



***Installation of One Additional
Gas-fired Generation Unit
(CCGT Unit No. 1) at the Black
Point Power Station***

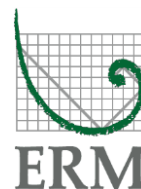
Monthly EM&A Report No.22

12 October 2018

Environmental Resources Management

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**Installation of One Additional Gas-fired Generation Unit (CCGT Unit No. 1)
at the Black Point Power Station
Environmental Certification Sheet
EP-507/2016/A and FEP-02/507/2016/A**


Reference Document/Plan

| | |
|--|---------------------------|
| Document/Plan to be Certified/-Verified: | Monthly EM&A Report No.22 |
| Date of Report: | 12 October 2018 |
| Date prepared by ET: | 12 October 2018 |
| Date received by IEC: | |


Reference EM&A Manual/ EP Requirement

| | |
|---|---------------------------------|
| EP Condition: | Condition No. 3.2 |
| Content: | <i>Monthly EM&A Reports</i> |
| Four hard copies and one electronic copy of the Monthly EM&A Reports shall be submitted to the Director within two weeks after the end of the reporting month. The submissions shall be certified by the ET Leader and verified by the IEC as complying with the relevant requirements as set out in the EM&A Manual before submission to the Director. Additional copies of the submission shall be provided upon request by the Director. | |

ET Certification

| | |
|---|-----------------------|
| I hereby certify that the above referenced document/ plan complies with the above referenced condition of EP-507/2016/A and FEP-02/507/2016/A. | |
| Dr Jasmine Ng, Environmental Team Leader: | Date: 12 October 2018 |
|  | |

IEC Verification

| | |
|--|-----------------------|
| I hereby verify that the above referenced document/ plan complies with the above referenced condition of EP-507/2016/A and FEP-02/507/2016/A. | |
| Mr Thomas Chan, Independent Environmental Checker: | Date: 12 October 2018 |
|  | |






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| | | | | | |
|---|---------------------------|---|---------|----------|-----------|
| Client: | | Project No: | | | |
| Castle Peak Power Company Limited (CAPCO) | | 0368878 | | | |
| Summary: | | Date: 12 October 2018 | | | |
| <p>This document presents the Monthly EM&A Report No.22 for the Installation of One Additional Gas-fired Generation Unit (CCGT Unit No. 1) at the Black Point Power Station (EP-507/2016/A; FEP-02/507/2016/A)</p> | | Approved by: | | | |
| | |  Dr Jasmine Ng Partner | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 0 | Monthly EM&A Report No.22 | JH | JNG | JNG | 12 Oct 18 |
| Revision | Description | By | Checked | Approved | Date |
| <p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p> | | <p>Distribution</p> <p><input checked="" type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Government</p> <p><input type="checkbox"/> Public</p> <div style="display: flex; justify-content: space-around;">   </div> | | | |

CONTENTS

| | | |
|------------|---|-----------|
| 1 | INTRODUCTION | 1 |
| 1.1 | PURPOSE OF THE REPORT | 1 |
| 1.2 | STRUCTURE OF THE REPORT | 1 |
| 2 | PROJECT INFORMATION | 3 |
| 2.1 | BACKGROUND | 3 |
| 2.2 | GENERAL SITE DESCRIPTION | 3 |
| 2.3 | CONSTRUCTION PROGRAMME AND ACTIVITIES | 3 |
| 2.4 | PROJECT ORGANISATION | 4 |
| 2.5 | STATUS OF ENVIRONMENTAL LICENCES, NOTIFICATION AND PERMITS | 4 |
| 3 | ENVIRONMENTAL MONITORING REQUIREMENT | 6 |
| 3.1 | WATER QUALITY MONITORING | 6 |
| 4 | IMPLEMENTATION STATUS OF THE ENVIRONMENTAL PROTECTION REQUIREMENTS | 7 |
| 4.1 | SUBMISSIONS UNDER THE PROJECT | 7 |
| 4.2 | MARINE VESSEL OPERATION | 7 |
| 5 | MONITORING RESULTS | 8 |
| 5.1 | WASTE MANAGEMENT | 8 |
| 6 | ENVIRONMENTAL SITE INSPECTION | 9 |
| 7 | ENVIRONMENTAL NON-CONFORMANCE | 10 |
| 7.1 | SUMMARY OF MONITORING EXCEEDANCE | 10 |
| 7.2 | SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE | 10 |
| 7.3 | SUMMARY OF ENVIRONMENTAL COMPLAINT | 10 |
| 7.4 | SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION | 10 |
| 8 | UPCOMING WORKS FOR THE NEXT REPORTING PERIOD | 11 |
| 8.1 | CONSTRUCTION ACTIVITIES FOR THE COMING MONTH | 11 |
| 8.2 | CONSTRUCTION PROGRAMME FOR THE NEXT MONTH | 11 |
| 9 | CONCLUSIONS | 12 |

LIST OF ANNEXES

| | |
|----------------|--|
| Annex A | Indicative Location Plan of Key Project Components for CCGT Unit No.1 |
| Annex B | Construction Programme for the Reporting Month and Coming Months |
| Annex C | Project Organization for EM&A Implementation |
| Annex D | Summary of Implementation Status of Environmental Mitigation |
| Annex E | Waste Flow Table |

EXECUTIVE SUMMARY

The construction works of CCGT Unit No. 1 of the **Additional Gas-fired Generation Units Project at the Black Point Power Station** commenced on 5 December 2016. This is the twenty-second monthly Environmental Monitoring and Audit (EM&A) report presenting the EM&A works carried out during the period from 1 to 30 September 2018 in accordance with the EM&A Manual and the requirements of EP-507/2016/A and FEP-02/507/2016/A.

Summary of the Construction Works undertaken during the Reporting Month

The major construction works undertaken during the reporting month include:

Construction Activities undertaken

- Heat Recovery Steam Generator (HRSG) modules lifting;
 - HRSG stack lifting;
 - Positioning of Steam Turbine and Generator;
 - Material offloading;
 - Foundation works (Intake, Diversion Culvert, Discharge Culvert, Pumping Station & Shafts);
 - Substructure & Superstructure works (Turbine Hall, Pipe Bridge & Feedwater Platform).
-

Environmental Site Inspection

Joint weekly site inspections were conducted by representatives of the Contractors, CAPCO Project Team and ET on 5, 13, 20 and 26 September 2018. The representative of the IEC joined the site inspection on 20 September 2018. Details of the audit findings and implementation status are presented in *Section 6*.

