hong Kong Link Road (HKLR) commenced in Year 2012 and the commission date is under review.

2.3.4B The Main Bridge of the HZMB within the Guangdong water would also be concurrent with the construction of HKBCF and southern landfall of TMCLKL. The commission date is also under review.

2.3.4C Another concurrent project during the construction of HKBCF is the 72 ha reclamation for Lantau Logistics Park. This has been considered as a concurrent project in the EIA.

3. PROJECT ORGANISATION

3.1 Project Organisation

3.1.1 The proposed project organization and lines of communication with respect to environmental protection works are shown in **Appendix C**.

3.1.2 The leader of the ET shall be an independent party from the Contractor and has relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the Engineer's Representative (ER) and EPD.

3.1.3 The duties and responsibilities of respective parties are:

3.1.3.1 **The Contractor**

The duties and responsibilities for the Contractor are:

- Employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of environmental monitoring and audit;
- Provide assistance to ET, IEC and ENPO in carrying out monitoring and auditing;
- Provide site and works information upon the request of ET, IEC or ENPO within two working days of such request;
- Participate in site inspections undertaken by the ET, as required, and undertake any corrections as instructed by the Engineer;
- 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;
- Adhere to the procedures for environmental complaint investigation as set out in Section 15.3 of this EM&A Manual; and
- Adhere to the agreed procedures for carrying out complaint investigation.

3.1.3.2 **Environmental Team (ET)**

The ET should conduct the EM&A programme and ensure the Contractor is adhering to the Assignment's environmental performance requirements throughout the construction stage.

The ET should be led and managed by an ET leader, who is independent from the Contractor. The ET Leader shall hold relevant professional qualifications, and have at least 7 years of experience in conducting EM&A for infrastructure projects, subject to the approval of the ER and the EPD.

The duties and responsibilities for the ET are:

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyse the environmental monitoring and audit data and review the success of EM&A programme to confirm the adequacy of mitigation measures implemented and the validity of EIA predictions, and to identify any adverse environmental impacts arising;
- Conduct environmental investigation and submit the ET Leader certified investigation report to the Contractor, IEC, ENPO and ER upon receive of environmental enquiry and/or complaint;
- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental

mitigation, and take proactive actions to pre-empt problems;

- Audit and prepare audit reports on the environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to the IEC, ENPO, Contractor, the ER and EPD or its delegated representative;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- Undertake regular on-site audits/inspections and report to the Contractor, IEC, ENPO and the ER of any potential non-compliance; and
- Follow up and close out non-compliance actions.

3.1.3.3 **Engineer or Engineer's Representative (ER)**

The Engineer is responsible for supervising the construction works and ensuring the works carried out by the Contractor is in accordance with the specification and contractual requirements. The duties and responsibilities of the Engineer in relation to EM&A programme are as follows:

- Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Assists the IEC and ENPO to audit the results of the EM&A works carried out by the ET; and
- Comply with the agreed Event and Action Plan in the event of any exceedance.

3.1.3.4 **Independent Environmental Checker (IEC)**

The IEC should advise the ER on the environmental issues related to the Assignment. The duties and responsibilities of the IEC are:

- Review the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Report the audit results to the ER and EPD in parallel;
- Review the EM&A reports (monthly and quarterly summary reports) submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary; and
- Report the findings of site inspections and other environmental performance reviews to ER and EPD.

3.1.3.5 **Environmental Protection Office (ENPO)**

Notwithstanding the above, given that the TMCLKL, HKBCF and HKLR will be constructed concurrently, an ENPO or equivalent to oversee the cumulative construction projects in North Lantau area will be established by the Project Proponent. The responsibility of the ENPO would be similar to that of the IEC but should also include:

- Coordinate the monitoring and auditing works for all the on-going projects in the area

in order to identify possible sources/causes of exceedances and recommend suitable remedial actions where appropriate;

- Review cumulative impacts including possible sources/causes of exceedance and recommending suitable remedial actions;
- Liaise with the mainland project teams for HZMB Main Section to identify and assess any cross-boundary cumulative impacts in order to establish suitable remedial actions where necessary; and
- Coordinate the assessment and response to complaints/enquires from locals, green groups, district councils or the public at large.

The exact responsibilities and organization of the ENPO have been defined by the Project Proponent in accordance with the relevant Environmental Permits.

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

3.1.5 The ET Leader shall have at least 7 years of experience in conducting EM&A for infrastructure projects. The qualification shall be vetted by the ER and the IEC.

4. ENVIRONMENTAL SUBMISSION

4.1 Introduction

4.1.1 The Contractor shall prepare the Environmental Management Plan (including a Waste Management Plan), Construction Method Statement and obtain approval from ER, IEC and relevant authorities to encompass the recommended environmental protection / mitigation measures with respect to their latest construction methodology and programme. All environmental submission shall be certified by the ET leader before seeking the IEC's verification.

4.2 Environmental Management Plan

4.2.1 A systematic Environmental Management Plan (EMP) shall be set up by the Contractor to ensure effective implementation of the mitigation measures, monitoring and remedial requirements presented in the EIA, EM&A and EMIS. The ER and the IEC will audit the implementation status against the EMP and advise the necessary remedial actions required. These remedial actions shall be enforced by the ER through contractual means.

4.2.2 The EMP will define in details how the Contractor (together with its sub-contractors) implements the recommended mitigation measures in order to achieve the environmental performance defined in the Hong Kong environmental legislation and the EIA documentation.

4.2.3 The review of on-site environmental performance shall be undertaken by ER and IEC through a systematic checklist and audit once the construction commences. The environmental performance review programme comprises a regular assessment on the effectiveness of the EMP. Reference should be made to Environment, Transport and Works Bureau Technical Circular (Works) No. 19/2005 "Environmental Management on Construction Sites" or its latest versions, and any other relevant Technical Circulars.

4.3 Waste Management Plan

4.3.1 As part of the EMP, the Contractor shall include a Waste Management Plan (WMP) for the construction works under this Contract and submit to the ER, IEC and EPD for approval. Where waste generation is unavoidable, the opportunities for recycling or reusing should be maximised. If wastes cannot be recycled, recommendations for appropriate disposal routes should be provided in the WMP. A method statement for stockpiling and transportation of the excavated materials and other construction wastes should also be included in the WMP and approved before the commencement of construction. All mitigation measures arising from the approved WMP shall be fully implemented.

4.3.2 For the purpose of enhancing the management of Construction and Demolition (C&D) materials including rock, and minimising its generation at source, construction would be undertaken in accordance with the Environment, Transport and Works Bureau Technical Circular (Works) No. 33/2002 - Management of Construction and Demolition Material Including Rock, or its latest versions. The management measures stipulated in the Technical Circular should be incorporated into the WMP.

4.4 Construction Method Statement

4.4.1 In case the Contractor would like to adopt alternative construction methods or implementation schedules, it is required to submit details of methodology and equipment to the ER for approval before the work commences. Any changes in construction method shall be reflected in a revised EMP or the Contractor will be required to demonstrate the manner in which the existing EMP should accommodate the proposed changes. The Contractor may need to apply for a

Further Environmental Permit (FEP) from EPD before commencement of any construction activities.

5. AIR QUALITY

5.1 Air Quality Parameters

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

5.1.2 1-hour and 24-hour TSP levels should be measured to indicate the impacts of construction dust on air quality. The 24-hour 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 IEC, 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.

5.1.3 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, and any other local atmospheric factors affecting or affected by site conditions, etc., shall be recorded down in detail. A sample data sheet is shown in **Appendix D**.

5.2 Monitoring Equipment

5.2.1 High volume samplers (HVSs) complying with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:

a) 0.6 - 1.7 m^3 per minute adjustable flow range;

b) equipped with a timing / control device with +/- 5 minutes accuracy for 24 hours operation;

c) installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;

d) capable of providing a minimum exposed area of 406 cm^2;

e) flow control accuracy: +/- 2.5% deviation over 24-hour sampling period;

f) equipped with a shelter to protect the filter and sampler;

g) incorporated with an electronic mass flow rate controller or other equivalent devices;

h) equipped with a flow recorder for continuous monitoring;

i) provided with a peaked roof inlet;

j) incorporated with a manometer;

k) able to hold and seal the filter paper to the sampler housing at horizontal position;

l) easily changeable filter; and

m) capable of operating continuously for a 24-hour period.

5.2.2 The ET is responsible for the provision, installation, operation, maintenance, dismantling of the monitoring equipment. They shall ensure that sufficient number of HVSs with an appropriate calibration kit is available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc., shall be clearly labeled.

5.2.3 Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the

internationally recognized primary standard and be calibrated annually. The ET shall provide the relevant calibration data and laboratory calibration certificate which should be properly document for future reference by the IEC and other concerned parties. All the data should be converted into standard temperature and pressure condition.

5.2.4 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded in the data sheet as mentioned in **Appendix D.**

5.2.5A If the ET leader proposes alternative dust monitoring equipment / methodology (e.g. use a direct reading dust meter to measure 1-hour TSP levels) after the approval of this EM&A manual, he shall seek approval from the IEC by submitting sufficient information to the IEC indicating that the instrument is capable of achieving a comparable result to the HVS. The 1-hour sampling shall also be determined periodically by the HVS to check the validity and accuracy of the results measured by direct reading method, and the checking result shall also submitted to the IEC for approval.

5.2.6 Wind data monitoring equipment shall also be provided and set up set up for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

a) The wind sensors should be installed 10 m above ground so that they are clear of obstructions or turbulence caused by buildings.

b) The wind data should be captured by a data logger. The data shall be downloaded for analysis at least once a month.

c) The wind data monitoring equipment should be re-calibrated at least once every six months.

d) Wind direction should be divided into 16 sectors of 22.5 degrees each.

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

5.3 Laboratory Measurement / Analysis

5.3.1 A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be the Hong Kong Laboratory Accreditation Scheme (HOKLAS) board accredited.

5.3.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER and the measurement procedures shall be witnessed by the IEC. Any measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and IEC. IEC shall regularly audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the ER with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his reference.

5.3.3 Filter paper of size 8" x 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hours and be pre-weighed before use for the sampling.

5.3.4 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with

readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

5.3.5 All the collected samples shall be kept in a good condition for 6 months before disposal.

5.4 Monitoring Locations

5.4.1 **Figure 2A** shows the locations of the proposed dust monitoring station for the Contract. 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 approval from ER and agreement from the IEC.

Table 5.1 Construction Dust Monitoring Locations

ID	Location Description
AMS 6(1)	Dragonair/CNAC (Group) Building
AMS 7(1)	Hong Kong SkyCity Marriott Hotel

Remarks:
(1) The ET of this Contract should conduct impact air quality monitoring at the AMS listed in the table as part of EM&A programme according to the latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project. The ET of the Contract shall communicate and share the monitoring data to the ET(s) of other works contracts if the air quality monitoring station(s) is/are as part of EM&A programme.

5.4.2A If alternative monitoring locations are proposed due to the situation mentioned in Section 5.4.1, the proposed site should be selected based on the following principles:

a) Situating at the site boundary or at locations close to the major dust emitting source(s);

b) Monitoring as close as possible to the sensitive receptor(s);

c) Taking into account the prevailing meteorological conditions; and

d) Assuring minimal disturbance to the occupants and working under a safe condition during monitoring.

5.4.3 The ET shall agree with the ER in consultation with the IEC on the position of the HVS for the installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:

a) a horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;

b) no two samplers should be placed less than 2 meters apart;

c) 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;

d) a minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers;

e) a minimum of 2 meters separation from any supporting structure, measured horizontally is required;

f) no furnace or incinerator flue is nearby;

g) airflow around the sampler is unrestricted;

h) the sampler is more than 20 meters from the dripline;

i) any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;

j) permission must be obtained to set up the samplers and to obtain access to the

monitoring stations; and

k) a secured supply of electricity is needed to operate the samplers.

5.4.4 The ENPO may, depending on site conditions and monitoring results, decide whether additional monitoring locations shall be included or any monitoring locations could be removed/ relocated during any stage of the construction phase.

5.5 Baseline Monitoring for Fugitive Dust

5.5.1 Baseline monitoring shall be carried out at all of the designated monitoring locations (see **Table 5.1**) for at least 14 consecutive days prior to the commissioning of major construction works to obtain daily 24-hour TSP samples. The selected baseline monitoring stations should reflect baseline conditions at the impact stations. One-hour sampling should also be done at least 3 times per day while the highest dust impact is expected.

5.5.2 During the baseline monitoring, there should not be any major construction or dust generation activities in the vicinity of the monitoring stations. Before commencing baseline monitoring, the ET shall inform the IEC of the baseline monitoring programme such that, if required, the ER can conduct on-site audit to ensure accuracy of the baseline monitoring results.

5.5.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations, the ET Leader shall carry out the monitoring at alternative locations that 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 the IEC.

5.5.4 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 to ER for approval.

5.5.5 Ambient conditions may vary seasonally and shall be reviewed once every three months. When the ambient conditions have changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring should be at times when the Contractor's activities are not generating dust, at least in the proximity of the monitoring stations. Should change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, should be revised. The revised baseline levels and air quality criteria should be agreed with the IEC and EPD.

5.5.6A It is noted that baseline monitoring was undertaken for the Project between September and November 2011 under Agreement CE No. 35/2011 (EP) Baseline Environmental monitoring for Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects – Investigation prior to the construction of the Project. The baseline monitoring results obtained under Agreement CE No. 35/2011(EP) will be adopted for this Contract.

5.6 Impact Monitoring for Fugitive Dust

5.6.1 The ET shall carry out impact monitoring during the entire construction period. For regular impact monitoring, the sampling frequency of at least once in every 6 days, shall be strictly observed at all the monitoring stations for 24-hour TSP monitoring. For 1-hour TSP monitoring, the sampling frequency of at least 3 times in every 6 days should be undertaken when the highest dust impact occurs. Before commencing impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the monitoring results.

5.6.2 The specific time to start and stop the 24-hour TSP monitoring shall be clearly defined for each location and be strictly followed by the ET.

5.6.3 In case of non-compliance with the air quality criteria, more frequent monitoring, as specified in the Action Plan in the following section, shall be conducted within the specified timeframe after the result is obtained. This additional monitoring shall be continued until

the excessive dust emission or the deterioration in air quality is rectified, and agreed with the ER and the IEC.

5.7 Action and Limit Levels

5.7.1 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. **Table 5.2** shows the air quality criteria, namely Action and Limit levels to be used.

Table 5.2 Action and Limit Levels for Air Quality

Parameter	Action Level	Limit Level
24-hour TSP Level in µg/m^3	For baseline level ≤ 200 µg/m^3, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 200 µg/m^3, Action level = Limit Level For Monitoring station AMS6 Action Level =(66.4*1.3+260)/2 = 173 µg/m^3 For Monitoring station AMS7 Action Level =(82.3*1.3+260)/2 = 183 µg/m^3	260 µg/m^3
1-hour TSP Level in µg/m^3	For baseline level ≤ 384 µg/m^3, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 384 µg/m^3, Action level = Limit Level For Monitoring station AMS6 Action Level =(169.2*1.3+500)/2 = 360 µg/m^3 For Monitoring station AMS7 Action Level =(184.2*1.3+500)/2 = 370 µg/m^3	500 µg/m^3

5.8 Event and Action Plan

5.8.1 Should non- compliance of the air quality criteria occur, actions in accordance with the Action Plan in **Table 5.3** shall be carried out.

Table 5.3 Event/Action Plan for Air Quality

EVENT	ACTION			
	ET	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	IEC	ER	CONTRACTOR
ACTION LEVEL				
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurement s to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify 3. Contractor; 4. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor 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.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	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.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
LIMIT LEVEL				
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

5.9 Mitigation Measures

5.9.1 The approved EIA Report has recommended dust control measures including 8 times of watering per day. Good site practices such as road surface paving, dust enclosures, wheel wash facilities would be implemented to reduce the generation of dust.

5.9.2 All the proposed mitigation measures are summarized in the EMIS in **Appendix B**.

5.10A Reporting of Monitoring Data to ENPO

5.10.1A The Assignment, which involves multiple construction contracts, would be constructed concurrently with other major infrastructures such as the HKLR and TM-CLKL. These interface projects will be overviewed by the ENPO. The ENPO will also oversee and coordinate the cumulative environmental issues arising from the concurrent projects.

5.10.2A To facilitate the ENPO to evaluate environmental impacts and investigate complaints, the ET Leaders shall provide the impact air quality monitoring results within one week after the

monitoring event. If the 1-hr TSP is measured by direct reading, the results shall be submitted to ENPO in the next working day. The ET Leader shall follow ENPO's requirements on the data submission format and procedure as per the current ET's practice and enable rapid response by all concerned parties.

6. NOISE

6.1 Noise Quality Parameters

6.1.1 Construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq, 30\ mins}$ shall be used as the monitoring parameter for the time between 0700 and 1900 hours on normal weekdays. For all other time periods, $L_{eq, 5\ mins}$ shall be employed for comparison with the Noise Control Ordinance (NCO) criteria.

6.1.2 As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

6.2 Monitoring Equipment

6.2.1 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement, the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.

6.2.2 Noise measurements should be made in accordance with standard acoustical principles and practices in relation to weather conditions.

6.2.3 The ET is responsible for the provision, installation, operation, maintenance and dismantle 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 labeled.

6.2.4A Due to rejection from Ho Yu College (NMS3) for setting up a noise monitoring station at their school, an alternative location at site boundary of the site office area at Works Area WA2 (NMS3B) was proposed and approved by ER. Same baseline and Action and Limit Levels for noise, as derived from the baseline monitoring data recorded at Ho Yu College, will be adopted for this alternative noise monitoring location.

6.3 Monitoring Locations

6.3.1 The location of construction noise monitoring stations for the Contract are presented in **Table 6.1** and shown in **Figure 2B**.

Table 6.1 Proposed Airborne Construction Noise Monitoring Locations

ID	Location Description
NMS2(1)	Seaview Crescent
NMS3B(1)(2)	Site Boundary of Site Office Area at Works Area WA2

Remarks:

(1) The ET of this Contract should conduct impact noise monitoring at the NMS listed in the table as part of EM&A programme according to the latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project. The ET of the Contract shall communicate and share the monitoring data to the ET(s) of other works contracts if the noise monitoring station(s) is/are as part of EM&A programme.

(2) The Action and Limit Levels for schools will be applied for this alternative monitoring location.

6.3.2 The ET shall select the monitoring location from the above table based on the locations of the construction activities and seek approval from ER and agreement from the IEC and EPD to the proposal. The monitoring location should be chosen based on the following criteria:

- at locations close to the major site activities which are likely to have noise impacts;
- close to the most affected existing noise sensitive receivers; and
- for monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance to the occupants during monitoring.

6.3.3 The monitoring station shall normally be at a point 1 m from the exterior of the sensitive receiver building facade and be at a position 1.2 m above the ground. If there is 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 +3 dB(A) shall be made to the free field measurements. The ET shall agree with the IEC on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same position.

6.3.4 The ENPO may, depending on site conditions and monitoring results, decide whether additional monitoring locations shall be included or any monitoring locations could be removed/ relocated during any stage of the construction phase.

6.4 Baseline Monitoring for Construction Noise

6.4.1 The ET shall carry out baseline 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_{eq}, L_{10} and L_{90} shall be carried out daily for a period of at least two weeks in a sample period of 5 minutes or 30 minutes between 07:00 and 19:00, and 5 minutes between 19:00 and 07:00. A schedule on the baseline monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.

6.4.2 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 to the ER for approval.

6.4.3A It is noted that baseline monitoring was undertaken for the Project between September and November 2011 under Agreement CE No. 35/2011 (EP) Baseline Environmental monitoring for Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects – Investigation prior to the construction of the Project. The baseline monitoring results obtained under Agreement CE No. 35/2011(EP) will be adopted for this Contract.

6.5 Impact Monitoring for Construction Noise

6.5.1 During normal construction working hour (07:00-19:00 Monday to Saturday), monitoring of $L_{eq,\ 30\ minutes}$ noise levels (as six consecutive $L_{eq,\ 5\ minutes}$ readings) shall be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM.

6.5.2 If a school exists near the construction activity, noise monitoring shall be carried out at the monitoring stations for the schools during the school examination periods. The ET Leader shall liaise with the school's personnel and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the Contract.

6.5.3 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan, 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.

6.5.4 A schedule on the compliance monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.

6.6 Event and Action Plan for Construction Noise

6.6.1 The Action and Limit Levels for construction noise are defined in **Table 6.2**. Should non-compliance of the criteria occur, actions in accordance with the Action Plan in **Table 6.3** shall be carried out.

Table 6.2 Action and Limit Levels for Construction Noise

Parameter	Action Level	Limit Level
07:00 – 19:00 hours on normal weekdays	When one documented complaint is received	75 dB(A)*

Note :
If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.
* Reduce to 70 dB(A) for schools and 65 dB(A) during school examination period.

Table 6.3 Event / Action Plan for Construction Noise Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC and Contractor; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Limit Level	1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

6.7 Mitigation Measures

6.7.1 The approved EIA Report has recommended construction noise control measures including the use of quiet plant and temporary noise barriers. All the proposed mitigation measures are summarised in the EMIS in **Appendix B**.

6.7.2 Not applicable.

6.7.3A The recommended noise control measures are summarized as follows:-

- Good site practices and noise management techniques;
- Use of site hoarding;
- Use of movable noise barrier and full enclosure for relatively static plant;
- Use of "quiet" plant and working methods;
- Sequencing operation of construction plant equipment; and
- Rescheduling to avoid noise construction works during school examination.

6.8A Reporting of Monitoring Data to ENPO

6.8.1A The Assignment, which involves multiple construction contracts, would be constructed concurrently with other major infrastructures such as the HKLR and TM-CLKL. These interface projects will be overviewed by the ENPO. The ENPO will also oversee and coordinate the cumulative environmental issues arising from the concurrent projects.

6.8.2A To facilitate the ENPO to evaluate environmental impacts and investigate complaints, the ET Leaders shall provide the impact noise monitoring results within one working day after the monitoring event. The ET Leader shall follow ENPO's requirement on the data submission format and procedure.

7. SEDIMENT QUALITY (NOT APPLICABLE)

8. WASTE MANAGEMENT

8.1 General

8.1.1 The quantity and timing of the generation of waste during the construction phase have been estimated. Measures including the opportunity for on-site sorting, reusing excavated materials for reclamation etc. are devised in the construction methodology to minimise the surplus materials to be disposed off-site. Proper disposal of chemical waste should be via a licensed waste collector.

8.1.2 All the proposed mitigation measures are stipulated in the approved EIA Report and summarized in the EMIS in **Appendix B**.

8.1.3 The types and quantities of waste that would be generated during the operational phase have been assessed. It is anticipated there would not be any insurmountable impacts during the operation phase. A trip-ticket system should be operated to monitor all movements of chemical wastes which will be collected by a licensed collector to a licensed facility for final treatment and disposal.

8.1.4 Recommendations have been made to ensure proper treatment and proper disposal of these wastes in the approved EIA Report and all the proposed mitigation measures are stipulated in the approved EIA Report are summarised in the EMIS in **Appendix B**.

8.1.5 EM&A requirements are required for waste management during the construction phase only and the effective management of waste arising during the construction phase will be monitored through the site audit programme. The aims of the waste audit are:

- to ensure the waste arising from the works are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner; and
- to encourage the reuse and recycling of material.

8.2 Waste EM&A Requirements

8.2.1 The Contractor shall be required to pay attention to the environmental standard and guidelines and carry out appropriate waste management and obtain the relevant licence/permits for waste disposal. The ET shall ensure that the Contractor has obtained from the appropriate authorities the necessary waste disposal permits or licences including:

- Chemical Waste Permits/licenses under the Waste Disposal Ordinance (Cap 354);
- Public Dumping Licence under the Land (Miscellaneous Provisions) Ordinance (Cap 28); and
- Effluent Discharge Licence under the Water Pollution Control Ordinance.

8.2.2 The Contractor shall refer to the relevant booklets issued by the DEP when applying for the licence/permit and the ET shall refer to these booklets for auditing purposes.

8.2.3 During the site inspections and the document review procedures, the ET shall pay special attention to the issues relating to waste management and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of Hong Kong. In addition to the site inspections, the ET shall review the documentation procedures prepared by the Waste Coordinator once a week to ensure proper records are being maintained and procedures undertaken in accordance with the WMP.

8.2.4 The Contractor's waste management practices should be audited with reference to the checklist detailed in **Table 8.1** below:

Table 8.1 Waste Management Checklist

Activities	Timing	Monitoring Frequency	If non-compliance, Action Required
All necessary waste disposal permits or licences have been obtained.	Before the commencement of demolition works	Once	Apply for the necessary permits/ licences prior to disposal of the waste. The ET shall ensure that corrective action has been taken.
Only licensed waste hauliers are used for waste collection.	Throughout the works	Weekly	The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to use a licensed waste haulier. The Contractor shall temporarily suspend waste collection of that particular waste until a licensed waste haulier is used. Corrective action shall be undertaken within 48 hours.
Records of quantities of wastes generated, recycled and disposed are properly kept. For demolition material/waste, the number of loads for each day shall be recorded (quantity of waste can then be estimated based on average truck load. Should landfill charging be implemented, the receipts of the charge could be used for estimating the quantity).	Throughout the works	Weekly	The Contractor shall estimate the missing data based on previous records and the activities carried out. The ET shall audit the results and forward to the ER and IEC for approval.
Wastes are removed from site in a timely manner. General refuse is collected on a daily basis.	Throughout the works	Weekly	The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to remove waste accordingly.
Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance.	Throughout the works	Weekly	The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to clean the storage area and/or cover the waste.
Different types of waste are segregated in different containers or skip to enhance recycling of material and proper disposal of waste.	Throughout the works	Weekly	The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to provide separate skips/ containers. The Contractor shall ensure the workers place the waste in the appropriate containers.
Chemical wastes are stored, handled and disposed of in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes, published by the EPD.	Throughout the works	Weekly	The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to rectify the problems immediately. Warning shall be given to the Contractor if corrective actions are not taken

Activities	Timing	Monitoring Frequency	If non-compliance, Action Required
			within 24 hrs and the Waste Control Group of the EPD shall be identified.
Demolition material/waste in dump trucks are properly covered before leaving the site.	Throughout the works	Weekly	The ET shall inform the ER and IEC of the non-compliance. The ER shall instruct the Contractor to comply. The Contractor shall prevent trucks shall leaving the site until the waste are properly covered.
Wastes are disposal of at licensed sites.	Throughout the works	Weekly	The ET shall inform the ER and IEC of the non-compliance. The ER shall warn the Contractor and instruct the Contractor to ensure the wastes are disposed of at the licensed sites. Should it involve chemical waste, the Waste Control Group of EPD shall be notified.

Note:
ET- Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

9. WATER QUALITY

9.1 Water Quality Parameters

9.1.1A This Contract does not involve marine works such as dredging and reclamation, only land-based construction works are anticipated. With proper implementation of recommended mitigation measures and with the implementation of regular site audit to ensure proper implementation of the mitigation measures and for compliance checking, no adverse water quality impact would be expected. No water quality monitoring will be undertaken for the Contract.

9.1.2 Prior to the commencement of the construction work, a detailed site drainage management plan should be submitted to EPD. The plan should cover measures to minimize all potential water quality impact arising from the surface runoffs of all the related constructions.