Environmental Exceedance/Non-conformance/Complaint/Summons and Prosecution

No non-compliance event was recorded during the reporting month.

No complaint was received during the reporting period.

No summon or prosecution was received in this reporting period.

Upcoming Works for the Next Reporting Period

The major construction works to be undertaken in the next reporting month include:

Construction Activities to be undertaken

- Stack Assembly;
 - Positioning of Gas Turbine;
 - Balance of Plant (BoP) piping prefabrication, natural gas pipeline installation and fuel oil pipeline installation;
 - Installation skid for east side and west side at Turbine Hall;
 - Foundation works (Intake, Diversion Culvert, Discharge Culvert, Pumping Station & Shafts);
 - Substructure & Superstructure works (Turbine Hall, Rainwater Collection Pump Room).
-

The Castle Peak Power Company Limited (CAPCO) is a joint venture between CLP Power Hong Kong Limited (CLP) and China Southern Power Grid Company Limited with CLP as the operator. ERM-Hong Kong, Limited (ERM) and Mott MacDonald Hong Kong Limited were appointed by CAPCO as the Environmental Team (ET) and the Independent Environmental Checker (IEC), respectively, to undertake the Environmental Monitoring and Audit (EM&A) activities for the installation of CCGT Unit No. 1 of the **Additional Gas-fired Generation Units Project at the Black Point Power Station (BPPS)** ("the Project").

1.1 *PURPOSE OF THE REPORT*

This is the twenty-second EM&A report which summarises the audit findings during the reporting period from 1 to 30 September 2018.

1.2 *STRUCTURE OF THE REPORT*

Section 1 : Introduction

It details the purpose and structure of the report.

Section 2 : Project Information

It summarises the background and scope of the project, site description, project organisation and contact details, construction programme, construction works undertaken and status of the Environmental Permits/Licenses during the reporting period.

Section 3 : Environmental Monitoring Requirement

It briefly introduces the environmental monitoring requirements for the Project.

Section 4 : Implementation Status of the Environmental Protection Requirements

It summarises the implementation of environmental protection measures during the reporting period.

Section 5 : Monitoring Results

It summarises the monitoring results obtained in the reporting period.

Section 6 : Environmental Site Inspection

It summarises the audit findings of the weekly site inspections undertaken within the reporting period.

Section 7 : **Environmental Non-conformance**

It summarises any monitoring exceedance, environmental complaints and summons within the reporting period.

Section 8 : **Upcoming Works for the Next Reporting Period**

It summarises the construction activities and the forecast of environmental impact for the next reporting month.

Section 9 : **Conclusions**

2.1 BACKGROUND

The scope of the Project involves the phased construction and operation of up to two additional combined cycle gas turbine (CCGT) units (with an installed capacity of up to 600 MW each) at the BPPS. The additional generation units will be of CCGT configuration using natural gas as the primary fuel. It is a Designated Project under the *Environmental Impact Assessment Ordinance* (Cap. 499) (EIAO). The current EM&A Programme only includes the CCGT Unit No. 1.

An EIA of the Additional Gas-fired Generation Units Project was prepared in accordance with the *EIA Study Brief* (No. ESB-286/2015) and the *Technical Memorandum of the Environmental Impact Assessment Process* (EIAO-TM) and submitted under the EIAO in February 2016. Subsequent to the approval of the EIA (EIAO Register Number AEIAR-197/2016), an Environmental Permit (EP-507/2016) (EP) for CCGT Unit No. 1 was granted by the Director of Environmental Protection (DEP) on 14 June 2016. An Application for Variation of an Environmental Permit (No. VEP-531/2017) was submitted to EPD on 28 July 2017 and the Variation of Environmental Permit (No. EP-507/2016/A) was granted on 21 August 2017. A FEP (FEP-02/507/2016/A) was granted to the Contractor, Leighton Contractors (Asia) Limited, of the CCGT Unit No. 1 on 13 September 2017.

2.2 GENERAL SITE DESCRIPTION

The proposed location for the Project is within the existing boundaries of the BPPS site. The size of the land reserved for the additional generation units and the associated facilities (the Project Site) is about 40,000 m². Construction works for CCGT Unit No. 1 is currently ongoing at the Project Site.

The location plan of key Project components for CCGT Unit No.1 is shown in *Annex A*.

2.3 CONSTRUCTION PROGRAMME AND ACTIVITIES

A summary of the major construction activities undertaken in this reporting period is shown in *Table 2.1*. The construction programme is presented in *Annex B*.

Table 2.1 *Summary of the Construction Activities Undertaken during the Reporting Month*

| Construction Activities undertaken |
|---|
| <ul style="list-style-type: none"> Heat Recovery Steam Generator (HRSG) modules lifting; HRSG stack lifting; Positioning of Steam Turbine and Generator; |

| Construction Activities undertaken |
|---|
| <ul style="list-style-type: none"> • Material offloading; • Foundation works (Intake, Diversion Culvert, Discharge Culvert, Pumping Station & Shafts); • Substructure & Superstructure works (Turbine Hall, Pipe Bridge & Feedwater Platform). |

2.4 PROJECT ORGANISATION

The project organizational chart and contact details are shown in *Annex C*.

2.5 STATUS OF ENVIRONMENTAL LICENCES, NOTIFICATION AND PERMITS

A summary of the valid permits, licences, and/or notifications on environmental protection for this Project is presented in *Table 2.2*.