9.1.3 The guidelines outlined in the Practice Note for Professional Persons Environmental Consultative Committee (ProPECC), Construction Site Drainage (PN 1/94) should be adopted to control construction site runoff. Mitigation measures to minimise water quality impacts from construction site runoff and wastewater and sewage generated from construction activities are:

- Provision of site drainage systems over the entire construction site with sediment control facilities. Regular inspection and maintenance of the site drainage systems are required to ensure proper and efficient operation at all times.
- Sedimentation tanks or package treatment systems are required to treat the large amount of sediment-laden wastewater generated from foundation construction work, wheel washing, site runoff. Any construction activities that generate wastewater with high concentrations of suspended solid (SS) should also be collected to these facilities for proper treatment prior to disposal. Treated wastewater can be reused for vehicle washing, dust suppression and general cleaning.
- The construction programme should be properly planned to avoid soil excavation in rainy seasons. Exposed stockpiles of excavated soils or construction materials should be covered with tarpaulin or impervious sheets to avoid release of pollutants into the drainage channels.
- Sewage generated from site toilets and canteen should be collected using a temporary storage system. Chemical toilets should be provided at different locations for use by the workers on site. Licensed waste collectors should be employed for collection and disposal of the sewage. The drainage system for collection of wastewater generated from canteen, if any, should be equipped with grease trap capable of providing at least 20 minutes retention during peak flow.
- Wheel washing facilities should be installed at all site entrances/exits.
- An emergency plan should be developed by the contractors to deal with accidental spillage of chemicals.

9.1.4 Upon completion of the HKLR / HKBCF development, stormwater drainage systems would be completed to collect stormwater generated from the whole area including new roads. Sewage generated from the HKBCF development would be treated on site to fulfill effluent limit for discharge. Additional mitigation measures would not be required.

9.1.5 Not applicable.

9.1.6 Not applicable.

9.1.7 Not applicable.

9.1.8 Not applicable.

9.1.9 Not applicable.

9.2 Monitoring Equipment (Not applicable)

9.3 Laboratory Measurement/Analysis (Not applicable)

9.4 Monitoring Locations (Not applicable)

9.5 Baseline Monitoring for Water Quality (Not applicable)

9.6 Efficiency of Silt Curtain and Cage Curtain (Not applicable)

9.7 Impact Monitoring for Water Quality (Not applicable)

9.8 Post-Monitoring for Water Quality (Not applicable)

9.9 Impact Operational Phase Monitoring (Not applicable)

9.10 Event and Action Plan (Not applicable)

9.11 Mitigation Measures

9.11.1 The approved EIA Report has recommended construction and operational phase mitigation measures. All the prepared mitigation measures are summarized in the EMIS as shown in **Appendix B.**

`

10. ECOLOGY

10.1 Introduction

10.1.1A While the HKBCF reclamation works are under a separate design and construction consultancy, this Contract mainly includes the construction of the remaining ancillary buildings and facilities, the associated civil engineering works and landscape works, and supply, and installation of specialized equipment for HZMB HKBCF. No significant ecological impact would be resulted from this land-based construction assignment. The implementation of recommended mitigation measures during the construction phase of the Contract were presented in the following Section.

10.2 Ecological Mitigation Measures and Implementations

Marine Water Quality

10.2.1 Not applicable.

10.2.2 Not applicable.

10.2.3 Not applicable.

10.2.4A Good Site Practices: Effluent monitoring should be incorporated to make sure that the discharged effluent form construction sites meets the relevant effluent discharge guidelines.

10.2.5 Strict enforcement on No-dumping – To avoid degrading the Chinese White Dolphin Habitat, restrictions prohibiting dumping of rubbish, food, oil, or chemicals will be strictly enforced.

10.2.6 Site runoff control – For works on land, standard site runoff control measures will be established and strictly enforced to ensure that discharge of contaminated or silt- laden runoff into North Lantau waters is minimized.

10.2.7A Spill response plan – The main scope of work of the Contract does not include marine construction or vessel operation related to construction works. There is no works area adjacent to the seawall. In the event of uncontrollable large spillage on main site area to the marine environment, a spill response plan, with specific provisions for protection marine ecology and dolphins, will be formulated.

10.2.8 Not applicable.

Terrestrial Disturbance

10.2.9 The impact from this minor and short-term source can be reduced by good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time.

Sedimentation from Land-based Works Areas

10.2.10 Not applicable.

Marine Noise and Disturbance

1) Bored Piling

10.2.11 Not applicable.

10.2.12 Not applicable.

10.2.13 Not applicable.

2) Sheet Piling

10.2.14 Not applicable.

10.2.15 Not applicable.

3) Reclamation and Works Vessels

10.2.16 Not applicable.

10.2.17 Not applicable.

10.2.18 Not applicable.

Marine Traffic

10.2.19A This Contract does not involve any marine construction works, vessel operation or works adjacent to the seawall.

10.2.20 Not applicable.

10.2.21 Not applicable.

Road Surface Runoff

10.2.22 Silt grease traps should be deployed to prevent a direct input of road surface runoff to the marine water.

Chemical Spillage

10.2.23 A Maritime Oil Spill Response Plan (MOSRP) has been developed by Marine Department to deal with oil spill and their potential hazard to the Hong Kong waters. The main objective of the MOSRP is to ensure a timely and effective response to oil spillage and /or their potential treats in the Hong Kong waters.

10.2.24 Similar to the Shenzhen Western Corridor project, a contingency plan will be formulated to deal with the accidental event of the serious spillage of oil or other harmful chemicals. A contingency plan in this regard will be primarily for safety issues and water quality, but could also help to safeguard the dolphin population. Following the example of Shenzhen Western Corridor, it will be specified in the contingency plan that AFCD must be alerted by the Hong Kong Police Force or Fire Service Department in case an accident of spillage of chemical or oil is reported.

Precautionary/Enhancement Measures

10.2.25 Not applicable.

10.2.26 Not applicable.

10.2.27 Not applicable.

10.3 Monitoring and Audit for Ecology (Not applicable)

10.4 Monitoring Location (Not applicable)

10.5 Baseline Monitoring for Ecology (Not applicable)

10.6 Impact Monitoring for Ecology (Not applicable)

10.7 Post-construction Monitoring for Ecology (Not applicable)

10.8 Event and Action Plan (Not applicable)

11. FISHERIES

11.1 Summary

11.1.1 The approved EIA report identified and assessed the potential impacts related to fisheries and marine culture.

11.1.2A The Contract does not involve any marine works such as dredging and reclamation. No water quality monitoring works are required for the Contract.

11.1.3 As mentioned in the approved EIA Report, no further monitoring and audit for fisheries are required.

12. CULTURAL HERITAGE

12.1 Summary

12.1.1 The marine archaeology investigation has concluded that there is no underwater cultural heritage within the study area. No adverse impact on marine archaeological is anticipated. Hence, further investigation or mitigation measure is not required.

12.1.2 The Contract does not involve any marine works such as dredging and reclamation. It would not have any impacts on known built heritage and archaeological site. Mitigation measure is not required for built heritage and terrestrial archaeology.

13. HAZARD TO LIFE

13.1 Summary

13.1.1 The HKBCF is a newly reclaimed site. No blasting work will be required for the Contract. Therefore no explosives QRA is required and hence no mitigation measure is required.

14. LANDSCAPE & VISUAL IMPACT

14.1 Introduction

14.1.1 The EIA has recommended landscape and visual mitigation measures (refer to Section 14 of approved EIA Report) to be undertaken during both the construction and operation phases of the project. This section outlines the monitoring and audit of these measures.

14.2 Monitoring Details

14.2.1 The design, implementation and maintenance of landscape mitigation measures should be checked to ensure that any potential conflicts between the proposed landscape measures and any other works of the project would be resolved as early as practical without affecting the implementation of the mitigation measures.

Table 14.1 Monitoring Programme

Stage	Monitoring Task	Monitoring Report	Form of Approval	Frequency
Detailed Design	Checking of design works against the recommendations of the landscape and visual impact assessments within the EIA should be undertaken during detailed design phase, to ensure that they fulfill the intention of the mitigation measures. Any changes to the design, including design changes on site should also be checked.	Not Required	Not Required	At the end of the Detailed Design Phase
Construction	Checking of the Contractor's operations during the construction period.	Report on Contractor's compliance by ET*	Counter-signature of report by IEC	Bi-weekly
Establishment Works	Checking of the planting works during the 12-month Establishment Period after completion of the construction works.	Report on Contractor's compliance by ET*	Counter-signature of report by IEC	Every 2 months
Long Term Management (10 year)	Monitoring of the long-term management of the planting works in the period up to 10 years after completion of the construction works.	Report on compliance by ET* or Maintenance Agency as appropriate	Counter-signature of report by Management Agency	Annually

Notes:
* Environmental Team (ET) – employed by the Contractor

Detailed Design Phase

14.2.2 The mitigation measures, which are proposed in the EIA to mitigate the landscape and visual impacts, should be embodied into the detailed engineering design, landscape design drawings and contract documents. The Detailed Design should be checked to ensure that the measures are fully incorporated. Potential conflicts with civil engineering, geotechnical,

structural, lighting, signage, drainage and underground utilities should resolved as early as practical.

14.2.3 The following mitigation measures are proposed to avoid and reduce the identified impacts.

- Minimize the footprint of project and that the quantity of landscape character units and landscape resources affected;
- Minimize temporary works areas for construction works;
- Undertaking good site practices by applying hydroseeding on temporary stockpiles and reclamation areas;
- Conservation of topsoil for reuse; and
- Waste limitation by recycling of felled trees into woodchip mulch for use in landscaped areas.

14.2.4 The following design measures will be developed during detailed design stage to remedy and compensate unavoidable impacts:

- Roadside planting and planting along the edge of the reclamation is proposed;
- Transplanting of mature trees in good health and amenity value where appropriate and reinstatement of areas disturbed during construction by compensatory hydro-seeding and planting;
- Protection measures for the trees to be retained during construction activities;
- Optimizing the sizes and spacing of the bridge columns. (This mitigation measure is not applicable to the Contract);
- Fine-tuning the location of the bridge columns to avoid visually-sensitive locations. (This mitigation measure is not applicable to the Contract);
- (Not applicable as the aesthetic design of the bridge is related to the HKLR Contract.)
- (Not applicable as the decorative urban design is related to the HKLR Contract.)
- Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed;
- Providing planting area around peripheral of HKBCF for tree planting screening effect. (This mitigation measure is not applicable to the Contract);
- Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline. (This mitigation measure is not applicable to the Contract);
- Providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure(e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF;
- Fine-tuning the sizes of the structural members to minimize the bulkiness of buildings and adjustment of building arrangement to minimise disturbance to surrounding vegetation in the HKBCF; and
- (Not applicable as the aesthetic design on the viaduct, tunnel portals, at grade roads and reclamation are related to the HKLR Contract.)

14.2.5 The following mitigation measures should be monitored during construction and operation phases:

Table 14.2 Mitigation Measures to be Monitored during Construction and Operation Phases

Stage	Description of Mitigation Measures
During Construction Phase	Mitigate both Landscape and Visual Impacts G1. Grass-hydroseed bare soil surface and stockpile areas. G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic. (This mitigation measure is not applicable to the Contract.) G3. (Not applicable as this is for HKLR). G4. For HKBCF, providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure (e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF (See Figure 14.3.1 of the approved EIA Report for example) G5. Vegetation reinstatement and upgrading to disturbed areas. G6. Maximize new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed. G7. Provide planting area around peripheral of and within HKBCF for tree screening buffer effect. (This mitigation measure is not applicable to the Contract.) G8. Plant salt-tolerant native trees and shrubs etc. along the planter strip at affected seawall. (This mitigation measure is not applicable to the Contract.) G9. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt "natural-look" by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of the new coastline (see Figure 14.4.2 of the approved EIA Report for example). (This mitigation measure is not applicable to the Contract)
	Mitigate Visual Impacts V1. Minimize time for construction activities during construction period. V2. Provide screen hoarding at the portion of the project site / works areas / storage areas near VSRs who have close low-level views to the Project during HKBCF construction.
During Operation Phase	Mitigate both Landscape and Visual Impacts G10. Provide proper planting maintenance on the new planting areas to enhance the aesthetic degree. V3. Lighting design to minimize glare at night. Decorative road lighting to be considered during detailed design stage

Note:
- Figure 14.3.1 – Landscape Master Plan showing the general arrangement of HKBCF with mitigation. This Plan is preliminary only and subject to further development in detailed design stage. (see Figure 14.3.1of the approved EIA Report)
- Figure 14.4.2 – Details of mitigation measure – G9 for the new coastline. (see Figure 14.4.2 of the approved EIA Report).

14.2.6 An implementation programme will be prepared as required by TM-EIAO. Reference will be made to the ETWB TC(W) No. 2/2004 on Maintenance of Vegetation and Hard Landscape Features which defines the management and maintenance responsibilities for natural vegetation and landscape works, including both softworks and hardworks, and the authorities for tree preservation and felling. The format of the preliminary arrangement of implementation programme is listed in **Table 14.3**.

Table 14.3 Proposed Format for Preliminary Funding, Implementation, Management and Maintenance Proposal

Mitigation Items	Funding & Implementation Unit (See Remark)	Maintenance Unit (See Remark)
During Construction		
V1 and V2	Project Proponent (i.e. HyD)	The Contractor
G3 and G4	Project Proponent / Initiating Department (e.g. the relevant User Department of the building)	Project Proponent / Initiating Department (e.g. the relevant User Department of the building)
G1, G2, G3, G6, G7, G8 and G9	Project Proponent (i.e. HyD)	HyD / LCSD
During Operation		
V3	Project Proponent (i.e. HyD)	HyD
G10	Project Proponent (i.e. HyD)	HyD / LCSD

Note:
The proposed mitigation measures and arrangements are tentative. The responsible parties are also tentative and subject to further agreements amongst the Government Departments.

Construction Phase & Establishment Period

14.2.7 The implementation of landscape construction works and subsequent maintenance operations during the 12-month Establishment Period must be supervised by qualified Landscape Resident Site Staff (Registered Landscape Architect or Professional Member of the Hong Kong Institute of Landscape Architects).

14.2.8 Measures to mitigate landscape and visual impacts during construction should be checked to ensure compliance with the intended aims of the measures.

14.2.9 The progress of the engineering works shall be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken.

Long Term Management (10 Years)

14.2.10 The planting works shall be monitored during the first 10 years of the operation phase of the project. Any areas of vegetation which is failed to establish, should be corrected by the relevant maintenance parties at the earliest opportunity. The maintenance requirement of the planting works stated under the 10-Year Management Programme is included in the monitoring requirement.

14.3 Baseline Monitoring

14.3.1 A photographic record of the site at the time of the Contractor's possession of the site shall be prepared by the Contractor and approved by the ER. The approved photographic record shall be submitted to the Project Proponent, ET, IEC and EPD for record.

14.4 Action Plan for Landscape and Visual Works

Table 14.4 Action Plan for Landscape and Visual Works

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Conflicts occur	• Check and certify Contractor's proposed remedial design conforms to the requirements of EP and prepare checking report(s).	• Check and verify ET Leader certified Contractor's proposed remedial design.	• Supervise the Contractor to carry out the proposed remediation work.	• Propose remedial design and carry out the proposed work.

15. SITE ENVIRONMENTAL AUDIT

15.1 Site Inspection

15.1.1 Site inspection provides an effective and direct means to initiate and enforce specified environmental protection and pollution control measures at the works area. These shall be undertaken routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

15.1.2 The ET Leader shall be responsible for formulating the environmental site inspections, the deficiency and action reporting system, and for carrying out the site inspection works. Within 21 days of the construction contract commencement, he shall submit a proposal for site inspection and deficiency and action reporting procedures to the Contractor for agreement, and to the ER for approval. The ET's proposal for rectification would be made known to the IEC.

15.1.3 Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site. It should also review the environmental situations outside the works area which is likely to be affected, directly or indirectly, by the site activities. The following information should be made reference in conducting the inspection:

(i) EIA recommendations on environmental protection and pollution control mitigation measures;

(ii) works progress and programme;

(iii) individual works methodology proposals (which shall include proposal on associated pollution control measures);

(iv) contract specifications on environmental protection;

(v) relevant environmental protection and pollution control laws; and

(vi) previous site inspection results.

15.1.4 The Contractor shall keep the ET Leader updated with all relevant information on the construction contract necessary for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works shall be submitted to the IEC and the Contractor within 1 working day. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, and the deficiency and action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections.

15.1.5 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.

15.2 Compliance with Legal and Contractual Requirements

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

15.2.2 In order that the works comply with the contractual requirements, all works method statements submitted by the Contractor to the ER for approval shall be sent to the ET Leader for vetting to ensure sufficient environmental protection and pollution control measures have been included. The implementation schedule of mitigation measures is summarized in **Appendix B**.

15.2.3 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 laws can be prevented.

15.2.4 The Contractor shall regularly copy relevant documents to the ET Leader so that checking can be carried out. The document shall at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licence / permits under the environmental protection laws, and copies of all valid licences / permits. The site diary and environmental records shall be made available for the inspection by the relevant parties.

15.2.5 After reviewing the document, the ET Leader shall advise the IEC and Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence / permit application and any environmental protection and pollution control preparation works may result in potential violation of environmental protection and pollution control requirements, he shall also advise the Contractor and the ER accordingly.

15.2.6 Upon receipt of the advice, the Contractor shall undertake immediate actions to correct the situation. The ER shall follow up to ensure that appropriate action has been taken in order to satisfy contractual and legal requirements.

15.3 Environmental Complaints

15.3.1 Complaints shall be referred to the ET Leader for action. The ET Leader shall undertake the following procedures upon receipt of any complaint:

(i) Log complaint and date of receipt onto the complaint database and inform the IEC immediately;

(ii) Investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;

(iii) Identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;

(iv) Advise the Contractor if mitigation measures are required;

(v) Review the Contractor's response to identify mitigation measures, and the updated situation;

(vi) If the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;

(vii) Undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;

(viii) Report investigation results and subsequent actions to complainant (if the source of complaint is EPD, the results should be reported within the timeframe assigned by the EPD);

(ix) Record the complaint, investigation, the subsequent actions and the results in the monthly EM&A Reports; and

(x) For each incident of environmental complaint received, prepare and certify the complaint investigation report. The certified complaint investigation report shall be submitted to the IEC and ER for verification.

16. REPORTING

16.1 General

16.1.1 Reports can be provided in an electronic medium upon agreeing the format with the ER and EPD. This would enable a transition from a paper/historic and reactive approach to an electronic / real time proactive approach. All the monitoring data (baseline and impact) shall also be submitted on diskettes or other approved media. The formats for air quality and noise to be submitted shall be separately agreed.

16.1.2A Once the monitoring data are available (e.g. noise, dust, water quality etc.) and vetted by the IEC, the ET is responsible to upload the relevant data to the dedicated website established and maintained by ENPO. The ET Leader shall follow ENPO's requirements on the data submission format and procedure.

16.1.3 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.

16.2 Baseline Monitoring Report

16.2.1 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 the Contractor, the IEC, the ER and EPD. The ET Leader shall liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format shall be agreed with the EPD prior to submission.

16.2.2 Baseline monitoring report shall include at least the following:

(i) Executive summary (about half a page);

(ii) Brief project background information;

(iii) Drawings showing locations of the baseline monitoring stations;

(iv) Monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations;
- Monitoring date, time, frequency and duration; and
- Quality assurance (QA) / quality control (QC) results and detection limits.

(v) Details of influencing factors, including:

- Major activities, if any, being carried out on the site during the period;
- Weather conditions during the period; and
- Other factors which might affect results.

(vi) Determination of the Action and Limit 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;

(vii) Revisions for inclusion in the EM&A Manual; and

(viii) Comments, recommendations and conclusions.

16.3 Monthly EM&A Reports

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

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

First Monthly EM&A Report

16.3.3 The first monthly EM&A report shall include at least the following:

(i) Executive summary (1-2 pages):

- Breaches of Action and Limit levels;
- Complaint log;
- Notifications of any summons and successful prosecutions;
- Reporting changes; and
- Future key issues.

(ii) Basic project information:

- Project organization including key personnel contact names and telephone numbers;
- Programme;
- Management structure, and
- Works undertaken during the month.

(iii) Environmental status:

- Works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and
- Drawings showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co- ordinates of the monitoring locations).

(iv) A brief summary of EM&A requirements including:

- All monitoring parameters;
- Environmental quality performance limits (Action and Limit levels);
- Event-Action Plans;
- Environmental mitigation measures, as recommended in the approved EIA Report; and
- Environmental requirements in contract documents.

(v) Implementation status:

- Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA.

(vi) Monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;

- Parameters monitored;
- Monitoring locations;
- Monitoring date, time, frequency, and duration;
- Graphical plots of monitored parameters in the month;
- Major activities being carried out on site during period;
- Weather conditions during the period;
- Any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

(vii) Report on non-compliance, complaints, and notifications of summons and successful prosecutions:

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

(viii) Others

- An account of the future key issues as reviewed from the works programme and work method statements;
- Advice on the solid and liquid waste management status;
- Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule, and complaint log summarizing the EM&A of the period; and
- Comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

Subsequent EM&A Reports

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

(i) Executive summary (1 - 2 pages):

- Breaches of Action and Limit levels;
- Complaint log;
- Notifications of any summons and successful prosecutions;
- Reporting changes; and
- Future key issues.

(ii) Basic project information:

- Project organization including key personnel contact names and telephone

numbers;

- Programme;
- Management structure, and
- Works undertaken during the month.

(iii) Environmental status:

- Construction programme with fine tuning of construction activities showing the inter-relationship with environmental protection / mitigation measures for the month;
- Works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and
- Drawing showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations.

(iv) Implementation status:

- Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the approved EIA Report.

(v) 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;
- Graphical plots of monitored parameters in the month;
- Major activities being carried out on site during period;
- Any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

(vi) Report on non-compliance, complaints, and notifications of summons and successful prosecutions:

- Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, 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.

(vii) Others

- An account of the future key issues as reviewed from the works programme and work method statements;
- Advice on the solid and liquid waste management status; and
- Comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

(viii) Appendices

- Action and Limit 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:
  a) Major activities being carried out on site during the period;
  b) Weather conditions during the period; and
  c) Any other factors that might affect the monitoring results.
- Monitoring schedule for the present and next reporting period;
- Cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- Outstanding issues and deficiencies.

16.4 Quarterly EM&A Summary Reports

16.4.1 A quarterly EM&A summary report of around 5 pages shall be produced and shall contain at least the following information:

(i) Executive summary (about half a page);

(ii) Basic project information including a synopsis of the assignment organization, programme, contacts of key management, and a synopsis of works undertaken during the quarter;

(iii) A brief summary of EM&A requirements including:

- Monitoring parameters;
- Environmental quality performance limits (Action and Limit levels); and
- Environmental mitigation measures, as recommended in the approved EIA Report.

(iv) Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the approved EIA Report, summarized in the updated implementation schedule;

(v) Drawings showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(vi) Graphical plots of any trends in monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations

- Major activities being carried out on site during the period;
- Weather conditions during the period; and
- Any other factors which might affect the monitoring results.

(vii) Advice on the solid and liquid waste management status;

(viii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

(ix) A brief review of the reasons for and the implications of non-compliance, including a review of pollution sources and working procedures;

(x) A summary description of actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;

(xi) A summarized record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xii) Comments (for example, a review of the effectiveness and efficiency of the mitigation measures and the performance of the environmental management system, that is, of the overall EM&A programme); recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and

(xiii) Contacts of Project Proponent and any hotline telephone number for the public to make enquiries.

16.5 Final EM&A Review Reports

16.5.1 The final EM&A report should contain at least the following:

(i) Executive summary (1 - 2 pages);

(ii) Drawings showing the assignment area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(iii) Basic project information including a synopsis of the assignment organisation, contacts of key management, and a synopsis of work undertaken during the course of the assignment or past twelve months;

(iv) A brief summary of EM&A requirements including:

- Environmental mitigation measures, as recommended in the approved EIA Report;
- Environmental impact hypotheses tested;
- Environmental quality performance limits (Action and Limit levels);
- All monitoring parameters; and
- Event-Action Plans.

(v) A summary of the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the approved EIA Report, summarised in the updated implementation schedule;

(vi) Graphical plots and statistical analysis of the trends of monitored parameters over the course of the assignment, including the post-assignment monitoring for all monitoring stations annotated against:

- Major activities being carried out on site during the period;
- Weather conditions during the period;
- Any other factors which might affect the monitoring results; and
- The return of ambient environmental conditions in comparison with baseline data.

(vii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

(viii) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;

(ix) A description of the actions taken in the event of non-compliance;

(x) Advice on the solid and liquid waste management status;

(xi) Provide clear-cut decisions on the environmental acceptability of the assignment with reference to the specific impact hypothesis;

(xii) A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

(xiii) A summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection / pollution control legislation, locations and nature of the breaches, investigation follow-up actions taken and results;

(xiv) A review of the validity of EIA predictions and identification of shortcomings in EIA recommendations;

(xv) Comments (for example, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme); and

(xvi) Recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigatory action when necessary).

16.6 Data Keeping

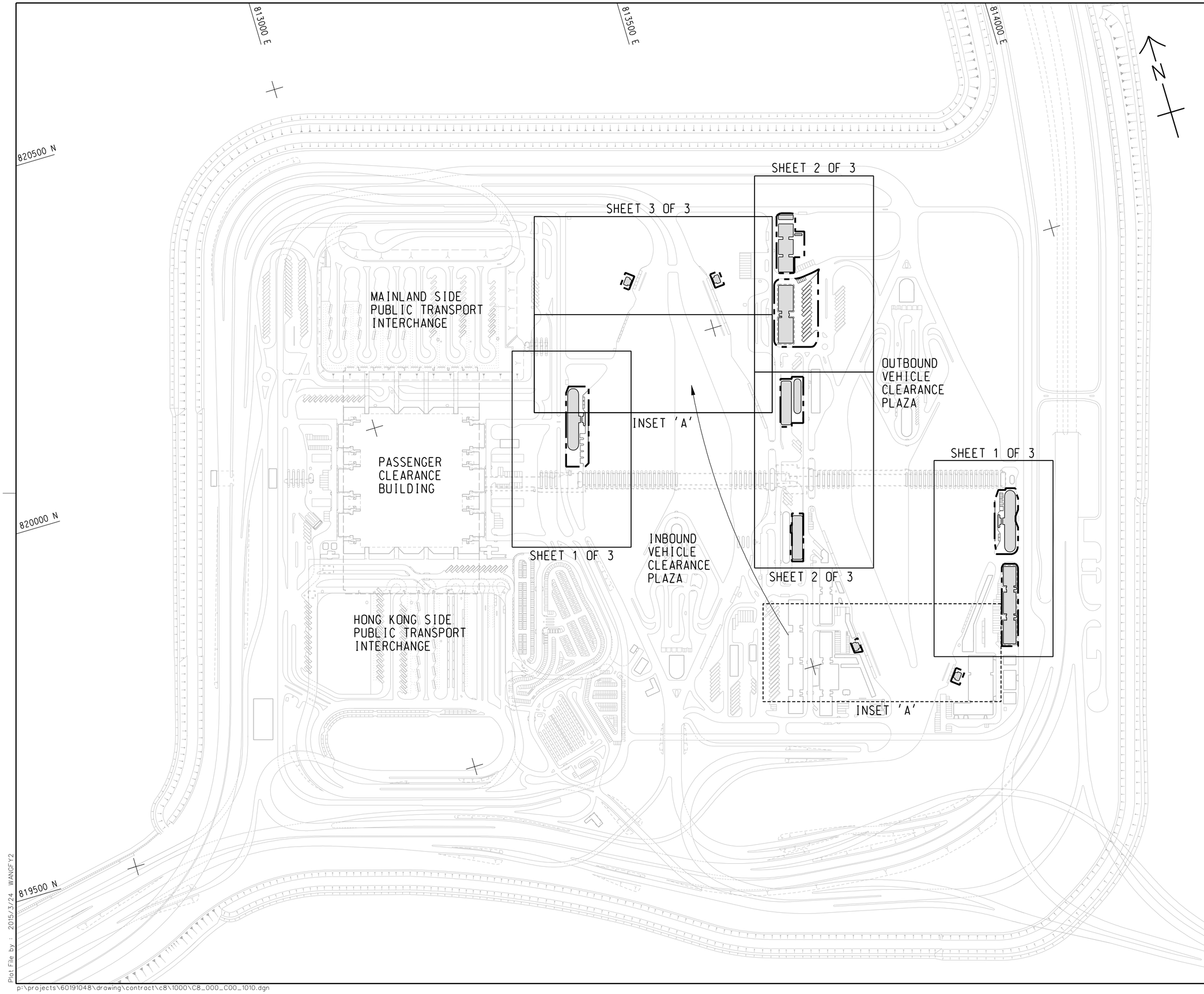
16.6.1 No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the monthly EM&A reports. However, any such document shall be well kept by the ET Leader and be ready for inspection upon request. All relevant information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

16.7 Interim Notifications of Environmental Quality Limit Exceedances

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

FIGURE 1A

SITE AREA OF THE CONTRACT



REV. 修訂	DESCRIPTION 內容摘要	D.G.	P.C. CHECKED 審核	DATE 日期
-	TENDER DRAWING	BWCW	SCI	MAR.15

路政署
HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

HONG KONG-ZHUHAI-MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- REMAINING ANCILLARY BUILDINGS AND FACILITIES

KEY PLAN

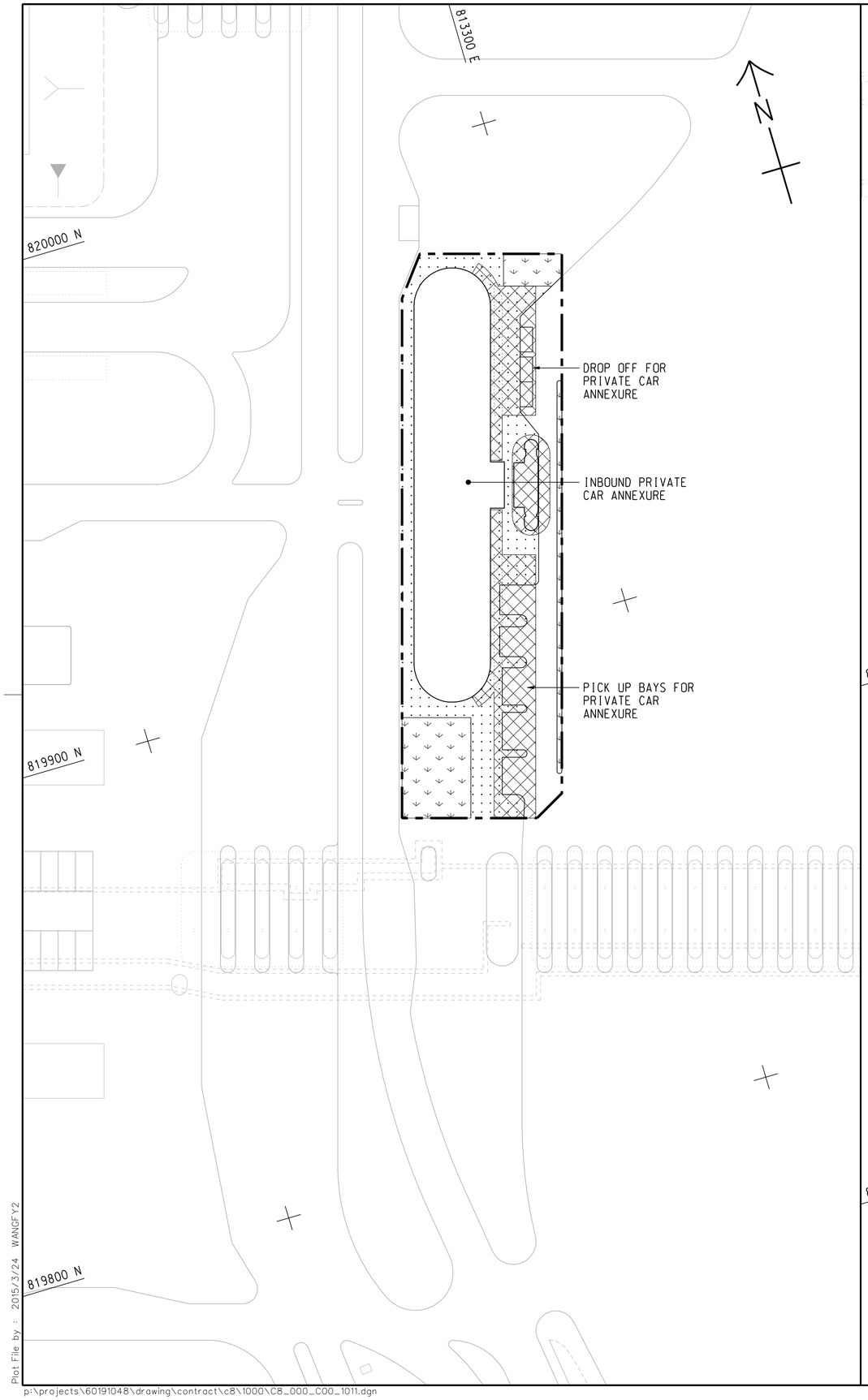
AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

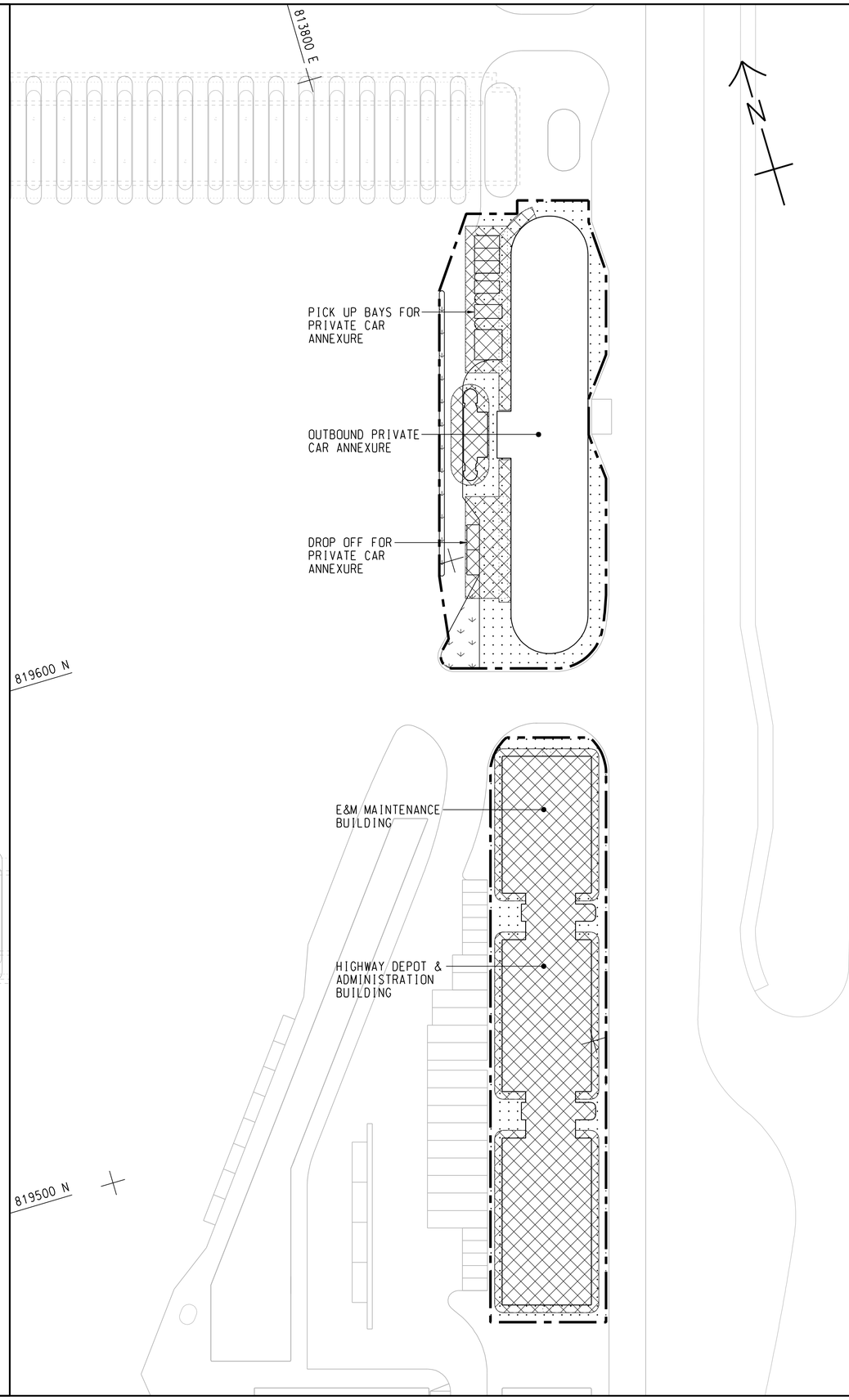
DRG.NO. 圖紙編號 60191048/C8/000/C00/1010

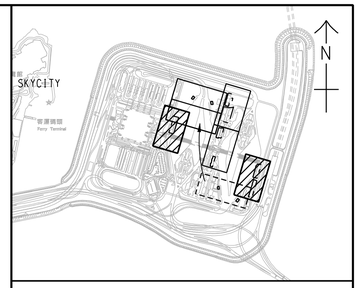
DESIGNED BY 設計 BWCW	CONTRACT NO. 合約編號 HY/2014/05	P. Dir. APPROVED 批准人 TKH	
DRAWN BY 繪圖 WSY	STATUS 階段		
SCALE 比例 A1 1 : 2500			
DIMENSIONS ARE IN 尺寸單位 METRES	© COPYRIGHT RESERVED 版 權 所 有		

Plot File by : 2015/3/24 WANGFY2

p:\projects\60191048\drawing\contract\c8\1000\C8_000_C00_1010.dgn







KEY PLAN
SCALE 1 : 20000

NOTE:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C8/000/C00/1012 AND 1013.

LEGEND:

- SITE BOUNDARY
- FOOTPATH (DETAILS REFER TO LANDSCAPE DETAIL DRAWINGS)
- CANOPY
- PLANTING AREA

REV. 修訂	DESCRIPTION 內容摘要	BY.	CHECKED 覆核	DATE 日期
-	TENDER DRAWING	BWCW	SCT	MAR.15

路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

HONG KONG-ZHUHAI-MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- REMAINING ANCILLARY BUILDINGS AND FACILITIES

GENERAL LAYOUT PLAN

SHEET 1 OF 3

AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

DRG.NO. 圖紙編號 60191048/C8/000/C00/1011

DESIGNED BY 設計 BWCW	CONTRACT NO. 合約編號 HY/2014/05	P. Dir. APPROVED 批准人 TKH
DRAWN BY 繪圖 WSY	STATUS 階段	
SCALE 比例 A1 1 : 500		
DIMENSIONS ARE IN 尺寸單位 METRES		

Plot File by : 2015/3/24 WANGFY2

p:\projects\60191048\drawing\contract\c8\1000\C8_000_C00_1011.dgn

813700 E

819900 N

820100 N

C&ED DANGEROUS GOOD STORE

DOG SWIMMING POOL & OUTDOOR AREA

CUSTOMS DETECTIVE DOG BASE BUILDING

819800 N

820000 N

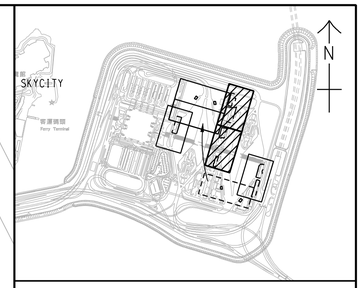
C&ED OUTBOUND CARGO EXAMINATION BUILDING AND EXAMINATION PLATFORM

819700 N

OUTBOUND X-RAY BUILDING

OUTBOUND X-RAY SCAN BUILDING

INBOUND X-RAY SCAN BUILDING



KEY PLAN

SCALE 1 : 20000

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60191048/C8/000/C00/1011.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C8/000/C00/1011 AND 1013.

REV. 修訂	DESCRIPTION 內容摘要	D.E.	P.E. CHECKED 查核	DATE 日期
-	TENDER DRAWING	BWCW	SCI	MAR.15

路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

HONG KONG-ZHUHAI-MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- REMAINING ANCILLARY BUILDINGS AND FACILITIES

GENERAL LAYOUT PLAN

SHEET 2 OF 3

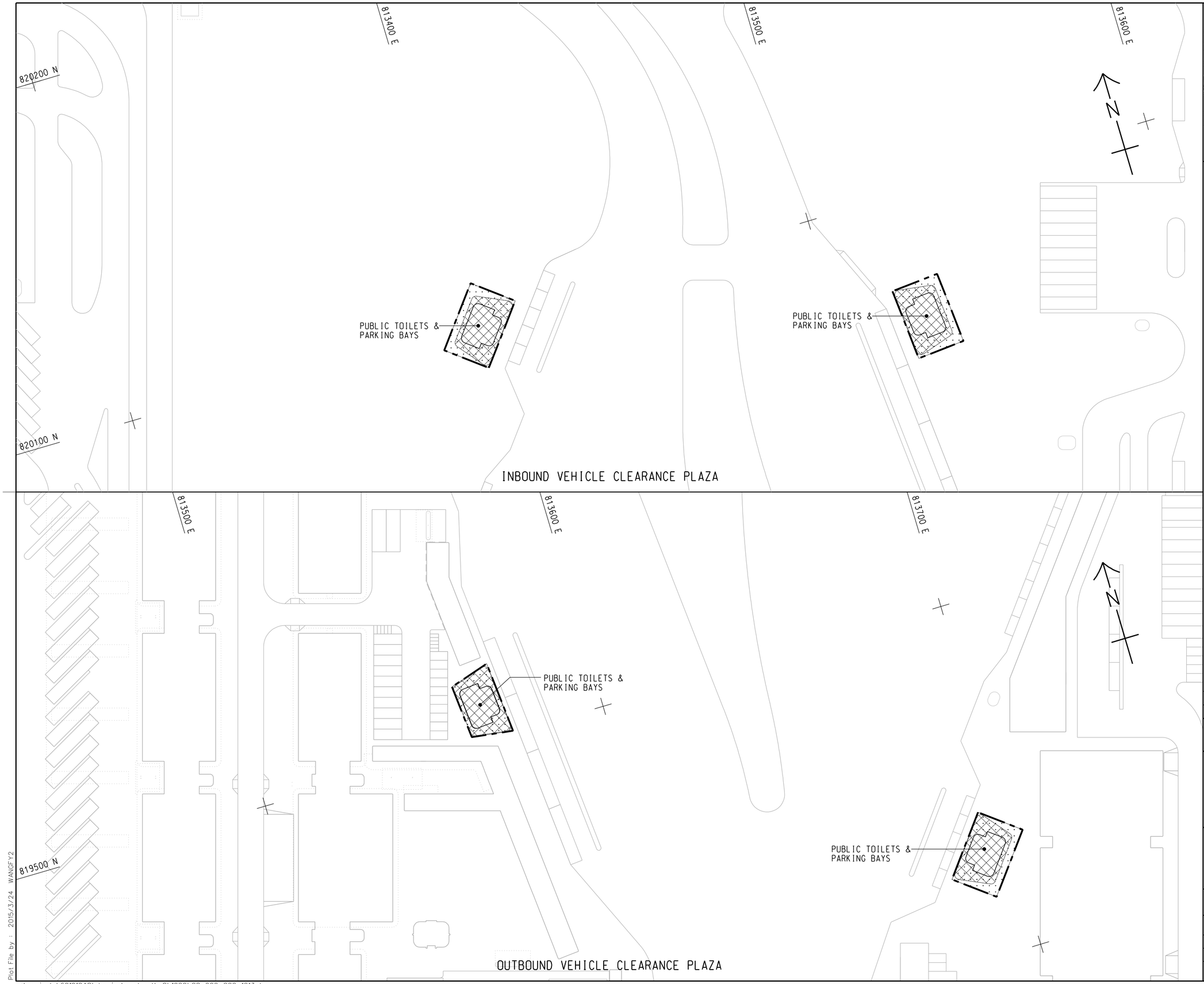
AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

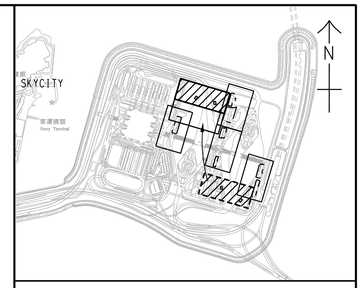
DRG.NO. 圖紙編號 60191048/C8/000/C00/1012

DESIGNED BY 設計	BWCW	CONTRACT NO. 合約編號	HY/2014/05
DRAWN BY 繪圖	WSY	P. Dir. APPROVED 批准人	TKH
SCALE 比例	A1 1 : 500	STATUS 狀態	
DIMENSIONS ARE IN 尺寸單位	METRES		

Plot File by : 2015/3/24 WANGFY2

p:\projects\60191048\drawing\contract\c8\1000\C8_000_C00_1012.dgn





KEY PLAN
SCALE 1 : 20000

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60191048/C8/000/C00/1011.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C8/000/C00/1011 AND 1012.

REV. 修訂	DESCRIPTION 內容摘要	D.C.	P.C. CHECKED 審核	DATE 日期
-	TENDER DRAWING	BWCW	SCI	MAR.15

路政署
HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

HONG KONG-ZHUHAI-MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- REMAINING ANCILLARY BUILDINGS AND FACILITIES

GENERAL LAYOUT PLAN

SHEET 3 OF 3

AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

DRG.NO. 圖紙編號 60191048/C8/000/C00/1013

DESIGNED BY 設計 BWCW	CONTRACT NO. 合約編號 HY/2014/05	P. Dir. APPROVED 批准人 TKH
DRAWN BY 繪圖 WSY	STATUS 階段	
SCALE 比例 A1 1 : 500		
DIMENSIONS ARE IN 尺寸單位 METRES		

Plot File by : 2015/3/24 WANGFY2

p:\projects\60191048\drawing\contract\c8\1000\C8_000_C00_1013.dgn

FIGURE 2A

LOCATION OF AIR MONITORING STATIONS

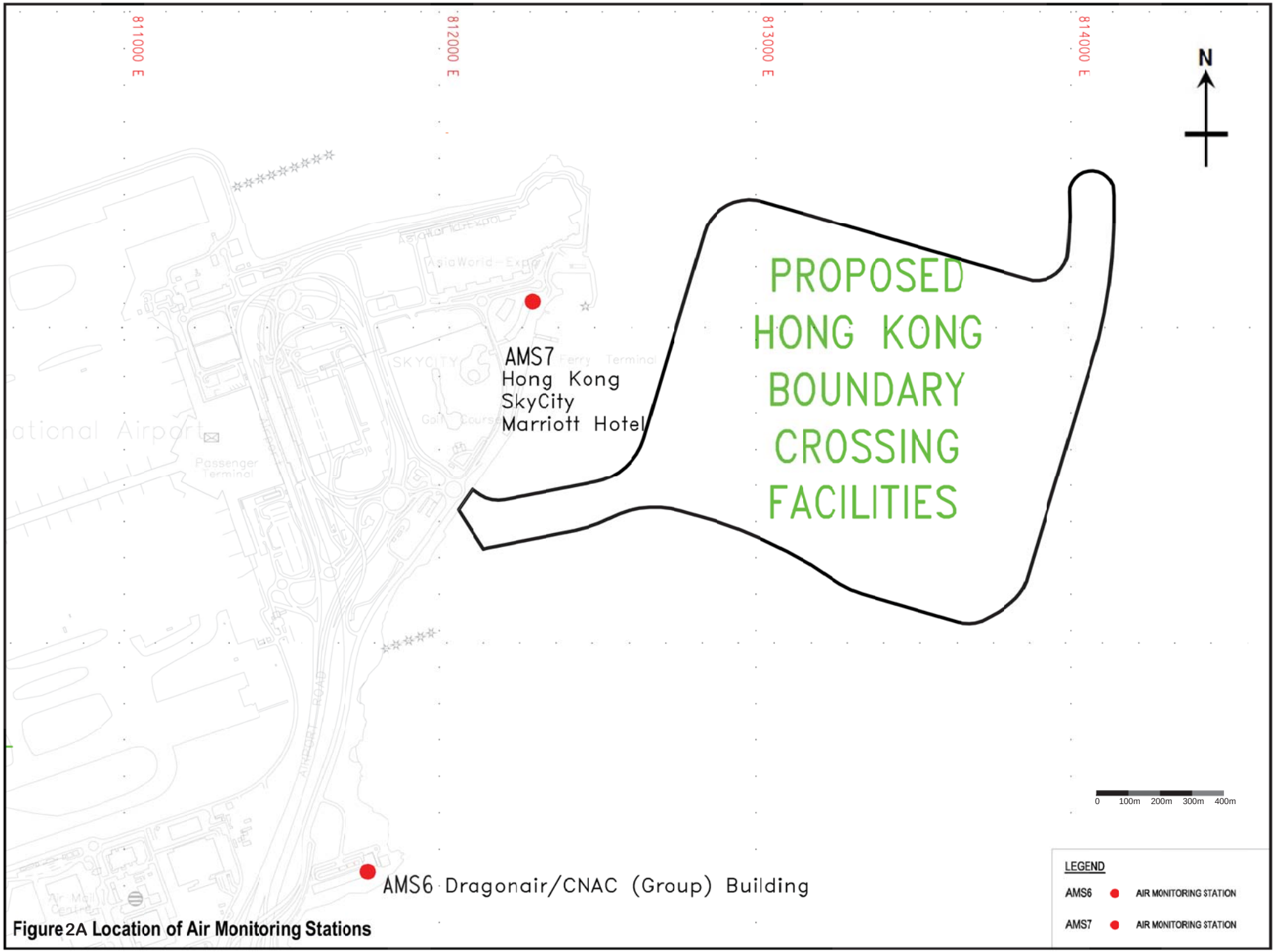


Figure 2A Location of Air Monitoring Stations

FIGURE 2B

LOCATION OF NOISE MONITORING STATIONS

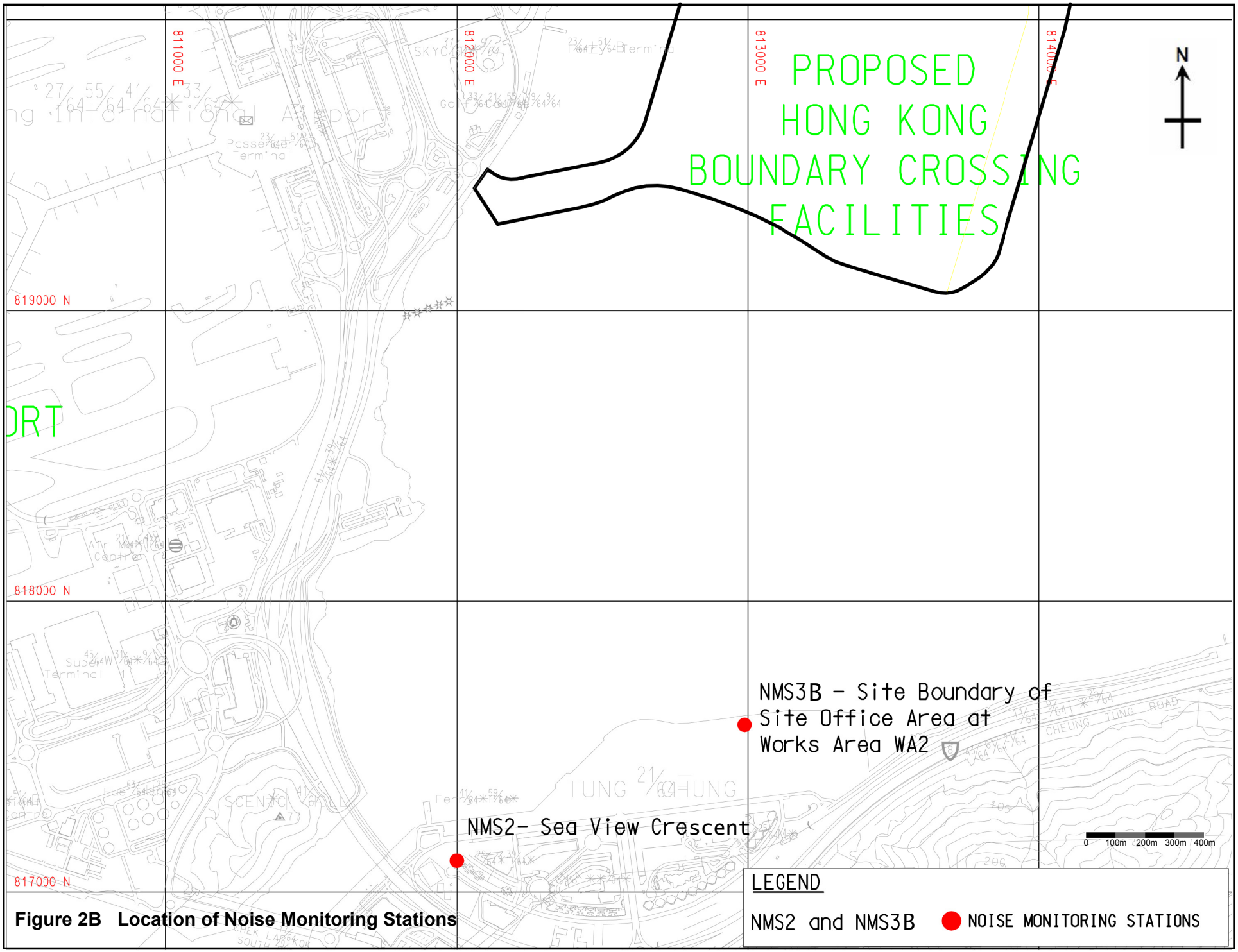
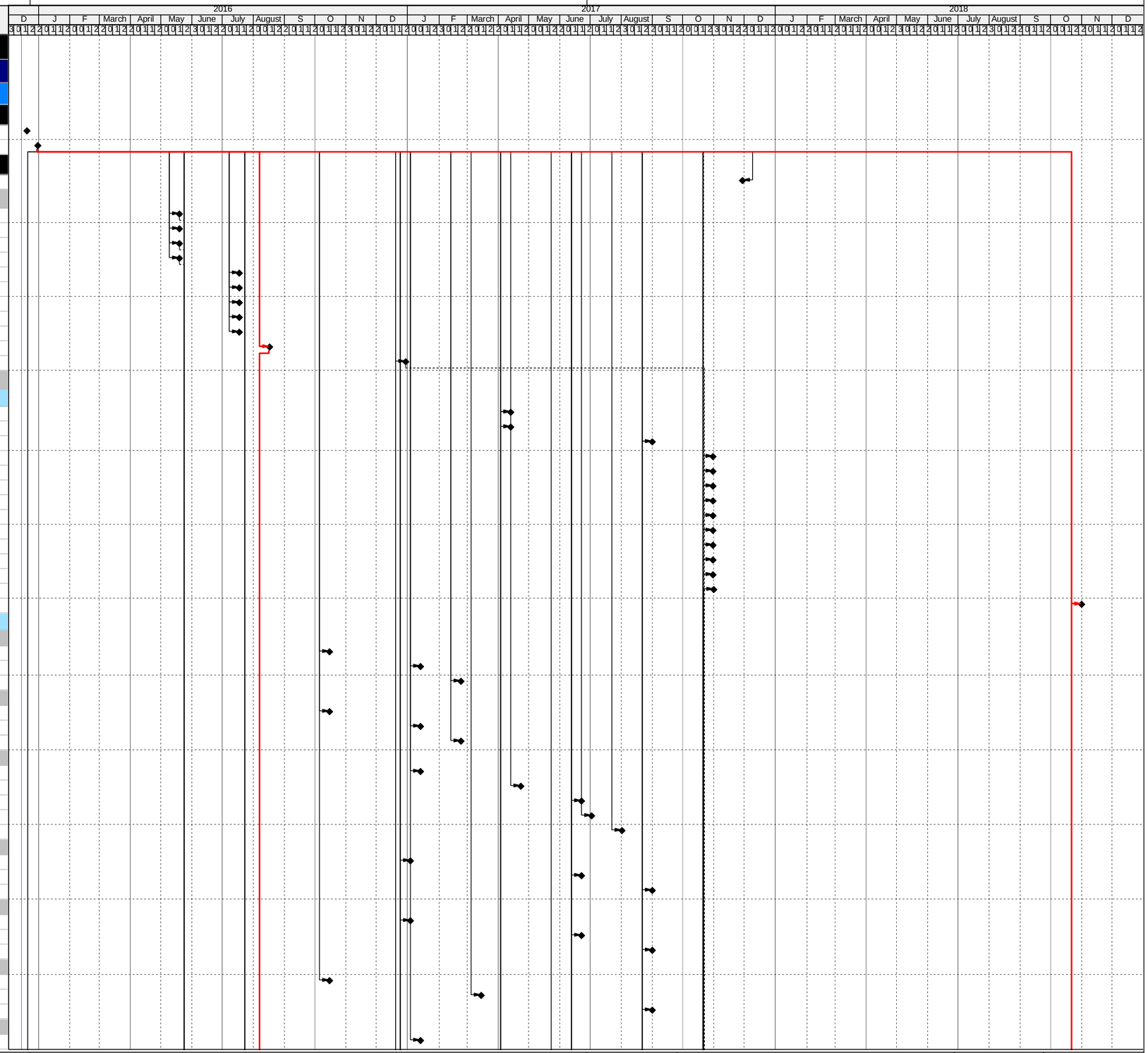