Table 2.2 *Summary of the Status of Valid Environmental Licence, Notification, Permit and Documentations*

| Permit/ Licences/ Notification | Reference | Validity Period | Remarks |
|--|-------------------|---------------------------|--------------------------------------|
| Environmental Permit | EP-507/2016 | Throughout the Contract | Permit granted on 14 Jun 2016 |
| Variation of Environmental Permit | EP-507/2016/A | Throughout the Contract | Permit granted on 21 Aug 2017 |
| Further Environmental Permit | FEP-02/507/2016/A | Throughout the Contract | Permit granted on 13 Sep 2017 |
| Notification Pursuant to Section 3(1) of the <i>Air Pollution Control (Construction Dust) Regulation</i> | 417935 | Throughout the Contract | Notification received on 14 Jun 2017 |
| | 417676 | Throughout the Contract | Notification received on 8 Jun 2017 |
| Wastewater Discharge Licence | WT00028829-2017 | To 31 Oct 2022 | Licence granted on 25 Oct 2017 |
| Chemical Waste Producer Registration | 5211-432-L2954-02 | Throughout the Contract | Registration approved on 4 Jul 2017 |
| | 5214-421-K3324-01 | Throughout the Contract | Registration approved on 6 Jul 2018 |
| Billing Account for Disposal of Construction Waste | 7028380 | Throughout the contract | Approved on 26 Jul 2017 |
| | 7029093 | Throughout the contract | Approved on 19 Oct 2017 |
| Construction Noise Permit | GW-RW0213-18 | 08 Jun 2018 – 22 Nov 2018 | Permit granted on 06 Jun 2018 |
| | GW-RW0247-18 | 1 Jul 2018 – 31 Dec 2018 | Permit granted on 25 Jun 2018 |

*3.1**WATER QUALITY MONITORING*

In accordance with the EM&A Manual, monitoring works is required at a frequency of once per week on first year of commissioning of the CCGT Unit No.1. The monitoring details including monitoring requirement, locations of monitoring stations will be confirmed and approved by EPD before commissioning of the CCGT Unit No.1.

4 IMPLEMENTATION STATUS OF THE ENVIRONMENTAL PROTECTION REQUIREMENTS

4.1 SUBMISSIONS UNDER THE PROJECT

The Contractors have implemented all the environmental mitigation measures and requirements as stated in the EIA Report, Environmental Permit (EP) and EM&A Manual for the installation of CCGT Unit No.1. The implementation status of the environmental mitigation measures for this Project during the reporting period is summarised in *Annex D*. The status of the required submissions under the EP and EM&A Manual for the Project is presented in *Table 4.1*.

Table 4.1 Status of Required Submission under the Project

| EP Condition | Submission | Submission Date |
|---|--------------------------------------|-------------------|
| Condition 3.2 under Environmental Permit No. EP-507/2016/A and FEP-02/507/2016/A. | 21 st Monthly EM&A Report | 13 September 2018 |

5.1

WASTE MANAGEMENT

The waste generated from this Project includes inert construction and demolition (C&D) materials, and non-inert C&D materials. Non-inert C&D materials are made up of general refuse and recyclable wastes such as plastics and paper/cardboard packaging waste. Steel materials generated from the project are also grouped into non-inert C&D materials as the materials were not disposed of with other inert C&D materials. With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting month are summarised in *Table 5.1*. Details of waste management data are presented in *Annex E*.

Table 5.1 Quantities of Waste Generated from the Project

| Reporting Month | Quantity | | | | | |
|--------------------|--|---|---|------------------------------------|-------------------------|-----------------------|
| | Inert C&D Materials ^(a) (b) (in '000m ³) | Chemical Waste ^(d) (in'000 kg) | Non-inert C&D Materials | | | |
| | | | General Refuse ^(c) (in '000m ³) | Recycled materials | | |
| | | | | Paper/card board (in'000 kg) | Plastics (in'000 kg) | Metals (in'000 kg) |
| September 2018 | 2.983 | 0 | 0.120 | 0 | 0 | 11.880 |

Notes:

(a) Inert C&D materials include bricks, concrete, building debris, rubble and excavated spoil.

(b) The inert C&D materials generated from the Project were sent to Tuen Mun Area 38 Fill Bank during the reporting month.

(c) The general refuse generated from the Project was sent to WENT landfill during the reporting month.

(d) Chemical waste includes waste oil. It is assumed density of waste oil to be 0.8 kg/L.

(e) The cut-off date for waste management data is 30 September 2018.

Joint weekly site inspections were conducted by representatives of the Contractors, CAPCO Project Team and ET on 5, 13, 20 and 26 September 2018. The representative of the IEC joined the site inspection on 20 September 2018. No non-compliance was recorded during the site inspections.

Findings and recommendations for the site inspection in this reporting month are summarised as follows:

5 September 2018

There was no major site observation.

13 September 2018

The Contractor (Leighton) was reminded to:

- enhance the silt traps and site drainage to collect the wastewater generated from wheel-washing and construction works in Shaft A; and
- clean up the oil stains found in Shaft E and dispose as chemical waste.

20 September 2018

The Contractor (Leighton) was reminded to:

- enhance preventive measures to avoid spillage of turbid dusty water from pipe piling at Shaft E to the surroundings.

Regarding the planter audit, CAPCO was recommended to:

- conduct close monitoring for BPT919 and BPT945; and
- maintain tidiness at the planter area.

26 September 2018

There was no major site observation.

All follow-up actions requested by ET and IEC during the site inspections were undertaken as reported by CAPCO and the Contractors. The abovementioned environmental issues had been addressed and mitigated during the reporting period.

7 *ENVIRONMENTAL NON-CONFORMANCE*

7.1 *SUMMARY OF MONITORING EXCEEDANCE*

No environmental monitoring is required during construction of CCGT Unit No. 1.

7.2 *SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE*

No non-compliance event was recorded during the reporting month.

7.3 *SUMMARY OF ENVIRONMENTAL COMPLAINT*

No environmental complaint was received during the reporting month.

7.4 *SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION*

No summon or prosecution was received during the reporting month.

8.1 CONSTRUCTION ACTIVITIES FOR THE COMING MONTH

Works to be undertaken in the next reporting month are summarised in *Table 8.1*.

Table 8.1 Construction Works to be undertaken in the Next Reporting Month

| Construction Activities to be undertaken |
|--|
| <ul style="list-style-type: none"> • Stack Assembly; • Positioning of Gas Turbine; • Balance of Plant (BoP) piping prefabrication, natural gas pipeline installation and fuel oil pipeline installation; • Installation skid for east side and west side at Turbine Hall; • Foundation works (Intake, Diversion Culvert, Discharge Culvert, Pumping Station & Shafts); • Substructure & Superstructure works (Turbine Hall, Rainwater Collection Pump Room). |

Potential environmental impacts arising from the above construction activities are mainly associated with dust, wastewater treatment and waste management.

8.2 CONSTRUCTION PROGRAMME FOR THE NEXT MONTH

The construction programme for the Project for the next reporting month is presented in *Annex B*.

This 22nd monthly Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken during the period from 1 to 30 September 2018 in accordance with the EM&A Manual and the requirements of EP-507/2016/A and FEP-02/507/2016/A.

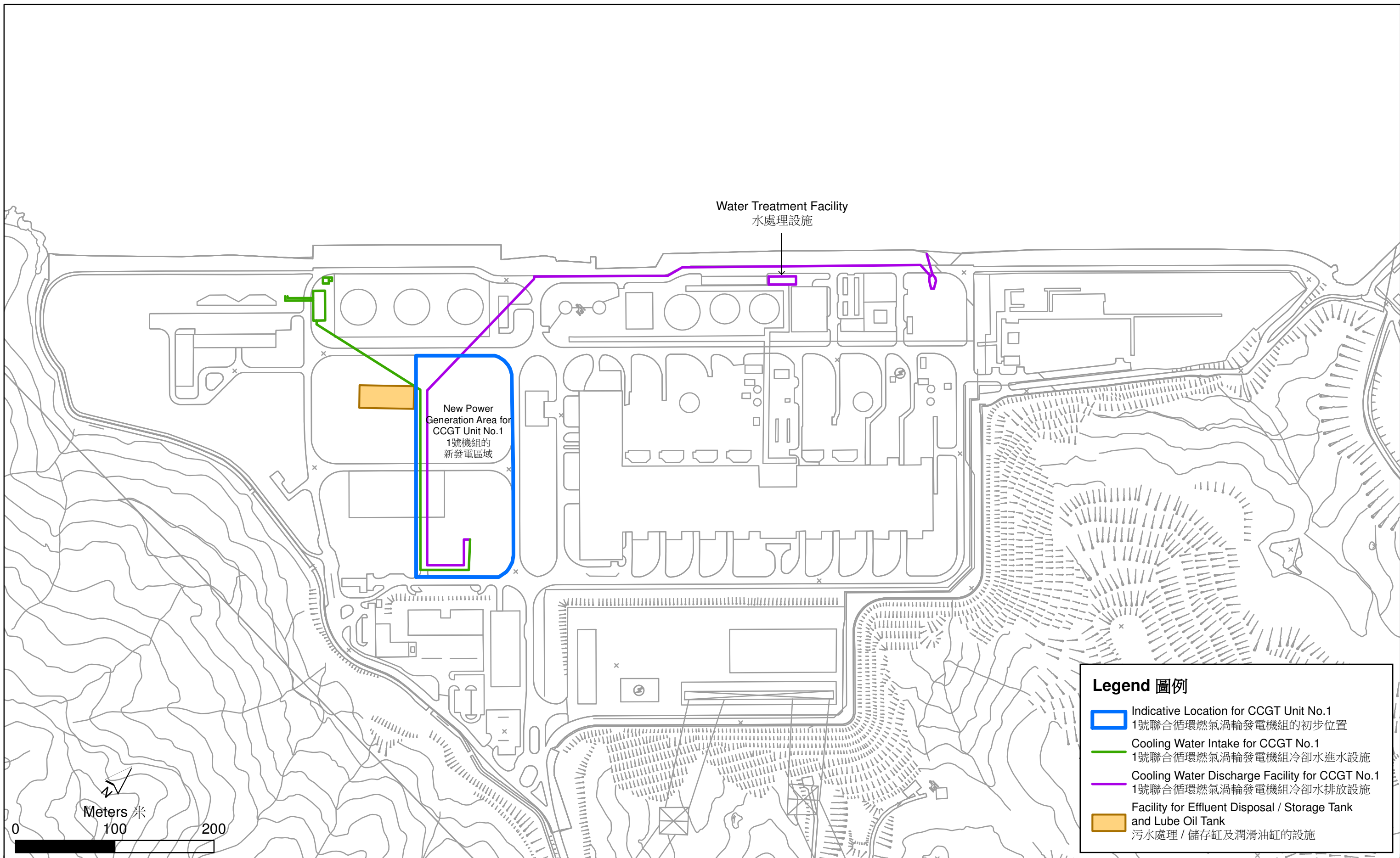
No non-compliance event was recorded during the reporting month.

No environmental complaint, summon or prosecution was received during the reporting month.

The Contractors have implemented possible and feasible mitigation measures to mitigate the potential environmental impacts during construction. The ET will continue to keep track of the EM&A programme to ensure compliance of environmental requirements and the effectiveness and efficiency of the mitigation measures implemented. If necessary, the Contractors will provide more mitigation measures to further alleviate the impacts.