Figure 2B Location of Noise Monitoring Stations

APPENDIX A

CONSTRUCTION PROGRAMME

Activity ID	Activity Name	Original Duration	Start	Finish
IWP - Remaining Ancillary Building and Fa		847	20-Dec-15	31-Oct-18
GENERAL/PRELIMINARIES		1047	20-Dec-15	31-Oct-18
Salient Key Dates and Milestones		1047	20-Dec-15	31-Oct-18
Commencement		11	20-Dec-15	31-Dec-15
AWARD	Contract Award Date	0	20-Dec-15*	
COMM	Commencement of Contract	0	31-Dec-15*	
Salient Key Dates and Milestones		1036	31-Dec-15	31-Oct-18
COMP	Completion of Contract	0		29-Nov-17*
Commencement and Completion Dates		225	19-May-16	30-Dec-16
SECTION VI	Section subject to Excision Section VI - (Day 140)	0	19-May-16*	
SECTION IX	Section subject to Excision Section IX - (Day 140)	0	19-May-16*	
SECTION IV	Section subject to Excision Section IV - (Day 140)	0	19-May-16*	
SECTION V	Section subject to Excision Section V - (Day 140)	0	19-May-16*	
SECTION VII	Section subject to Excision Section VII - (Day 200)	0	18-Jul-16*	
SECTION VIII	Section subject to Excision Section VIII - (Day 200)	0	18-Jul-16*	
SECTION X	Section subject to Excision Section X - (Day 200)	0	18-Jul-16*	
SECTION XI	Section subject to Excision Section XI - (Day 200)	0	18-Jul-16*	
SECTION XII	Section subject to Excision Section XII - (Day 200)	0	18-Jul-16*	
SECTION XIII	Section subject to Excision Section XIII - (Day 230)	0	17-Aug-16*	
SECTION XIV	Section subject to Excision Section XIV - (Day 365)	0	30-Dec-16*	
Key Dates for Achievement of Stage and Sections		746	15-Oct-16	31-Oct-18
Sectional Key Dates		566	13-Apr-17	31-Oct-18
RAB-KD2	KD2 - Completion of Section II of the Works (470 days)	0		13-Apr-17*
RAB-KD1	KD1 - Completion of Section I of the Works (470 days)	0		13-Apr-17*
RAB-KD3	KD3 - Completion of Section III of the Works (610 days)	0		31-Aug-17*
RAB-KD6	KD6 - Completion of Section VI of the Works (670 days)	0		30-Oct-17*
RAB-KD7	KD7 - Completion of Section VII of the Works (670 days)	0		30-Oct-17*
RAB-KD8	KD8 - Completion of Section VIII of the Works (670 days)	0		30-Oct-17*
RAB-KD4	KD4 - Completion of Section IV of the Works (670 days)	0		30-Oct-17*
RAB-KD9	KD9 - Completion of Section IX of the Works (670 days)	0		30-Oct-17*
RAB-KD5	KD5 - Completion of Section V of the Works (670 days)	0		30-Oct-17*
RAB-KD11	KD11 - Completion of Section XI of the Works (670 days)	0		30-Oct-17*
RAB-KD12	KD12 - Completion of Section XII of the Works (670 days)	0		30-Oct-17*
RAB-KD10	KD10 - Completion of Section X of the Works (670 days)	0		30-Oct-17*
RAB-KD13	KD13 - Completion of Section XIII of the Works (670 days)	0		31-Oct-17*
RAB-KD14	KD14 - Completion of Section XIV of the Works (1035 days)	0		31-Oct-18
Stage Key Dates		320	15-Oct-16	31-Aug-17
Stage 1 - Building 53 and 58		130	15-Oct-16	22-Feb-17
RAB-KD1A	KD1A - Achievement of Stage 1A of the Works (290 days)	0		15-Oct-16*
RAB-KD1B	KD1B - Achievement of Stage 1B of the Works (380 days)	0		13-Jan-17*
RAB-KD1C	KD1C - Achievement of Stage 1C of the Works (420 days)	0		22-Feb-17*
Stage 2 - Building 59		130	15-Oct-16	22-Feb-17
RAB-KD2A	KD2A - Achievement of Stage 2A of the Works (290 days)	0		15-Oct-16*
RAB-KD2B	KD2B - Achievement of Stage 2B of the Works (380 days)	0		13-Jan-17*
RAB-KD2C	KD2C - Achievement of Stage 2C of the Works (420 days)	0		22-Feb-17*
Stage 3 - Building 23		200	13-Jan-17	01-Aug-17
RAB-KD3A	KD3A - Achievement of Stage 3A of the Works (380 days)	0		13-Jan-17*
RAB-KD3B	KD3B - Achievement of Stage 3B of the Works (480 days)	0		23-Apr-17*
RAB-KD3C	KD3C - Achievement of Stage 3C of the Works (540 days)	0		22-Jun-17*
RAB-KD3D	KD3D - Achievement of Stage 3D of the Works (550 days)	0		02-Jul-17*
RAB-KD3E	KD3E - Achievement of Stage 3E of the Works (580 days)	0		01-Aug-17*
Stage 4 - Building 21		240	03-Jan-17	31-Aug-17
RAB-KD4A	KD4A - Achievement of Stage 4A of the Works (370 days)	0		03-Jan-17*
RAB-KD4B	KD4B - Achievement of Stage 4B of the Works (540 days)	0		22-Jun-17*
RAB-KD4C	KD4C - Achievement of Stage 4C of the Works (610 days)	0		31-Aug-17*
Stage 5 - Building 22		240	03-Jan-17	31-Aug-17
RAB-KD5A	KD5A - Achievement of Stage 5A of the Works (370 days)	0		03-Jan-17*
RAB-KD5B	KD5B - Achievement of Stage 5B of the Works (540 days)	0		22-Jun-17*
RAB-KD5C	KD5C - Achievement of Stage 5C of the Works (610 days)	0		31-Aug-17*
Stage 6 - Building 25		320	15-Oct-16	31-Aug-17
RAB-KD6A	KD6A - Achievement of Stage 6A of the Works (290 days)	0		15-Oct-16*
RAB-KD6B	KD6B - Achievement of Stage 6B of the Works (440 days)	0		14-Mar-17*
RAB-KD6C	KD6C - Completion of Stage 6C of the Works (610 days)	0		31-Aug-17*
Stage 7 - Building 32		230	13-Jan-17	31-Aug-17
RAB-KD7A	KD7A - Achievement of Stage 7A of the Works (380 days)	0		13-Jan-17*

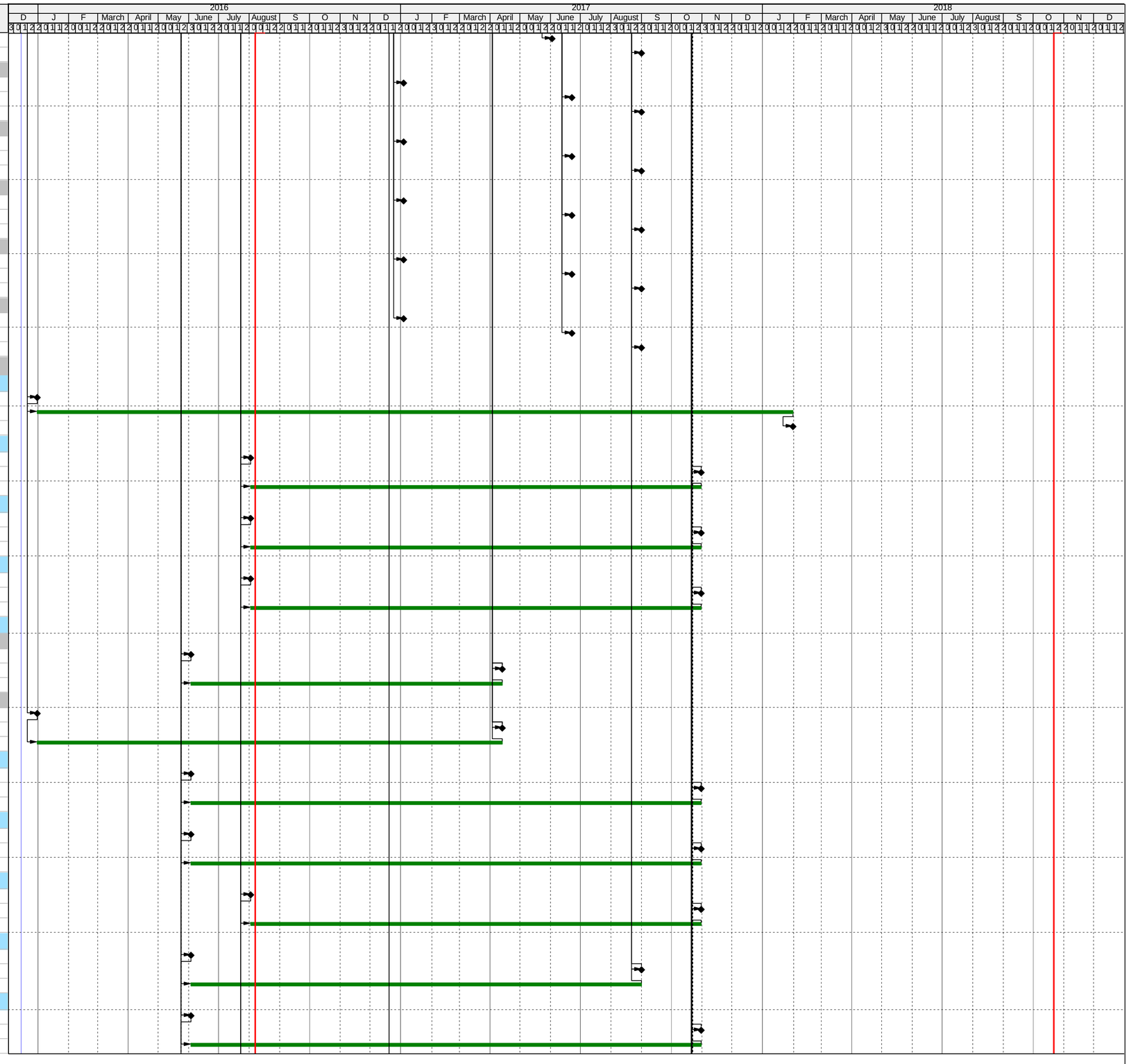


Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

Initial Works Programme

Date	Revision	Checked	Approved
21-Dec-15	Initial Works Programme	SGJ	

Activity ID	Activity Name	Original Duration	Start	Finish
RAB-KD7B	KD7B - Achievement of Stage 7B of the Works (520 days)	0		02-Jun-17*
RAB-KD7C	KD7C - Achievement of Stage 7C of the Works (610 days)	0		31-Aug-17*
Stage 8 - Building 44		240	03-Jan-17	31-Aug-17
RAB-KD8A	KD8A - Achievement of Stage 8A of the Works (370 days)	0		03-Jan-17*
RAB-KD8B	KD8B - Achievement of Stage 8B of the Works (540 days)	0		22-Jun-17*
RAB-KD8C	KD8C - Achievement of Stage 8C of the Works (610 days)	0		31-Aug-17*
Stage 9 - Building 50 (H1)		240	03-Jan-17	31-Aug-17
RAB-KD9A	KD9A - Achievement of Stage 9A of the Works (370 days)	0		03-Jan-17*
RAB-KD9B	KD9B - Achievement of Stage 9B of the Works (540 days)	0		22-Jun-17*
RAB-KD9C	KD9C - Achievement of Stage 9C of the Works (610 days)	0		31-Aug-17*
Stage 10 - Building 50 (H2)		240	03-Jan-17	31-Aug-17
RAB-KD10A	KD10A - Achievement of Stage 10A of the Works (370 days)	0		03-Jan-17*
RAB-KD10B	KD10B - Achievement of Stage 10B of the Works (540 days)	0		22-Jun-17*
RAB-KD10C	KD10C - Achivement of Stage 10C of the Works (610 days)	0		31-Aug-17*
Stage 11 - Building 50 (A1)		240	03-Jan-17	31-Aug-17
RAB-KD11A	KD11A - Achievement of Stage 11A of the Works (370 days)	0		03-Jan-17*
RAB-KD11B	KD11B - Achievement of Stage 11B of the Works (540 days)	0		22-Jun-17*
RAB-KD11C	KD11C - Achievement of Stage 11C of the Works (610 days)	0		31-Aug-17*
Stage 12 - Buuilding 50 (A2)		240	03-Jan-17	31-Aug-17
RAB-KD12A	KD12A - Achievement of Stage 12A of the Works (370 days)	0		03-Jan-17*
RAB-KD12B	KD12B - Achievement of Stgae 12B of the Works (540 days)	0		22-Jun-17*
RAB-KD12C	KD12C - Achievement of Stage 12C of the Works (610 days)	0		31-Aug-17*
Possession and Vacate Dates		763	31-Dec-15	31-Jan-18
Portion 3.10 WA3		763	31-Dec-15	31-Jan-18
PD_WA3	Possession date for Portion 3.10 WA3	0	31-Dec-15	
PA_WA3	Period of Access to Portion WA3	763	31-Dec-15	31-Jan-18
PA_WA5	Vacation date for Portion 3.10 WA3	0		31-Jan-18*
Portion A1 - Building 50 (A1)		455	02-Aug-16	30-Oct-17
PD_A1	Possession date for Portion A1 (Day 215)	0	02-Aug-16	
VD_A1	Vacation date for Portion A1 (Day 670)	0		30-Oct-17
PA_A1	Period of Access to Portion A1	455	02-Aug-16	30-Oct-17
Portion A2 - Building 50 (A2)		455	02-Aug-16	30-Oct-17
PD_A2	Possession date for Portion A2 (Day 215)	0	02-Aug-16	
VD_A2	Vacation date for Portion A2 (Day 670)	0		30-Oct-17
PA_A2	Period of Access to Portion A2	455	02-Aug-16	30-Oct-17
Portion B - Building 45		455	02-Aug-16	30-Oct-17
PD_B	Possession date for Portion B (Day 215)	0	02-Aug-16	
VD_B	Vacation date for Portion B (Day 670)	0		30-Oct-17
PA_B	Period of Access to Portion B	455	02-Aug-16	30-Oct-17
Portion C - Building 53, 58 & 59		470	31-Dec-15	13-Apr-17
Portion C1 - Building 58 and 53		315	03-Jun-16	13-Apr-17
PD_C1	Possession date for Portion C1(Day 155)	0	03-Jun-16	
VD_C1	Vacation date for Portion C1(Day 470)	0		13-Apr-17
PA_C1	Period of Access to Portion C1	315	03-Jun-16	13-Apr-17
Portion C2 - Building 59		470	31-Dec-15	13-Apr-17
PD_C2	Possession date for Portion C2 (Day 5)	0	31-Dec-15	
VD_C2	Vacation date for Portion C2 (Day 470)	0		13-Apr-17
PA_C2	Period of Access to Portion C2	470	31-Dec-15	13-Apr-17
Portion D - Building 25		515	03-Jun-16	30-Oct-17
PD_D	Possession date for Portion D (Day 155)	0	03-Jun-16	
VD_D	Vacation date for Portion D (Day 670)	0		30-Oct-17
PA_D	Period of Access to Portion D	515	03-Jun-16	30-Oct-17
Portion E - Building 32		515	03-Jun-16	30-Oct-17
PD_E	Possession date for Portion E (Day 155)	0	03-Jun-16	
VD_E	Vacation date for Portion E (Day 670)	0		30-Oct-17
PA_E	Period of Access to Portion E	515	03-Jun-16	30-Oct-17
Portion F - Building 44 and 45		455	02-Aug-16	30-Oct-17
PD_F	Possession date for Portion F (Day 215)	0	02-Aug-16	
VD_F	Vacation date for Portion F (Day 670)	0		30-Oct-17
PA_F	Period of Access to Portion F	455	02-Aug-16	30-Oct-17
Portion G1 - Building 23		455	03-Jun-16	31-Aug-17
PD_G1	Possession date for Portion G1 (Day 155)	0	03-Jun-16	
VD_G1	Vacation date for Portion G1 (Day 610)	0		31-Aug-17
PA_G1	Period of Access to Portion G1	455	03-Jun-16	31-Aug-17
Portion G2 - Building 21		515	03-Jun-16	30-Oct-17
PD_G2	Possession date for Portion G2 (Day 155)	0	03-Jun-16	
VD_G2	Vacation date for Portion G2 (Day 670)	0		30-Oct-17
PA_G2	Period of Access to Portion G2	515	03-Jun-16	30-Oct-17

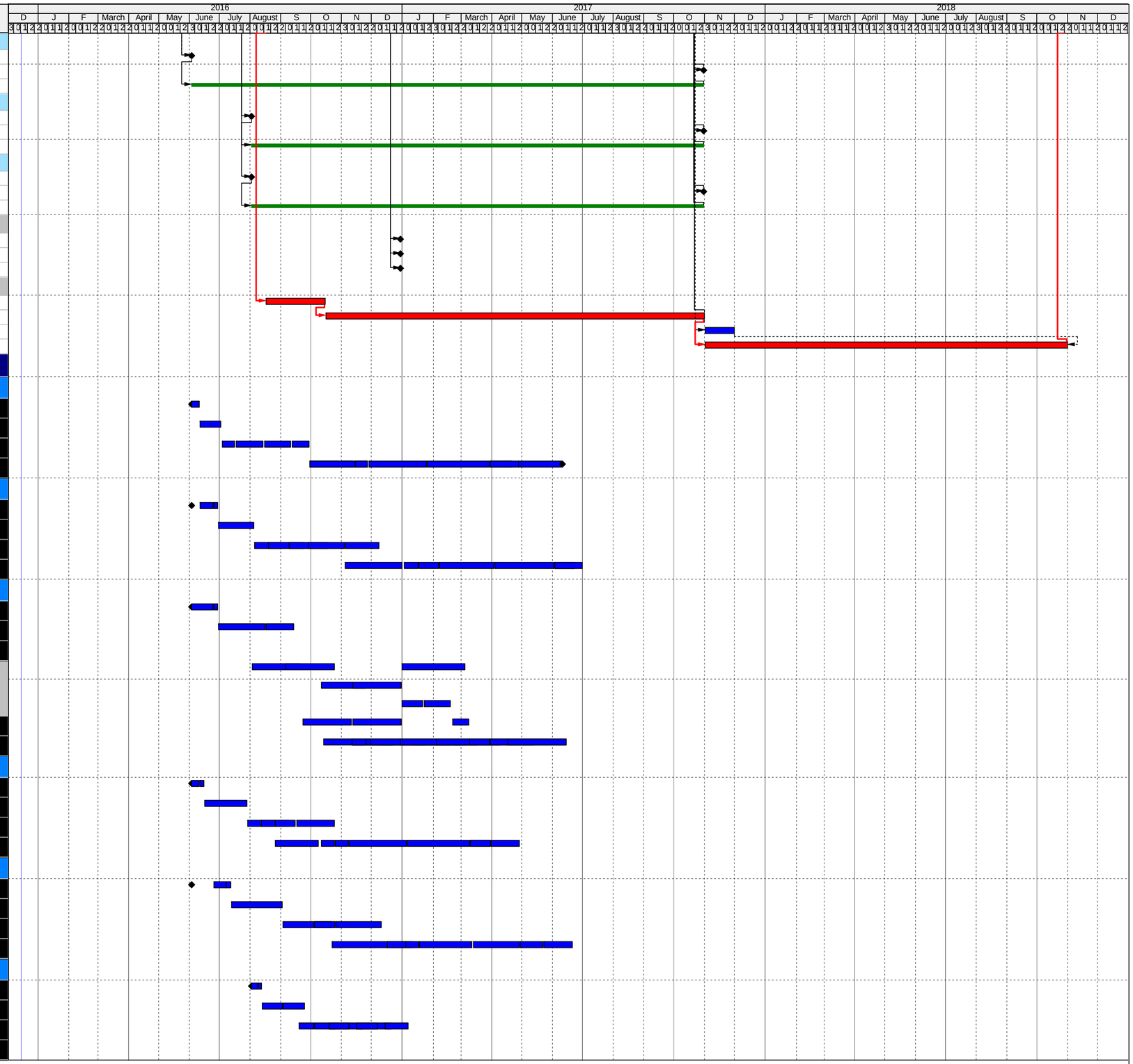


Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

Initial Works Programme

Date	Revision	Checked	Approved
21-Dec-15	Initial Works Programme	SGJ	

Activity ID	Activity Name	Original Duration	Start	Finish
Portion G3 - Building 22		515	03-Jun-16	30-Oct-17
PD_G3	Possession date for Portion G3 (Day 155)	0	03-Jun-16	
VD_G3	Vacation date for Portion G3 (Day 670)	0		30-Oct-17
PA_G3	Period of Access to Portion G3	515	03-Jun-16	30-Oct-17
Portion H1 - Building 50 (H1)		455	02-Aug-16	30-Oct-17
PD_H1	Possession date for Portion H1 (Day 215)	0	02-Aug-16	
VD_H1	Vacation date for Portion H1 (Day 670)	0		30-Oct-17
PA_H1	Period of Access to Portion H1	455	02-Aug-16	30-Oct-17
Portion H2 - Building 50 (H2)		455	02-Aug-16	30-Oct-17
PD_H2	Possession date for Portion H2 (Day 215)	0	02-Aug-16	
VD_H2	Vacation date for Portion H2 (Day 670)	0		30-Oct-17
PA_H2	Period of Access to Portion H2	455	02-Aug-16	30-Oct-17
Given Access to various locations by others		0	30-Dec-16	30-Dec-16
GA_1.1	Access Date for Location 1.1 (Day 365)	0	30-Dec-16	
GA_1.2	Access Date for Location 1.2 (Day 365)	0	30-Dec-16	
GA_1.3	Access Date for Location 1.3 (Day 365)	0	30-Dec-16	
Landscaping		806	17-Aug-16	31-Oct-18
LA_102	Landscape Works subject to Excision - Mobilisation	60	17-Aug-16	15-Oct-16
LA_103	Landscape Works subject to Excision - Works	381	16-Oct-16	31-Oct-17
LA_110	Maintenance Period for Landscape Works	30	01-Nov-17	30-Nov-17
LA_120	Establishment Works subject to Excision	365	01-Nov-17	31-Oct-18
CONSTRUCTION		444	05-Jan-16	06-Jul-17
Building 021 - C&ED Dangerous Goods Store		302	03-Jun-16	10-Jun-17
Excavation		6	03-Jun-16	10-Jun-16
Raft		18	11-Jun-16	02-Jul-16
Structure		75	04-Jul-16	29-Sep-16
ABWF/E&M		203	30-Sep-16	10-Jun-17
Building 022 - Customs Detective Dog Base B		319	03-Jun-16	30-Jun-17
Excavation		22	03-Jun-16	29-Jun-16
Raft		30	30-Jun-16	04-Aug-16
Structure		105	05-Aug-16	08-Dec-16
ABWF/E&M		192	04-Nov-16	30-Jun-17
Building 023 - C&ED Outbound Cargo Examin		305	03-Jun-16	14-Jun-17
Excavation		22	03-Jun-16	29-Jun-16
Raft		64	30-Jun-16	13-Sep-16
Structure		172	03-Aug-16	04-Mar-17
Ground Floor		172	03-Aug-16	04-Mar-17
First Floor		68	11-Oct-16	30-Dec-16
Dog House		36	31-Dec-16	18-Feb-17
Cure and Strip		132	23-Sep-16	08-Mar-17
ABWF/E&M		196	14-Oct-16	14-Jun-17
Building 025 - Inbound Private Car Annexure		268	03-Jun-16	28-Apr-17
Excavation		10	03-Jun-16	15-Jun-16
Raft		36	16-Jun-16	28-Jul-16
Structure		72	29-Jul-16	24-Oct-16
ABWF/E&M		198	26-Aug-16	28-Apr-17
Building 032 - Outbound Private Car Annexure		310	03-Jun-16	20-Jun-17
Excavation		32	03-Jun-16	12-Jul-16
Raft		45	13-Jul-16	02-Sep-16
Structure		82	03-Sep-16	10-Dec-16
ABWF/E&M		194	22-Oct-16	20-Jun-17
Building 044 - E&M Maintenance Building		274	02-Aug-16	06-Jul-17
Excavation		10	02-Aug-16	12-Aug-16
Raft		36	13-Aug-16	24-Sep-16
Structure		90	19-Sep-16	06-Jan-17
ABWF/E&M		204	26-Oct-16	06-Jul-17

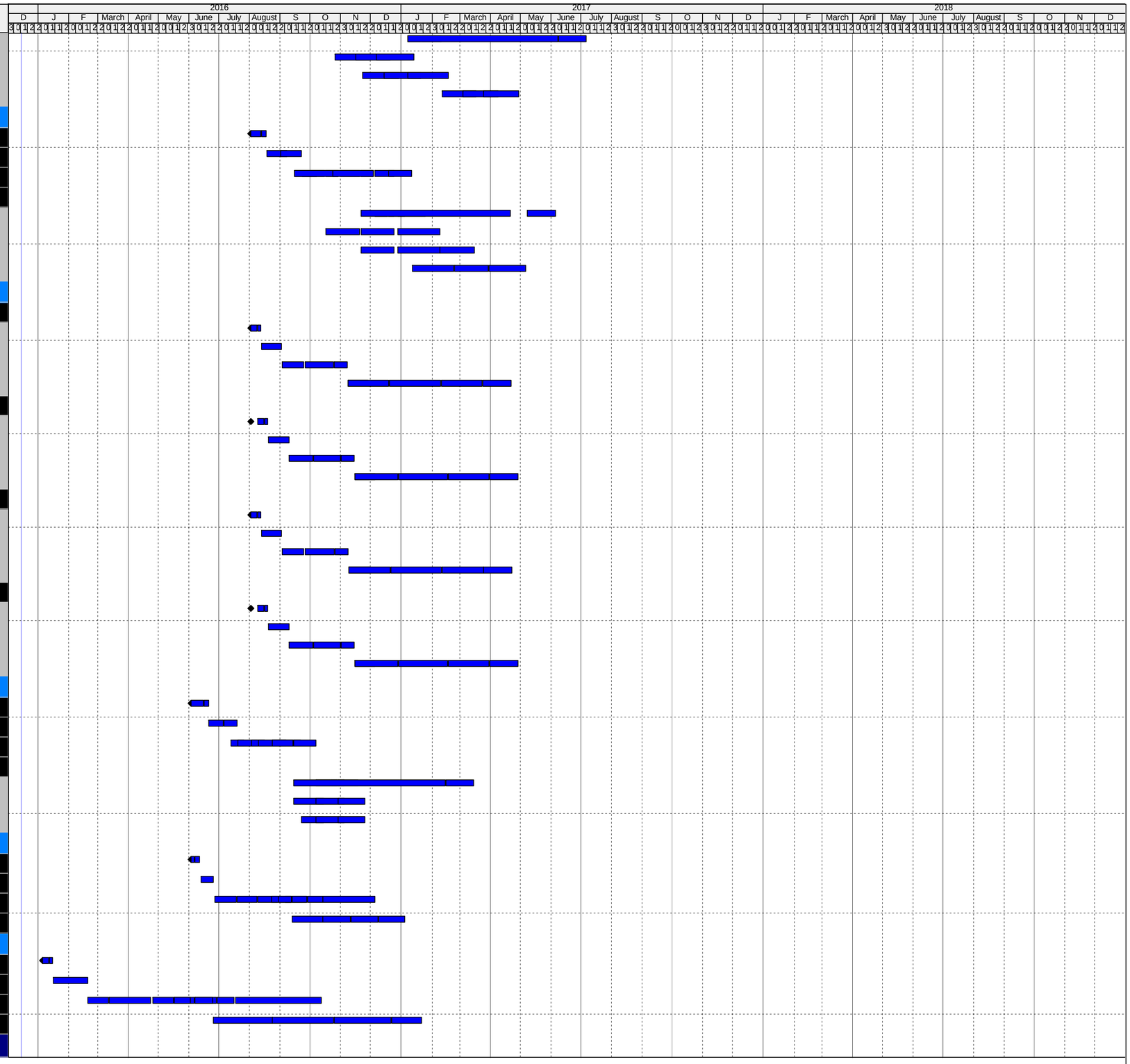


Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

Initial Works Programme

Date	Revision	Checked	Approved
21-Dec-15	Initial Works Programme	SGJ	

Activity ID	Activity Name	Original Duration	Start	Finish
	Misc	144	07-Jan-17	06-Jul-17
	Ground Floor	66	26-Oct-16	13-Jan-17
	First Floor	66	23-Nov-16	17-Feb-17
	Second Floor and Green Roof	66	11-Feb-17	29-Apr-17
	Building 045 - Highways Depot & Administrati(	248	02-Aug-16	05-Jun-17
	Excavation	14	02-Aug-16	17-Aug-16
	Raft	30	18-Aug-16	22-Sep-16
	Structure	96	15-Sep-16	11-Jan-17
	ABWF/E&M	186	17-Oct-16	05-Jun-17
	Misc	156	21-Nov-16	05-Jun-17
	Ground Floor	90	17-Oct-16	08-Feb-17
	First Floor	90	21-Nov-16	15-Mar-17
	Second Floor	90	12-Jan-17	06-May-17
	Building 050 - Public Toilets Type 2	219	02-Aug-16	28-Apr-17
	Public Toilet (Portion H1)	213	02-Aug-16	21-Apr-17
	Excavation	10	02-Aug-16	12-Aug-16
	Raft	18	13-Aug-16	02-Sep-16
	Structure	53	03-Sep-16	07-Nov-16
	ABWF/E&M	132	08-Nov-16	21-Apr-17
	Public Toilet (Portion H2)	219	02-Aug-16	28-Apr-17
	Excavation	16	02-Aug-16	19-Aug-16
	Raft	18	20-Aug-16	09-Sep-16
	Structure	53	10-Sep-16	14-Nov-16
	ABWF/E&M	132	15-Nov-16	28-Apr-17
	Public Toilet (Portion A1)	214	02-Aug-16	22-Apr-17
	Excavation	10	02-Aug-16	12-Aug-16
	Raft	18	13-Aug-16	02-Sep-16
	Structure	54	03-Sep-16	08-Nov-16
	ABWF/E&M	132	09-Nov-16	22-Apr-17
	Public Toilet (Portion A2)	219	02-Aug-16	28-Apr-17
	Excavation	16	02-Aug-16	19-Aug-16
	Raft	18	20-Aug-16	09-Sep-16
	Structure	53	10-Sep-16	14-Nov-16
	ABWF/E&M	132	15-Nov-16	28-Apr-17
	Building 053 - Outbound X-Ray Building	230	03-Jun-16	14-Mar-17
	Excavation	14	03-Jun-16	20-Jun-16
	Raft	24	21-Jun-16	19-Jul-16
	Structure	72	13-Jul-16	06-Oct-16
	ABWF/E&M	144	14-Sep-16	14-Mar-17
	Misc	144	14-Sep-16	14-Mar-17
	Ground Floor	60	14-Sep-16	25-Nov-16
	First Floor	54	22-Sep-16	25-Nov-16
	Building 058 - Outbound X-Ray Scan Tunnel	177	03-Jun-16	04-Jan-17
	Excavation	7	03-Jun-16	11-Jun-16
	Raft	12	13-Jun-16	25-Jun-16
	Structure	135	27-Jun-16	05-Dec-16
	ABWF/E&M	92	13-Sep-16	04-Jan-17
	Building 059 - Inbound X-Ray Scan Tunnel	313	05-Jan-16	21-Jan-17
	Excavation	10	05-Jan-16	15-Jan-16
	Raft	24	16-Jan-16	19-Feb-16
	Structure	195	20-Feb-16	12-Oct-16
	ABWF/E&M	174	25-Jun-16	21-Jan-17
	STATUTORY SUBMISSIONS & APPROVALS	293	03-Dec-16	29-Nov-17

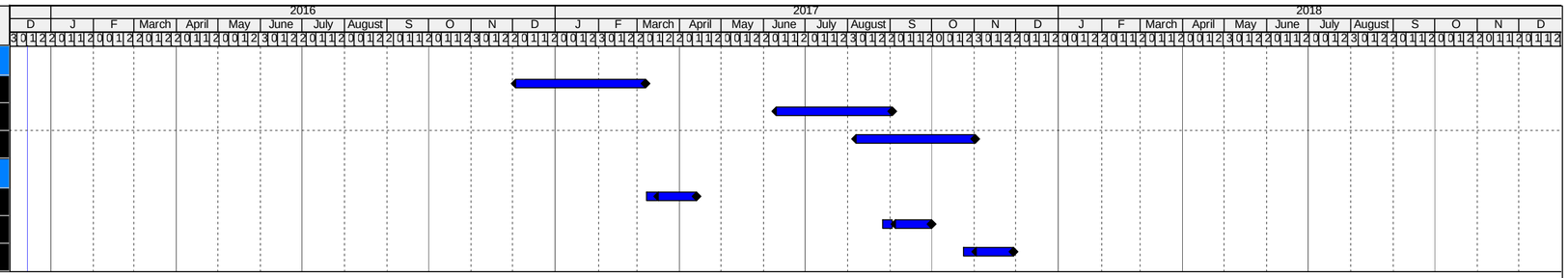


Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

Initial Works Programme

Date	Revision	Checked	Approved
21-Dec-15	Initial Works Programme	SGJ	

Activity ID	Activity Name	Original Duration	Start	Finish
	Water Supply	269	03-Dec-16	01-Nov-17
	Completion (470 days) Bldg 53,58,59	72	03-Dec-16	07-Mar-17
	Completion (640 days) Bldg 23	72	10-Jun-17	02-Sep-17
	Completion (700 days) Bldge 21,22,25,32,44,45,50	72	07-Aug-17	01-Nov-17
	FSD Certificate	221	08-Mar-17	29-Nov-17
	Completion (470 days) Bldg 53,58,59	31	08-Mar-17	13-Apr-17
	Completion (640 days) Bldg 23	31	26-Aug-17	30-Sep-17
	Completion (700 days) Bldge 21,22,25,32,44,45,50	31	24-Oct-17	29-Nov-17



Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

Initial Works Programme

Date	Revision	Checked	Approved
21-Dec-15	Initial Works Programme	SGJ	

Activity ID	Activity Name
	Hong Kong-Zhuhai_Macao Bridge Hong Kong Boundary Crossing F
	Key Dates
	Interface Activities
	Site and Facility Inspection
JS1200	Pre Site and Facility Inspection by Contractor at Location 4 - Deg2
JS1210	Joint Site and Facility Inspection with Interface Contractor at Location 4 - Deg2
JS1620	Pre Site and Facility Inspection by Contractor at Location 14 - Deg2
JS1630	Joint Site and Facility Inspection with Interface Contractor at Location 14 - Deg2
JS1760	Pre Site and Facility Inspection by Contractor at Location 18 - Deg1
JS1770	Joint Site and Facility Inspection with Interface Contractor at Location 18 - Deg1
JS1780	Pre Site and Facility Inspection by Contractor at Location 18 - Deg2
JS1790	Joint Site and Facility Inspection with Interface Contractor at Location 18 - Deg2
	Access Dates
AD1000	Location 1(PCB (001) Basement)-Deg1 (270d)
AD1010	Location 1(PCB (001) Basement)-Deg2 (380d)
AD1020	Location 1(PCB (001) ELV Room (Grid Line E3))-Deg1 (270d)
AD1030	Location 1(PCB (001) ELV Room (Grid Line E3))-Deg2 (380d)
AD1040	Location 2(PCB (001) First Floor Main Server Room)-Deg1 (330d)
AD1050	Location 2(PCB (001) First Floor Main Server Room)-Deg2 (380d)
AD1060	Location 2(PCB (001) First Floor Main Server Room) - For Server Installation - Deg2 (3
AD1070	Location 2(PCB (001) Ground Floor ELV Room (Grid Line E3)) - Deg1 (330d)
AD1080	Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5)) -
AD1090	Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5)) -
AD1130	Location 3(Inbd Cargo Exam Bldg (037) Platform Control Room)-Deg2 (500d)
AD1150	Location 3(Inbd Cargo Exam Bldg (037) Inspector Offices 128,129,130,131,128,129,14
AD1170	Location 3a(Inbd Cargo Exam Bldg (037) ROCARS Room)-Deg2 (480d)
AD1190	Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room)-Deg2 (480d)
AD1200	Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room) - For Server installation -
AD1220	Location 4(Outbd Cargo Exam Bldg (023))-Deg2 (680d)
AD1240	Location 4a(Outbd Cargo Exam Bldg (023))-Deg2 (630d)
AD1270	Location 6(Common Utility Enclosure & Staff Subway)-Deg1 (400d)
AD1290	Location 7(Common Utility Enclosure & Staff Subway)-Deg1 (270d)
AD1300	Location 8(Inbd Private Car Annex (025))-Deg1 (430d)
AD1310	Location 8(Inbd Private Car Annex (025))-Deg2 (580d)
AD1320	Location 8(Inbd Private Car Annex (025) Canopy)-Deg1 (430d)
AD1330	Location 8(Inbd Private Car Annex (025) Canopy)-Deg2 (580d)
AD1340	Location 9(Outbd Private Car Annex (032))-Deg1 (520d)
AD1350	Location 9(Outbd Private Car Annex (032))-Deg2 (660d)
AD1360	Location 9(Outbd Private Car Annex (032) Canopy)-Deg1 (520d)
AD1370	Location 9(Outbd Private Car Annex (032) Canopy)-Deg2 (660d)
AD1501	Location 12(Inbd Private Car Kiosks(027))-Deg1 (400d) Phase 2
AD1510	Location 12(Inbd Private Car Kiosks(027))-Deg2 (480d) Phase 1
AD1511	Location 12(Inbd Private Car Kiosks(027))-Deg2 (480d) Phase 2
AD1521	Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg1 (400d) Phase 2

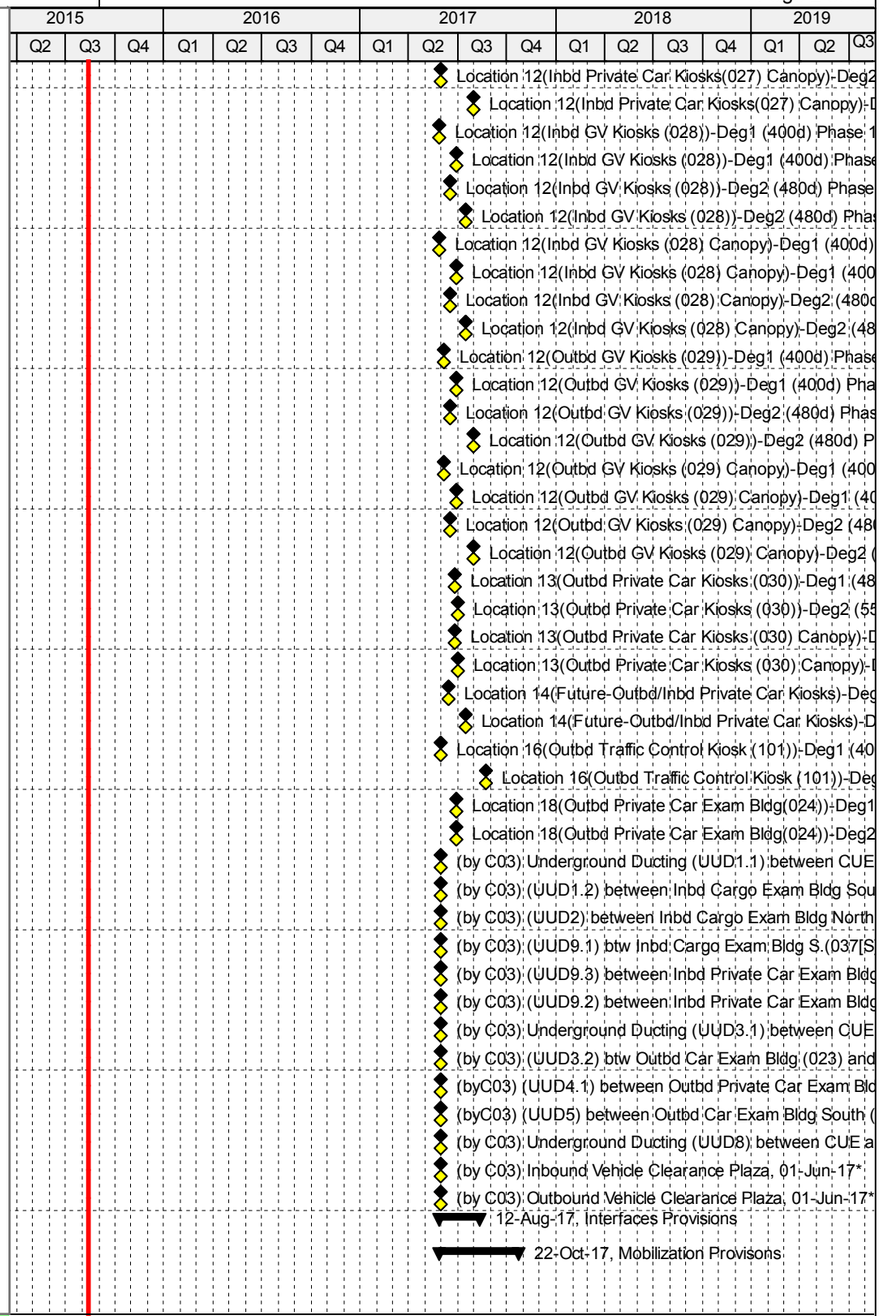
Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
AD1530	Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg2 (480d) Phase 1
AD1531	Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg2 (480d) Phase 2
AD1540	Location 12(Inbd GV Kiosks (028))-Deg1 (400d) Phase 1
AD1541	Location 12(Inbd GV Kiosks (028))-Deg1 (400d) Phase 2
AD1550	Location 12(Inbd GV Kiosks (028))-Deg2 (480d) Phase 1
AD1551	Location 12(Inbd GV Kiosks (028))-Deg2 (480d) Phase 2
AD1560	Location 12(Inbd GV Kiosks (028) Canopy)-Deg1 (400d) Phase 1
AD1561	Location 12(Inbd GV Kiosks (028) Canopy)-Deg1 (400d) Phase 2
AD1570	Location 12(Inbd GV Kiosks (028) Canopy)-Deg2 (480d) Phase 1
AD1571	Location 12(Inbd GV Kiosks (028) Canopy)-Deg2 (480d) Phase 2
AD1580	Location 12(Outbd GV Kiosks (029))-Deg1 (400d) Phase 1
AD1581	Location 12(Outbd GV Kiosks (029))-Deg1 (400d) Phase 2
AD1590	Location 12(Outbd GV Kiosks (029))-Deg2 (480d) Phase 1
AD1591	Location 12(Outbd GV Kiosks (029))-Deg2 (480d) Phase 2
AD1600	Location 12(Outbd GV Kiosks (029) Canopy)-Deg1 (400d) Phase 1
AD1601	Location 12(Outbd GV Kiosks (029) Canopy)-Deg1 (400d) Phase 2
AD1610	Location 12(Outbd GV Kiosks (029) Canopy)-Deg2 (480d) Phase 1
AD1611	Location 12(Outbd GV Kiosks (029) Canopy)-Deg2 (480d) Phase 2
AD1620	Location 13(Outbd Private Car Kiosks (030))-Deg1 (480d) Phase 1
AD1630	Location 13(Outbd Private Car Kiosks (030))-Deg2 (550d) Phase 1
AD1640	Location 13(Outbd Private Car Kiosks (030) Canopy)-Deg1 (480d) Phase 1
AD1650	Location 13(Outbd Private Car Kiosks (030) Canopy)-Deg2 (550d) Phase 1
AD1660	Location 14(Future-Outbd/Inbd Private Car Kiosks)-Deg1 (610d)
AD1670	Location 14(Future-Outbd/Inbd Private Car Kiosks)-Deg2 (680d)
AD1700	Location 16(Outbd Traffic Control Kiosk (101))-Deg1 (400d)
AD1710	Location 16(Outbd Traffic Control Kiosk (101))-Deg2 (480d)
AD1740	Location 18(Outbd Private Car Exam Bldg(024))-Deg1 (-)
AD1750	Location 18(Outbd Private Car Exam Bldg(024))-Deg2 (670d)
AD1780	(by C03) Underground Ducting (UUD1.1) between CUE and Inbd Cargo Exam Bldg (0
AD1790	(by C03) (UUD1.2) between Inbd Cargo Exam Bldg South (037[S]) and DOH Cargo C
AD1800	(by C03) (UUD2) between Inbd Cargo Exam Bldg North (037[N]) and Inbd Vehicle Cle
AD1810	(by C03) (UUD9.1) btw Inbd Cargo Exam Bldg S.(037[S]) & Inbd PC Exam Bldg(033) &
AD1820	(by C03) (UUD9.3) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clear
AD1830	(by C03) (UUD9.2) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clear
AD1840	(by C03) Underground Ducting (UUD3.1) between CUE to Outbd Cargo Exam Bldg (0
AD1850	(by C03) (UUD3.2) btw Outbd Car Exam Bldg (023) and Outbd PC Exam Bldg (024) a
AD1860	(byC03) (UUD4.1) between Outbd Private Car Exam Bldg (024) and Outbd Vehicle Cle
AD1870	(byC03) (UUD5) between Outbd Car Exam Bldg South (023[S]) and Outbd Vehicle Cle
AD1880	(by C03) Underground Ducting (UUD8) between CUE and Outbd PCA (032)
AD1910	(by C03) Inbound Vehicle Clearance Plaza
AD1920	(by C03) Outbound Vehicle Clearance Plaza
	Interfaces Provisions
	Mobilization Provisons
	WA4 Site Erection & Servicing



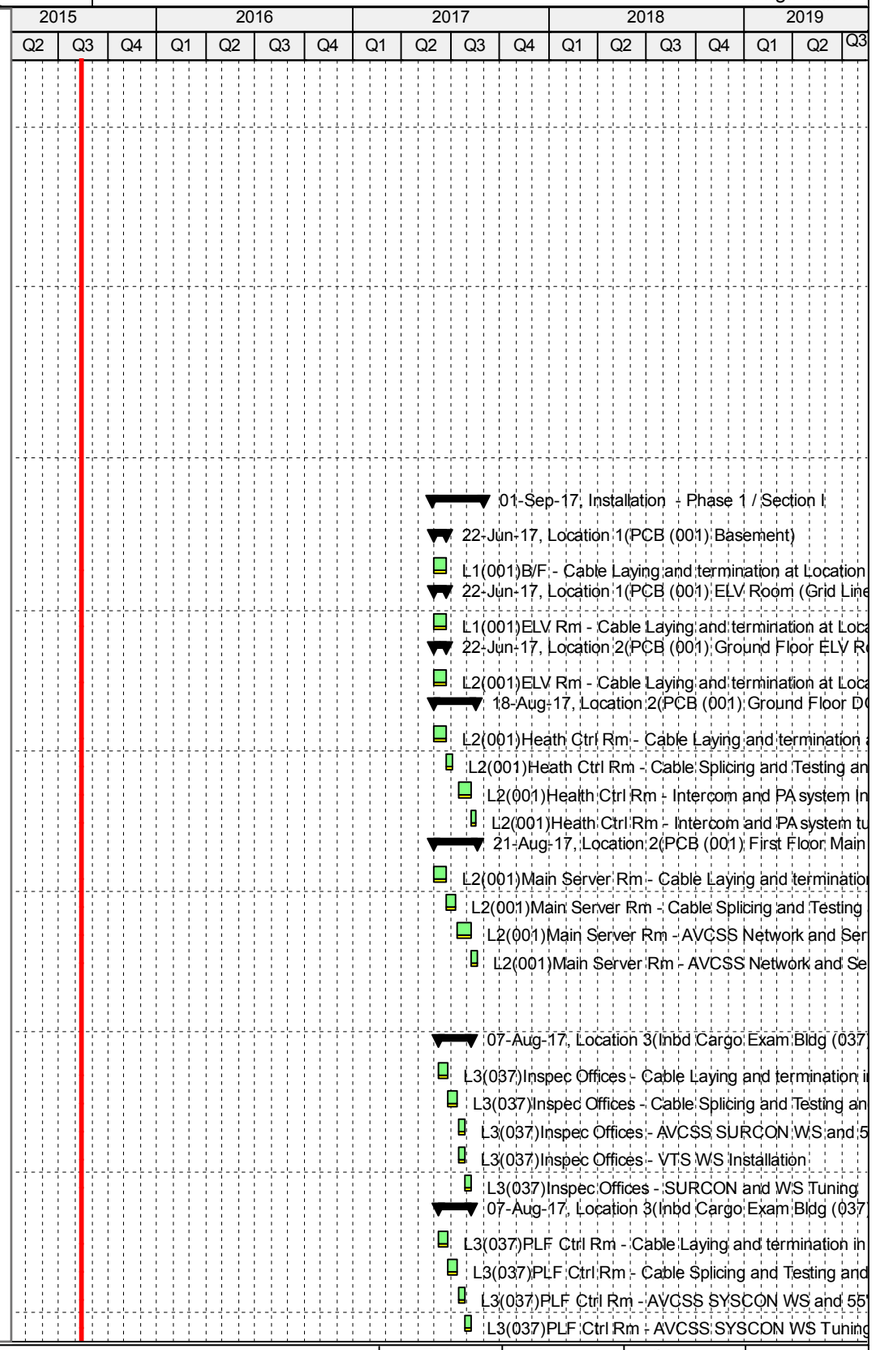
Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
	Detailed Design Specification
	Contruction Design and Management
	Supply/Manufacture Mock-up items
	Supply/Manufacture prototypes
	Software Design, Coding and Testing
	Coding
	Software System Inetgration
	Prototype & Software Simulation Tests
	Procurement - Phase 1 / Section I
	Supply/Manufacture products for FAT
	Factory Acceptance Test (FAT)
	Supply/Manufacture Equipment
	Delivery and Bench Acceptance Test for Phase 1/ Section I
	Installation - Phase 1 / Section I
	Location 1(PCB (001) Basement)
EM1920	L1(001)B/F - Cable Laying and termination at Location 1 and Location 2
	Location 1(PCB (001) ELV Room (Grid Line E3))
EM1940	L1(001)ELV Rm - Cable Laying and termination at Location 1 and Location 2
	Location 2(PCB (001) Ground Floor ELV Room (Grid Line E3))
EM1960	L2(001)ELV Rm - Cable Laying and termination at Location 1 and Location 2
	Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5))
EM1080	L2(001)Heath Ctrl Rm - Cable Laying and termination at Location 1 and Location 2
EM1100	L2(001)Heath Ctrl Rm - Cable Splicing and Testing and Labeling
EM1120	L2(001)Health Ctrl Rm - Intercom and PA system Installation
EM1140	L2(001)Heath Ctrl Rm - Intercom and PA system tuning
	Location 2(PCB (001) First Floor Main Server Room)
EM1000	L2(001)Main Server Rm - Cable Laying and termination at Location 1 and Location 2
EM1020	L2(001)Main Server Rm - Cable Splicing and Testing and Labeling
EM1040	L2(001)Main Server Rm - AVCSS Network and Server Installation
EM1060	L2(001)Main Server Rm - AVCSS Network and Server Tuning
	Location 3(Inbd Cargo Exam Bldg (037) MDF Room)
	Location 3(Inbd Cargo Exam Bldg (037) ELV Room)
	Location 3(Inbd Cargo Exam Bldg (037) Inspector Offices 128,129,130,131,128,129,14
EM2020	L3(037)Inspec Offices - Cable Laying and termination in Location 3 and Location 3a
EM2040	L3(037)Inspec Offices - Cable Splicing and Testing and Labeling
EM2060	L3(037)Inspec Offices - AVCSS SURCON WS and 55" LCD Installation
EM2080	L3(037)Inspec Offices - VTS WS Installation
EM2100	L3(037)Inspec Offices - SURCON and WS Tuning
	Location 3(Inbd Cargo Exam Bldg (037) Platform Control Room)
EM1160	L3(037)PLF Ctrl Rm - Cable Laying and termination in Location 3 and Location 3a
EM1180	L3(037)PLF Ctrl Rm - Cable Splicing and Testing and Labeling
EM1200	L3(037)PLF Ctrl Rm - AVCSS SYSCON WS and 55" TV Wall Installation
EM1220	L3(037)PLF Ctrl Rm - AVCSS SYSCON WS Tuning