Annex A

Works Area for CCGT Unit
No. 1 at the Black Point
Power Station



Annex A

Indicative Location Plan of Key Project Components for CCGT Unit No.1

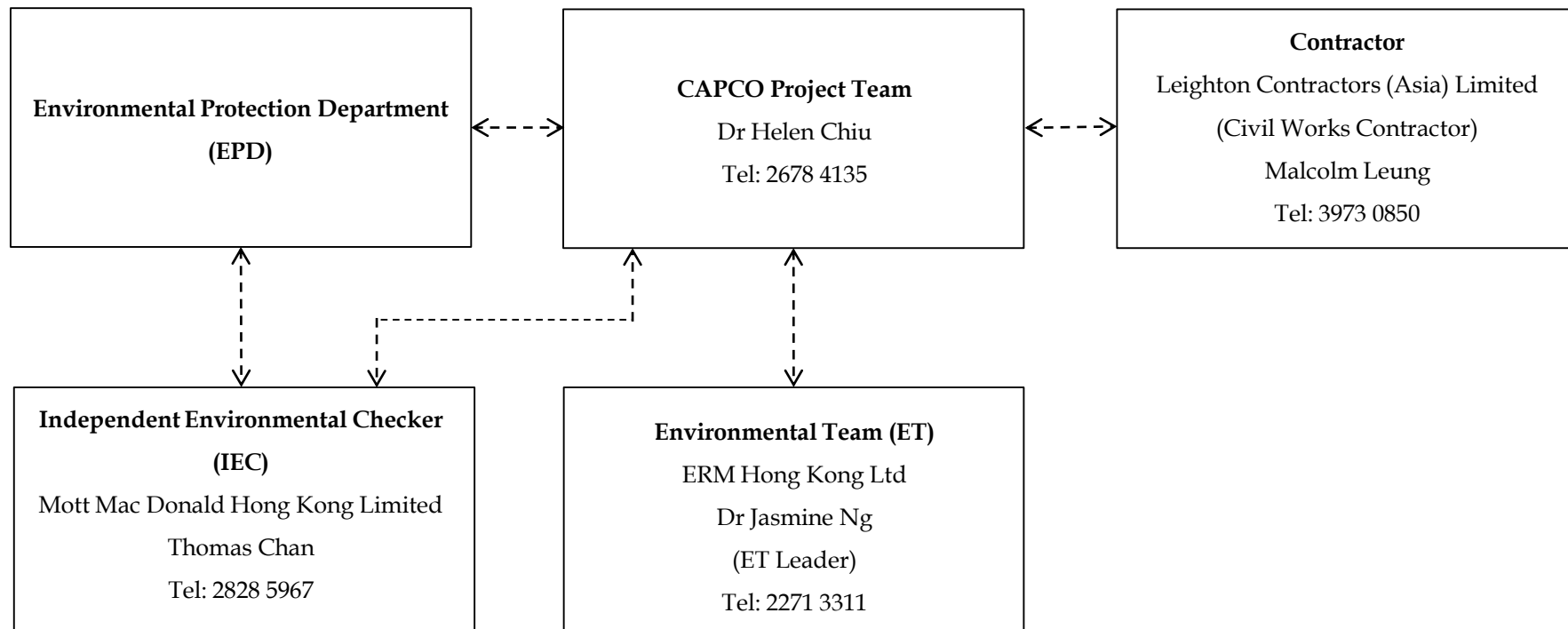
Annex B

Construction Programme for the Reporting Month and Coming Months

| | Year 2018 | | | | Year 2019 | | | | | | | | | | | |
|---------------------------------|-----------|----|----|----|-----------|---|---|---|---|---|---|---|---|----|----|----|
| CCGT Unit No.1 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Civil Works | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Equipment Supply & Installation | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

Annex C

Project Organization for EM&A Implementation



Key
----- Line of Communication

Annex D

Summary of Implementation Status of Environmental Mitigation

Annex D - Environmental Mitigation Implementation Status for Additional CCGT Units Project at BPPS

Note:

- ✓ Compliance of Mitigation Measures
- <> Compliance of Mitigation but need improvement
- x Non-compliance of Mitigation Measures
- ▲ Non-compliance of Mitigation Measures but rectified by the Contractor
- Δ Deficiency of Mitigation Measures but rectified by the Contractor
- N/A Not Applicable in Reporting Period