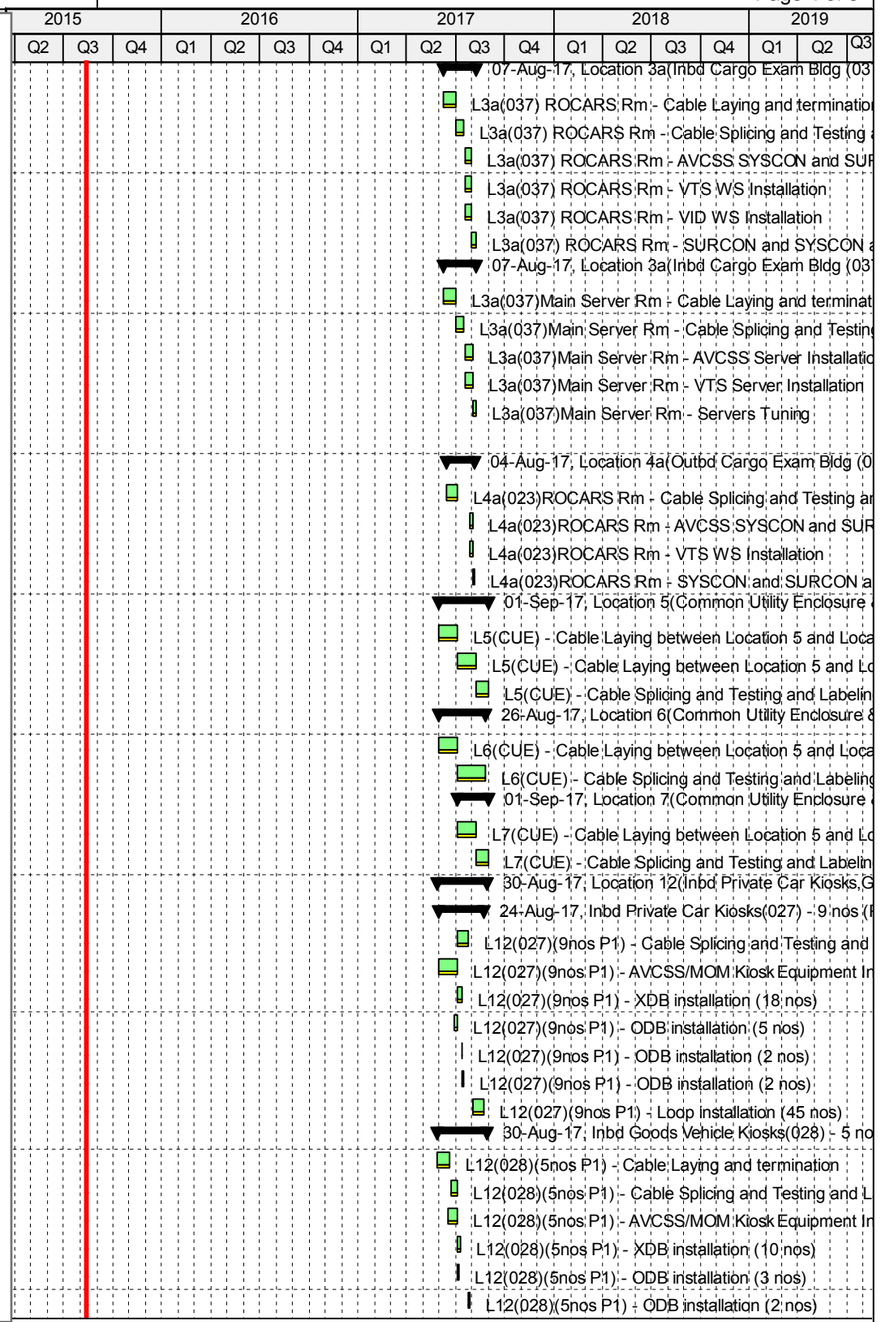
Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
Location 3a(Inbd Cargo Exam Bldg (037) ROCARS Room)	
EM1240	L3a(037) ROCARS Rm - Cable Laying and termination in Location 3 and Location 3a
EM1260	L3a(037) ROCARS Rm - Cable Splicing and Testing and Labeling
EM1280	L3a(037) ROCARS Rm - AVCSS SYSCON and SURCON and Intercom Installation
EM1300	L3a(037) ROCARS Rm - VTS WS Installation
EM1320	L3a(037) ROCARS Rm - VID WS Installation
EM1340	L3a(037) ROCARS Rm - SURCON and SYSCON and WS Tuning
Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room)	
EM2120	L3a(037)Main Server Rm - Cable Laying and termination in Location 3 and Location 3a
EM2140	L3a(037)Main Server Rm - Cable Splicing and Testing and Labeling
EM2160	L3a(037)Main Server Rm - AVCSS Server Installation
EM2180	L3a(037)Main Server Rm - VTS Server Installation
EM2200	L3a(037)Main Server Rm - Servers Tuning
Location 4(Outbd Cargo Exam Bldg (023) MDF Room)	
Location 4a(Outbd Cargo Exam Bldg (023) ROCARS Room)	
EM2240	L4a(023)ROCARS Rm - Cable Splicing and Testing and Labeling
EM2260	L4a(023)ROCARS Rm - AVCSS SYSCON and SURCON and Intercom Installation
EM2280	L4a(023)ROCARS Rm - VTS WS Installation
EM2300	L4a(023)ROCARS Rm - SYSCON and SURCON and WS Tuning
Location 5(Common Utility Enclosure & Staff Subway)	
EM2341	L5(CUE) - Cable Laying between Location 5 and Location 6
EM2361	L5(CUE) - Cable Laying between Location 5 and Location 7
EM2380	L5(CUE) - Cable Splicing and Testing and Labeling
Location 6(Common Utility Enclosure & Staff Subway)	
EM2400	L6(CUE) - Cable Laying between Location 5 and Location 6
EM2420	L6(CUE) - Cable Splicing and Testing and Labeling
Location 7(Common Utility Enclosure & Staff Subway)	
EM2440	L7(CUE) - Cable Laying between Location 5 and Location 7
EM2460	L7(CUE) - Cable Splicing and Testing and Labeling
Location 12(Inbd Private Car Kiosks,GV Kiosks (027,028,029))	
Inbd Private Car Kiosks(027) - 9 nos (Phase 1)	
EM1500	L12(027)(9nos P1) - Cable Splicing and Testing and Labeling
EM1520	L12(027)(9nos P1) - AVCSS/MOM Kiosk Equipment Installation (9 nos)
EM1541	L12(027)(9nos P1) - XDB installation (18 nos)
EM1542	L12(027)(9nos P1) - ODB installation (5 nos)
EM1543	L12(027)(9nos P1) - ODB installation (2 nos)
EM1544	L12(027)(9nos P1) - ODB installation (2 nos)
EM1560	L12(027)(9nos P1) - Loop installation (45 nos)
Inbd Goods Vehicle Kiosks(028) - 5 nos (Phase 1)	
EM1620	L12(028)(5nos P1) - Cable Laying and termination
EM1640	L12(028)(5nos P1) - Cable Splicing and Testing and Labeling
EM1660	L12(028)(5nos P1) - AVCSS/MOM Kiosk Equipment Installation (5 nos)
EM1681	L12(028)(5nos P1) - XDB installation (10 nos)
EM1682	L12(028)(5nos P1) - ODB installation (3 nos)
EM1683	L12(028)(5nos P1) - ODB installation (2 nos)



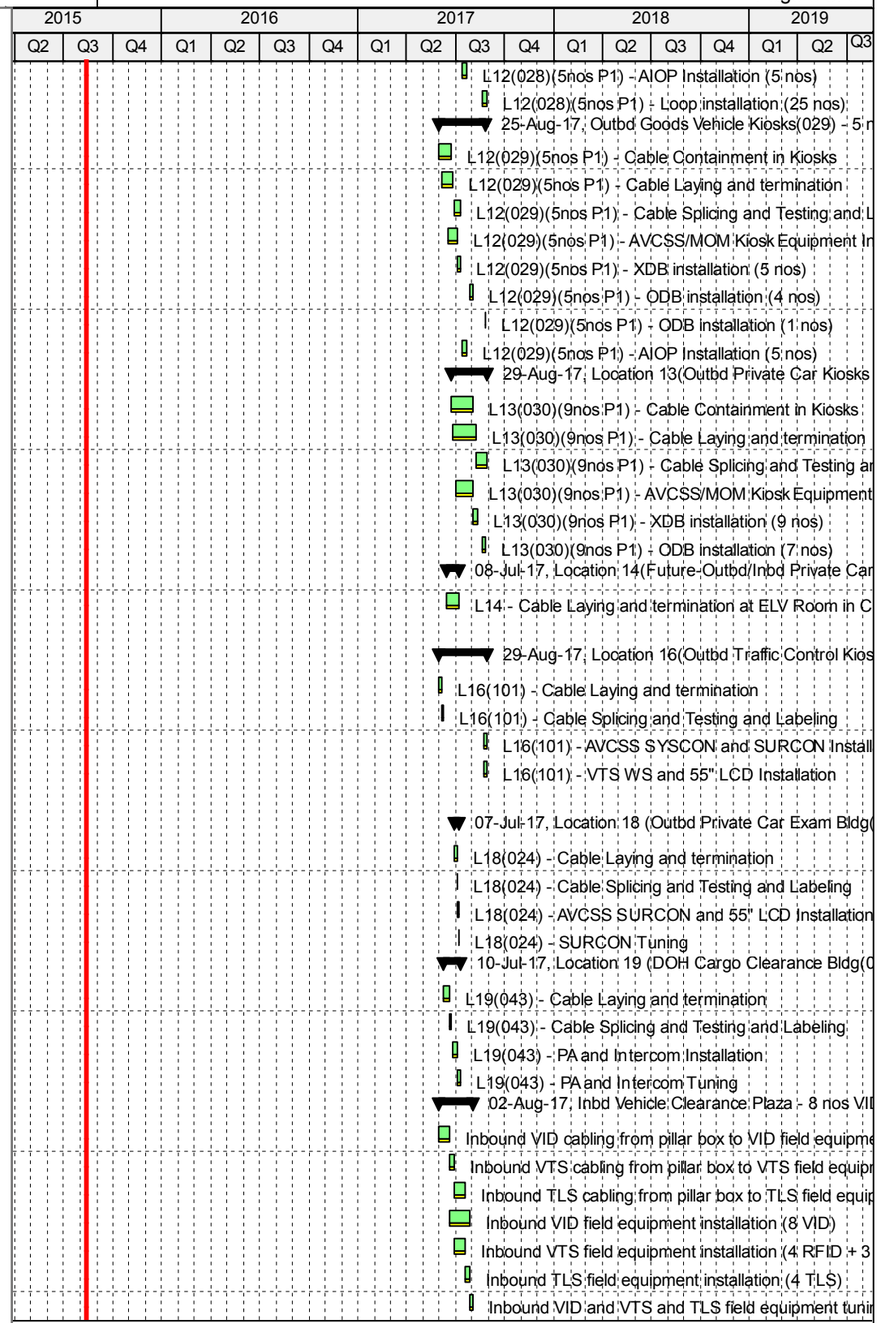
Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
EM1700	L12(028)(5nos P1) - AIOP Installation (5 nos)
EM1720	L12(028)(5nos P1) - Loop installation (25 nos)
Outbd Goods Vehicle Kiosks(029) - 5 nos (Phase 1)	
EM1740	L12(029)(5nos P1) - Cable Containment in Kiosks
EM1760	L12(029)(5nos P1) - Cable Laying and termination
EM1780	L12(029)(5nos P1) - Cable Splicing and Testing and Labeling
EM1800	L12(029)(5nos P1) - AVCSS/MOM Kiosk Equipment Installation (5 nos)
EM1821	L12(029)(5nos P1) - XDB installation (5 nos)
EM1822	L12(029)(5nos P1) - ODB installation (4 nos)
EM1823	L12(029)(5nos P1) - ODB installation (1 nos)
EM1840	L12(029)(5nos P1) - AIOP Installation (5 nos)
Location 13(Outbd Private Car Kiosks (030)) - 9 nos (Phase 1)	
EM2520	L13(030)(9nos P1) - Cable Containment in Kiosks
EM2540	L13(030)(9nos P1) - Cable Laying and termination
EM2560	L13(030)(9nos P1) - Cable Splicing and Testing and Labeling
EM2580	L13(030)(9nos P1) - AVCSS/MOM Kiosk Equipment Installation (9 nos)
EM2601	L13(030)(9nos P1) - XDB installation (9 nos)
EM2602	L13(030)(9nos P1) - ODB installation (7 nos)
Location 14(Future-Outbd/Inbd Private Car Kiosks) - 6+6 nos	
EM1440	L14 - Cable Laying and termination at ELV Room in CUE
Location 15(Inbd Traffic Control Kiosk (100))	
Location 16(Outbd Traffic Control Kiosk (101))	
EM2760	L16(101) - Cable Laying and termination
EM2780	L16(101) - Cable Splicing and Testing and Labeling
EM2800	L16(101) - AVCSS SYSCON and SURCON Installation
EM2820	L16(101) - VTS WS and 55" LCD Installation
Location 17(Inbd Private Car Exam Bldg(033) Operational Office)	
Location 18 (Outbd Private Car Exam Bldg(024) Operational Office)	
EM2940	L18(024) - Cable Laying and termination
EM2960	L18(024) - Cable Splicing and Testing and Labeling
EM2980	L18(024) - AVCSS SURCON and 55" LCD Installation
EM3000	L18(024) - SURCON Tuning
Location 19 (DOH Cargo Clearance Bldg(043))	
EM1360	L19(043) - Cable Laying and termination
EM1380	L19(043) - Cable Splicing and Testing and Labeling
EM1400	L19(043) - PA and Intercom Installation
EM1420	L19(043) - PA and Intercom Tuning
Inbd Vehicle Clearance Plaza - 8 nos VID, 7 nos VTS, 4 nos TLS	
EM3020	Inbound VID cabling from pillar box to VID field equipment
EM3040	Inbound VTS cabling from pillar box to VTS field equipment
EM3060	Inbound TLS cabling from pillar box to TLS field equipment
EM3080	Inbound VID field equipment installation (8 VID)
EM3100	Inbound VTS field equipment installation (4 RFID + 3 Cameras)
EM3120	Inbound TLS field equipment installation (4 TLS)
EM3140	Inbound VID and VTS and TLS field equipment tuning



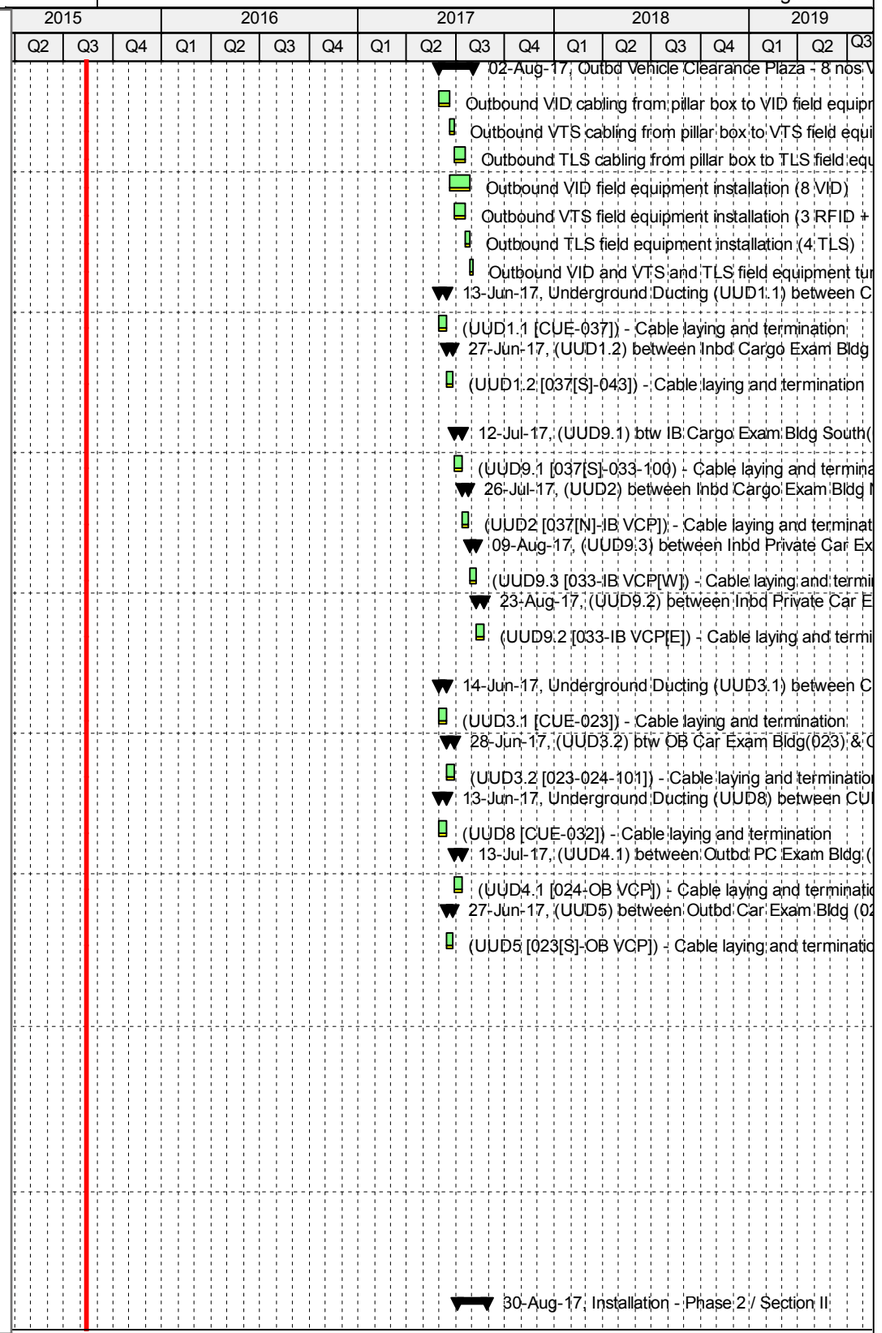
Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities - Automatic Vehicle Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
	Outbd Vehicle Clearance Plaza - 8 nos VID, 6 nos VTS, 4 nos TLS
EM3160	Outbound VID cabling from pillar box to VID field equipment
EM3180	Outbound VTS cabling from pillar box to VTS field equipment
EM3200	Outbound TLS cabling from pillar box to TLS field equipment
EM3220	Outbound VID field equipment installation (8 VID)
EM3240	Outbound VTS field equipment installation (3 RFID + 3 Cameras)
EM3260	Outbound TLS field equipment installation (4 TLS)
EM3280	Outbound VID and VTS and TLS field equipment tuning
	Underground Ducting (UUD1.1) between CUE and Inbd Cargo Exam Bldg (037)
UD1000	(UUD1.1 [CUE-037]) - Cable laying and termination
	(UUD1.2) between Inbd Cargo Exam Bldg South (037[S]) and DOH Cargo Clearance Bl
UD1060	(UUD1.2 [037[S]-043]) - Cable laying and termination
	Underground Ducting (UUD6) between CUE and Shuttle Bus Kiosk (006) and Inbd Priv
	(UUD9.1) btw IB Cargo Exam Bldg South(037[S]) & IB PC Exam Bldg(033) & IB Traffic
UD1040	(UUD9.1 [037[S]-033-100) - Cable laying and termination
	(UUD2) between Inbd Cargo Exam Bldg North (037[N]) to Inbd VCP
UD1010	(UUD2 [037[N]-IB VCP]) - Cable laying and termination
	(UUD9.3) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clearance Plaza
UD1070	(UUD9.3 [033-IB VCP[W]) - Cable laying and termination
	(UUD9.2) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clearance Plaza
UD1020	(UUD9.2 [033-IB VCP[E]) - Cable laying and termination
	Underground Ducting (UUD7) between PCB(001) and Inbd Coach Kiosks(010)
	Underground Ducting (UUD3.1) between CUE and Outbd Cargo Exam Bldg (023)
UD1030	(UUD3.1 [CUE-023]) - Cable laying and termination
	(UUD3.2) btw OB Car Exam Bldg(023) & OB PC Exam Bldg(024) & OB Traffic Control I
UD1050	(UUD3.2 [023-024-101]) - Cable laying and termination
	Underground Ducting (UUD8) between CUE and Outbd PCA (032)
UD1100	(UUD8 [CUE-032]) - Cable laying and termination
	(UUD4.1) between Outbd PC Exam Bldg (024) and Outbd Vehicle Clearance Plaza
UD1080	(UUD4.1 [024-OB VCP]) - Cable laying and termination
	(UUD5) between Outbd Car Exam Bldg (023[S]) and Outbd Vehicle Clearance Plaza
UD1090	(UUD5 [023[S]-OB VCP]) - Cable laying and termination
	Initial On-Site Test and Commissioning / Pre-SAT (Phase 1 / Section I)
	Site Acceptance Test (Phase 1 / Section I)
	Security Risk Assessment and Audit
	Operability Period Test (Phase 1 / Section I)
	Completion (Phase 1 /Section I)
	Training and Document (Phase 1 /Section I)
	Operation (Phase 1 /Section I)
	Engineering Support for Phase 1 / Section I
	Procurement - Phase 2 / Section II
	Delivery and Bench Acceptance Test for Phase 2/Section II
	Installation - Phase 2 / Section II



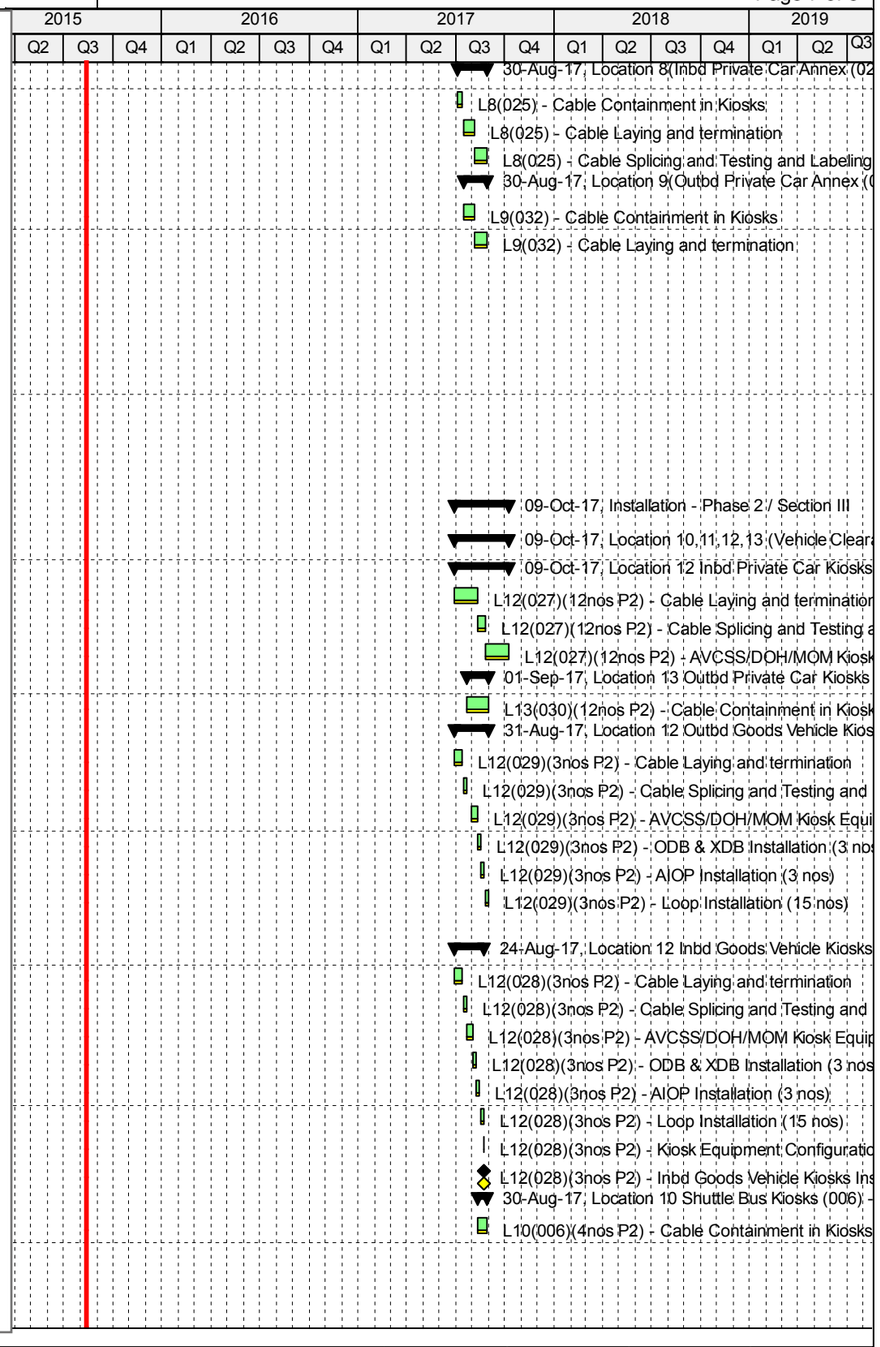
Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities - Automatic Vehicle Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
	Location 8(Inbd Private Car Annex (025)) (Phase 2)
EM3370	L8(025) - Cable Containment in Kiosks
EM3380	L8(025) - Cable Laying and termination
EM3400	L8(025) - Cable Splicing and Testing and Labeling
	Location 9(Outbd Private Car Annex (032)) (Phase 2)
EM3500	L9(032) - Cable Containment in Kiosks
EM3520	L9(032) - Cable Laying and termination
	Initial On-Site Test and Commissioning / Pre-SAT (Phase 2 / Section II)
	Site Acceptance Test (Phase 2 / Section II)
	Operability Period Test (Phase 2 / Section II)
	Completion (Phase 2 / Section II)
	Engineering Support for Phase 2 / Section II
	Procurement for Phase2 / Section III
	Delivery and Bench Acceptance Test for Phase2 / Section III
	Installation - Phase 2 / Section III
	Location 10,11,12,13 (Vehicle Clearance Kiosks)
	Location 12 Inbd Private Car Kiosks (027) - 12 nos (Phase 2)
EM4440	L12(027)(12nos P2) - Cable Laying and termination
EM4460	L12(027)(12nos P2) - Cable Splicing and Testing and Labeling
EM4480	L12(027)(12nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (12 nos)
	Location 13 Outbd Private Car Kiosks (030) - 12 nos (Phase 2)
EM4560	L13(030)(12nos P2) - Cable Containment in Kiosks
	Location 12 Outbd Goods Vehicle Kiosks (029) - 3 nos (Phase 2)
EM4880	L12(029)(3nos P2) - Cable Laying and termination
EM4900	L12(029)(3nos P2) - Cable Splicing and Testing and Labeling
EM4920	L12(029)(3nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (3 nos)
EM4940	L12(029)(3nos P2) - ODB & XDB Installation (3 nos)
EM4960	L12(029)(3nos P2) - AIOP Installation (3 nos)
EM4980	L12(029)(3nos P2) - Loop Installation (15 nos)
	Location 11 Outbd Coach Kiosks (009) - 4 nos (Phase 2)
	Location 12 Inbd Goods Vehicle Kiosks (028) - 3 nos (Phase 2)
EM4720	L12(028)(3nos P2) - Cable Laying and termination
EM4740	L12(028)(3nos P2) - Cable Splicing and Testing and Labeling
EM4760	L12(028)(3nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (3 nos)
EM4780	L12(028)(3nos P2) - ODB & XDB Installation (3 nos)
EM4800	L12(028)(3nos P2) - AIOP Installation (3 nos)
EM4820	L12(028)(3nos P2) - Loop Installation (15 nos)
EM4840	L12(028)(3nos P2) - Kiosk Equipment Configuration (3 nos)
EM5120	L12(028)(3nos P2) - Inbd Goods Vehicle Kiosks Installation Complete
	Location 10 Shuttle Bus Kiosks (006) - 4 nos (Phase 2)
EM4000	L10(006)(4nos P2) - Cable Containment in Kiosks
	Location 11 Inbd Coach Kiosks (010) - 2 nos (Phase 2)-1
	Location 11 Inbd Coach Kiosks (010) - 2 nos (Phase 2)-2
	Initial On-Site Test and Commissioning / Pre-SAT (Phase 2 / Section III)



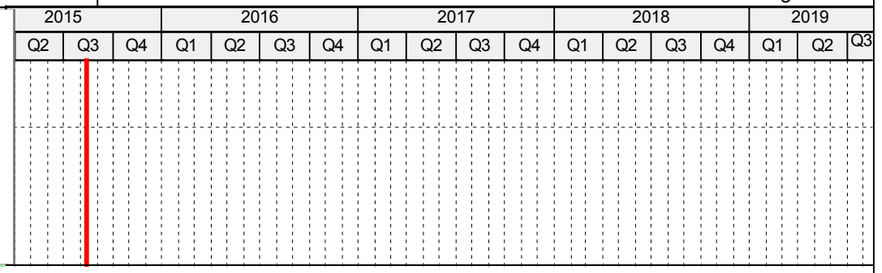
Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities - Automatic Vehicle Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
	Site Acceptance Test (Phase 2 / Section III)
	Operability Period Test (Phase 2 / Section III)
	Completion (Phase 2 / Section III)
	Operation (Phase 2 / Section III)
	Defect Liability Period (DLP)
	Document Submission (Phase 2 / Section III)



Programme No.: HZMB-DWP
Data Date: 14-Aug-15

Actual Level of Effort
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone
summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

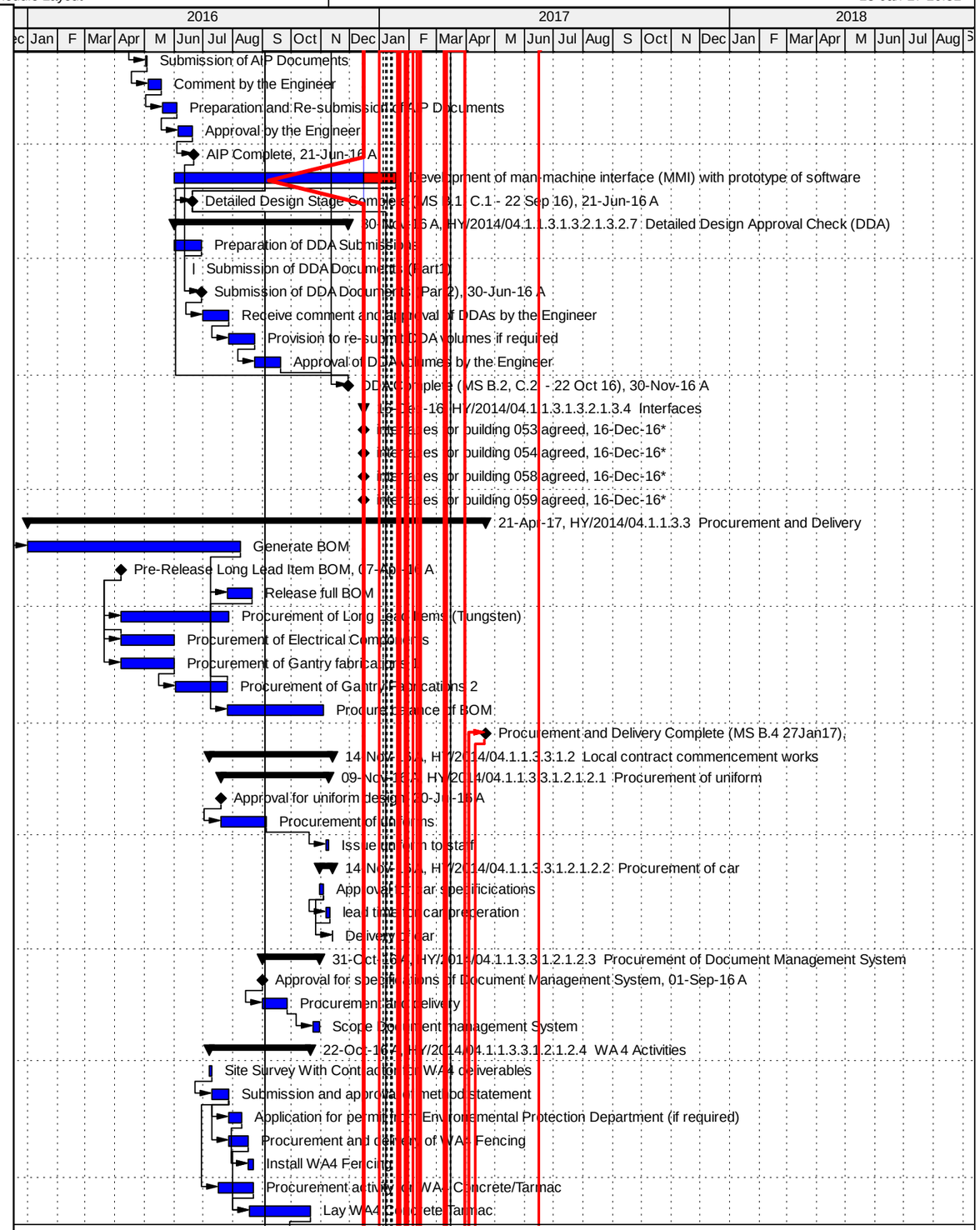
Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name
HY/2014/04	Hong Kong-Zhuhai-Macao Brid
HY/2014/04.1	Contract No. HY/2014/04 Hong
HY/2014/04.1.1.1	Contract Award
3	Letter of Acceptance
4	Contract Signing
HY/2014/04.1.1.1.1	Milestone
HY/2014/04.1.1.1.1.1	Cost Centre B
A1(	MS B1 - Submission of Draft Detailed Design Do
A1(	MS B2 - Submission of Final Detailed Design Do
A1(	MS B3 - Acceptance of Factory Acceptance Test
A1(	MS B4 - Complete order and delivery on Site of a
A1(	MS B5 - Acceptance of Integration Test
A1(	MS B6 - Acceptance of Site Acceptance Test
A1(	MS B7 - Acceptance of Operability Test
A1(	MS B8 - Issue of Certificate of Completion for wc
HY/2014/04.1.1.1.1.2	Cost Centre C
A1(	MS C1 - Submission of Draft Detailed Design Do
A11	MS C2 - Submission of Final Detailed Design Do
A11	MS C3 - Acceptance of Factory Acceptance Tes
A11	MS C4 - Complete order and delivery on Site of a
A11	MS C5 - Acceptance of Integration Test
A11	MS C6 - Acceptance of Site Acceptance Test
A11	MS C7 - Acceptance of Operability Test
A11	MS C8 - Issue of Certificate of Completion for wc
HY/2014/04.1.1.1.1.3.5	Site Access
HY/2014/04.1.1.1.1.3.5.1.3.5.1	Location 1 - Cargo Exa
100	Inbound Cargo Exam Bldg - Degree 2 inspection
102	Outbound Cargo Exam Bldg - Degree 1 inspection
103	Outbound Cargo Exam Bldg - Degree 1 inspectic
104	Outbound Cargo Exam Bldg - Degree 2 inspection
105	Outbound Cargo Exam Bldg - Degree 2 inspectic
97	Inbound Cargo Exam Bldg - Degree 1 inspection
98	Inbound Cargo Exam Bldg - Degree 1 inspection
99	Inbound Cargo Exam Bldg - Degree 2 inspection
HY/2014/04.1.1.1.1.3.5.1.3.5.3	Location 2 - X-ray Build
107	Inbound X-Ray Bldg - Degree 2 inspection
108	Inbound X-Ray Bldg - Degree 2 inspection comp
HY/2014/04.1.1.1.1.3.5.1.3.5.4	Location 3 - X-Ray Scar
110	Inbound/Outbound X-Ray Scan Tunnel - Degree
111	Inbound/Outbound X-Ray Scan Tunnel - Degree
112	Inbound/Outbound X-Ray Scan Tunnel - Degree
113	Inbound X-Ray Scan Tunnel - Degree 2 inspectic
HY/2014/04.1.1.3	Design, build, supply and install
28	Commencement of design Works
HY/2014/04.1.1.3.1.3.2	Detailed Design Stage
30	Kick-off Meeting
31	Project Charter
32	Liaison with Building Contractors on civil provisio
33	Interface and Coordination with interfacing contra
35	Presentation of the workflow and system design
36	Preparation of AIP Submissions, including checki

Actual Level of Effort | Remaining Work | Milestone
Actual Work | Critical Remaining Work | summary

TASK filter: All Activities

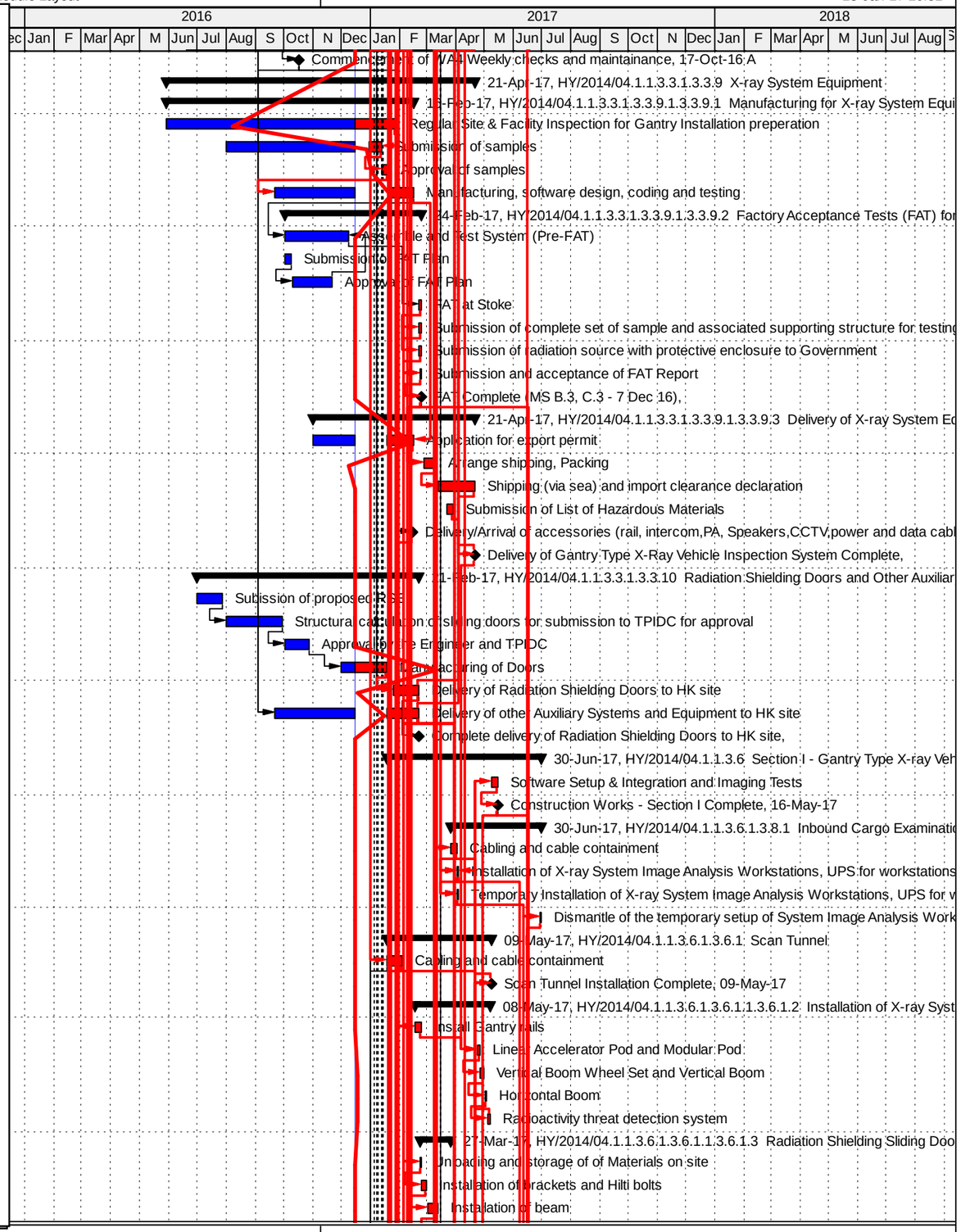
Activity ID	Activity Name
37	Submission of AIP Documents
38	Comment by the Engineer
39	Preparation and Re-submission of AIP Documents
40	Approval by the Engineer
41	AIP Complete
42	Development of man-machine interface (MMI) wi
51	Detailed Design Stage Complete (MS B.1, C.1 - 2
HY/2014/04.1.1.3.1.3.2.1.3.2.7 Detailed Design Approv	
44	Preparation of DDA Submissions
45	Submission of DDA Documents (Part1)
46	Submission of DDA Documents (Part2)
47	Receive comment and approval of DDAs by the I
48	Provision to re-submit DDA volumes if required
49	Approval of DDA volumes by the Engineer
50	DDA Complete (MS B.2, C.2 - 22 Oct 16)
HY/2014/04.1.1.3.1.3.2.1.3.4 Interfaces	
91	interfaces for building 053 agreed
92	interfaces for building 054 agreed
93	interfaces for building 058 agreed
94	interfaces for building 059 agreed
HY/2014/04.1.1.3.3 Procurement and Delivery	
53	Generate BOM
54	Pre-Release Long Lead Item BOM
55	Release full BOM
56	Procurement of Long Lead Items (Tungsten)
57	Procurement of Electrical Components
58	Procurement of Gantry fabrications 1
59	Procurement of Gantry Fabrications 2
60	Procure balance of BOM
89	Procurement and Delivery Complete (MS B.4 27.
HY/2014/04.1.1.3.3.1.2 Local contract commencement w	
HY/2014/04.1.1.3.3.1.2.1.2.1 Procurement of uniform	
7	Approval for uniform design
8	Procurement of uniforms
9	Issue uniform to staff
HY/2014/04.1.1.3.3.1.2.1.2.2 Procurement of car	
11	Approval for car specificications
12	lead time for car preperation
13	Delivery of car
HY/2014/04.1.1.3.3.1.2.1.2.3 Procurement of Docume	
15	Approval for specifications of Document Manage
16	Procurement and delivery
17	Scope Document management System
HY/2014/04.1.1.3.3.1.2.1.2.4 WA 4 Activities	
19	Site Survey With Contractor for WA4 deliverables
20	Submission and approval of method statement
21	Application for permit from Environemental Prote
22	Procurement and delivery of WA4 Fencing
23	Install WA4 Fencing
24	Procurement activity for WA4 Concrete/Tarmac
25	Lay WA4 Concrete/Tarmac



Actual Level of Effort | Actual Work | Remaining Work | Critical Remaining Work | Milestone | summary

TASK filter: All Activities

Activity ID	Activity Name
26	Commencement of WA4 Weekly checks and ma
HY/2014/04.1.1.3.3.1.3.3.9	X-ray System Equipment
HY/2014/04.1.1.3.3.1.3.3.9.1.3.3.9.1	Manufacturing for
63	Regular Site & Facility Inspection for Gantry Insta
64	Submission of samples
65	Approval of samples
66	Manufacturing, software design, coding and testin
HY/2014/04.1.1.3.3.1.3.3.9.1.3.3.9.2	Factory Acceptanc
68	Assemble and Test System (Pre-FAT)
69	Submission of FAT Plan
69.5	Approval of FAT Plan
70	FAT at Stoke
71	Submission of complete set of sample and asso
72	Submission of radiation source with protective er
73	Submission and acceptance of FAT Report
74	FAT Complete (MS B.3, C.3 - 7 Dec 16)
HY/2014/04.1.1.3.3.1.3.3.9.1.3.3.9.3	Delivery of X-ray S
76	Application for export permit
77	Arrange shipping, Packing
78	Shipping (via sea) and import clearance declaratio
79	Submission of List of Hazardous Materials
80	Delivery/Arrival of accessories (rail, intercom,PA,
81	Delivery of Gantry Type X-Ray Vehicle Inspectior
HY/2014/04.1.1.3.3.1.3.3.10	Radiation Shielding Doors a
83	Subission of proposed RSE
84	Structural calculation of sliding doors for submis
85	Approval by the Engineer and TPIDC
86	Manufacturing of Doors
87	Delivery of Radiation Shielding Doors to HK site
88	Delivery of other Auxiliary Systems and Equipmer
A1000	Complete delivery of Radiation Shielding Doors to
HY/2014/04.1.1.3.6	Section I - Gantry Type X-ray Vehi
212	Software Setup & Integration and Imaging Tests
213	Construction Works - Section I Complete
HY/2014/04.1.1.3.6.1.3.8.1	Inbound Cargo Examination I
315	Cabling and cable containment
316	Installation of X-ray System Image Analysis Work
317	Temporary Installation of X-ray System Image An
318	Dismantle of the temporary setup of System Ima
HY/2014/04.1.1.3.6.1.3.6.1	Scan Tunnel
116	Cabling and cable containment
140	Scan Tunnel Installation Complete
HY/2014/04.1.1.3.6.1.3.6.1.1.3.6.1.2	Installation of X-ra
118	Install Gantry rails
119	Linear Accelerator Pod and Modular Pod
120	Vertical Boom Wheel Set and Vertical Boom
121	Horizontal Boom
122	Radioactivity threat detection system
HY/2014/04.1.1.3.6.1.3.6.1.1.3.6.1.3	Radiation Shieldin
124	Unloading and storage of of Materials on site
125	Installation of brackets and Hilti bolts
126	Installation of beam



Actual Level of Effort | Remaining Work | Milestone
Actual Work | Critical Remaining Work | summary

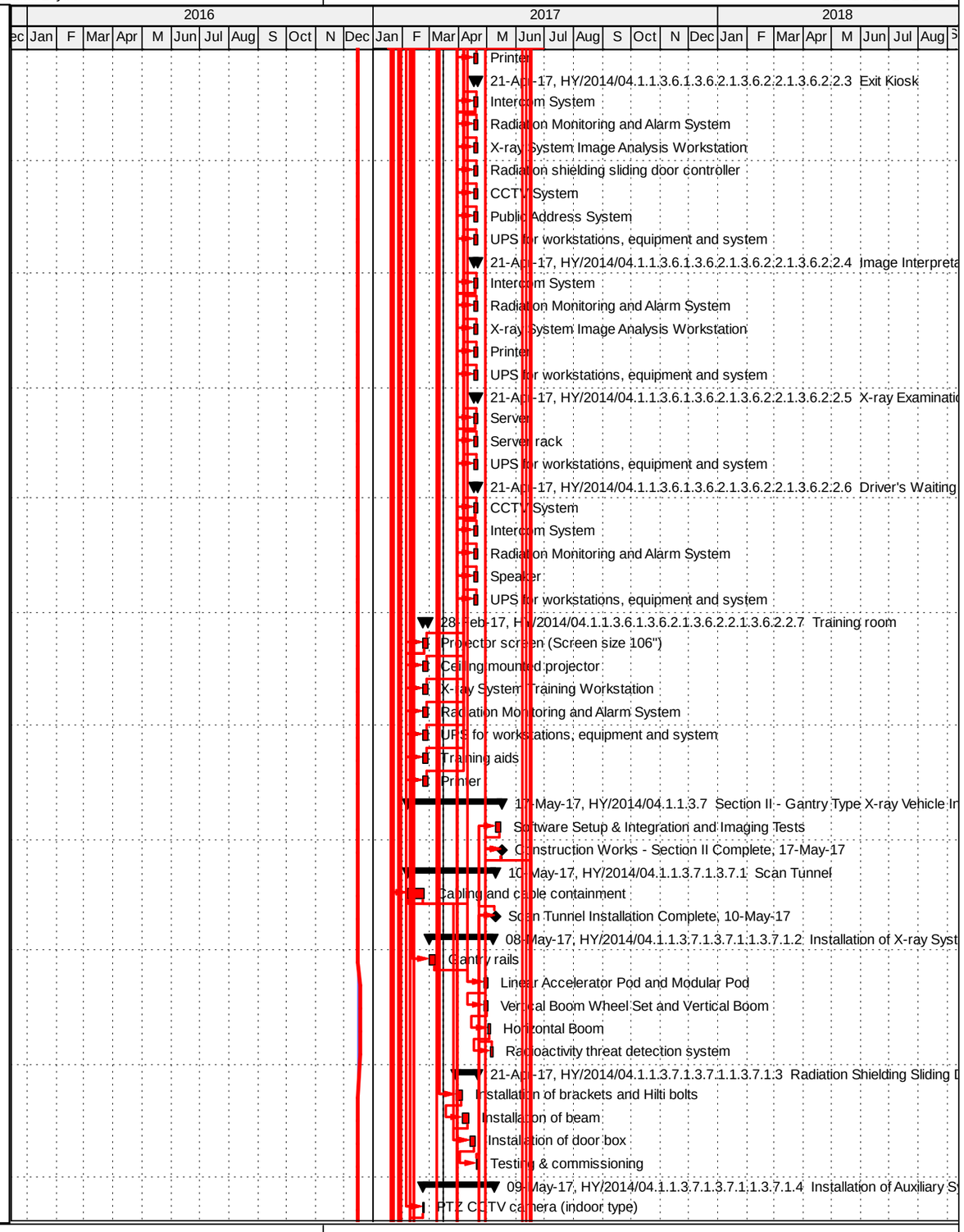
TASK filter: All Activities

Activity ID	Activity Name
127	Installation of door box
128	Testing & commissioning
HY/2014/04.1.1.3.6.1.3.6.1.1.3.6.1.4	Installation of oth
130	PTZ CCTV camera (indoor type)
131	PTZ CCTV camera (outdoor type)
132	Humidity Sensor
133	CCTV Control System
134	Drop arm barrier, stop/go light and connection to
135	Perimeter Alarm System and connection to the x-
136	Infra-red over-height detection portal and connec
137	Control, monitoring and alarms of infra-red over-
138	Personal X-ray Dosimeter
139	UPS for workstations, equipment and system
HY/2014/04.1.1.3.6.1.3.6.2	X-ray Building
211	X-ray Building Installation Complete
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.1	Cabling and cable
143	Entry Kiosk
144	Control Room
145	Exit Kiosk
146	Image Interpretation Room
147	X-ray Examination System Operation Room
148	Driver's Waiting Room
149	Training Room
150	Cabling and cable containment complete
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2	Equipment Installa
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2.1.3.6.2.2.1	Entry
:	X-ray System Image Analysis Workstation
:	CCTV System
:	Intercom System
:	Public Address System
:	Perimeter Alarm System
:	Radiation Monitoring and Alarm System
:	Over Height Detection System alarm
:	Drop Arm Barrirer controller
:	Radiation shielding sliding door controller
:	UPS for workstations, equipment and system
:	Speaker
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2.1.3.6.2.2.2	Cont
:	Video Wall (4nos. 55" LED)
:	UPS for workstations, equipment and system
:	CCTV System
:	Public Address System
:	Intercom System
:	Radiation Monitoring and Alarm System
:	Perimeter Alarm system
:	Wall-mounted Display Unit of Humidity Sensor
:	Over Height Detection System alarm
:	Drop Arm Barrier controller
:	Radiation shielding sliding door controller
:	X-ray System Control Workstation
:	Scanner

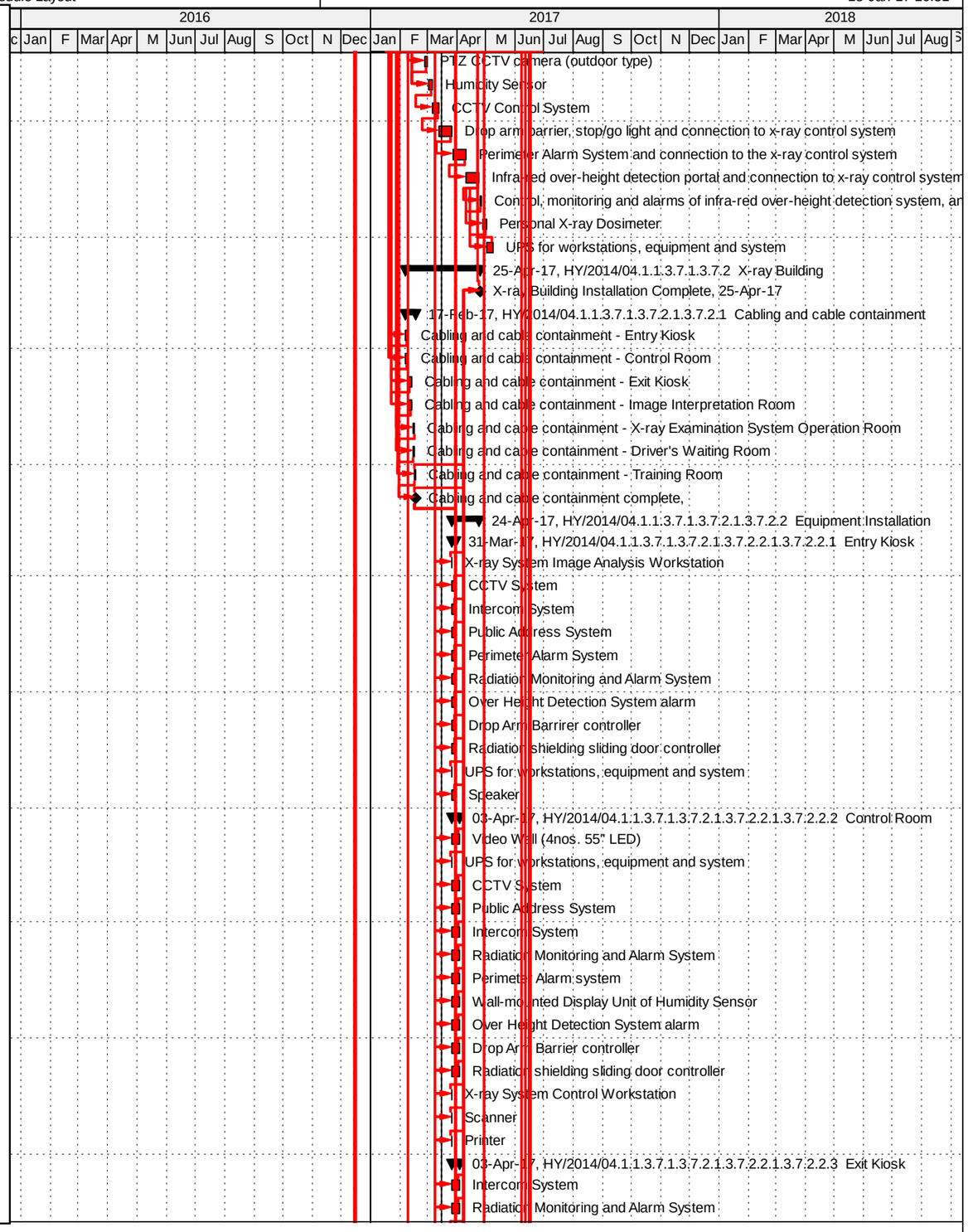
Actual Level of Effort | Remaining Work | Milestone
Actual Work | Critical Remaining Work | summary