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | to When to implement the measures? | Implementation Status |
|--------------------|----------------|--|-----------------------------|------------------------------------|-----------------------|
| Air Quality | | | | | |
| S4.10.1 | S3.1 | Impervious dust screen or sheeting will be provided to enclose scaffolding from the ground floor level of building for construction of superstructure of the new buildings. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Impervious sheet will be provided for skip hoist for material transport. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | The area where dusty work takes place should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after dusty activities as far as practicable. | Contractor | Construction Stage | Δ |
| S4.10.1 | S3.1 | All dusty materials should be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Dropping heights for excavated materials should be controlled to a practical height to minimise the fugitive dust arising from unloading. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | During transportation by truck, materials should not be loaded to a level higher than the side and tail boards, and should be dampened or covered before transport. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Wheel washing device should be provided at the exits of the work sites. Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty material from its body and wheels as far as practicable. | Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | to When to implement the measures? | Implementation Status |
|-----------------------|----------------|--|-----------------------------|------------------------------------|-----------------------|
| S4.10.1 | S3.1 | Road sections between vehicle-wash areas and vehicular entrance will be paved. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Hoarding of not less than 2.4m high from ground level will be provided along the length of the Project Site boundary. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Haul roads will be kept clear of dusty materials and will be sprayed with water so as to maintain the entire road surface wet at all times. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Temporary stockpiles of dusty materials will be either covered entirely by impervious sheets or sprayed with water to maintain the entire surface wet all the time. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Stockpiles of more than 20 bags of cement, dry pulverised fuel ash and dusty construction materials will be covered entirely by impervious sheeting sheltered on top and 3-sides. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | All exposed areas will be kept wet always to minimise dust emission. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Ultra-low-sulphur diesel (ULSD) will be used for all construction plant on-site, as defined as diesel fuel containing not more than 0.005% sulphur by weight) as stipulated in <i>Environment, Transport and Works Bureau Technical Circular (ETWB-TC(W)) No 19/2005</i> on Environmental Management on Construction Sites. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | The engine of the construction equipment during idling will be switched off. | Contractor | Construction Stage | ✓ |
| S4.10.1 | S3.1 | Regular maintenance of construction equipment deployed on-site will be conducted to prevent black smoke emission. | Contractor | Construction Stage | ✓ |
| S4.11.2 | S3.2 | It is recommended to continuously monitor and record the levels of air pollutants of the exhaust gas streams emitted from the stacks of the additional CCGT units by means of CEMS per the licence requirements. Continuous monitoring of ambient concentrations of SO ₂ , NO and NO ₂ will be continued at the current CLP's AQMSs. | CAPCO | Operational Stage | N/A |
| Hazard to Life | | | | | |
| S5.6 | S4 | All construction workers shall comply with CLP's safety policy and requirements. | Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|---------------|----------------|--|-----------------------------|---------------------------------|-----------------------|
| S5.6 | S4 | Method statements and risk assessments shall be prepared and safety control measures shall be in place before commencement of work. | Contractor | Construction Stage | ✓ |
| S5.6 | S4 | All work procedures shall be complied with the operating plant procedures or guidelines and regulatory requirements. | Contractor | Construction Stage | ✓ |
| S5.6 | S4 | Work permit system, on-site pre-work risk assessment and emergency response procedure shall be in place before commencement of work. | Contractor | Construction Stage | ✓ |
| S5.6 | S4 | All construction workers shall equip with appropriate PPE when working at the Project Site. | Contractor | Construction Stage | ✓ |
| S5.6 | S4 | Safety training and briefings shall be provided to all construction workers. | Contractor | Construction Stage | ✓ |
| S5.6 | S4 | All construction workers shall be under close site supervision. | Contractor | Construction Stage | ✓ |
| S5.6 | S4 | Regular site safety inspections shall be conducted during the construction phase of the Project. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Ensure speed limit enforcement is specified in the contractor's method statement to limit the speed of construction vehicles on-site. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Conduct speed checks to ensure enforcement of speed limits and to ensure adequate site access control. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Provide escort for hydrogen and CO ₂ delivery vehicle drivers to ensure the right access route is used during the construction phases of the Project. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | A lifting plan, with detailed risk assessment, should be prepared and endorsed for heavy lifting of large equipment. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Vehicle crash barrier, designed for the specific speed limit at the BPPS, should be provided between the construction site and the distillate oil storage facilities during 1 st CCGT unit construction phase. Also, a vehicle crash barrier is to be provided between the construction site and the 1 st CCGT unit during 2 nd CCGT unit construction phase. | Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|---------------|----------------|---|-----------------------------|---------------------------------|-----------------------|
| S5.13 | S4 | Any lifting operation near or over live equipment should be strictly minimised. If such operation cannot be avoided, lifting activities should be assessed, controlled and supervised. Adequate protection covers should also be provided on the existing BPPS facilities in case the operation of lifting equipment has a potential to impact live equipment at BPPS. Process isolation should be achieved in case that live equipment protection becomes impractical. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | The hydrogen road trailer and carbon dioxide road tanker delivery should follow alternative route, which is further from the construction site, during crane operation and movement of construction vehicles in the vicinity. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Ensure that a hazardous area classification study is conducted and hazardous area maps are updated before the start of the construction activities to ensure ignition sources are controlled during both construction and operation phases. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Ensure work permit system for hot work activities within the Project Site is specified in the contractor's method statement to minimise/ control ignition sources during construction phase. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Ensure effective communication system/ protocol is in place between the construction contractors and operation staff. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Ensure the Project Construction Emergency Response Plan is integrated with the Emergency Response Plan for the BPPS during construction phases. The plan should address stop work instructions to be promptly communicated to all construction workers performing hot works in case a confirmed flammable gas (natural gas and hydrogen) detection at the BPPS. | Contractor | Construction Stage | ✓ |
| S5.13 | S4 | Ensure that construction activities do not impede the functions of fire and gas detection system, fire protection system, muster areas, fire-fighting vehicle access and escape routes. | Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|----------------------|----------------|--|-----------------------------|---------------------------------|-----------------------|
| S5.13 | S4 | Ensure a Job Safety Analysis is conducted for construction activities of the Project during the construction phases, to identify and analyse hazards associated with the construction activities (e.g. lifting operations by cranes) onto the existing plant facilities and operations. Potential risks of the construction activities shall be assessed, and risk precautionary measures shall be implemented in Contractor's works procedures. | Contractor | Construction Stage | ✓ |
| Water Quality | | | | | |
| S 7.9 | S6.5 | Reduction of dredging rate from 4,000 m ³ per day to 740 m ³ per day for dredging at the seawater intake and discharge outfall | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | Deploy floating type silt curtain around grab dredger | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | Deploy single layer of floating type silt curtain surrounding coral colonies identify at dive survey Transect C (SR18). The silt curtain surrounding SR18 should provide sufficient clearance to the coral colonies such that no direct impact from the installation and anchoring of silt curtain would be inflicted on the coral colonies. | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | The contractor shall regularly inspect the silt curtains and check that they are moored and marked to avoid danger to marine traffic. Regular inspection on the integrity of the silt curtain should be carried out by the contractor and any damage to the silt curtain shall be repaired by the contractor promptly. Relevant marine works shall only be undertaken when the repair is fixed to the satisfaction of the engineer. | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | Construction of intake and outfall structure shall be conducted behind drained cofferdam. | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | All vessels should be well maintained and inspected before use to limit any potential discharges to the marine environment. | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | All vessels must have a clean ballast system. | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | No discharge of sewage/grey wastewater should be allowed. Wastewater from potentially contaminated area on working vessels should be minimised and collected. These kinds of wastewater should be brought back to port and discharged at appropriate collection and treatment system. | Contractor | Construction Stage | ✓ |
| S 7.9 | S6.5 | No soil waste is allowed to be disposed overboard. | Contractor | Construction Stage | N/A |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|---------------|----------------|---|-----------------------------|---------------------------------|-----------------------|
| S 7.9 | S6.5 | Silt removal facilities such as silt traps or sedimentation facilities will be provided to remove silt particles from runoff to meet the requirements of the TM standard under the WPCO. The design of silt removal facilities will be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly. | Contractor | Construction Stage | Δ |
| S 7.9 | S6.5 | Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms. | Contractor | Construction Stage | N/A |
| S 7.9 | S6.5 | Appropriate surface drainage will be designed and provided where necessary. | Contractor | Construction Stage | Δ |
| S 7.9 | S6.5 | The precautions to be taken at any time of year when rainstorms are likely together with the actions to be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94. | Contractor | Construction Stage | ✓ |
| S 7.9 | S6.5 | Oil interceptors will be provided in the drainage system where necessary and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages. | Contractor | Construction Stage | ✓ |
| S 7.9 | S6.5 | Temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge, if any, will be adequately designed for the controlled release of storm flows. | Contractor | Construction Stage | ✓ |
| S 7.9 | S6.5 | The temporary diverted drainage, if any, will be reinstated to the original condition when the construction work has finished or when the temporary diversion is no longer required. | Contractor | Construction Stage | ✓ |
| S 7.9 | S6.5 | Appropriate infiltration control, such as cofferdam wall, should be adopted to limit groundwater inflow to the excavation works areas in the Project site. Groundwater pumped out from excavation area should be discharged into the storm system via silt removal facilities. | Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|-------------------------|----------------|---|-----------------------------|---------------------------------|-----------------------|
| S 7.9 | S6.5 | Appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers over the construction site to prevent direct disposal of sewage into the water environment. | Contractor | Construction Stage | ✓ |
| S 7.9 | S6.5 | The contingency plan for the existing operation of the BPPS is considered sufficient for directing immediate response to any accidental spillage event. | CAPCO | Construction Stage | ✓ |
| S 7.9 | S6.5 | Mitigation measures required for maintenance dredging at seawater intake and discharge outfall would be the same as that recommended for construction phase dredging operation | Contractor | Construction Stage | N/A |
| S7.9 and S7.12 | S6.2-S6.5 | A water quality monitoring programme shall be implemented for the construction phase. | ET | Construction Stage | N/A |
| S7.9 and S7.12 | S6.2-S6.5 | To ensure compliance to the effluent standard, regular monitoring of effluent quality is recommended during normal operation. Furthermore, marine water monitoring at selected nearby WSRs during the first year of project commission are recommended to ensure compliance to WQO or other water quality criteria. | ET/ CAPCO | Operational Stage | N/A |
| Waste Management | | | | | |
| S8.5.1 | Table 7.1 | The Contractor must ensure that all the necessary waste disposal and marine dumping permits or licences are obtained prior to the commencement of the construction works. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | The contractor will open a billing account with EPD in accordance with the Waste Disposal (Charges for Disposal of Construction Waste) Regulation for the payment of disposal charges. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | A trip-ticket system will be established in accordance with <i>DEVB TC(W) No. 6/2010</i> to monitor the reuse of surplus excavated materials off-site and disposal of construction waste and general refuse at transfer facilities/ landfills, and to control fly-tipping. | Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|---------------|----------------|---|-----------------------------|---------------------------------|-----------------------|
| S8.5.1 | S7.2 | A WMP as stated in the <i>PNAP ADV-19</i> for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established and implemented during the construction phase as part of the Environmental Management Plan (EMP). The Contractor will be required to prepare the EMP and submits it to the Architect/ Engineer under the Contract for approval prior to implementation. | Contractor | Construction Stage | ✓ |
| S8.5.1 | Table 7.1 | The management of dredged/ excavated sediment management requirement from <i>PNAP ADV-21</i> will be incorporated in the Specification of the Contract Documents. | CAPCO/ Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | C&D materials will be segregated on-site into public fill and construction waste and stored in different containers or skips to facilitate reuse of the public fill and proper disposal of the construction waste. Specific areas of the Site will be designated for such segregation and storage if immediate use is not practicable. Prefabrication will be adopted as far as practicable to reduce the construction waste arisings. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | The Contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | Containers used for storage of chemical wastes will: <ul style="list-style-type: none"> • Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; • Have a capacity of less than 450 L unless the specifications have been approved by the EPD; and • Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | The storage area for chemical wastes will: <ul style="list-style-type: none"> • Be clearly labelled and used solely for the storage of chemical waste; • Be enclosed on at least 3 sides; | Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|---------------------------|----------------|--|-----------------------------|---------------------------------|-----------------------|
| | | <ul style="list-style-type: none"> Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest; Have adequate ventilation; Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and Be arranged so that incompatible materials are appropriately separated. | | | |
| S8.5.1 | S7.2 | Chemical waste will be disposed of: <ul style="list-style-type: none"> Via a licensed waste collector; and To a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | General refuse will be stored in enclosed bins separately from construction and chemical wastes. The general refuse will be delivered to the WENT Landfill, separately from construction and chemical wastes, on a daily basis to reduce odour, pest and litter impacts. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | Recycling bins will be provided at strategic locations within the Project Site to facilitate recovery of recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) from the Project Site. Materials recovered will be sold for recycling. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | To avoid any odour and litter impact, appropriate number of portable toilets will be provided for workers on-site. | Contractor | Construction Stage | ✓ |
| S8.5.1 | S7.2 | At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling. | Contractor | Construction Stage | ✓ |
| Land Contamination | | | | | |
| S9.8 | S8 | During construction stage, good house-keeping practices shall be maintained by the Contractor to minimise the risk of land contamination due to construction activities, including but not limited to the followings: | Contractor | Construction Stage | Δ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|----------------|----------------|---|-----------------------------|---------------------------------|-----------------------|
| | | <ul style="list-style-type: none"> Minimise the chemical stock within Project Site, only store the amount of chemicals needed; Designated chemical/ chemical waste storage shall be established on concrete paved ground, as far as practicable. Secondary containments shall be provided for storage of chemicals/ chemical wastes; Conduct regular maintenance and inspection on plants and equipment, particularly those involve the use of fuel, hydraulic oil or any sort of chemicals; and Divert rainfall and surface run-off around construction areas. | | | |
| Ecology | | | | | |
| S10.9.2 | S9.1 | The vessel operators will be required to control and manage all effluent from vessels to prevent avoidable water quality impacts. | Contractor | Construction Stage | ✓ |
| S10.9.2 | S9.1 | A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced. This will also be covered in the contractor briefings. | Contractor | Construction Stage | ✓ |
| S10.9.2 | S9.1 | The effects of construction of the Project on the water quality of the area will be reduced with the implementation of mitigation measures as described in the Water Quality Impact Assessment. | Contractor | Construction Stage | ✓ |
| S10.9.3 | S9.1 | All vessel operators working on the Project construction will be given a briefing, alerting them to the possible presence of dolphins in the marine works areas, and the guidelines for safe vessel operation in the presence of cetaceans. The use of high-speed vessels will be avoided as far as possible. All vessels used in this Project will be required to slow to 10 knots around the Project's marine works areas and area with high dolphin usage. | Contractor | Construction Stage | ✓ |
| S10.9.3 | S9.1 | The vessel operators of this Project will be required to use predefined and regular routes. | Contractor | Construction Stage | ✓ |
| S10.9.3 | S9.2.1 | A marine mammal exclusion zone within a radius of 250 m from dredger will be implemented during the construction phase. Qualified observer(s) will scan an exclusion zone of 250 m radius around the work area for at least 30 minutes prior to the start of dredging. If cetaceans are observed in the exclusion zone, dredging will be delayed until they have left the area. | Contractor | Construction Stage | N/A |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|-------------------------------|----------------|---|-----------------------------|---------------------------------|-----------------------|
| S10.9.4 | S9.1 | Structures will utilise appropriate design to complement the surrounding landscape wherever possible. Materials and finishes will be considered during detailed design. | CAPCO | Construction Stage | ✓ |
| S10.9.4 | S9.1 | All of the major lighting sources will be pointed inward and downwards to avoid disturbances to wildlife. | CAPCO | Construction Stage | ✓ |
| S10.9.4 | S9.1 | Good site practices and precautionary measures are recommended to be implemented to avoid encroachment onto the nearby natural habitats, minimise disturbance to wildlife, and ensure air and water quality is maintained. Mitigations measures as mentioned in the air quality (Section 4 in Approved EIA Report ref. no. AEIAR-197/2016) and water quality (Section 7 in Approved EIA Report ref. no. AEIAR-197/2016) assessments will be consequently instigated to minimise dust and surface runoff to adjacent wildlife and natural habitats during construction activities. | CAPCO/ Contractor | Construction Stage | ✓ |
| S10.9.4 | S9.1 | Erect fences or demarcate along the boundary of the works area before the commencement of works to prevent vehicle movements, and encroachment of staffs, onto adjacent areas. | CAPCO/ Contractor | Construction Stage | ✓ |
| S10.9.4 | S9.1 | Avoid any damage and unnecessary disturbance to the surrounding natural habitats. | CAPCO/ Contractor | Construction Stage | ✓ |
| Landscape & Visual | | | | | |
| S12.8 | S11 | Sensitive architectural design of the new facilities. This should take into account material texture, colour, finished to structure and the context of the site. | CAPCO/ Design Contractor | Construction Stage | N/A |
| S12.8 | S11 | Reinstatement. Following construction, areas temporarily affected by the construction works, will be reinstated to their former state. This will include the artificial shoreline as well as parts of some roads. | CAPCO/ Contractor | Construction Stage | N/A |
| S12.8 | S11 | Preservation of vegetation. Plants affected by the proposed Project are all within movable planters. Prior to construction, these affected moveable planters should be re-located to a suitable area, still within the BPPS, taking care to ensure the existing health status of the vegetation is maintained or enhanced at the new location. Once construction is complete the final location of the moveable planters should be integrated into the LMP. | CAPCO/ Contractor | Construction Stage | ✓ |

| EIA Reference | EM&A Reference | Recommended Environmental Protection Measures/ Mitigation Measures | Who implement the measures? | When to implement the measures? | Implementation Status |
|---------------|----------------|---|--|---------------------------------|-----------------------|
| S12.8 | S11 | Update Landscape Master Plan (LMP) to take account of the changes brought about by the Project and explore suitable areas where soft landscaping may be installed amongst the new facilities. The LMP should give due consideration to the possibility of re-provisioning of disturbed lands and provision of screen planting within the facility boundaries as far as practicable. | Qualified Landscape Professional employed by Project Proponent | Construction Stage | N/A |

Annex E

Waste Flow Table

Annex E - Waste Flow Table for Additional CCGT Units Project at BPPS

Monthly Summary Waste Flow Table for 2018

| Month | Actual Quantities of Inert C&D Materials Generated Monthly ⁽¹⁾ | | | | | Actual Quantities of C&D Wastes Generated Monthly | | | | |
|--------------|---|--------------------------------|--------------------------|--------------------------|--|---|----------------------------|-------------------------|-------------------------------|--|
| | Total Quantity Generated | Broken Concrete ⁽⁵⁾ | Reused in the Contract | Reused in other Projects | Disposed as Public Fill ⁽³⁾ | Metals | Paper/ cardboard packaging | Plastics ⁽²⁾ | Chemical Waste ⁽⁴⁾ | Others, e.g. general refuse ⁽³⁾ |
| | (in '000m ³) | (in '000m ³) | (in '000m ³) | (in '000m ³) | (in '000m ³) | (in '000kg) | (in '000kg) | (in '000kg) | (in'000 kg) | (in '000m ³) |
| Jan-18 | 0.048 | 0.000 | 0.000 | 0.000 | 0.048 | 63.782 | 0.000 | 0.000 | 0.000 | 0.033 |
| Feb-18 | 0.311 | 0.000 | 0.000 | 0.112 | 0.199 | 19.790 | 0.000 | 0.000 | 0.000 | 0.032 |
| Mar-18 | 1.923 | 0.000 | 0.000 | 0.007 | 1.916 | 34.170 | 0.000 | 0.000 | 0.000 | 0.058 |
| Apr-18 | 0.399 | 0.000 | 0.000 | 0.000 | 0.399 | 9.500 | 0.000 | 0.000 | 0.000 | 0.057 |
| May-18 | 2.638 | 0.000 | 0.000 | 0.000 | 2.638 | 34.209 | 0.000 | 0.000 | 0.000 | 0.074 |
| Jun-18 | 2.754 | 0.000 | 0.000 | 0.000 | 2.754 | 29.080 | 0.000 | 0.000 | 0.000 | 0.051 |
| Sub-total | 8.073 | 0.000 | 0.000 | 0.119 | 7.954 | 190.531 | 0.000 | 0.000 | 0.000 | 0.304 |
| Jul-18 | 3.488 | 0.000 | 0.000 | 0.000 | 3.488 | 2.880 | 0.000 | 0.000 | 0.000 | 0.057 |
| Aug-18 | 1.131 | 0.000 | 0.000 | 0.000 | 1.131 | 13.970 | 0.000 | 0.000 | 0.000 | 0.084 |
| Sep-18 | 2.983 | 0.000 | 0.000 | 0.000 | 2.983 | 11.880 | 0.000 | 0.000 | 0.000 | 0.120 |
| Oct-18 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Nov-18 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Dec-18 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total (2018) | 15.675 | 0.000 | 0.000 | 0.119 | 15.556 | 219.261 | 0.000 | 0.000 | 0.000 | 0.565 |
| 2016 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2017 | 29.871 | 0.554 | 0.048 | 0.000 | 29.269 | 200.162 | 0.004 | 0.750 | 0.180 | 0.303 |
| Cumulative | 45.546 | 0.554 | 0.048 | 0.119 | 44.825 | 419.423 | 0.004 | 0.750 | 0.180 | 0.869 |

Notes:

- (1) Inert C&D materials include bricks, concrete, building debris, rubble and excavated spoil.
- (2) Plastics refer to plastic bottles/containers, plastic sheets/foam form packaging material.
- (3) Density Assumption: 1.6(kg/l) for Public Fill and 0.9(kg/l) for General Refuse.
- (4) Chemical waste includes waste oil. Density of waste oil is assumed to be 0.8 kg/L.
- (5) Density of broken concrete is assumed to be 2.5 ton/m³.
- (6) The cut-off data for waste management data is 30 September 2018.