TASK filter: All Activities

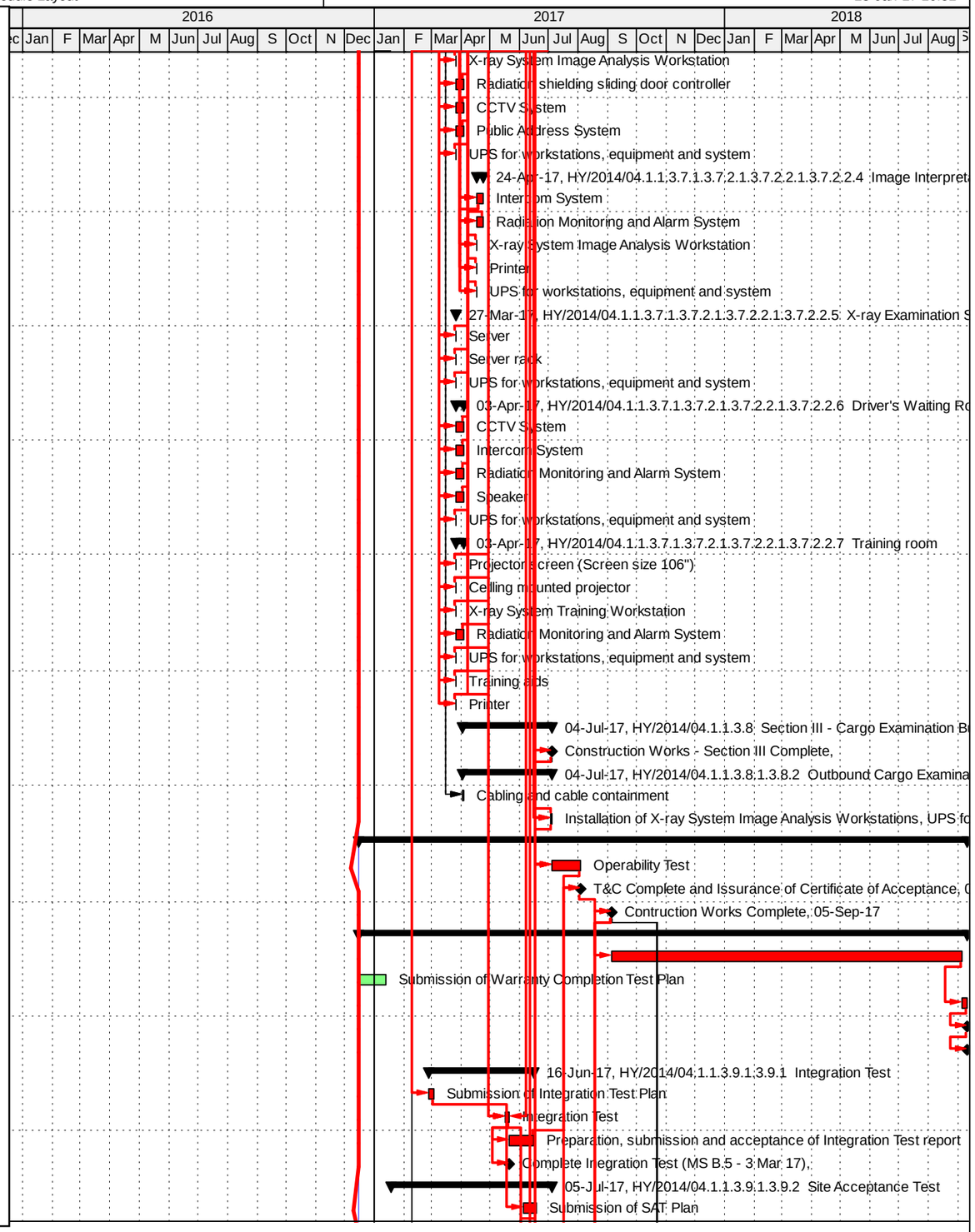
Activity ID	Activity Name
:	Printer
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2.1.3.6.2.2.3	Exit K
:	Intercom System
:	Radiation Monitoring and Alarm System
:	X-ray System Image Analysis Workstation
:	Radiation shielding sliding door controller
:	CCTV System
:	Public Address System
:	UPS for workstations, equipment and system
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2.1.3.6.2.2.4	Imag
:	Intercom System
:	Radiation Monitoring and Alarm System
:	X-ray System Image Analysis Workstation
:	Printer
:	UPS for workstations, equipment and system
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2.1.3.6.2.2.5	X-ray
:	Server
:	Server rack
:	UPS for workstations, equipment and system
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2.1.3.6.2.2.6	Drive
:	CCTV System
:	Intercom System
:	Radiation Monitoring and Alarm System
:	Speaker
:	UPS for workstations, equipment and system
HY/2014/04.1.1.3.6.1.3.6.2.1.3.6.2.2.1.3.6.2.2.7	Train
:	Projector screen (Screen size 106")
:	Ceilling mounted projector
:	X-ray System Training Workstation
:	Radiation Monitoring and Alarm System
:	UPS for workstations, equipment and system
:	Training aids
:	Printer
HY/2014/04.1.1.3.7	Section II - Gantry Type X-ray Vehi
311	Software Setup & Integration and Imaging Tests
312	Construction Works - Section II Complete
HY/2014/04.1.1.3.7.1.3.7.1	Scan Tunnel
216	Cabling and cable containment
239	Scan Tunnel Installation Complete
HY/2014/04.1.1.3.7.1.3.7.1.1.3.7.1.2	Installation of X-ra
218	Gantry rails
219	Linear Accelerator Pod and Modular Pod
220	Vertical Boom Wheel Set and Vertical Boom
221	Horizontal Boom
222	Radioactivity threat detection system
HY/2014/04.1.1.3.7.1.3.7.1.1.3.7.1.3	Radiation Shieldin
224	Installation of brackets and Hilti bolts
225	Installation of beam
226	Installation of door box
227	Testing & commissioning
HY/2014/04.1.1.3.7.1.3.7.1.1.3.7.1.4	Installation of Aux
229	PTZ CCTV camera (indoor type)



Activity ID	Activity Name
230	PTZ CCTV camera (outdoor type)
231	Humidity Sensor
232	CCTV Control System
233	Drop arm barrier, stop/go light and connection to
234	Perimeter Alarm System and connection to the x-
235	Infra-red over-height detection portal and connec
236	Control, monitoring and alarms of infra-red over-
237	Personal X-ray Dosimeter
238	UPS for workstations, equipment and system
HY/2014/04.1.1.3.7.1.3.7.2 X-ray Building	
310	X-ray Building Installation Complete
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.1 Cabling and cable	
242	Cabling and cable containment - Entry Kiosk
243	Cabling and cable containment - Control Room
244	Cabling and cable containment - Exit Kiosk
245	Cabling and cable containment - Image Interpret
246	Cabling and cable containment - X-ray Examinati
247	Cabling and cable containment - Driver's Waiting
248	Cabling and cable containment - Training Room
249	Cabling and cable containment complete
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2 Equipment Installa	
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2.1.3.7.2.2.1 Entry	
2	X-ray System Image Analysis Workstation
2	CCTV System
2	Intercom System
2	Public Address System
2	Perimeter Alarm System
2	Radiation Monitoring and Alarm System
2	Over Height Detection System alarm
2	Drop Arm Barrirer controller
2	Radiation shielding sliding door controller
2	UPS for workstations, equipment and system
2	Speaker
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2.1.3.7.2.2.2 Cont	
2	Video Wall (4nos. 55" LED)
2	UPS for workstations, equipment and system
2	CCTV System
2	Public Address System
2	Intercom System
2	Radiation Monitoring and Alarm System
2	Perimeter Alarm system
2	Wall-mounted Display Unit of Humidity Sensor
2	Over Height Detection System alarm
2	Drop Arm Barrier controller
2	Radiation shielding sliding door controller
2	X-ray System Control Workstation
2	Scanner
2	Printer
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2.1.3.7.2.2.3 Exit K	
2	Intercom System
2	Radiation Monitoring and Alarm System



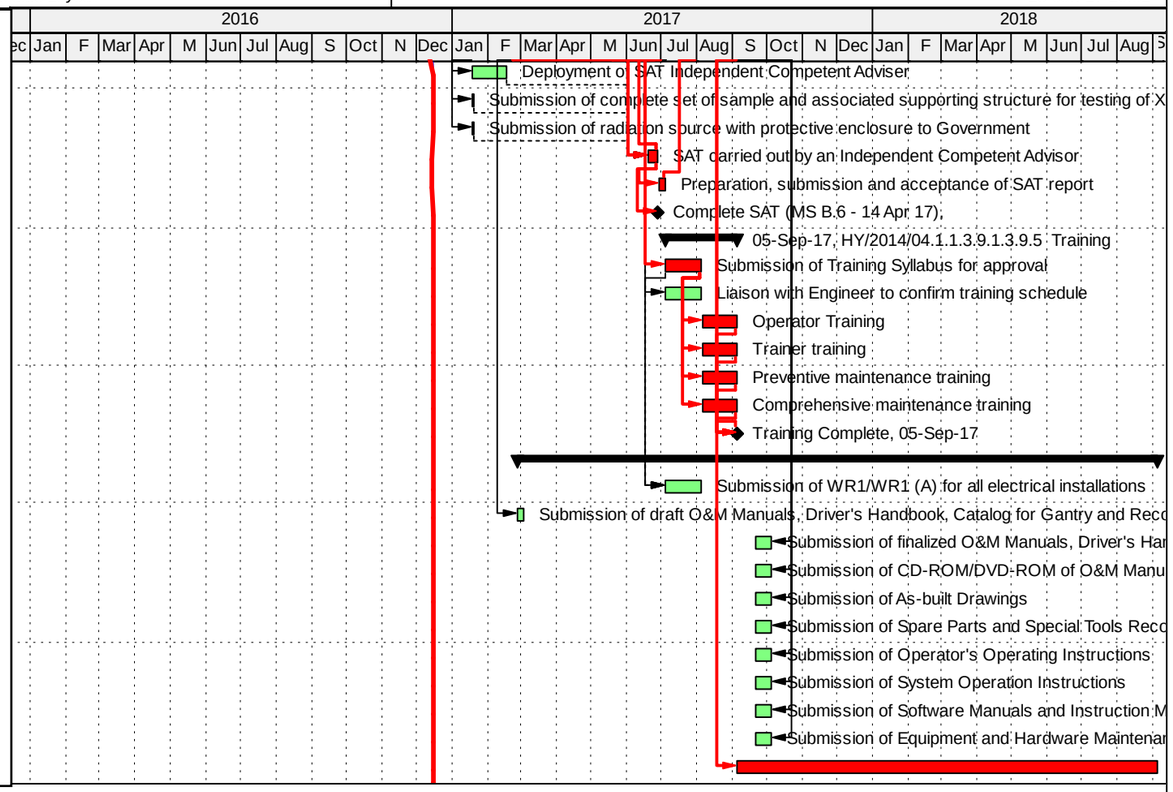
Activity ID	Activity Name
	X-ray System Image Analysis Workstation
	Radiation shielding sliding door controller
	CCTV System
	Public Address System
	UPS for workstations, equipment and system
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2.1.3.7.2.2.4	Imag
	Intercom System
	Radiation Monitoring and Alarm System
	X-ray System Image Analysis Workstation
	Printer
	UPS for workstations, equipment and system
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2.1.3.7.2.2.5	X-ray
	Server
	Server rack
	UPS for workstations, equipment and system
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2.1.3.7.2.2.6	Drive
	CCTV System
	Intercom System
	Radiation Monitoring and Alarm System
	Speaker
	UPS for workstations, equipment and system
HY/2014/04.1.1.3.7.1.3.7.2.1.3.7.2.2.1.3.7.2.2.7	Train
	Projector screen (Screen size 106")
	Ceilling mounted projector
	X-ray System Training Workstation
	Radiation Monitoring and Alarm System
	UPS for workstations, equipment and system
	Training aids
	Printer
HY/2014/04.1.1.3.8	Section III - Cargo Examination Bu
322	Construction Works - Section III Complete
HY/2014/04.1.1.3.8.1.3.8.2	Outbound Cargo Examinatior
320	Cabling and cable containment
321	Installation of X-ray System Image Analysis Work
HY/2014/04.1.1.3.9	On-Site Testing & Commissioning
335	Operability Test
336	T&C Complete and Issurance of Certificate of Ac
345	Contruction Works Complete
HY/2014/04.1.1.3.9.1.3.10	Defect Liability Period for Con
359	Defect Liability Period
360	Submission of Warranty Completion Test Plan
361	Warranty Completion Test
362	DLP Complete and issuance of Defect Laibility C
363	Commencement of Maintenance Services
HY/2014/04.1.1.3.9.1.3.9.1	Integration Test
325	Submission of Integration Test Plan
326	Integration Test
327	Preparation, submission and acceptance of Inte
327.5	Complete Inegration Test (MS B.5 - 3 Mar 17)
HY/2014/04.1.1.3.9.1.3.9.2	Site Acceptance Test
329	Submission of SAT Plan



Actual Level of Effort | Actual Work | Remaining Work | Critical Remaining Work | Milestone | summary

TASK filter: All Activities

Activity ID	Activity Name
330	Deployment of SAT Independent Competent Advi
331	Submission of complete set of sample and assoc
332	Submission of radiation source with protective er
333	SAT carried out by an Independent Competent A
334	Preparation, submission and acceptance of SAT
334.5	Complete SAT (MS B.6 - 14 Apr 17)
HY/2014/04.1.1.3.9.1.3.9.5 Training	
338	Submission of Training Syllabus for approval
339	Liaison with Engineer to confirm training schedule
340	Operator Training
341	Trainer training
342	Preventive maintenance training
343	Comprehensive maintenance training
344	Training Complete
HY/2014/04.1.1.3.9.1.3.9.7 Other Documentation	
347	Submission of WR1/WR1 (A) for all electrical ins
348	Submission of draft O&M Manuals, Driver's Han
349	Submission of finalized O&M Manuals, Driver's H
350	Submission of CD-ROM/DVD-ROM of O&M Ma
351	Submission of As-built Drawings
352	Submission of Spare Parts and Special Tools Re
353	Submission of Operator's Operating Instructions
354	Submission of System Operation Instructions
355	Submission of Software Manuals and Instruction
356	Submission of Equipment and Hardware Mainter
357	Submission of Software License Installation Disk



Actual Level of Effort | Actual Work | Remaining Work | Critical Remaining Work | Milestone | summary

TASK filter: All Activities

APPENDIX B

ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE (EMIS)

Contract No. HY/2014/05 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Remaining Ancillary Buildings and Facilities
Environmental Mitigation Implementation Schedule

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
Air Quality							
S5.5.6.1	A1	1) The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1-hr and 24hr TSP levels are 500 μgm^{-3} and 260 μgm^{-3}, respectively)
S5.5.6.2	A2	2) Proper watering of exposed spoil should be undertaken throughout the construction phase: • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1-hr and 24hr TSP levels are 500 μgm^{-3} and 260 μgm^{-3}, respectively)

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
S5.5.6.2	A2	• When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • W here a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1-hr and 24hr TSP levels are 500 μgm^{-3} and 260 μgm^{-3}, respectively)

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
S5.5.6.2	A2	• Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1-hr and 24hr TSP levels are 500 μgm^{-3} and 260 μgm^{-3}, respectively)
S5.5.6.3	A3	3) The Contractor should undertake proper watering on all exposed spoil (with at least 8 times per day) throughout the construction phase.	Control construction dust	Contractor	All construction sites	Construction stage	To control the dust impact
S5.5.6.4	A4	4) Engineer to incorporate the controlled measures into the Particular Specification (PS) for the civil work. The PS should also draw the contractor's attention to the relevant latest Practice Notes issued by EPD.	Control construction dust	Engineer	All construction sites	Design Stage	Air Pollution Control (Construction Dust) Regulation
S5.5.6.4	A5	5) Implement regular dust monitoring under EM&A programme during the construction stage.	Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor	Selected representative dust monitoring station	Construction stage	• Air Pollution Control (Construction Dust) Regulation To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1- hr and 24hr TSP levels are 500 μgm^{-3} and 260 μgm^{-3}, respectively)

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
S5.5.7.1	A6	The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant: • Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; • All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; • Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; • The materials which may generate airborne dusty emissions should be wetted by water spray system; • All receiving hoppers should be enclosed on three sides up to 3m above unloading point; • All conveyor transfer points should be totally enclosed; • All access and route roads within the premises should be paved and wetted; and • Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body.	Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor	Selected representative dust monitoring station	Construction stage	• Air Pollution Control (Construction Dust) Regulation • To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1- hr and 24hr TSP levels are 500 μgm^{-3} and 260 μgm^{-3}, respectively)
S5.5.2.7	A7	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: • All road surface within the barging facilities will be paved; • Dust enclosures will be provided for the loading ramp; • Vehicles will be required to pass through designated wheels wash facilities; and • Continuous water spray at the loading points.	Control construction dust	Contractor	All construction sites	Construction stage	Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
Construction Noise (Air borne)							
S6.4.10	N1	1) Use of good site practices to limit noise emissions by considering the following: • only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • machines and plant (such as trucks, cranes) 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, where possible, be orientated so that the noise is directed away from nearby NSRs; • silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • mobile plant should be sited as far away from NSRs as possible and practicable; • material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.	Control construction airborne noise by means of good site practices	Contractor	All construction sites	Construction stage	Noise Control Ordinance
S6.4.11	N2	2) Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites	Construction stage	• Noise Control Ordinance • Annex 5, TM-EIA
S6.4.12	N3	3) Install movable noise barriers (typically density @14kg/m^2), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	Screen the noisy plant items to be used at all construction sites	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	• Noise Control Ordinance • Annex 5, TM-EIA • 75dB(A) for residential premises • The movable barrier should achieve at least 5dB(A) and the full enclosure should be designed to achieve 10dB(A)

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
S6.4.13	N4	4) Select "Quiet plants" which comply with the BS 5228 Part 1 or TM standards.	Reduce the noise levels of plant items	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	• Noise Control Ordinance & its TM • Annex 5, TM-EIA
S6.4.14	N5	5) Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction stage	• Noise Control Ordinance • Annex 5, TM-EIA
	N6	6) Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction stage	• Noise Control Ordinance • Annex 5, TM-EIA • 75dB(A) for residential premises

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
Waste Management (Construction Waste)							
S8.3.8	WM1	*Construction and Demolition Material* The following mitigation measures should be implemented in handling the waste: • Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; • Carry out on-site sorting; • Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; • Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; • Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; and • Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction. • In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation.	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	• Land (Miscellaneous Provisions) Ordinance • Waste Disposal Ordinance • ETWB TC 19/2005

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
S8.3.9-S8.3.11	WM2	*C&D Waste* • Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. • The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	• Land (Miscellaneous Provisions) Ordinance • Waste Disposal Ordinance • ETWB TC 19/2005
S8.2.12-S8.3.15	WM3	*Chemical Waste* • Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • 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 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. • The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated.	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction stage	• Waste Disposal (Chemical Waste) General) Regulation • Code of Practice on the Packaging, Labelling and Storage of Chemical Waste

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
		• Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD.					
S8.3.16	WM4	*Sewage* • Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly.	Proper handling of sewage from worker to avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	Waste Disposal Ordinance
S8.3.17	WM5	*General Refuse* • General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. • A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. • Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. • Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided. • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes.	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	Waste Disposal Ordinance

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
Water Quality (Construction Phase)							
S9.11.1.7	W2	<u>Land Works</u> General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include: • wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; • sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; • storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; • silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm; • temporary access roads should be surfaced with crushed stone or gravel; • rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; • measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; • open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; • manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; • discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system;	To control construction water quality	Contractor	Land-based works areas	Construction stage	TM-EIAO

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
S9.11.1.7	W2	• all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit; • wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; • the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; • wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; • vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal; • the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; • waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; • all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and • surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.	To control construction water quality	Contractor	Land-based works areas	Construction stage	TM-EIAO

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
Ecology (Construction Phase)							
S10.7	E4	• Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater	Prevent Sedimentation from Land-based works areas	Contractor	Land-based works areas	During construction	TM-Water
S10.7	E5	• Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time	Prevent disturbance to terrestrial fauna and habitats	Contractor	Land-based works areas	During construction	
Fisheries							
S11.7	F4	• Maritime Oil Spill Response Plan (MOSRP); • Contingency plan.	Minimise impacts on marine water quality impacts	Marine Department	HKBCF	During operation	

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
Landscape & Visual (Detailed Design Phase)							
S14.3.3.1	LV1	General design measures include: • Roadside planting and planting along the edge of the reclamation is proposed; • Transplanting of mature trees in good health and amenity value where appropriate and reinstatement of areas disturbed during construction by compensatory hydro-seeding and planting; • Protection measures for the trees to be retained during construction activities; • Optimizing the sizes and spacing of the bridge columns. (This mitigation measure is not applicable to the Contract); • Fine-tuning the location of the bridge columns to avoid visually-sensitive locations. (This mitigation measure is not applicable to the Contract); • (Not applicable as the aesthetic design of the bridge is related to the HKLR Contract); • (Not applicable as the decorative urban design is related to the HKLR Contract); • Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed; • Providing planting area around peripheral of HKBCF for tree planting screening effect. (This mitigation measure is not applicable to the Contract); • Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline. (This mitigation measure is not applicable to the Contract); • Providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure(e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF; • Fine-tuning the sizes of the structural members to minimize the bulkiness of buildings and adjustment of building arrangement to minimise disturbance to surrounding vegetation in the HKBCF; and • (Not applicable as the aesthetic design on the viaduct, tunnel portals, at grade roads and reclamation are related to the HKLR Contract).	Minimise visual & landscape impact	Detailed designer	HKBCF	Design Stage	

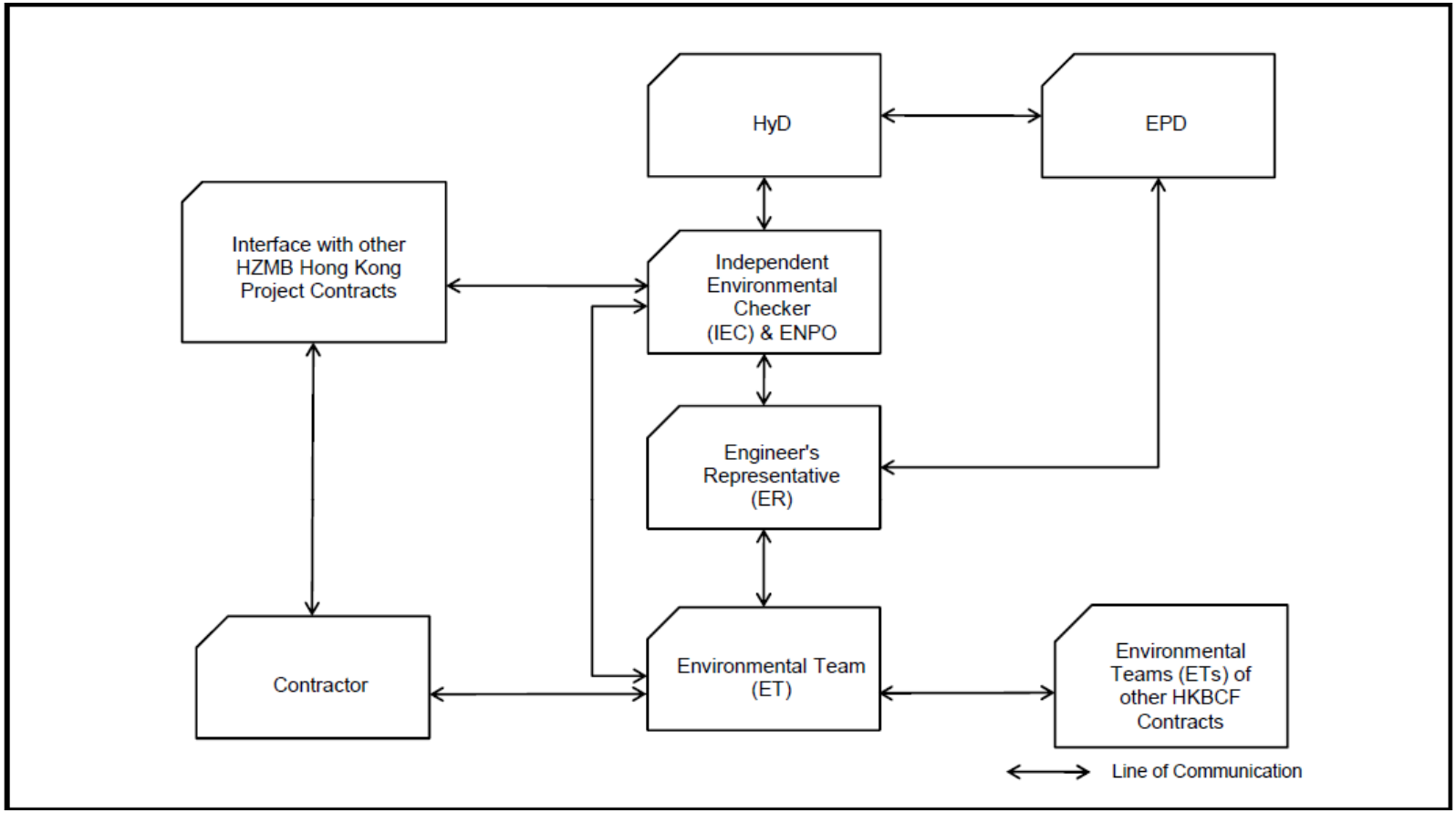
EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
Landscape & Visual (Construction Phase)							
S14.3.3.3	LV2	Mitigate both Landscape and Visual Impacts G1. Grass-hydroseed bare soil surface and stockpile areas. G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic. (This mitigation measure is not applicable to the Contract.) G3. (Not applicable as this is for HKLR.) G4. For HKBCF, providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure (e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF (See Figure 14.3.1 of the Approved EIA Report for example) G5. Vegetation reinstatement and upgrading to disturbed areas. G6. Maximize new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed. G7. Provide planting area around peripheral of and within HKBCF for tree screening buffer effect. (This mitigation measure is not applicable to the Contract.) G8. Plant salt-tolerant native trees and shrubs etc. along the planter strip at affected seawall. (This mitigation measure is not applicable to the Contract.) G9. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt “natural-look” by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance “natural-look” of the new coastline (see Figure 14.4.2 of the approved EIA Report for example). (This mitigation measure is not applicable to the Contract)	Minimise visual & landscape impact	Contractor	HKBCF	Construction stage	
S14.3.3.3	LV3	<u>Mitigate Visual Impacts</u> V1.Minimize time for construction activities during construction period. V2.Provide screen hoarding at the portion of the project site / works areas / storage areas near VSRs who have close low-level views to the Project during HKBCF construction.					

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
EM&A							
S15.2.2	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Project Proponent	All construction sites	Construction stage	• EIAO Guidance Note No.4/2002 • TM-EIAO
S15.5 - S15.6	EM2	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Contractor	All construction sites	Construction stage	• EIAO Guidance Note No.4/2002 • TM-EIAO

APPENDIX C

PROJECT ORGANIZATION FOR ENVIRONMENTAL WORKS

Project Organisation for Environmental Works



APPENDIX D

SAMPLE DATA SHEET FOR MONITORING

Data Sheet for TSP Monitoring

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		
Site Conditions		
Initial Flow Rate, Qsi	Pi (mmHg)	
	Ti (C)	
	Hi (in.)	
	Qsi (Std. m^3)	
Final Flow Rate, Qsf	Pf (mmHg)	
	Tf (C)	
	Hf (in.)	
	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)		

	Name & Designation	Signature	Date
Field Operator:			
Laboratory Staff			
Checked by:			

Noise Monitoring Field Record Sheet

Monitoring Location		
Description of Location		
Date of Monitoring		
Measurement Start Time (hh:mm)		
Measurement Time Length(min.)		
Noise Meter Model/Identification		
Calibrator Model/Identification		
Measurement Results	L_{90} (dB(A))	
	L_{10} (dB(A))	
	Leq (dB(A))	
Major Construction Noise Source(s) During Monitoring		
Other Noise Source(s) During Monitoring		
Remarks		

	Name & Designation	Signature	Date
Recorded by			
Checked by			

APPENDIX E

SAMPLE TEMPLATE FOR INTERIM NOTIFICATION

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: