Gammon Construction Limited

Contract No. HY/2014/07
Central Kowloon Route – Kai Tak West

Supplementary Contamination Assessment Report

January 2019

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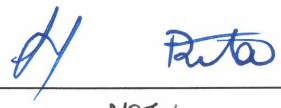
Prepared & Checked:	Lawrence Tso / Rita Chung	
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Version:	4	Date: 16 January 2019

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ERM

Environmental Permit No. FEP-01/457/2013/C

Central Kowloon Route

Independent Environmental Checker Verification

Works Contract:	**Kai Tak West (HY/2014/07)**

Reference Document/Plan

Document/~~Plan~~ to be ~~Certified~~/ Verified:	Supplementary Contamination Assessment Report and Remediation Action Plan
Date of Report:	16 January 2019 (Version 4)
Date received by IEC:	17 January 2019

Reference EP Condition

Environmental Permit Condition: 2.14

To determine the extent and level of land contamination and formulate necessary remedial measures at the Kowloon City Ferry Pier Public Transport Interchange and the To Kwa Wan Vehicle Examination Centre, the Permit Holder shall:-

(a) no later than one month after the completion of the land contamination investigation works at the Kowloon City Ferry Pier Public Transport Interchange (boreholes EBH1 and EBH2 as shown in Figure 4 of EP) and the To Kwa Wan Vehicle Examination Centre (borehole EBH3 as shown in Figure 4 of EP) in accordance with the endorsed Contamination Assessment Plan (CAP), submit to the Director for approval four hard copies and one electronic copy of Contamination Assessment Report (CAR) to document the findings of the land contamination investigation works and assessment on the nature and extent of land contamination;

(b) if land contamination is confirmed, submit to the Director for approval four hard copies and one electronic copy of Remedial Action Plan (RAP) to formulate necessary remedial measures. All remedial measures described in the approved RAP shall be fully and properly implemented.

(c) if remediation is required, deposit with the Director four hard copies and one electronic copy of Remediation Report (RR), no later than one month after the completion of the remediation works. The RR shall provide details on the remediation works carried out, types and volume of contaminated soil, standards and levels of treatment, and locations of all on-site and off-site disposal sites (including record of disposal). No construction works at the Kowloon City Ferry Pier Public Transport Interchange or the To Kwa Wan Vehicle Examination Centre shall be carried out prior to the EPD's endorsement of the said RR.

Before submission to the Director, the CAR, RAP and RR shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report.

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of FEP-01/457/2013/C.

Ms Mandy To
Independent Environmental Checker

Date: 18 January 2019

Our ref: 0436942_IEC Verification Cert_KTW_CAR RAP_20190118.docx

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1. INTRODUCTION

Project Background

1.1 The Central Kowloon Route (CKR) is a dual 3-lane trunk road across central Kowloon linking the West Kowloon in the west and the Kai Tak Development (KTD) in the east. The CKR will be about 4.7 km long with an underground tunnel section of about 3.9 km long, in particular, there will be an underwater tunnel of about 370 m long in Kowloon Bay to the north of the To Kwa Wan Typhoon Shelter. It will connect the West Kowloon Highway at Yau Ma Tei Interchange with the road network at Kowloon Bay and the future Trunk Road T2 at KTD which will connect to the future Tseung Kwan O - Lam Tin Tunnel (TKO-LTT) and Cross Bay Link (CBL). CKR, Trunk Road T2 and TKO-LTT will form a strategic highway link, namely Route 6, connecting West Kowloon and Tseung Kwan O. Consultancy studies for Trunk Road T2, TKO-LTT and CBL have been commissioned by Civil Engineering Development Department (CEDD). In addition, 3 ventilation buildings, which will be located in Ya Ma Tei, Ho Man Tin and ex-Kai Tak airport area, are proposed to ensure acceptable air quality within the tunnel.

1.2 The Environmental Impact Assessment (EIA) Report for Central Kowloon Route (Register No.: AEIAR-171/2013) was approved on 11 July 2013 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) for the construction and operation of CKR (EP No.: EP-457/2013) was granted on 9 August 2013. Variation of EP (VEP) for CKR was subsequently applied and the amended EP (EP No. EP-457/2013/C) was issued by the Director of Environmental Protection (DEP) on 16 January 2017.

1.3 Gammon Construction Limited (Gammon) was awarded the Contract No. HY/2014/07 - Central Kowloon Route – Kai Tak West (CKR-KTW) (the Contract). The Contract is one of the works contracts of CKR project and includes constructing the CKR section from Ma Tau Kok to within KTD. The major construction activities include:

- construction of approximately 160 m long cut-and-cover tunnel and 370 m long underwater tunnel between the tunnel section at Ma Tau Kok and the depressed road of the CKR within KTD;
- reconstruction of the seawall at Ma Tau Kok public pier, and the sloping seawall at the Former Kai Tak Airport Runway;
- construction of approximately 125 m long depressed road and 200 m long underpass of the CKR within KTD;
- construction of approximately 360m long underground tunnel ventilation adit of the CKR;
- reconstruction of Kowloon City Ferry Pier Public Transport Interchange; and
- other associated works.

1.4 The site layout plan of the Contract is shown in **Figure 1**.

1.5 Further EP (FEP) for CKR-KTW was applied for the Contract and the DEP issued the Further EP (EP No.: FEP-01/457/2013/C) on 28 February 2018. Condition 2.14 of the FEP stipulated the submission and measures for mitigating land contamination impact for CKR-KTW. Condition 2.14 of the FEP is extracted below and Figure 4 of FEP is enclosed in **Appendix A**.

2.14 To determine the extent and level of land contamination and formulate necessary remedial measures at the Kowloon City Ferry Pier Public Transport Interchange and the To Kwa Wan Vehicle Examination Centre, the Permit Holder shall:-

(a) no later than one month after the completion of the land contamination investigation works at the Kowloon City Ferry Pier Public Transport Interchange

(boreholes EBH1 and EBH2 as shown in Figure 4 of this Permit) and the To Kwa Wan Vehicle Examination Centre (borehole EBH3 as shown in Figure 4 of this Permit) in accordance with the endorsed Contamination Assessment Plan (CAP)[1], submit to the Director for approval four hard copies and one electronic copy of Contamination Assessment Report (CAR) to document the findings of the land contamination investigation works and assessment on the nature and extent of land contamination;

(b) if land contamination is confirmed, submit to the Director for approval four hard copies and one electronic copy of Remedial Action Plan (RAP) to formulate necessary remedial measures. All remedial measures described in the approved RAP shall be fully and properly implemented.

(c) if remediation is required, deposit with the Director four hard copies and one electronic copy of Remediation Report (RR), no later than one month after the completion of the remediation works. The RR shall provide details on the remediation works carried out, types and volume of contaminated soil, standards and levels of treatment, and locations of all on-site and off-site disposal sites (including record of disposal). No construction works at the Kowloon City Ferry Pier Public Transport Interchange or the To Kwa Wan Vehicle Examination Centre shall be carried out prior to the EPD's endorsement of the said RR.

Before submission to the Director, the CAR, RAP and RR shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report.

1.6 AECOM Asia Co. Ltd. (AECOM) was commissioned by Gammon to carry out land contamination assessment for the Contract. Following to Condition 2.14 of the FEP, land contamination investigation works (including field works and laboratory testing) at the Kowloon City Ferry Pier Public Transport Interchange and the To Kwa Wan Vehicle Examination Centre were carried out in the period from 14 April 2018 to 2 January 2019. The field works were conducted by Gammon and supervised by the land contamination specialist from AECOM whereas laboratory analysis was carried out by ALS Technichem (HK) Pty Limited (ALS). AECOM collated the information from the investigation works for the preparation of this supplementary Contamination Assessment Report (CAR).

Purpose of this Report

1.7 The purpose of this supplementary CAR is to fulfil the requirements stipulated in Condition 2.14 (a) and (b) of the FEP. This supplementary CAR documents the findings of the land contamination investigation works and assessment on the nature and extent of land contamination and presents the necessary remedial measures.

1.8 It should be noted that this supplementary CAR only covered the land contamination investigation works at the Kowloon City Ferry Pier Public Transport Interchange and the To Kwa Wan Vehicle Examination Centre as stipulated in Condition 2.14 of the FEP. The contaminated soil within the Yau Ma Tei area (i.e. around sampling location PBH4) as identified in the EIA Report for CKR is located well outside of the Contract area and the associated land contamination investigation / remediation works will be separately addressed by others. According to the EIA Report for CKR, remediation works are required for the contaminated soil excavated from PBH4 and upon completion of the remediation works, a remediation report (RR) for PBH4 should be submitted to EPD for record and agreement.

[1] Appendix 8.3 of the approved EIA Report (Register No.: AEIAR-171/2013)

Relevant Environmental Guidelines

1.9 In addition to the abovementioned FEP, EIA Report for CKR and endorsed CAP, the land contamination assessment will be carried out with reference to the following EPD issued guidelines:

- Guidance Note for Contaminated Land Assessment and Remediation (Guidance Note);
- Practice Guide for Investigation and Remediation of Contaminated Land (Practice Guide); and
- Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (Guidance Manual).

1.10 The Risk-based Remediation Goals (RBRGs) stipulated in the Guidance Manual will be adopted as the criteria for assessing soil and groundwater contamination.

Structure of this Report

1.11 Apart from this introductory section, the structure of this supplementary CAR is outlined below:

- Section 2 – provides details of the site investigation programme;
- Section 3 – presents and interprets the contamination assessment results;
- Section 4 – discusses the recommended precautionary measures; and
- Section 5 – presents the conclusion and recommendations.

2. SITE INVESTIGATION PROGRAMME

2.1 According to Condition 2.14 of FEP, there are 2 boreholes (viz. EBH1 and EBH2) for the land contamination investigation works at the Kowloon City Ferry Pier Public Transport Interchange (KCFP-PTI) and 1 borehole (viz. EBH3) for the To Kwa Wan Vehicle Examination Centre (TKW-VEC).

2.2 Referring to the endorsed CAP in Appendix 8.3 of the EIA Report for CKR, EBH1 and EBH2 are for the confirmatory investigation to delineate the contamination extent identified within KCFP-PTI at time of the EIA study. The concerned sampling location at the time of the EIA study was PBH7 (refer to **Appendix A**). One sample from PBH7 (soil sample at 7.00 – 7.95 m below ground level (m bgl)) was found to exceed the RBRGs. The soil sample (7.00 – 7.95 m bgl) had exceeded the RBRGs for Urban Residential (UR) and Rural Residential (RR) land use scenario for lead but were below both the Industrial (IND) and Public Parks (PP) land use scenario (which are the closest use for public transport terminus). Details of the exceedance is summarised in **Table 2.1.**

Table 2.1 Summary of RBRGs Exceedance at PBH7

Sampling Location	Depth (m bgl)	Contaminant	Concentration (mg/kg)	RBRG Level (mg/kg)*	C_{sat} (mg/kg)	Exceeded RBRGs Land Use Scenario
PBH7	7.00 to 7.95	Lead	490	UR: 258 RR: 255 IND: 2290 PP: 857	-	UR and RR

Note:
* UR – Urban Residential land use scenario
RR - Rural Residential land use scenario
IND - Industrial land use scenario
PP – Public Parks land use scenario

2.3 For EBH3, based on the endorsed CAP, the site investigation is for the proposed additional works area (EP-1). The chemicals of concern identified at the time was volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals and petroleum carbon ranges (PCRs). Due to site access issue, no land contamination investigation works were conducted within EP-1 at the time of the EIA study.

2.4 Details of the land contamination investigation works at KCFP-PTI and TKW-VEC are discussed below. The sampling and testing schedule is summarised in **Table 2.3**.

Confirmatory Investigation for KCFP-PTI (EBH1 and EBH2)

Sampling Locations

2.5 The SI field works for EBH1 and EBH2 were carried out from 30 May to 5 June 2018 and 14 April to 20 April 2018 respectively. The SI works were supervised by the land contamination specialist from AECOM. Due to encountering of underground utilities at EBH1 and encroachment to the existing bus stop queuing area at EBH2, EBH1 and EBH2 were relocated approximately 5 m and 2 m respectively from the locations shown in FEP. The as-built sampling locations are shown in **Figure 2** and summarised in **Table 2.3**.

Soil Sampling and Depths

2.6 Boreholes were constructed at both the sampling location by means of dry rotary drilling methods, i.e. without the use of flushing medium, to prevent cross-contamination during sampling. Soil samples were collected, as far as possible, at depths as specified in the

endorsed CAP (i.e. 0.5, 1.5, 3.0, 5.0, 7.0, 9.0, 11.0, 12.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0 and 20.0 m bgl).

2.7 Prior to soil boring, inspection pits were excavated down to a maximum depth of 2.9 m bgl to inspect for underground utilities. Disturbed soil samples were collected in the inspection pits at the specified depths (i.e. 0.5 and 1.5 m bgl) by stainless steel hand tools. Soil boring using drill rigs was then performed from 3.0 m bgl to the termination depth and undisturbed U76 or U100 were collected at the specified depths. As hard materials were encountered at EBH1, no soil samples were able to be collected from 18.0 m bgl and onwards.

2.8 Based on the above, a total of 29 soil samples (12 samples from EBH1, 15 samples from EBH2 and 2 soil duplicates for quality assurance / quality control (QA/QC) programme) were collected from EBH1 and EBH2 for testing.

2.9 All the sampling equipment was decontaminated by washing with phosphate-free detergent then rinsed by distilled water before sampling so as to minimise the potential for cross contamination.

2.10 Sample containers used were laboratory cleansed, airtight and made of glass with Teflon-lined lids so that the container does not react with the sample or absorb contaminants. All samples collected were uniquely labelled, including the sampling location codes, identification number and the depths at which the samples were taken. Other information such as the date and time of sample collection were also recorded. The samples were stored at 0 - 4ºC immediately after collection. Samples were delivered to laboratory within the same day of the samples being collected and analysed within the respective holding time.

2.11 No oil/free product were noted in the sampling location. No distinctive, characteristic smell of soil sample exhibiting signs of contamination was noticeable during the SI works.

2.12 Chain of Custody (COC) protocol was adopted for the SI works and they are attached in **Appendix B**. Photos of SI are provided in **Appendix G**.

Strata Logging

2.13 Strata logging for boreholes was undertaken during the course of drilling and sampling by a qualified geologist. The logs included the general stratigraphic descriptions, depth of soil sampling and sample notation. The presence of any rocks/boulders/cobbles and foreign materials such as metals, wood and plastics was also recorded. The borehole logs are provided in **Appendix C**.

Groundwater Sampling

2.14 According to the endorsed CAP, no collection of groundwater samples is required for the confirmation investigation.

Laboratory Analysis

2.15 The laboratory analysis were conducted by ALS Technichem (HK) Pty Limited (“ALS”) (address: 11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong), a HOKLAS accredited laboratory (Registration No.: 066).

2.16 Based on the contaminant identified at PBH7 and according to the Contract requirements, lead was tested on all the collected soil samples from EBH1 and EBH2. The referenced analytical method and adopted reporting limit are shown in **Table 3.3** and in accordance with the endorsed CAP. The laboratory analysis was completed on 20 June 2018.

Assessment Criteria

2.17 Based on the approved CAP, the RBRGs for all 4 land use scenarios (i.e. UR, RR, IND and PP) was adopted in case the excavated contaminated soil, if any, was used as public fill for unidentified after-uses. The RBRGs for soil and soil saturation limits are given in **Appendix F**.

Additional Works Area at TKW-VEC (EBH3)

Sampling Locations

2.18 The SI field works for TKW-VEC was carried out on 2 May and 11 to 17 December 2018. Due to the encountering of hard materials, no samples were collected for testing from the original proposed EBH3 location. The sampling location was subsequently relocated to approximately 6.2 m northeast of the original proposed location.

2.19 The sampling works were supervised by the land contamination specialist from AECOM. The as-built sampling location is shown in **Figure 2** and summarised in **Table 2.3**.

Soil Sampling and Depths

2.20 Inspection pit was excavated down to 2.9 m bgl at the relocated EBH3 on 2 May 2018 and disturbed soil samples were collected at 0.5 m and 1.5 m bgl by stainless steel hand tools.

2.21 Based on the latest engineering design, as soil excavation of up to 6 to 7 m bgl may be required in the area, further SI works were carried out at EBH3 in the period from 11 to 17 December 2018 to collect soil samples below 2.9 m bgl. For the further SI works, borehole was constructed by means of dry rotary drilling methods, i.e. without the use of flushing medium, to prevent cross-contamination during sampling. Soil samples were collected, as close as possible, at depths 3.0 m, 6.0 m, and 9.0 m bgl.

2.22 A total of 7 soil samples (including 2 soil duplicate for QA/QC programme) were collected from EBH3 for testing.

2.23 All the sampling equipment was decontaminated by washing with phosphate-free detergent then rinsed by distilled water before sampling so as to minimize the potential for cross contamination.

2.24 Sample containers used were laboratory cleansed, airtight and made of glass with Teflon-lined lids so that the container does not react with the sample or absorb contaminants. All samples collected were uniquely labelled, including the sampling location codes, identification number and the depths at which the samples were taken. Other information such as the date and time of sample collection were also recorded. The samples were stored at 0 - 4ºC immediately after collection. Samples were delivered to laboratory within the same day of the samples being collected and analysed within the respective holding time.

2.25 No oil/free product was found in the sampling location. No distinctive, characteristic smell of soil sample exhibiting signs of contamination was noticeable during the SI works.

2.26 Chain of Custody (COC) protocol was adopted for the SI works and they are attached in **Appendix B**. Photos of SI are provided in **Appendix G**.

On-site Screening

2.27 In addition to the abovementioned soil samples, soil sub-samples were also collected at 0.5 m, 1.5 m , 3.45 m, 6.90 m and 9.45 m bgl and screened on-site for VOCs using a photo-ionization detector (PID). Each soil sub-sample was put into a plastic zip-lock bag and equilibrated for approximately 10 minutes to allow VOCs in the soil to volatilize. The zip-lock bag was then pierced with the probe of the PID which will measure the concentration of total

VOCs in gas phase of the soil samples. The on-site screening was conducted by the land contamination specialist and results are shown in **Table 2.2.**

Table 2.2 Summary of On-Site PID Screening

Sampling Location ID	Sampling Depth (m bgl)	PID Readings (ppm)
EBH3	0.5	0
	1.5	9.4
	3.45	0.4
	6.90	28.0
	9.45	0.7

2.28 As shown in **Table 2.2**, except for 6.90 m bgl, low PID readings (below 20 ppm) were detected at all sampling depths. As the groundwater level is approximately 3.20 m bgl, the higher reading at 6.90 m bgl could be due to the presence of high moisture content in the sub-sample. Indeed, based on the laboratory testing results (refer to **Section 3)**, no VOCs were detected in all the soil samples at EBH3. Based on the results, no additional samples were collected for analysis.

Strata Logging

2.29 Strata logging for inspection pit / borehole was undertaken during the course of excavation and sampling by a qualified geologist. The logs included the general stratigraphic descriptions, depth of soil sampling and sample notation. The presence of any rocks/boulders/cobbles and foreign materials such as metals, wood and plastics was also recorded. The borehole logs are provided in **Appendix C**.

Groundwater Sampling

2.30 Groundwater was encountered in EBH3. Groundwater well was installed according to the Practice Guide and well development was carried out prior to groundwater sampling. Groundwater level was measured using an interface probe. A total of 1 groundwater sample and 1 duplicate groundwater sample were collected using Teflon bailer for analysis.

2.31 According to borehole log in **Appendix C**, the groundwater level at EBH3 is approximately +1.04 mPD or 3.20 m bgl.

2.32 No oil/ free product was found in the groundwater samples and no distinctive, characteristic smell of water sample exhibiting signs of contamination was noticeable during the SI works.

2.33 Chain of Custody (COC) protocol was adopted for the SI works and they are attached in **Appendix B**.

Laboratory Analysis

2.34 The laboratory analysis were conducted by ALS.

2.35 In accordance with the endorsed CAP, the identified chemicals of concern (i.e. VOCs, SVOCs, metals and PCRs) were tested on all the collected soil and groundwater samples. The referenced analytical method and adopted reporting limit are shown in **Table 3.4** and in accordance with the endorsed CAP. The laboratory analysis was completed on 2 January 2019.

Assessment Criteria

2.36 Based on the approved CAP, since the future land use of works area EP-1 has not yet confirmed, the most stringent set of RBRGs was adopted for data analysis. The RBRGs for

soil and soil saturation limits and the RBRGs for groundwater and groundwater solubility limits are given in **Appendix F**.

Quality Assurance / Quality Control (QA/QC)

2.37 The following QA/QC sample collection programme was adopted:

- 1 duplicate soil sample per 20 soil samples for the target contaminant(s) (a total of 4 duplicate soil samples (2 for EBH1 and EBH2 and 2 for EBH3) were collected);
- 1 duplicate groundwater sample per 20 groundwater samples for the target contaminant(s) (a total of 1 duplicate groundwater sample (EBH3) was collected);
- 1 equipment blank per 20 samples for the target contaminant(s) (a total of 4 equipment blanks (2 for EBH1 and EBH2 and 2 for EBH3) were collected);
- 1 field blank per 20 samples for the target contaminant(s) (a total of 4 field blanks (2 for EBH1 and EBH2 and 2 for EBH3) were collected);
- 1 trip blank per trip for analysis of volatile parameters (only apply to EBH3) (a total of 5 trip blanks were taken).

Table 2.3 Sampling and Testing Schedule

Sampling Location ID	As-Built Coordinates		Sampling Method	Sampling Depths (m bgl)	Testing Parameters				
	Northing	Easting			VOCs	SVOCs	Metals (Full-list)	Metal (Lead only)	PCRs
KCFP-PTI									
EBH1	819954.69	837927.08	Dry rotary drilling	0.50 1.50 3.00 - 3.45 5.00 - 5.45 7.00 - 7.45 9.00 - 9.45 10.70 - 11.15 12.00 - 12.45 14.00 - 14.45 15.00 - 15.30 16.00 - 16.30 17.00 - 17.16^				√	
EBH2	819941.70	837963.04	Dry rotary drilling	0.50 1.50 3.00 - 3.45 5.00 - 5.45 6.80 - 7.25 9.00 - 9.45 11.00 - 11.45 12.00 - 12.45 14.00 - 14.45 15.00 - 15.45 16.00 - 16.45 17.00 - 17.45 18.00 - 18.45 19.00 - 19.45 20.00				√	
TKW-VEC									
EBH3*	819758.59	837973.54	Inspection pit	0.5 1.5	√	√[1]	√[2]		√
	819758.58	837973.56	Dry rotary drilling / groundwater well	3.00 – 3.45 6.45 – 6.90[+] 9.00 – 9.45 Groundwater					

Note:
^ Due to encountering of hard materials, the last soil sample collected at EBH1 was 17.00 – 17.16m bgl.
* The sampling location was relocated due to encountering of hard materials.
+ Due to encountering of gravel / cobbles, no soil sample was recovered at depth 6.00 – 6.45 m bgl. Soil sample collected at 6.45 – 6.90 m bgl was analysed instead.
1. According to Table 6.3 of the endorsed CAP, only testings of Acenaphthlene, Acenaphthene, Anthracene, Benze(b)floranthene, Chrysene, Fluoranthene, Napthalene, Phenanthrene are required for groundwater sample collected at EBH3.
2. According to Table 6.3 of the endorsed CAP, only testing for Mercury is required for groundwater sample collected at EBH3.

3. CONTAMINATION ASSESSMENT RESULTS AND INTERPRETATION

Confirmatory Investigation for KCFP-PTI (EBH1 and EBH2)

Laboratory Analytical Results and Results Interpretation

3.1 The 29 soil samples (including 2 duplicate samples) were delivered to ALS for laboratory analysis. Summary tables of the laboratory testing results are presented in **Appendix D** and the Certificates of Analysis (COA) are presented in **Appendix E**.

3.2 Of the 29 soil samples, 1 soil sample (EBH1 (9.00-9.45 m bgl)) have exceeded the RBRGs for UR and RR land use scenarios for lead but were within the RBRGs for IND and PP land use scenarios. No RBRGs exceedances were identified in the corresponding depths at EBH2.

3.3 For depth where contamination were identified in EIA Report for CKR (i.e. PBH7 (7.00 to 7.95 m bgl), no RBRGs exceedances were identified in the corresponding depths at EBH1 and EBH2.

3.4 Details of the concerned soil sample results are summarized in **Table 3.1**. The completed Standard Form 3.2 are shown in **Table 3.3**.

Table 3.1 Summary of Concerned Soil Sample Results

Sampling Location	Depth (m bgl)	Contaminant	Concentration (mg/kg)	RBRG Level (mg/kg)*	C_{sat} (mg/kg)	Exceeded RBRGs Land Use Scenario
7.0 m bgl Soil Stratum						
PBH7	7.00 to 7.95	Lead	490	UR: 258 RR: 255 IND: 2290 PP: 857	-	UR and RR
EBH1	7.00 to 7.45		4			No exceedance
EBH2	6.80 to 7.25		16			No exceedance
9.0 m bgl Soil Stratum						
PBH7	No samples taken^	Lead	-	UR: 258 RR: 255 IND: 2290 PP: 857	-	-
EBH1	9.00 to 9.45		373			UR and RR
EBH2	9.00 to 9.45		20			No exceedance

Note:
^ The lowest soil sample depth collected at PBH7 is 7.00 to 7.95 m bgl
* UR – Urban Residential land use scenario
RR - Rural Residential land use scenario
IND - Industrial land use scenario
PP – Public Parks land use scenario

Impact Evaluation and Estimated Contamination Extent

3.5 Details of the 2 soil strata (i.e. PBH7 at 7.00 to 7.95 m bgl and EBH1 at 9.00 to 9.45 m bgl) that exceeded the RBRGs for UR and RR land use scenarios are discussed below.

<u>PBH7 at 7.00 to 7.95 m bgl</u>

3.6 EBH1 is built to check the affected radius of PBH7 while EBH2 is located at the east of EBH1. Referring to **Table 3.1**, as there are no RBRGs exceedances at EBH1 and EBH2 at the corresponding depths, it could be reasonably assumed that the contamination of PBH7 was relatively localised and would not fall beyond EBH1. The contamination at PBH7 is therefore expected to be located west of EBH1 (refer to **Figure 3**).

3.7 The construction works for CKR west of EBH1 will be carried out under a separate contract and will include tunnel construction in rock stratum using drill-and-blast method. No soil excavation is anticipated west of EBH1 and the concerned soil stratum will be left in place. Given that the land use in the area is public transport interchange (PTI) and the soil did not exceed the RBRGs for IND and PP land use scenarios (which are the closest land use scenarios for PTI), the hazards or risks to human health arising from the exposure to the soil are considered minimal. No remedial actions (including the submission of Remediation Action Plan (RAP) and Remediation Report (RR)) are therefore considered necessary for this soil stratum.

EBH1 at 9.00 to 9.45 m bgl

3.8 Similar to the soil stratum PBH7 (7.00 to 7.95 m bgl), it could be reasonably assumed that the contamination of EBH1 (9.00 to 9.45 m bgl) is relatively localised and a circular area with radius of 10 m centred at EBH1 is considered adequate to cover the horizontal contamination extent (refer to **Figure 3**). As shown in **Figure 3**, the contamination extent fall mainly within the abovementioned tunnel construction using drill-and-blast method with a small portion within the proposed access shaft. The construction of access shaft would be carried out under this Contract and would require soil excavation within this soil stratum. Given the concerned soil stratum did not exceed the RBRGs for IND and PP land use scenarios, the soil would cause minimal hazards or risks to users / operators of the future PTI if it is left in place (i.e. area within the drill-and-blast tunnel construction area) or if it is excavated and reused within the PTI (i.e. soil excavated from the concerned soil stratum within the proposed access shaft). However, as the concerned soil stratum has exceeded the RBRGs for UR and RR land use scenarios, any excavated soil should not be disposed of off- site.

3.9 Soil excavated within this soil stratum under this Contract are therefore recommended to be backfilled within the PTI area. As minimal human health hazards / risks are anticipated if the concerned soil stratum are left in place or properly reuse on site, no remedial actions (including the submission of Remediation Action Plan (RAP) and Remediation Report (RR)) are considered necessary for this soil stratum. Having said that, precautionary measures as discussed in **Section 4** should be implemented to protect site workers during excavation, handling and backfilling the concerned soil.

3.10 Based on the above, there are approximately 1021.0 m^3 of soil within the EBH1 (9.00 to 9.45 m bgl) stratum, of which approximately **54.3 m^3** are encroached into the proposed access shaft and are required to be excavated under the Contract. The excavated soil will need to be backfilled within the PTI area.

3.11 Details of the contamination at EBH1 (9.00 to 9.45 m bgl) that require excavation and proper reuse on-site are summarized in **Table 3.2** and depicted in **Figure 3**.

Table 3.2 Location, Depth and Estimated Quantity of Soil at EB1 (9.00 to 9.45 m bgl) that Requires Excavation and Proper Reuse On-Site

Sample Location ID	Sample Depth with RBRGs Exceedance (m bgl)	Contaminant	Estimated Quantities of Soil			
			Depth (m bgl)*	Thickness (m)	Area (m^2)	Soil Volume (m^3)
EBH1	9.00 - 9.45	Lead	7.45 - 10.70	3.25	16.7	54.3

* The vertical extent is the depth of samples above and below EBH1 (9.00 to 9.45 m bgl) with no exceedances in RBRGs for UR and RR (i.e. 7.45 m to 10.70 m bgl).

Land Contamination Assessment at the Additional Works Area at TKW-VEC (EBH3)

Laboratory Analytical Results and Results Interpretation

3.12 The 7 soil samples (including 2 duplicate sample) and 2 groundwater samples (including 1 duplicate sample) were delivered to ALS for laboratory analysis. Summary tables of the laboratory testing results are presented in **Appendix D** and the Certificates of Analysis (COA) are presented in **Appendix E**.

3.13 Based on the laboratory analytical results of the soil samples, no exceedances in the 4 RBRGs land use scenarios (i.e. UR, RR, IND and PP) and soil saturation limit (Csat) were found. For groundwater samples, no exceedance in the 3 RBRGs land use scenarios (i.e. UR, RR and IND) and solubility limit were noted. The completed Standard Form 3.2 and 3.3 are shown in **Table 3.4** and **Table 3.5** respectively.

3.14 Based on the above results and from site observations, no evidence of contamination were found at EBH3 at depths 0.5 m, 1.5 m, 3.00 m, 6.45 m, 9.00 m bgl and in groundwater.

QA/QC Analysis

3.15 QA/QC is the practice of making sure that collection and analysis techniques provide precise and accurate information. This process is to ensure the levels of contamination measured in the environmental samples reflect the actual environmental levels and are not due to accidental contamination of the sample or sample container. In this land contamination assessment, the following soil and groundwater duplicate samples, equipment blanks, field blanks and trip blanks were sampled and analysed:

- 4 soil duplicate samples (EBH1 (1.5m), EBH2 (5.00 - 5.45 m) and EBH3 (1.5 m, 3.00 – 3.45 m))
- 1 groundwater duplicate sample (EBH3)
- 4 equipment blanks (EBH1, EBH2 and 2 for EBH3 (equipment blank 20180508 and equipment blank 20181213))
- 4 field blanks (EBH1, EBH2 and 2 for EBH3 (field blank 20180508 and field blank 20181213))
- 5 trip blanks (EBH3 (2/05/2018), EBH3 (8/05/2018), EBH3 (13/12/2018), EBH3 (14/12/2018), EBH3 (17/12/2018)

3.16 The laboratory testing results for duplicate samples and blanks are presented in **Appendix D** and the Certificates of Analysis are presented in **Appendix E**.

3.17 Except for zinc in EBH3 (Equipment Blank 20180508), the analytical results for all equipment blanks, field blanks and trip blanks were recorded below their respective reporting limits. For the duplicate samples, no significant differences between the results of the duplicates and the original samples were observed. The results of duplicate and original sample are generally in the same order.

3.18 Zinc is detected in EBH3 (Equipment Blank 20180508) with value of 15 µg/L and is marginally above the reporting limit of 10 µg/L. However, the detection is considered not an issue since the zinc concentrations of the collected soil samples were in the range of 78 to 182 mg/kg and were well below the RBRGs land use scenarios of 10,000 mg/kg. Any cross-contamination during sample collection is not expected to have influence on the outcome of this assessment.

3.19 The laboratory QA/QC measures (laboratory duplicate, method blank, laboratory control spike and matrix spike) showed to be within the acceptable limits.

3.20 From the above, the QA/QC analytical results appeared to be in order and there is no evidence to indicate that there are errors in sampling and testing procedures that would influence the results and findings of this assessment. The procedures for sample collection and preparation are considered acceptable.

Table 3.3 Standard Form 3.2 - Soil Data Summary and Comparison to RBRGs and C_{sat} for EBH1 and EBH2

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (mg/kg)	Method Reporting Limit (mg/kg)	Analytical Method	Relevant Land Use Categories	RBRG(s) (mg/kg) [2]				C_{sat} (mg/kg)	Maximum Detected Concentration Exceeds [3]	
						Urban Residential	Rural Residential	Industrial	Public Parks		RBRG	C_{sat}
Metals												
Lead	29/29	4-373	1	USEPA 6020	Urban Residential / Rural Residential / Industrial / Public Parks	258	**255**	2290	857	NA	Yes	NA

Note:
1. x = number of samples in which chemical was found above the method of reporting limit
   y = number of samples analysed for chemical
2. Bolded value indicates the most stringent set of RBRG for Soil & Soil Saturation Limit.
3. NA = Not Applicable
4. Duplicate soil samples are included in the summary.

Table 3.4 Standard Form 3.2 - Soil Data Summary and Comparison to RBRGs and C_{sat} for EBH3

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (mg/kg) [2]	Method Reporting Limit (mg/kg)	Analytical Method	Relevant Land Use Categories	RBRG(s) (mg/kg) [3]				C_{sat} (mg/kg)	Maximum Detected Concentration Exceeds [4]	
						Urban Residential	Rural Residential	Industrial	Public Parks		RBRG	C_{sat}
Volatile Organic Chemicals												
Benzene	0/7	ND	0.2	USEPA 8260	Urban Residential / Rural Residential / Industrial / Public Parks	0.704	**0.279**	9.21	42.2	336	NA	NA
Ethylbenzene	0/7	ND	0.5			709	298	8240	10000*	**138**	NA	NA
Toluene	0/7	ND	0.5			1440	705	10000*	10000*	**235**	NA	NA
Xylenes (Total)	0/7	ND	2			95	**36.8**	1230	10000*	150	NA	NA
Acetone	0/7	ND	50			9590	**4260**	10000*	10000*	***	NA	NA
Bromodichloromethane	0/7	ND	0.1			0.317	**0.129**	2.85	13.4	1030	NA	NA
2-Butanone	0/7	ND	5			10000*	**10000***	10000*	10000*	***	NA	NA
Chloroform	0/7	ND	0.04			0.132	**0.053**	1.54	253	1100	NA	NA
Methyl tert-Butyl Ether	0/7	ND	0.5			6.88	**2.8**	70.1	505	2380	NA	NA
Methylene Chloride	0/7	ND	0.5			1.3	**0.529**	13.9	128	921	NA	NA
Styrene	0/7	ND	0.5			3220	1540	10000*	10000*	**497**	NA	NA
Tetrachloroethene	0/7	ND	0.04			0.101	**0.044**	0.777	1.84	97.1	NA	NA
Trichloroethene	0/7	ND	0.1			0.523	**0.211**	5.68	69.4	488	NA	NA

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (mg/kg) [2]	Method Reporting Limit (mg/kg)	Analytical Method	Relevant Land Use Categories	RBRG(s) (mg/kg) [3]				C_{sat} (mg/kg)	Maximum Detected Concentration Exceeds [4]	
						Urban Residential	Rural Residential	Industrial	Public Parks		RBRG	C_{sat}
Semi-Volatile Organic Chemicals												
Acenaphthene	0/7	ND	0.5	USEPA 8270A/8082	Urban Residential / Rural Residential / Industrial / Public Parks	3510	3280	10000*	10000*	**60.2**	NA	NA
Acenaphthylene	0/7	ND	0.5			2340	1510	10000*	10000*	**19.8**	NA	NA
Anthracene	0/7	ND	0.5			10000*	10000*	10000*	10000*	**2.56**	NA	NA
Benzo(a)anthracene	0/7	ND	0.5			12	**11.4**	91.8	38.3	NA	NA	NA
Benzo(a)pyrene	0/7	ND	0.5			1.2	**1.14**	9.18	3.83	NA	NA	NA
Benzo(b)fluoranthene	0/7	ND	0.5			**9.88**	10.1	17.8	20.4	NA	NA	NA
Benzo(g,h,i)perylene	0/7	ND	0.5			1800	**1710**	10000*	5740	NA	NA	NA
Benzo(k)fluoranthene	0/7	ND	0.5			120	**114**	918	383	NA	NA	NA
Chrysene	0/7	ND	0.5			**871**	919	1140	1540	NA	NA	NA
Dibenzo(a,h)anthracene	0/7	ND	0.5			1.2	**1.14**	9.18	3.83	NA	NA	NA
Fluoranthene	0/7	ND	0.5			2400	**2270**	10000*	7620	NA	NA	NA
Fluorene	0/7	ND	0.5			2380	2250	10000*	7450	**54.7**	NA	NA
Indeno(1,2,3-cd)pyrene	0/7	ND	0.5			12	**11.4**	91.8	38.3	NA	NA	NA
Naphthalene	0/7	ND	0.5			182	**85.6**	453	914	125	NA	NA
Phenanthrene	0/7	ND	0.5			10000*	10000*	10000*	10000*	**28**	NA	NA
Pyrene	0/7	ND	0.5			1800	**1710**	10000*	5720	NA	NA	NA
bis-(2-Ethylhexyl)phthalate	0/7	ND	5			30	**28**	91.8	94.2	NA	NA	NA
Hexachlorobenzene	0/7	ND	0.2			0.243	**0.22**	0.582	0.713	NA	NA	NA
Phenol	0/7	ND	0.5			10000*	10000*	10000*	10000*	**7260**	NA	NA

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (mg/kg) [2]	Method Reporting Limit (mg/kg)	Analytical Method	Relevant Land Use Categories	RBRG(s) (mg/kg) [3]				C_{sat} (mg/kg)	Maximum Detected Concentration Exceeds [4]	
						Urban Residential	Rural Residential	Industrial	Public Parks		RBRG	C_{sat}
Petroleum Carbon Ranges												
C6 - C8	0/7	ND	5	USEPA 8260/8015	Urban Residential / Rural Residential / Industrial / Public Parks	1410	**545**	10000*	10000*	1000	NA	NA
C9 - C16	0/7	ND	200			2240	**1330**	10000*	10000*	3000	NA	NA
C17 - C35	2/7	1130-1900	500			10000*	10000*	10000*	10000*	**5000**	NA	NA
Metals												
Antimony	3/7	1-8	1	USEPA 6020	Urban Residential / Rural Residential / Industrial / Public Parks	29.5	**29.1**	261	97.9	NA	No	NA
Arsenic	7/7	5-17	1			22.1	**21.8**	196	73.5	NA	No	NA
Barium	7/7	30.1-196	1			10000*	**10000***	10000*	10000*	NA	No	NA
Cadmium	2/7	0.3-0.5	0.2			73.8	**72.8**	653	245	NA	No	NA
Trivalent Chromium	7/7	3.4-56.6	1	USEPA 3060 / By Calculation		10000*	**10000***	10000*	10000*	NA	No	NA
Hexavalent Chromium	0/7	ND	1			221	**218**	1960	735	NA	NA	NA
Cobalt	7/7	1.3-9.8	1	USEPA 6020		1480	**1460**	10000*	4900	NA	No	NA
Copper	7/7	4-95	1			2950	**2910**	10000*	9790	NA	No	NA
Lead	7/7	21-59	1			258	**255**	2290	857	NA	No	NA
Manganese	7/7	186-534	1			10000*	**10000***	10000*	10000*	NA	No	NA
Mercury	3/7	0.09-0.15	0.05			11	**6.52**	38.4	45.6	NA	No	NA
Molybdenum	6/7	1-4	1			369	**364**	3260	1220	NA	No	NA
Nickel	7/7	2-24	1			1480	**1460**	10000*	4900	NA	No	NA
Tin	7/7	2.4-5.5	1			10000*	**10000***	10000*	10000*	NA	No	NA

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (mg/kg) [2]	Method Reporting Limit (mg/kg)	Analytical Method	Relevant Land Use Categories	RBRG(s) (mg/kg) [3]				C_{sat} (mg/kg)	Maximum Detected Concentration Exceeds [4]	
						Urban Residential	Rural Residential	Industrial	Public Parks		RBRG	C_{sat}
Zinc	7/7	47-182	1	USEPA 6020	Urban Residential / Rural Residential / Industrial / Public Parks	10000*	**10000***	10000*	10000*	NA	No	NA

Note:
* indicates a 'ceiling limit' concentration.
*** indicates that the C_{sat} value exceeds the "ceiling limit" therefore the RBRG applies.
1. x = number of samples in which chemical was found above the method of reporting limit
   y = number of samples analyzed for chemical
2. ND = The concentrations of the chemical are lower than the reporting limit
3. Bolded value indicates the most stringent set of RBRG for Soil & Soil Saturation Limit.
4. NA = Not Applicable
5. Duplicate soil samples are included in the summary.
6. The adopted analytical method for Mercury is USEPA 6020 rather than APHA 3112B as specified in the CAP. Given the analytical method is HOKLAS accredited, the analytical results of Mercury is considered acceptable.

Table 3.5 Standard Form 3.3 - Groundwater Data Summary and Comparison to RBRGs and Solubility Limit for EBH3

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (µg/L)[2]	Method Reporting Limit (µg/L)	Analytical Method	Relevant Land Use Categories	RBRG(s) (µg/L)[3]			Solubility Limit (µg/L)	Maximum Detected Concentration Exceeds [4]	
						Urban Residential	Rural Residential	Industrial		RBRG	Solubility Limit
Volatile Organic Chemicals											
Benzene	0/2	ND	5	USEPA 8260	Urban Residential / Rural Residential / Industrial	3860	**1490**	54000	1750000	NA	NA
Ethylbenzene	0/2	ND	5			1020000	391000	10000000*	**169000**	NA	NA
Toluene	0/2	ND	5			5110000	1970000	10000000*	**526000**	NA	NA
Xylenes (Total)	0/2	ND	20			112000	**43300**	1570000	175000	NA	NA
Acetone	0/2	ND	500			10000000*	**10000000***	10000000*	***	NA	NA
Bromodichloromethane	0/2	ND	5			2220	**871**	26200	6740000	NA	NA
2-Butanone	0/2	ND	50			10000000*	**10000000***	10000000*	***	NA	NA
Chloroform	0/2	ND	5			956	**382**	11300	7920000	NA	NA
Methyl tert-Butyl Ether	0/2	ND	5			153000	**61100**	1810000	***	NA	NA
Methylene Chloride	0/2	ND	50			19000	**7590**	224000	***	NA	NA
Styrene	0/2	ND	5			3020000	1160000	10000000*	**310000**	NA	NA
Tetrachloroethene	0/2	ND	5			250	**99.6**	2950	200000	NA	NA
Trichloroethene	0/2	ND	5			1210	**481**	14200	1100000	NA	NA

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (µg/L)[2]	Method Reporting Limit (µg/L)	Analytical Method	Relevant Land Use Categories	RBRG(s) (µg/L)[3]			Solubility Limit (µg/L)	Maximum Detected Concentration Exceeds [4]	
						Urban Residential	Rural Residential	Industrial		RBRG	Solubility Limit
Semi-Volatile Organic Chemicals											
Acenaphthene	0/2	ND	2	USEPA 8270A	Urban Residential / Rural Residential / Industrial	10000000*	7090000	10000000*	**4240**	NA	NA
Acenaphthylene	0/2	ND	2			1410000	542000	10000000*	**3930**	NA	NA
Anthracene	0/2	ND	2			10000000*	10000000*	10000000*	**43.4**	NA	NA
Benzo(b)fluoranthene	0/2	ND	1			539	203	7530	**1.50**	NA	NA
Chrysene	0/2	ND	1			58100	21900	812000	**1.60**	NA	NA
Fluoranthene	0/2	ND	2			10000000*	10000000*	10000000*	**206**	NA	NA
Naphthalene	0/2	ND	2			61700	**23700**	862000	31000	NA	NA
Phenanthrene	0/2	ND	2			10000000*	10000000*	10000000*	**1000**	NA	NA
Petroleum Carbon Ranges											
C6 - C8	0/2	ND	20	USEPA 8260/8015	Urban Residential / Rural Residential / Industrial	82200	31700	1150000	**5230**	NA	NA
C9 - C16	0/2	ND	500			714000	276000	9980000	**2800**	NA	NA
C17 - C35	0/2	ND	500			12800	4930	178000	**2800**	NA	NA

Chemical	Frequency of Detection (x/y) [1]	Range of Detected Concentration (µg/L)[2]	Method Reporting Limit (µg/L)	Analytical Method	Relevant Land Use Categories	RBRG(s) (µg/L)[3]			Solubility Limit (µg/L)	Maximum Detected Concentration Exceeds [4]	
						Urban Residential	Rural Residential	Industrial		RBRG	Solubility Limit
Metals											
Mercury	0/2	ND	0.5	USEPA 6020	Urban Residential / Rural Residential / Industrial	486	**184**	6790	NA	NA	NA

Note:
* indicates a 'ceiling limit' concentration.
*** indicates that the solubility limit exceeds the "ceiling limit" therefore the RBRG applies.
1. x = number of samples in which chemical was found above the method of reporting limit
   y = number of samples analyzed for chemical
2. ND = The concentrations of the chemical are lower than the reporting limit
3. Bolded value indicates the most stringent set of RBRG for Groundwater & Groundwater Solubility Limit.
4. NA = Not Applicable
5. Duplicate groundwater sample is included in the summary.
6. The adopted analytical method for Mercury is USEPA 6020 rather than APHA 3112B as specified in the CAP. Given the analytical method is HOKLAS accredited, the analytical results of Mercury is considered acceptable.

4. RECOMMENDED PRECAUTIONARY MEAURES

Overview

4.1 As discussed in **Section 3**, there are approximately 1021.0 m^3 of soil (the Concerned Soil) within the EBH1 (9.00 to 9.45 m bgl) stratum. Of the Concerned Soil, approximately **54.3 m^3** are encroached into the proposed access shaft and are required to be excavated under the Contract. Concerned Soil that are excavated will need to be backfilled within the PTI area. The extent of soil requiring excavation and reuse on-site under the Contract is depicted in **Figure 3.**

4.2 In order to protect site workers, the following precautionary measures should be implemented when excavating, handling and backfilling the Concerned Soil.

Soil Excavation, Stockpiling and Backfilling

4.3 The Concerned Soil identified within the works area, where excavation would be carried out, shall be excavated from the ground prior to any construction works on site.

4.4 Detailed design drawings for planned excavations in the indicated areas should be prepared by the Contractor. Factors such as excavation areas and depths, engineering properties and stability of the soils should be considered for safe working conditions. The excavations should be designed in accordance with the geotechnical properties of the soils and appropriate safety factors determined by the Contractor. The excavated areas should be set out by an appropriate qualified and licensed land surveyor.

4.5 The excavated Concerned Soil would need to be backfilled within the PTI area. The backfilling is also required to meet engineering specification. Location of the Concerned Soil as well as the tentative area for backfilling are shown in **Figure 3**. Photograph of the tentative area for backfilling is shown in **Appendix G**. Site Boundary is shown in **Figure 1**.

Mitigation Measures and Safety Measures

4.6 In order to minimise the potentially adverse environmental impacts arising from the handling of potentially contaminated materials, the following environmental mitigation measures are proposed during the course of soil excavation, stockpiling and backfilling works:

- Excavation profiles must be properly designed and executed.
- Stockpiling site(s) shall be lined with impermeable sheeting and bunded. Stockpiles shall be fully covered by impermeable sheeting to reduce dust emission.
- Excavation and stockpiling should be carried out during dry season as far as possible to minimise potentially contaminated runoffs from the Concerned Soil.
- Regular site audit will be conducted under the Environmental Monitoring and Audit (EM&A) programme to ensure the soil excavation, stockpiling and backfilling works are carried out in accordance with this report. Findings of the site audit will be presented in the EM&A reports to be submitted to EPD under the Further Environmental Permit.
- The truck transferring Concerned Soil shall be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the truck.

4.7 All activities should be carried out by persons appropriately trained in health and safety and appropriate personal protective equipment should be used by the persons engaged in the handling and backfilling of the Concerned Soil. The following guidelines of health and safety

should be strictly followed by all site personnel working on the area of handling and backfilling of the Concerned Soil at all times:

- Temporary fencing or warning ribbons will be provided to the boundary of excavation, slope crest and temporarily stockpiled areas. Where necessary, the exposed areas should be temporarily covered with impermeable sheeting during heavy rainstorm.
- Workers are required to wear appropriate protective clothing and safety equipment.
- Smoking, eating and drinking are strictly prohibited.
- Relevant occupational health and safety regulations and guidelines during excavation should be observed.

4.8 In order to minimise the potentially adverse effects on health and safety of workers during the course of excavation and backfilling works, the following basic health and safety measures should be implemented as far as possible:

- Set up a list of safety measures for site workers;
- Provide written information and training on safety for site workers;
- Keep a log-book and plan showing the potentially contaminated zones and clean zones;
- Maintain a hygienic working environment;
- Avoid dust generation;
- Provide personal protective clothing (e.g. chemical resistant jackboot, liquid tight gloves) to site workers; and
- Provide first aid training and materials to site workers.

Works Sequence

4.9 The proposed sequence for the works is as follow:

- Provide temporary support of the excavation;
- Excavate and stockpile the Concerned Soil; and
- Backfill the Concerned Soil within the PTI area as shown in **Figure 3**.

5. CONCLUSION

5.1 Land contamination investigation works (including field works and laboratory testing) at the Kowloon City Ferry Pier Public Transport Interchange (KCFP-PTI) and the To Kwa Wan Vehicle Examination Centre (TKW-VEC) were carried out from 14 April to 2 January 2019 2018. Referring to **Section 1.8**, as the identified contaminated soil within the Yau Ma Tei area (i.e. around sampling location PBH4) in the EIA Report for CKR is located well outside of the Contract area, the associated land contamination investigation / remediation works will be separately addressed by others. According to the EIA Report for CKR, remediation works are required for the contaminated soil excavated from PBH4 and upon completion of the remediation works, a remediation report (RR) for PBH4 should be submitted to EPD for record and agreement.

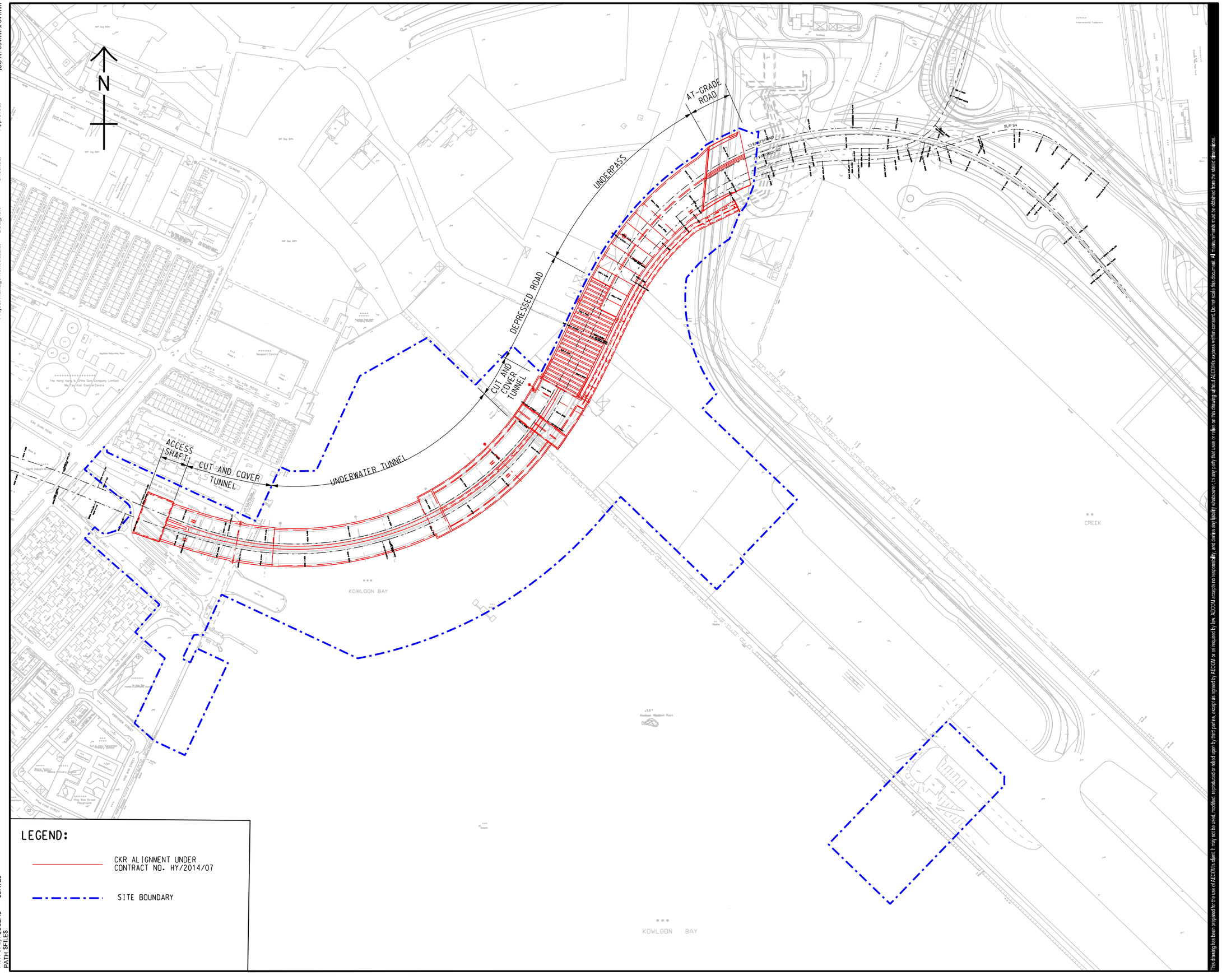
5.2 For KCFP-PTI, a total of 29 confirmatory samples (including 2 duplicate samples) were collected and tested. According to the laboratory analytical results, 1 soil sample have exceeded the RBRGs for UR and RR land use scenarios for lead but were well within the RBRGs for IND and PP land use scenarios. The quantities of soil are estimated to be 1021.0 m^3, of which approximately **54.3 m^3** are anticipated to be excavated under the Contract. Soil that exceeded the RBRGs for UR and RR land use scenarios and need to be excavated under the Contract shall be backfilled within the PTI area according to **Section 4** of this report. Given the future land use and that all the soil identified from the EIA Report for CKR and confirmatory investigation within the PTI are below the RBRGs for IND and PP land use scenarios, no remedial actions (including the submission of Remediation Action Plan and Remediation Report) are considered necessary. Appropriate precautionary measures have been proposed to minimise the potential environmental impacts and safety hazards to site workers from the soil handling and backfilling works.

5.3 For TKW-VEC, a total of 7 soil samples (including 2 duplicate samples) and 2 groundwater samples (including 1 duplicate sample) were collected and tested. According to the laboratory analytical results, no exceedance in the 4 RBRGs land use scenarios, soil saturation limit (C_{sat}) and solubility limit were found in the collected soil and groundwater samples. As no contamination were found, remedial actions (including the submission of RAP and RR) are considered not necessary for the additional works area at TKW-VEC.

Figures

ISO A1 594mm x 841mm

Project Management Initials: Designer: Checked: Approved:



LEGEND:

CKR ALIGNMENT UNDER CONTRACT NO. HY/2014/07

SITE BOUNDARY

Plot File by: $USER$
PATH $FILE$
$DATE$

AECOM

PROJECT

CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST

CLIENT

GAMMON CONSTRUCTION LIMITED

CONSULTANT

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

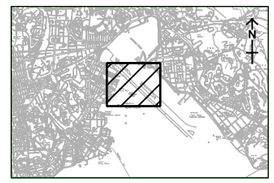
I/R	DATE	DESCRIPTION	CHK.

STATUS

SCALE / **DIMENSION UNIT**

A3 1 : 4000 — METRES

KEY PLAN



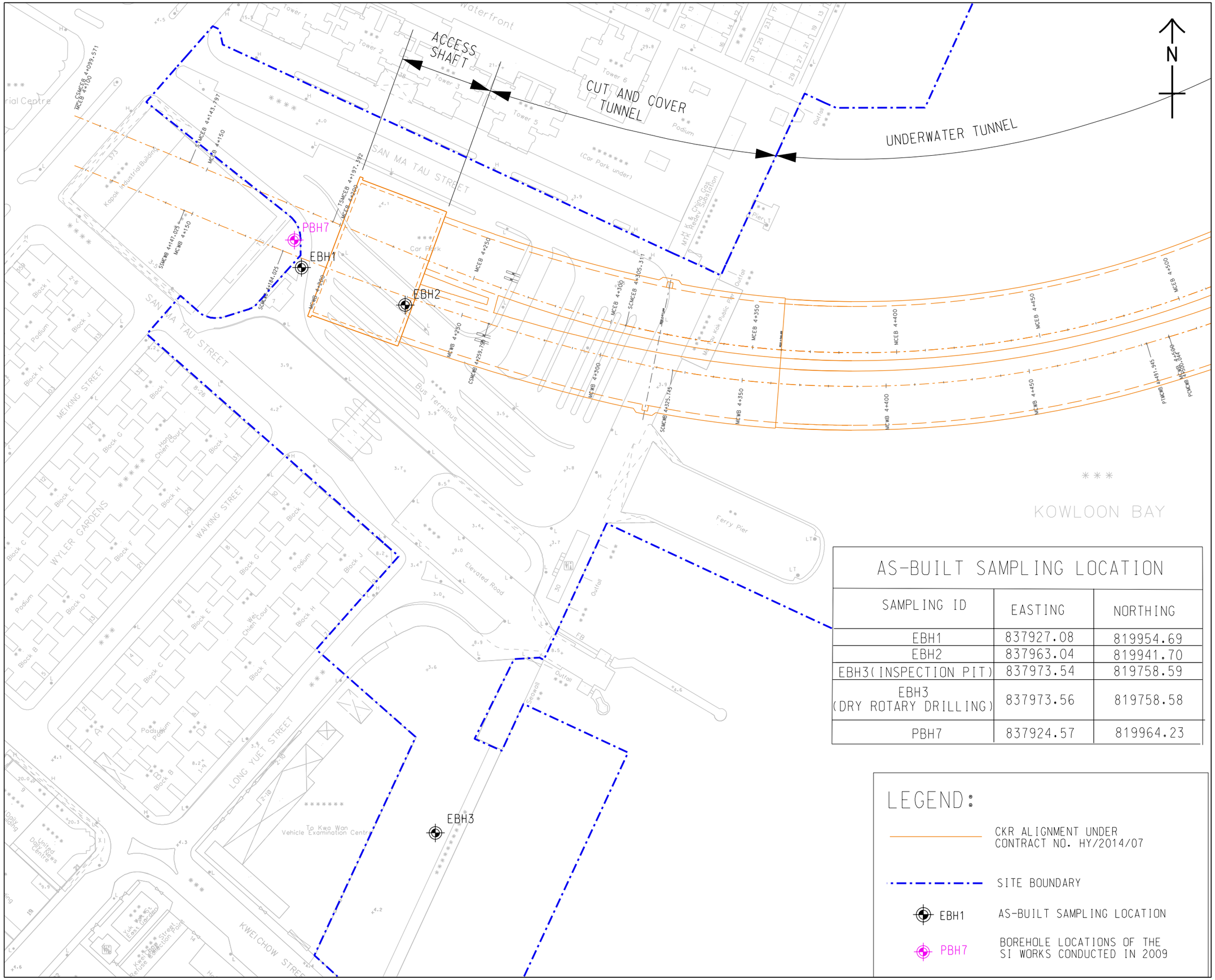
PROJECT NO. / **AGREEMENT NO.**

SHEET TITLE

SITE LAYOUT PLAN

SHEET NUMBER

FIGURE 1



AS-BUILT SAMPLING LOCATION

SAMPLING ID	EASTING	NORTHING
EBH1	837927.08	819954.69
EBH2	837963.04	819941.70
EBH3(INSPECTION PIT)	837973.54	819758.59
EBH3 (DRY ROTARY DRILLING)	837973.56	819758.58
PBH7	837924.57	819964.23

LEGEND:

- CKR ALIGNMENT UNDER CONTRACT NO. HY/2014/07
- SITE BOUNDARY
- EBH1 — AS-BUILT SAMPLING LOCATION
- PBH7 — BOREHOLE LOCATIONS OF THE SI WORKS CONDUCTED IN 2009

AECOM

PROJECT

CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST

CLIENT

GAMMON CONSTRUCTION LIMITED

CONSULTANT

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.

STATUS

SCALE A3 1:1200

DIMENSION UNIT METRES

KEY PLAN

PROJECT NO.

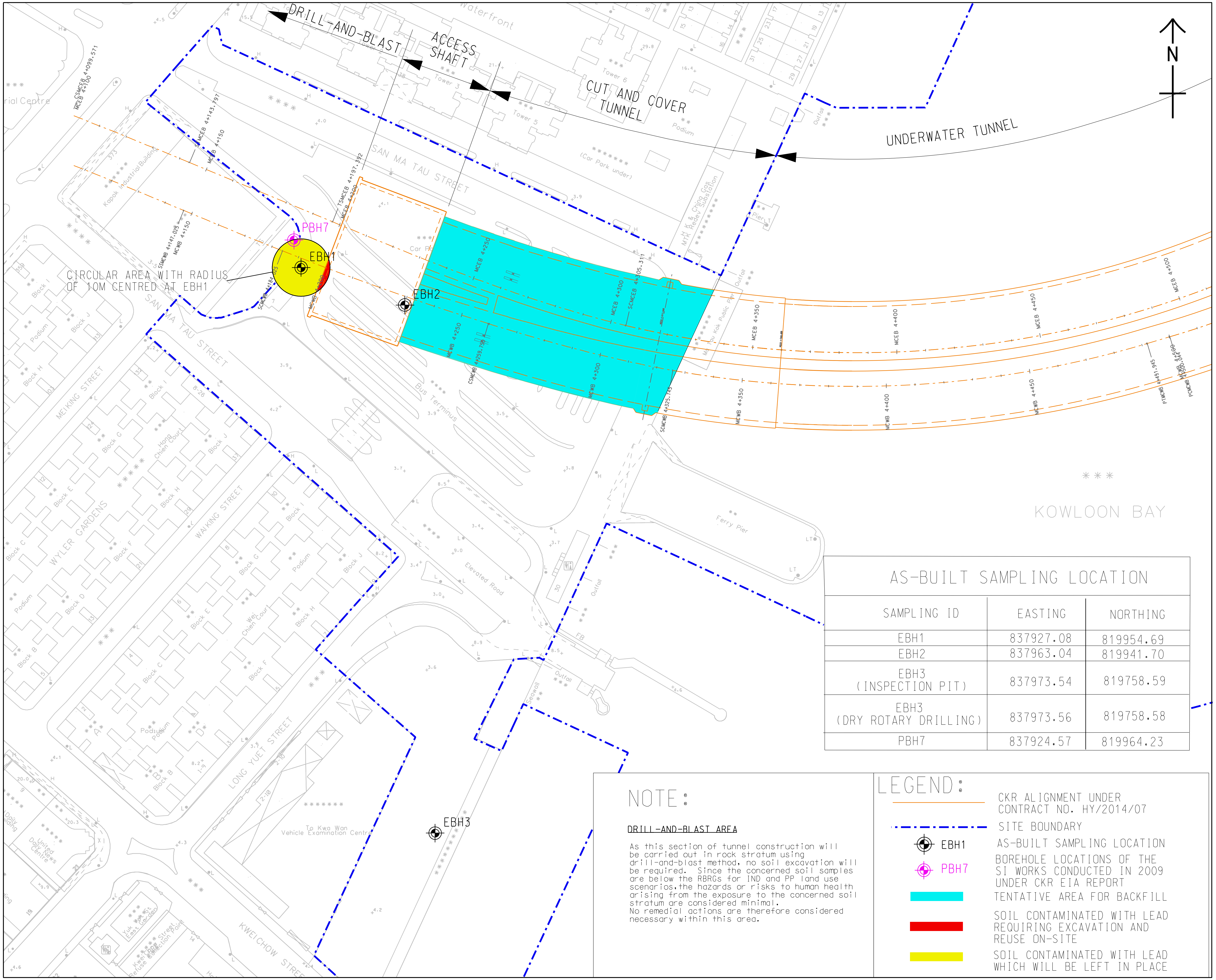
AGREEMENT NO.

SHEET TITLE

AS-BUILT SAMPLING LOCATIONS

SHEET NUMBER

FIGURE 2



AS-BUILT SAMPLING LOCATION

SAMPLING ID	EASTING	NORTHING
EBH1	837927.08	819954.69
EBH2	837963.04	819941.70
EBH3 (INSPECTION PIT)	837973.54	819758.59
EBH3 (DRY ROTARY DRILLING)	837973.56	819758.58
PBH7	837924.57	819964.23

NOTE:

DRILL-AND-BLAST AREA

As this section of tunnel construction will be carried out in rock stratum using drill-and-blast method, no soil excavation will be required. Since the concerned soil samples are below the RBRGs for IND and PP land use scenarios, the hazards or risks to human health arising from the exposure to the concerned soil stratum are considered minimal. No remedial actions are therefore considered necessary within this area.

LEGEND:

- CKR ALIGNMENT UNDER CONTRACT NO. HY/2014/07
- SITE BOUNDARY
- EBH1 — AS-BUILT SAMPLING LOCATION
- PBH7 — BOREHOLE LOCATIONS OF THE SI WORKS CONDUCTED IN 2009 UNDER CKR EIA REPORT
- TENTATIVE AREA FOR BACKFILL
- SOIL CONTAMINATED WITH LEAD REQUIRING EXCAVATION AND REUSE ON-SITE
- SOIL CONTAMINATED WITH LEAD WHICH WILL BE LEFT IN PLACE

AECOM

PROJECT 項目

CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST

CLIENT 業主

GAMMON CONSTRUCTION LIMITED

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

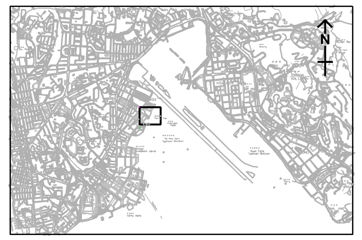
I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例: A3 1:1200

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖



PROJECT NO. 項目編號

AGREEMENT NO. 協議編號

SHEET TITLE 圖紙名稱

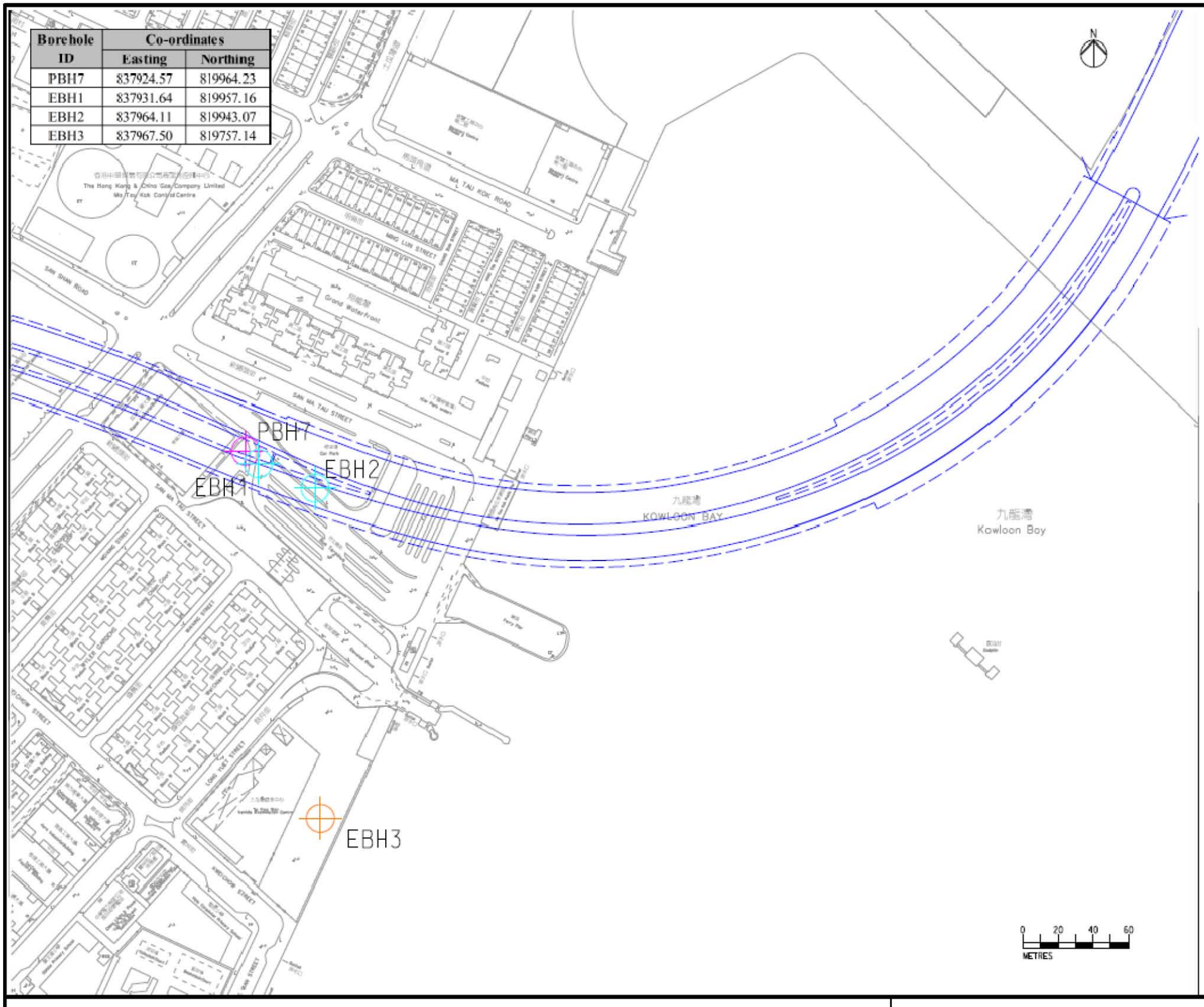
EXTENT OF SOIL REQUIRING EXCAVATION AND REUSE ON-SITE AND THE TENTATIVE AREA FOR BACKFILLING

SHEET NUMBER 圖紙編號

FIGURE 3

Appendix A – Figure 4 of FEP (EP No.: FEP-01/457/2013/C) – Location of Contaminated Borehole and Confirmatory Investigation (East Portion)

Borehole ID	Co-ordinates	
	Easting	Northing
PBH7	837924.57	819964.23
EBH1	837931.64	819957.16
EBH2	837964.11	819943.07
EBH3	837967.50	819757.14



Legend

- PBH1 — Borehole Locations of the SI Works Conducted in 2009 with RBRGs Exceedance
- EBH1 — Borehole Locations of the SI Works Conducted in 2011 & 2012 (Confirmatory Investigation)
- EBH3 — Borehole Locations for Additional Works Area

Project Title – Central Kowloon Route
工程名稱 – 中九龍幹線

Environmental Permit No. : EP -457/2013/C
環境許可證編號：EP -457/2013/C

Figure 4 – Location of Contaminated Borehole and Confirmatory Investigation (East Portion)
圖 4 -受污染鑽孔及確定研究的地點（東段）

Appendix B – Chain-of-Custody Form

CHAIN OF CUSTODY DOCUMENTATION

H 013091

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: M/F, Gammon Technology Park, 21 Chun Wan St.	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route Kai Tak West	EMAIL REPORT TO:
SITE: P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES**(note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		Metal - Lead Only											
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1.	EBH1 - 0.5m	S	30/05/2018	1400	Soil Jar	1	✓											
2.	EBH1 - 1.5m	S		1500	Soil Jar	1	✓											
3.	EBH1 - 1.5m	S		1500	Soil Jar	1	✓											(Duplicate)
4.	Field Blank 20180530	W		1500	250mL Plastic Bottle	1	✓											
5.	Equipment Blank 20180530	W		16:00	250mL Plastic Bottle	1	✓											

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Ray CHOW	Date: 30/5/2018		Name:	Date: 30/5/2018		Con' Note No:
Of: AECOM	Time: 1600		Of: ALS	Time: 16:50		
Name: Taylor Ho	Date: 30/5/2018		Name:	Date:		Transport Co:
Of: Gammon	Time: 1600		Of:	Time:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 013092

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: 1/F Gammon Technology Park, 21 Chik Han Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 3191 5273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		Lead / metal
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1.	EBH1 3.00 - 3.45	S	2/6	11:05am	U100	1	✓
2.	EBH1 5.00 - 5.45	S	2/6	13:45	U100	1	✓

RELINQUISHED BY:			RECEIVED BY		METHOD OF SHIPMENT
Name: Peter Chung	Date: 2-6-2018	Name:	Date: 2/6/2018		
Of: AECOM	Time: 15:30.	Of:	Time: 15:30		Con' Note No:
Name: Arthur Chiu	Date: 2-6-2018	Name:	Date:		Transport Co:
Of: Gammon	Time: 15:30	Of:	Time:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 013093

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: M/F, Gammon Technology Park, 21 Chun Wan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 3191 5273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES(note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		Metal - Lead only
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1.	EBH1 7.00-7.45	S	4/6	10:40	U100	1	✓
2.	EBH1 9.00-9.45	S	4/6	12:00	U100	1	✓
3.	EBH1 10.70-11.15	S	4/6	15:15	U100	1	✓
4.	EBH1 12.00-12.45	S	4/6	16:00	U100	1	✓

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: RAY CHOW	Date: 4/6/2018	Name:	Date: 4/6	Con' Note No:
Of: AECOM	Time: 16:30	Of: ALS	Time: 1715	
Name: Arthur Chu	Date: 4/6/2018	Name:	Date:	Transport Co:
Of: Gammon	Time: 16:30	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 013094

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: M/F, Gammon Technology Park, 21 Chun Wan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water) | CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Metal-Lead only
1.	EBH1 14.00-14.45	S	5/6	9:30	U76	1	✓
2.	EBH1 15.00-15.30	S	5/6	10:30	U76	1	✓
3.	EBH1 16.00-16.30	S	5/6	11:20	U76	1	✓
4.	EBH1 17.00-17.16	S	5/6	14:00	Sat Jar	1	✓

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Roger Chung	Date: 5/6/2018		Name:	Date:		Con' Note No:
Of: AECOM	Time:		Of:	Time:		
Name: Arthur Chin	Date: 5/6/2018		Name: Kelvin	Date: 5-Jun-2018		Transport Co:
Of: Gammon	Time:		Of: ALS HK	Time: 17:05		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

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H 013081

ALS Laboratory Group

CLIENT: Gammon Construction Limited

ADDRESS / OFFICE: M/F, Gammon Technology Park, 21 Chun Wan St

PROJECT MANAGER (PM): Ashley Fung

PROJECT ID: Central Kowloon Route - Kai Tak West

SITE:

P.O. NO.:

RESULTS REQUIRED (Date):

QUOTE NO.:

SAMPLER:

MOBILE:

PHONE 3191 5273

EMAIL REPORT TO: ashley.fung@gammonconstruction.com

EMAIL INVOICE TO: (if different to report)

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A (circled)

SAMPLE TEMPERATURE

CHILLED: Yes (circled) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

Notes: e.g. Highly contaminated samples

e.g. "High PAHs expected"

Extra volume for QC or trace LORs etc.

cancelled PCB test as per client's request. confirmed by Kerry on 20/4/2018. Chen

SAMPLE INFORMATION (note: S = Soil, W=Water) / CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Metal - Lead only	PCB	Notes
1	EBH2 - 0.5m	Soil	14/04	15:30	soil Jar	1	✓	✓	
2	EBH2 - 0.5m	Soil	14/04	15:45	soil Jar	1	✓	✓	

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Ray CHOW	Date: 14/04/2018	Name:	Date:	Con' Note No:
Of: AECOM	Time: 16:30	Of:	Time:	
Name: Warren Au	Date: 14/04/2018	Name: Ketsu Lau	Date: 14-Apr-2018	Transport Co:
Of: Gammon	Time: 16:30	Of: ALS HK	Time: 17:30	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

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CHAIN OF CUSTODY DOCUMENTATION

H 013082

CLIENT: Gammon Construction Limited
ADDRESS / OFFICE: M/F - Gammon Technology Park, 21 Chun Yeung Street West
PROJECT MANAGER (PM): Ashley Fung
PROJECT ID: Central Kowloon Route Kai Tak West
SITE: Kai Tak West P.O. NO.: 3191 5273
RESULTS REQUIRED (Date): QUOTE NO.:

SAMPLER: ~~Taylor Ho~~ King Lam
MOBILE: ~~9524 0842~~
PHONE: ~~9524 0842~~ 31915273
EMAIL REPORT TO:
EMAIL INVOICE TO: (if different to report)

ALS Laboratory Group

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

	SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD only 1 metal										
	ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles											
(1)	~~3~~	EBH 2 - 3.0-3.45m	Soil	18/04	10:30	U100	1	✓										
(2)	~~4~~	EBH 2 5.0-5.45m	Soil	18/04	11:30	U100	1	✓										
(3)	~~5~~	EBH 2 6.8-7.25m	Soil	18/04	14:30	U100	1	✓										
(4)	~~6~~	EBH 2 9.0-9.45m	Soil	18/04	15:45	U100	1	✓										
(5)		EBH 2 5.0-5.45m	Soil					✓										(Duplicate).
(6)		Field Blank 20180418	W			250mL Plastic Red/Green	1	✓										
(7)		Equipment Blank 20180418	W			250mL Plastic Red/Green	1	✓										

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name:	Rita Chung	Date: 18/04/2018	Name:		Date:	Con' Note No:
Of:	AECOM	Time: 16:30	Of:		Time:	
Name:	Taylor Ho	Date: 18/04/2018	Name:		Date: 18 Apr - 2018	Transport Co:
Of:	Gammon	Time: 16:30	Of:	ALS HK	Time: 17:10	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

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CHAIN OF CUSTODY DOCUMENTATION

H 013084

ALS Laboratory Group

CLIENT: Gammon Constructed Limited	SAMPLER:
ADDRESS / OFFICE: M/F - Gammon Technology Park-21 Chun Yan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 3191 5273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

	SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD only 1 metal
	ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
①		FBH-2 1100-1145	Soil	19/04	0945	U100	1	✓
②		FBH-2 1200-1245	Soil	19/04	1430	U76	1	✓
③		FBH-2 1400-1445	Soil	19/04	1530	U76	1	✓

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name:	Rita Chung	Date: 19/04/2018	Name:		Date:	Con' Note No:
Of:	AECOM	Time: 1530	Of:		Time:	
Name:	Taylor Ho	Date: 19/04/2018	Name:	Kelsw	Date: 19-Apr-2018	Transport Co:
Of:	Gammon	Time: 1530	Of:	ALS HK	Time: 16:15	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 013085

ALS Laboratory Group

CLIENT: Gammon Constructed Limited	SAMPLER:
ADDRESS / OFFICE: MF Gammon Technology Park 21 Chun Wan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 3191 5273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		Lead (metal)
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1	EBH-2 1500-1545	Soil	20/04	9am	U76	1	✓
2	EBH-2 1600-1645	Soil	20/04	10am	U76	1	✓
3	EBH-2 1700-1745	Soil	20/04	10:40	U76	1	✓
4	EBH-2 1800-1845	Soil	20/04	11:20	U76	1	✓
5	EBH-2 1900-1945	Soil	20/04	14:00	U76	1	✓
6	EBH-2 2000	Soil	20/04	16:00	~~U76~~ Soil jar	1	✓

RELINQUISHED BY:			RECEIVED BY		METHOD OF SHIPMENT
Name: Rita Chung Kate	Date: 20/4/2018		Name:	Date:	Con' Note No:
Of: AECOM	Time: 16:00		Of:	Time:	
Name: Taylor Ho	Date: 20/04/2018		Name: Kelvin	Date: 20-Apr-2018	Transport Co:
Of: Gammon	Time: 16:00		Of: ALS HK	Time: 17:50	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 013087

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: MF Gammon Technology Park 21 Chun Wan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Kai Tak West Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 31915273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES(note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY:
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		PCBs	VOCs	SVOCs	Metal - Full list
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles				
1.	EBH-3[redacted] - 0.5m	~~MS~~ S	2/5/2018	13:00	Soil Jar	1	✓	✓	✓	✓
2.	EBH-3[redacted] - 1.5m	S	2/5/2018	1330	Soil Jar	1	✓	✓	✓	✓
3.	Trip Blank 20180502	W	2/5/2018	/	2x 40mL Vial	2		✓		✓

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Taylor Ho	Date: 02/05/2018		Name:	Date: 2/5		Con' Note No:
Of: Gammon	Time: 1600		Of: ALS	Time: 1630		
Name: RAY CHOW	Date: 02/05/2018		Name:	Date:		Transport Co:
Of: AECOM	Time: 1600		Of:	Time:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 013090

ALS Laboratory Group

CLIENT:	Gammon Construction Limited
ADDRESS / OFFICE:	WF Gammon Technology Park 21 Chun Wan Street
PROJECT MANAGER (PM):	Ashley
PROJECT ID:	Central Kowloon Route 9
SITE:	Kai Tak West
P.O. NO.:	3191 5273
RESULTS REQUIRED (Date):	
QUOTE NO.:	
SAMPLER:	
MOBILE:	
PHONE	3191 5273
EMAIL REPORT TO:	
EMAIL INVOICE TO: (if different to report)	

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water) | CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	NOC	CVOC	MPAHs	PCRs	Notes
1	EBH3 1.5m (duplicate)	Soil	8/5/18	10am	Soil Jar	1	✓	✓	✓	✓	Duplicate.
2	Field blank	W	"	"	Vials	2	✓	✓	✓	✓	
2	20180508	W	"	"	1L Amber bottle	1	✓	✓	✓	✓	
2		W	"	"	250mL bottles	2			✓		
3	Equipment blank	W	"	"	Vials	2	✓			✓	
3	20180508	W	"	"	1L Amber bottle	1	✓	✓	✓	✓	
3		W	"	"	250mL bottles	2	✓	✓	✓	✓	
4	Trip Blank	W	"	"	Vials	2	✓				
4	20180508.	~~W~~	"								

RELINQUISHED BY:

Name:	Rita Chung	Date:	8/5/2018
Of:	AECOM.	Time:	12:00
Name:	Taylor Ho	Date:	8/5/2018
Of:	Gammon	Time:	12:00

RECEIVED BY

Name:		Date:	8/5
Of:	ALS	Time:	1205
Name:		Date:	
Of:		Time:	

METHOD OF SHIPMENT

Con' Note No:	
Transport Co:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

ALS Laboratory Group

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CHAIN OF CUSTODY DOCUMENTATION

H 013086

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: M/F, Gammon Technology Park, 4 Chun Wan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 3191 5273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	VOC	SVOC	Metals	PCRS	Notes
1	Field blank	W	13/12/18	14:00	Vials	2	✓	✓	✓	✓	
	20181213	W	"	"	1L Amber bottle	1					
		W	"	"	250mL bottle	2					
2.	Equipment blank	W	"	"	Vials	2	✓	✓	✓	✓	
	20181213	W	"	"	1L Amber bottle	1					
		W	"	"	250mL bottle	2					
3.	Trip Blank	W	"	"	Vials	2	✓				
4-5	EBH3 3-3.45m	S	"	15:15	U10b	1	✓	✓	✓	✓	(Duplicate)

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Arthur Chan	Date: 13/12/2018		Name:	Date:		Con' Note No:
Of: Gammon Construction Limited	Time: 15:30		Of:	Time:		
Name: Rita Chung [redacted]	Date: 13/12/2018		Name:	Date: 13/12/2018		Transport Co:
Of: AECOM	Time: 15:30		Of: ALS	Time: 16:05		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

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CHAIN OF CUSTODY DOCUMENTATION

H 013096

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: M/F, Gammon Technology Park, 21 Chun Wan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 3191 5273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		VOC	SVOC	Metals	PCRS									
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
1.	EBH3 6.45-6.90M	S	14/12/18	9:45	U100	1	✓	✓	✓	✓									CR=0.2
2.	EBH3 7.00-7.45M	S	"	11:19	U100	1													(On hold) CR=0.15
3.	EBH3 7.50-7.95M	S	"	14:00	Soil Jar	1													(On hold) CR=0
4.	EBH3 8.00-8.45M	S	"	14:00	U100	1													(On hold) CR=0.35
5.	EBH3 8.50-8.95m	S	"	15:40	U100	1													(On hold) CR=0.1
6.	EBH3 9.00-9.45m	S	"	15:40	U100.	1	✓	✓	✓	✓									CR=0.45.
7.	Trip blank. 14/12/2018.	W	"	"	Vials.	2	✓												

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Archer Chan	Date: 14/12/18		Name:	Date:		Con' Note No:
Of: Gammon Construction Limited	Time: 4:00 pm		Of:	Time:		
Name: Rita Chung	Date: 14/12/18		Name:	Date: 14/12/2018		Transport Co:
Of: AECOM	Time: 4:00 pm.		Of: ALS	Time: 17:00		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 013098

ALS Laboratory Group

CLIENT: Gammon Construction Limited	SAMPLER:
ADDRESS / OFFICE: M/F, Gammon Technology Park, 21 Chun Wan Street	MOBILE:
PROJECT MANAGER (PM): Ashley Fung	PHONE 3191 5273
PROJECT ID: Central Kowloon Route	EMAIL REPORT TO:
SITE: Kai Tak West P.O. NO.: 3191 5273	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES**(note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		VOCs	* SVOCs	# Metals	PCRs								
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
(1)	Trip Blank	W	17/12/18	10am	Vials	2	V											
(2)	EBH3 groundwater	W	17/12/18	10:45am	250mL Plastic	1	√	√	√	√								
		W	17/12/18	"	1L Amber Glass	1												
		W	17/12/18	"	Vials	2												
(3)	EBH3 groundwater	W	17/12/18	"	250mL Plastic	1	√	√	√	√								
	(Duplicate)	W	17/12/18	"	1L Amber Glass	1												
		W	17/12/18	"	Vials	2												
							A	A										

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.
* SVOCs:
Only: Acenaphthlene, Acenaphthene, Anthracene, Benze(b)floranthene, Chrysene, Fluoranthene, Naphthalene and Phenanthrene.
Metals:
Only Mercury.

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Arthur Chin	Date: 17/12/2018		Name:	Date:		Con' Note No:
Of: Gammon Construction Limited	Time: 10:45am		Of:	Time:		
Name: Rita Qiang	Date: 17/12/2018		Name:	Date: 17/12/2018		Transport Co:
Of: AECOM	Time: 10:45		Of: ALS	Time: 11:20		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

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Appendix C – Borehole Records

DRILLHOLE RECORD

Gammon

HOLE No. **EBH1**

CONTRACT No. Contract No. HY/2014/07

SHEET **1** of **2**

PROJECT Central Kowloon Route - Kai Tak West

METHOD Rotary	CO-ORDINATES	PROJECT No. J3706
MACHINE & No. GI-01	E 837927.08 N 819954.69	DATE from 30/05/2018 to 05/06/2018
FLUSHING MEDIUM DRY	ORIENTATION **Vertical**	GROUND LEVEL + 4.30 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/06/2018	SX	08:00										4.30	0.00			Grey, CONCRETE slab.
												4.10	0.20			Light brown (7.5YR 6/4), very silty fine to coarse SAND. (FILL)
									A		0.45 0.50					
									B		0.95 1.00					
									C	INSPECTION PIT	1.45 1.50					
									D		1.95 2.00					
									E		2.45 2.50					
	SX 3.00								F		2.95	1.30	3.00			
	PX			100				7 bls	1		3.00					Light brown (7.5YR 6/4), slightly silty fine to coarse SAND. (FILL)
									2		3.40 3.45					
								22 bls	3		5.00					
				100					4		5.40 5.45					
		3.65m at 18:00														
02/06/2018 04/06/2018		3.70m at 08:00		56				61 bls	5		7.00	-2.70	7.00			Grey (N6), dappled pink, silty fine to coarse SAND with some coral and shell fragments. (FILL)
									6		7.40 7.45					
								42 bls	7		9.00	-4.70	9.00		V	Extremely weak, pink (2.5YR 6/4), spotted grey, reddish brown and white, completely decomposed GRANITE. (Silty fine to coarse SAND with some subangular fine gravel sized rock fragments)
				100					8		9.40 9.45					
												-5.70	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **06/06/2018**

CHECKED **T T FUNG**

DATE **07/06/2018**

REMARKS

1. Inspection pit was dug to 3.00m depth on 30/05/2018.

PRELIMINARY

t:\gintw\library\01 july 2017 - copy.glb\3110 geo drillhole (march 2014)

DRILLHOLE RECORD

Gammon

HOLE No. **EBH1**

CONTRACT No. Contract No. HY/2014/07

SHEET **2** of **2**

PROJECT Central Kowloon Route - Kai Tak West

METHOD Rotary	CO-ORDINATES	PROJECT No. J3706
MACHINE & No. GI-01	E 837927.08 N 819954.69	DATE from 30/05/2018 to 05/06/2018
FLUSHING MEDIUM DRY	ORIENTATION **Vertical**	GROUND LEVEL + 4.30 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
										-5.70	10.00		V	As sheet 1 of 2.
				100				37 bls	9 10.70 10 11.10 11.15	-6.40	10.70		V	Extremely weak, orangish pink (2.5YR 7/4), spotted grey, black and white, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with some subangular fine gravel sized rock fragments)
	PX 12.00 HX	3.90m at 18:00		100				137 bls	11 12.00 12 12.40 12.45					
04/06/2018 05/06/2018		4.00m at 08:00												
				100				138 bls	13 14.00 14 14.40 14.45					
				83				200 bls	15 15.00 16 15.25 15.30	-10.70	15.00		V	Very weak, pink (2.5YR 6/4), spotted grey, orangish brown, black and white, completely decomposed GRANITE. (Fine to coarse SAND with some subangular fine to medium gravel sized rock fragments)
				83				200 bls	17 16.00 18 16.25 16.30	-11.70	16.00		V	Very weak, pink (2.5YR 6/4), dappled orangish brown, spotted grey, black and white, completely decomposed GRANITE. (Fine to coarse SAND with some subangular fine to medium gravel sized rock fragments)
				0				200 bls	19 17.00 17.11 17.16	-12.70	17.00		V	Very weak, greyish pink (10R 5/2), spotted grey, orangish brown, black and white, completely decomposed GRANITE. (Fine to coarse SAND with much subangular fine gravel sized rock fragments)
05/06/2018	HX 18.00	4.20m at 18:00		0				200 bls	20 18.00 18.02 18.03	-13.70	18.00		V	
										-13.73	18.03		V	No sample recovered. Inferred as completely decomposed GRANITE. End of hole at 18.03m depth.
										-15.70	20.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **06/06/2018**

CHECKED **T T FUNG**

DATE **07/06/2018**

REMARKS

PRELIMINARY

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DRILLHOLE RECORD

Gammon

HOLE No. **EBH2**

CONTRACT No. Contract No. HY/2014/07

SHEET 1 of 3

PROJECT Central Kowloon Route - Kai Tak West

METHOD Rotary	CO-ORDINATES	PROJECT No. J3706
MACHINE & No. GI-02	E 837963.04 N 819941.70	DATE from 18/04/2018 to 20/04/2018
FLUSHING MEDIUM DRY	ORIENTATION **Vertical**	GROUND LEVEL + 3.94 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
18/04/2018	SX	08:00										3.94	0.00			
												3.79	0.15			BITUMEN layer.
									A		0.45 0.50					Brown (10YR 5/4), grey (N6) and dark grey (N3), slightly silty fine to coarse SAND with some angular to subangular fine to coarse gravel sized rock, concrete and bitumen fragments. (FILL)
									B		0.95 1.00					
									C		1.45 1.50					
									D		1.95 2.00					
									E		2.45 2.50					
	SX 3.00								F		2.95	0.94	3.00			
	PX			100				7 bls	1		3.00					Stiff, orangish brown (5YR 5/8), very sandy SILT with much angular to subangular fine to coarse gravel sized rock and wood fragments. (FILL)
									2		3.40 3.45					
			65	100				18 bls	3		5.00	-1.06	5.00			Orangish brown (5YR 5/8), very clayey silty fine to coarse SAND with much subangular fine gravel sized rock fragments. (FILL)
									4		5.40 5.45					
				100				15 bls	5		6.80	-2.86	6.80			Grey (N6), very clayey silty fine to coarse SAND with much subangular fine to coarse gravel sized rock and shell fragments. (FILL)
									6		7.20 7.25					
				67				22 bls	7		9.00	-5.06	9.00			Very stiff, reddish orange (2.5YR 6/8), mottled light grey and yellowish brown, slightly sandy SILT. (ALLUVIUM)
									8		9.40 9.45					
												-6.06	10.00			

INSPECTION PIT

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **21/04/2018**

CHECKED **T T FUNG**

DATE **23/04/2018**

REMARKS

1. Inspection pit was dug to 3.00m depth.

PRELIMINARY

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DRILLHOLE RECORD

Gammon

HOLE No. **EBH2**

CONTRACT No. Contract No. HY/2014/07

SHEET **2** of **3**

PROJECT Central Kowloon Route - Kai Tak West

METHOD Rotary	CO-ORDINATES	PROJECT No. J3706
MACHINE & No. GI-02	E 837963.04 N 819941.70	DATE from 18/04/2018 to 20/04/2018
FLUSHING MEDIUM DRY	ORIENTATION **Vertical**	GROUND LEVEL + 3.94 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
										-6.06	10.00			As sheet 1 of 3.
18/04/2018		4.16m at 18:00								-7.06	11.00			
19/04/2018		4.45m at 08:00		100				55 bls	9 11.00 10 11.40 11.45					Reddish pink (2.5YR 5/8), slightly silty fine to coarse SAND. (ALLUVIUM)
				100				33 bls	11 12.00 12 12.40 12.45	-8.06	12.00		V	Extremely weak, light pink (2.5YR 7/6), mottled light brown, reddish brown and white, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with occasional subangular fine gravel sized rock fragments)
				100				24 bls	13 14.00 14 14.40 14.45	-10.06	14.00		V	Extremely weak, pink (2.5YR 6/4), mottled black and white, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with occasional subangular fine gravel sized rock fragments)
19/04/2018	PX 15.00	4.33m at 18:00	65											
20/04/2018	HX	4.50m at 08:00		100				36 bls	15 15.00 16 15.40 15.45	-12.06	16.00		V	Extremely weak, pink (2.5YR 6/4), mottled dark grey and white, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with occasional subangular fine gravel sized rock fragments)
				100				42 bls	17 16.00 18 16.40 16.45					
				100				118 bls	19 17.00 20 17.40 17.45	-14.06	18.00		V	Extremely weak, brownish pink (10R 5/6), mottled dark brown, black and white, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with occasional subangular fine gravel sized rock fragments)
				100				90 bls	21 18.00 22 18.40 18.45					
				100				41 bls	23 19.00 24 19.40 19.45					
	HX	4.15m at								-16.06	20.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **21/04/2018**

CHECKED **T T FUNG**

DATE **23/04/2018**

REMARKS

PRELIMINARY

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DRILLHOLE RECORD

Gammon

HOLE No. **EBH2**

CONTRACT No. Contract No. HY/2014/07

SHEET **3** of **3**

PROJECT Central Kowloon Route - Kai Tak West

METHOD Rotary	CO-ORDINATES	PROJECT No. J3706
MACHINE & No. GI-02	E 837963.04 N 819941.70	DATE from 18/04/2018 to 20/04/2018
FLUSHING MEDIUM DRY	ORIENTATION **Vertical**	GROUND LEVEL + 3.94 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
20/04/2018	20.07	18.00		0				200 blows	25		20.00 20.02 20.07	-16.06 -16.13	20.00 20.07		V	No sample recovered from U76. Inferred as completely decomposed GRANITE. End of hole at 20.07m depth.
												-26.06	30.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **21/04/2018**

CHECKED **T T FUNG**

DATE **23/04/2018**

REMARKS

PRELIMINARY

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DRILLHOLE RECORD

Gammon

HOLE No. **EBH3**

CONTRACT No. Contract No. HY/2014/07

SHEET **1** of **1**

PROJECT Central Kowloon Route - Kai Tak West

METHOD Rotary	CO-ORDINATES	PROJECT No. J3706
MACHINE & No. -	E 837973.54 N 819758.59	DATE from 02/05/2018 to 02/05/2018
FLUSHING MEDIUM DRY	ORIENTATION **Vertical**	GROUND LEVEL + 4.25 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/05/2018		14:00							A	INSPECTION PIT	0.45 0.50	4.25	0.00			Reddish orange, brown and dark grey, fine to coarse SAND with much angular to subangular fine to coarse gravel sized rock, brick and bitumen fragments. (FILL)
									B		0.95 1.00					
									C		1.45 1.50	2.75	1.50			
									D		1.95 2.00	2.25	2.00			Reddish orange and brown, slightly silty fine to coarse SAND with occasional angular to subangular fine to coarse gravel sized rock and brick fragments. (FILL)
									E		2.45 2.50					Brown, slightly silty fine to coarse SAND with occasional subangular fine gravel sized rock fragments. (FILL)
02/05/2018		Dry at 18:00							F		2.95 3.00	1.25	3.00			
																End of hole at 3.00m depth.
												-5.75	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **04/05/2018**

CHECKED **T T FUNG**

DATE **05/05/2018**

REMARKS

1. Inspection pit was dug to 3.00m depth.

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DRILLHOLE RECORD

Gammon

HOLE No. **EBH3**

CONTRACT No. HY/2014/07

SHEET **1** of **1**

PROJECT Central Kowloon Route - Kai Tak West

METHOD Rotary	CO-ORDINATES	PROJECT No. J3706
MACHINE & No. 20-092	E 837973.56 N 819758.58	DATE from 11/12/2018 to 14/12/2018
FLUSHING MEDIUM DRY	ORIENTATION **Vertical**	GROUND LEVEL + 4.24 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
11/12/2018	SX	08:00										4.24	0.00			
												4.09	0.15			Black (N2.5), BITUMEN layer.
									A		0.45 0.50					Brown (10YR 5/4), slightly silty fine to coarse SAND with some subangular fine to coarse gravel and cobble sized rock, brick and bitumen fragments. (FILL)
									B	INSPECTION PIT	0.95 1.00	3.24	1.00			
									C		1.45 1.50					Brown (10YR 5/4), slightly silty fine to coarse SAND with some subangular fine to coarse gravel sized rock, brick and bitumen fragments. (FILL)
		Dry at 18:00														
11/12/2018									D		1.95	2.24	2.00			
13/12/2018		Dry at 08:00									2.00					Light greyish brown (10YR 6/3), slightly silty fine to coarse SAND with some subangular fine to medium gravel sized rock and brick fragments. (FILL)
	SX 3.00															
	PX			100				21 bls	1		3.00					
									2		3.40 3.45					
		2.97m at 18:00														
13/12/2018																
14/12/2018		3.20m at 08:00										-1.76	6.00			
				0				49 bls			6.00					Grey (N6) and reddish orange (2.5YR 6/8), angular to subangular fine to coarse GRAVEL with occasional cobble sized rock and brick fragments in sandy matrix. (FILL)
				50				29 bls	3		6.40	-2.21	6.45			
									4		6.45					
									5		6.85 6.90	-2.76	7.00			Greyish brown (10YR 5/2), dappled dark grey and light orangish brown, silty fine to coarse SAND with some subangular fine to coarse gravel and occasional cobble sized rock fragments. (FILL)
				38				53 bls	6		7.00					
									7		7.40 7.45					
				0				66 bls			7.50					Dark brownish grey (2.5YR 4/1), fine to coarse SAND with some shell fragments. (FILL)
									8		7.90 7.95	-3.76	8.00			
				88				58 bls	9		8.00					Greyish brown (10YR 5/2), slightly silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
									10		8.40 8.45	-4.26	8.50			
				28				123 bls	11		8.50					Dark brownish grey (2.5YR 4/1), fine to coarse SAND with some subangular fine to medium gravel sized rock fragments. (FILL)
	PX 9.00								12		8.90 8.95	-4.76	9.00			
				100				146 bls	13		9.00					Light brownish grey (10YR 6/2), subangular fine to coarse GRAVEL sized rock fragments in sandy matrix. (FILL)
		3.00m at 18:00														
14/12/2018									14		9.40 9.45	-5.21	9.45			End of hole at 9.45m depth.
												-5.76	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **15/12/2018**

CHECKED **T T FUNG**

DATE **17/12/2018**

REMARKS

1. Inspection pit was dug to 2.00m depth.
2. Monitoring well was installed at 5.50m depth.
3. U100 samples (3.00-3.45m, 6.45-6.90m, 7.00-7.45m, 8.00-8.45m, 8.50-8.95m and 9.00-9.45m), soil sample (7.50-7.95m) and water sample were sent to the laboratory.

PRELIMINARY

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Appendix D – Summary Table of the Laboratory Testing Results

Contract Number: HY/2014/07
Central Kowloon Route - Kai Tak West
Soil Testing Result Table

Parameters			VOCs												
			Benzene	Ethylbenzene	Toluene	Xylenes (Total)	Acetone	Bromodichloromethane	2-Butanone	Chloroform	Methyl tert-Butyl Ether	Methylene Chloride	Styrene	Tetrachloroethene	Trichloroethene
Unit			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.2	0.5	0.5	2	50	0.1	5	0.04	0.5	0.5	0.5	0.04	0.1
RBRGs of Urban Residentail			0.704	709	1440	95	9590	0.317	10000*	0.132	6.88	1.3	3220	0.101	0.523
RBRGs of Rural Residential			0.279	298	705	36.8	4260	0.129	10000*	0.053	2.8	0.529	1540	0.044	0.211
RBRGs of Industrial			9.21	8240	10000*	1230	10000*	2.85	10000*	1.54	70.1	13.9	10000*	0.777	5.68
RBRGs of Public Parks			42.2	10000*	10000*	10000*	10000*	13.4	10000*	253	505	128	10000*	1.84	69.4
Saturation Limit			336	138	235	150	***	1030	***	1100	2380	921	497	97.1	488
Sample Location	Sampling Depth (m bgl^)	Date of Sampling													
EBH1	0.50	30/05/2018													
EBH1	1.50	30/05/2018													
EBH1	1.5 (Duplicate)	30/05/2018													
EBH1	3.00 - 3.45	02/06/2018													
EBH1	5.00 - 5.45	02/06/2018													
EBH1	7.00 - 7.45	04/06/2018													
EBH1	9.00 - 9.45	04/06/2018													
EBH1	10.70 - 11.15	04/06/2018													
EBH1	12.00 - 12.45	04/06/2018													
EBH1	14.00 - 14.45	05/06/2018													
EBH1	15.00 - 15.30	05/06/2018													
EBH1	16.00 - 16.30	05/06/2018													
EBH1	17.00 - 17.16	05/06/2018													
EBH2	0.50	14/04/2018													
EBH2	1.50	14/04/2018													
EBH2	3.00-3.45	18/04/2018													
EBH2	5.00-5.45	18/04/2018													
EBH2	5.00-5.45 (Dulpicate)	18/04/2018													
EBH2	6.80-7.25	18/04/2018													
EBH2	9.00-9.45	18/04/2018													
EBH2	11.00-11.45	19/04/2018													
EBH2	12.00-12.45	19/04/2018													
EBH2	14.00-14.45	19/04/2018													
EBH2	15.00-15.45	20/04/2018													
EBH2	16.00-16.45	20/04/2018													
EBH2	17.00-17.45	20/04/2018													
EBH2	18.00-18.45	20/04/2018													
EBH2	19.00-19.45	20/04/2018													
EBH2	20.00	20/04/2018													
EBH3	0.50	02/05/2018	<0.2	<0.5	<0.5	<2.0	<50	<0.1	<5	<0.04	<0.5	<0.5	<0.5	<0.04	<0.1
EBH3	1.50	02/05/2018	<0.2	<0.5	<0.5	<2.0	<50	<0.1	<5	<0.04	<0.5	<0.5	<0.5	<0.04	<0.1
EBH3	1.50 (Duplicate)	08/05/2018	<0.2	<0.5	<0.5	<2.0	<50	<0.1	<5	<0.04	<0.5	<0.5	<0.5	<0.04	<0.1
EBH3	3.00 - 3.45	13/12/2018	<0.2	<0.5	<0.5	<2.0	<50	<0.1	<5	<0.04	<0.5	<0.5	<0.5	<0.04	<0.1
EBH3	3.00 - 3.45 (Duplicate)	13/12/2018	<0.2	<0.5	<0.5	<2.0	<50	<0.1	<5	<0.04	<0.5	<0.5	<0.5	<0.04	<0.1
EBH3	6.45 - 6.95	14/12/2018	<0.2	<0.5	<0.5	<2.0	<50	<0.1	<5	<0.04	<0.5	<0.5	<0.5	<0.04	<0.1
EBH3	9.00 - 9.45	14/12/2018	<0.2	<0.5	<0.5	<2.0	<50	<0.1	<5	<0.04	<0.5	<0.5	<0.5	<0.04	<0.1

Parameters			PAHs															
			Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Unit			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RBRGs of Urban Residentail			3510	2340	10000*	12	1.2	9.88	1800	120	871	1.2	2400	2380	12	182	10000*	1800
RBRGs of Rural Residential			3280	1510	10000*	11.4	1.14	10.1	1710	114	919	1.14	2270	2250	11.4	85.6	10000*	1710
RBRGs of Industrial			10000*	10000*	10000*	91.8	9.18	17.8	10000*	918	1140	9.18	10000*	10000*	91.8	453	10000*	10000*
RBRGs of Public Parks			10000*	10000*	10000*	38.3	3.83	20.4	5740	383	1540	3.83	7620	7450	38.3	914	10000*	5720
Saturation Limit			60.2	19.8	2.56	--	--	--	--	--	--	--	--	54.7	--	125	28	--
Sample Location	Sampling Depth (m bgl^)	Date of Sampling																
EBH1	0.50	30/05/2018																
EBH1	1.50	30/05/2018																
EBH1	1.5 (Duplicate)	30/05/2018																
EBH1	3.00 - 3.45	02/06/2018																
EBH1	5.00 - 5.45	02/06/2018																
EBH1	7.00 - 7.45	04/06/2018																
EBH1	9.00 - 9.45	04/06/2018																
EBH1	10.70 - 11.15	04/06/2018																
EBH1	12.00 - 12.45	04/06/2018																
EBH1	14.00 - 14.45	05/06/2018																
EBH1	15.00 - 15.30	05/06/2018																
EBH1	16.00 - 16.30	05/06/2018																
EBH1	17.00 - 17.16	05/06/2018																
EBH2	0.50	14/04/2018																
EBH2	1.50	14/04/2018																
EBH2	3.00-3.45	18/04/2018																
EBH2	5.00-5.45	18/04/2018																
EBH2	5.00-5.45 (Dulpicate)	18/04/2018																
EBH2	6.80-7.25	18/04/2018																
EBH2	9.00-9.45	18/04/2018																
EBH2	11.00-11.45	19/04/2018																
EBH2	12.00-12.45	19/04/2018																
EBH2	14.00-14.45	19/04/2018																
EBH2	15.00-15.45	20/04/2018																
EBH2	16.00-16.45	20/04/2018																
EBH2	17.00-17.45	20/04/2018																
EBH2	18.00-18.45	20/04/2018																
EBH2	19.00-19.45	20/04/2018																
EBH2	20.00	20/04/2018																
EBH3	0.50	02/05/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
EBH3	1.50	02/05/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
EBH3	1.50 (Duplicate)	08/05/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
EBH3	3.00 - 3.45	13/12/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
EBH3	3.00 - 3.45 (Duplicate)	13/12/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
EBH3	6.45 - 6.95	14/12/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
EBH3	9.00 - 9.45	14/12/2018	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0..500	<0.500	<0.500	<0.500	<0.500	<0.500

Parameters			SVOCs			Metals															Petroleum Carbon Ranges		
			bis-(2-Ethylhexyl)phthalate	Hexachlorobenzene	Phenol	Antimony	Arsenic	Barium	Cadmium	Trivalent Chromium	Hexavalent Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Tin	Zinc	C6 - C8 Fraction	C9 - C16 Fraction	C17 - C35 Fraction
Unit			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			5	0.2	0.5	1	1	1	0.2	1	1	1	1	1	1	0.05	1	1	1	1	5	200	500
RBRGs of Urban Residentail			30	0.243	10000*	29.5	22.1	10000*	73.8	10000*	221	1480	2950	258	10000*	11	369	1480	10000*	10000*	1410	2240	10000*
RBRGs of Rural Residential			28	0.22	10000*	29.1	21.8	10000*	72.8	10000*	218	1460	2910	255	10000*	6.52	364	1460	10000*	10000*	545	1330	10000*
RBRGs of Industrial			91.8	0.582	10000*	261	196	10000*	653	10000*	1960	10000*	10000*	2290	10000*	38.4	3260	10000*	10000*	10000*	10000*	10000*	10000*
RBRGs of Public Parks			94.2	0.713	10000*	97.9	73.5	10000*	245	10000*	735	4900	9790	857	10000*	45.6	1220	4900	10000*	10000*	10000*	10000*	10000*
Saturation Limit			--	--	7260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1000	3000	5000
Sample Location	Sampling Depth (m bgl^)	Date of Sampling																					
EBH1	0.50	30/05/2018												19									
EBH1	1.50	30/05/2018												17									
EBH1	1.5 (Duplicate)	30/05/2018												19									
EBH1	3.00 - 3.45	02/06/2018												17									
EBH1	5.00 - 5.45	02/06/2018												27									
EBH1	7.00 - 7.45	04/06/2018												4									
EBH1	9.00 - 9.45	04/06/2018												**373**									
EBH1	10.70 - 11.15	04/06/2018												40									
EBH1	12.00 - 12.45	04/06/2018												104									
EBH1	14.00 - 14.45	05/06/2018												43									
EBH1	15.00 - 15.30	05/06/2018												12									
EBH1	16.00 - 16.30	05/06/2018												9									
EBH1	17.00 - 17.16	05/06/2018												15									
EBH2	0.50	14/04/2018												110									
EBH2	1.50	14/04/2018												145									
EBH2	3.00-3.45	18/04/2018												24									
EBH2	5.00-5.45	18/04/2018												28									
EBH2	5.00-5.45 (Dulpicate)	18/04/2018												28									
EBH2	6.80-7.25	18/04/2018												16									
EBH2	9.00-9.45	18/04/2018												20									
EBH2	11.00-11.45	19/04/2018												13									
EBH2	12.00-12.45	19/04/2018												41									
EBH2	14.00-14.45	19/04/2018												40									
EBH2	15.00-15.45	20/04/2018												47									
EBH2	16.00-16.45	20/04/2018												28									
EBH2	17.00-17.45	20/04/2018												30									
EBH2	18.00-18.45	20/04/2018												18									
EBH2	19.00-19.45	20/04/2018												12									
EBH2	20.00	20/04/2018												18									
EBH3	0.50	02/05/2018	<5.00	<0.200	<0.50	8	17	196	0.5	56.6	<1.0	9.8	48	58	460	<0.05	2	24	5.5	182	<5	<200	1900
EBH3	1.50	02/05/2018	<5.00	<0.200	<0.50	<1	5	30.1	<0.2	3.4	<1.0	1.3	4	21	418	0.05	1	2	2.9	78	<5	<200	<500
EBH3	1.50 (Duplicate)	08/05/2018	<5.00	<0.200	<0.50	4	13	124	0.3	31.9	<1.0	6.5	27	43	534	<0.05	1	14	4.7	109	<5	<200	1130
EBH3	3.00 - 3.45	13/12/2018	<5.00	<0.200	<0.50	<1	5	66	<0.2	6.9	<1.0	2	14	59	186	0.15	1	3	2.8	103	<5	<200	<500
EBH3	3.00 - 3.45 (Duplicate)	13/12/2018	<5.00	<0.200	<0.50	<1	5	65.1	<0.2	7.5	<1.0	2.2	95	42	404	0.09	3	4	4.4	95	<5	<200	<500
EBH3	6.45 - 6.95	14/12/2018	<5.00	<0.200	<0.50	1	7	75.1	<0.2	14.3	<1.0	4.1	59	52	288	0.1	4	15	4.7	92	<5	<200	<500
EBH3	9.00 - 9.45	14/12/2018	<5.00	<0.200	<0.50	<1	6	49.5	<0.2	8	<1.0	1.9	10	22	234	<0.05	<1	4	2.4	47	<5	<200	<500

Note:

LOR = Limit of Reporting

^: metres below ground level

*: the 'ceiling limit' concentration
Bolded and underlined value indicates excceding at least one of the RBRGs criteria.

Full analytical results should be referred to laboratory report.

Contract Number: HY/2014/07
Central Kowloon Route - Kai Tak West
Groundwater Testing Result Table

			VOCs													PAHs								Metals	Petroleum Carbon Ranges		
Parameters			Benzene	Ethylbenzene	Toluene	Xylenes (Total)	Acetone	Bromodichloromethane	2-Butanone	Chloroform	Methyl tert-Butyl Ether	Methylene Chloride	Styrene	Tetrachloroethene	Trichloroethene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(b)fluoranthene	Chrysene	Fluoranthene	Naphthalene	Phenanthrene	Mercury	C8 - C8 Fraction	C9 - C16 Fraction	C17 - C35 Fraction
Unit			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR			5.0	5.0	5.0	20	500	5	50	5.0	5.0	50	5.0	5.0	5.0	2	2	2	1	1	2	2	2	0.5	20	500	500
RBRGs of Urban Residential			3860	1020000	5110000	112000	10000000*	2220	10000000*	956	153000	19000	3020000	250	1210	10000000*	1410000	10000000*	539	58100	10000000*	61700	10000000*	486	82200	714000	12800
RBRGs of Rural Residential			1490	391000	1970000	43300	10000000*	871	10000000*	382	61100	75900	1160000	99.6	481	7090000	542000	10000000*	203	21900	10000000*	23700	10000000*	184	31700	276000	4930
RBRGs of Industrial			54000	10000000*	10000000*	1570000	10000000*	26200	10000000*	11300	1810000	224000	10000000*	2950	14200	10000000*	10000000*	10000000*	7530	812000	10000000*	862000	10000000*	6790	1150000	9980000	178000
Solubility Limit			1750000	169000	526000	175000	***	6740000	***	7920000	***	***	310000	200000	1100000	4240	3930	43.4	1.5	1.6	206	31000	1000	NA	5230	2800	2800
Sample Location	Sampling Depth (m bgl^)	Date of Sampling																									
EBH3	-	17/12/2019	<5.0	<5.0	<5.0	<20	<500	<5	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<2	<2	<2	<1	<1	<2	<2	<2	<0.5	<20	<500	<500
EBH3 (Duplicate)	-	17/12/2019	<5.0	<5.0	<5.0	<20	<500	<5	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<2	<2	<2	<1	<1	<2	<2	<2	<0.5	<20	<500	<500

Note:

LOR= Limit of Reporting

^ metre below ground level

*** indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies.

* indicates a 'ceiling limit' concentration.

Full analytical results should be referred to laboratory report

Contract Number: HY/2014/07
Central Kowloon Route - Kai Tak West
QA/QC Testing Result Table

VOCs

Sample Location	Sample Type	Date of Sampling	Benzene	Ethylbenzene	Toluene	Xylenes (Total)	Acetone	Bromodichloromethane	2-Butanone	Chloroform	Methyl tert-Butyl Ether	Methylene Chloride	Styrene	Tetrachloroethene	Trichloroethene
Unit			μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
LOR			5	5	5	20	500	5	50	5	5	50	5	5	5
EBH1	Field Blank	30/5/2018													
EBH1	Equipment Blank	30/5/2018													
EBH2	Field Blank	18/04/2018													
EBH2	Equipment Blank	18/04/2018													
EBH3	Trip Blank	02/05/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Trip Blank	08/05/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Field Blank	08/05/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Equipment Blank	08/05/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Field Blank	13/12/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Equipment Blank	13/12/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Trip Blank	13/12/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Trip Blank	14/12/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0
EBH3	Trip Blank	17/12/2018	<5.0	<5.0	<5.0	<20	<500	<5.0	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0

PAHs

Sample Location	Sample Type	Date of Sampling	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b) & Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Unit			μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
LOR			2.0	2.0	2.0	2.0	2.0	1.0, 2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EBH1	Field Blank	30/5/2018															
EBH1	Equipment Blank	30/5/2018															
EBH2	Field Blank	18/04/2018															
EBH2	Equipment Blank	18/04/2018															
EBH3	Trip Blank	02/05/2018															
EBH3	Trip Blank	08/05/2018															
EBH3	Field Blank	08/05/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0,<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EBH3	Equipment Blank	08/05/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0,<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EBH3	Field Blank	13/12/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0, <2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EBH3	Equipment Blank	13/12/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0, <2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EBH3	Trip Blank	13/12/2018															
EBH3	Trip Blank	14/12/2018															
EBH3	Trip Blank	17/12/2018															

SVOCs

Sample Location	Sample Type	Date of Sampling	bis-(2-Ethylhexyl)phthalate	Hexachlorobenzene	Phenol
Unit			μg/L	μg/L	μg/L
LOR			20	4.0	2.0
EBH1	Field Blank	30/5/2018			
EBH1	Equipment Blank	30/5/2018			
EBH2	Field Blank	18/04/2018			
EBH2	Equipment Blank	18/04/2018			
EBH3	Trip Blank	02/05/2018			
EBH3	Trip Blank	08/05/2018			
EBH3	Field Blank	08/05/2018	<20.0	<4.0	<2.0
EBH3	Equipment Blank	08/05/2018	<20.0	<4.0	<2.0
EBH3	Field Blank	13/12/2018	<20	<4.0	<2.0
EBH3	Equipment Blank	13/12/2018	<20	<4.0	<2.0
EBH3	Trip Blank	13/12/2018			
EBH3	Trip Blank	14/12/2018			
EBH3	Trip Blank	17/12/2018			

Metals

Sample Location	Sample Type	Date of Sampling	Antimony	Arsenic	Barium	Cadmium	Trivalent Chromium	Hexavalent Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Tin	Zinc
Unit			μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
LOR			1	10	1	0.2	20	20	1	1	1	1	0.5	1	1	1	10
EBH1	Field Blank	30/5/2018									<1						
EBH1	Equipment Blank	30/5/2018									<1						
EBH2	Field Blank	18/04/2018									<1						
EBH2	Equipment Blank	18/04/2018									<1						
EBH3	Trip Blank	02/05/2018															
EBH3	Trip Blank	08/05/2018															
EBH3	Field Blank	08/05/2018	<1	<10	<1	<0.2	<20	<20	<1	<1	<1	<1	<0.5	<1	<1	<1	<10
EBH3	Equipment Blank	08/05/2018	<1	<10	<1	<0.2	<20	<20	<1	<1	<1	<1	<0.5	<1	<1	<1	15
EBH3	Field Blank	13/12/2018	<1	<10	<1	<0.2	<20	<20	<1	<1	<1	<1	<0.5	<1	<1	<1	<10
EBH3	Equipment Blank	13/12/2018	<1	<10	<1	<0.2	<20	<20	<1	<1	<1	<1	<0.5	<1	<1	<1	<10
EBH3	Trip Blank	13/12/2018															
EBH3	Trip Blank	14/12/2018															
EBH3	Trip Blank	17/12/2018															

Petroleum Carbon Ranges

Sample Location	Sample Type	Date of Sampling	C6 - C8 Fraction	C9 - C16 Fraction	C17 - C35 Fraction
Unit			μg/L	μg/L	μg/L
LOR			20	500	500
EBH1	Field Blank	30/5/2018			
EBH1	Equipment Blank	30/5/2018			
EBH2	Field Blank	18/04/2018			
EBH2	Equipment Blank	18/04/2018			
EBH3	Trip Blank	02/05/2018			
EBH3	Trip Blank	08/05/2018			
EBH3	Field Blank	08/05/2018	<20	<500	<500
EBH3	Equipment Blank	08/05/2018	<20	<500	<500
EBH3	Field Blank	13/12/2018	<20	<500	<500
EBH3	Equipment Blank	13/12/2018	<20	<500	<500
EBH3	Trip Blank	13/12/2018			
EBH3	Trip Blank	14/12/2018			
EBH3	Trip Blank	17/12/2018			

Note:

LOR = Limit of Reporting

Full analytical results should be referred to laboratory report.

Appendix E – Certificates of Analysis

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 6
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1832181
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 30-May-2018
Order number	:	Quote number	: HKE/1752a/2017	Issue Date	: 12-Jun-2018
C-O-C number	: H013091			No. of samples received	: 5
Site	:			No. of samples analysed	: 5

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 30-May-2018 to 08-Jun-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1832181

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH1-0.5m	EBH1-1.5m	EBH1-1.5m (Duplicate)	----	----
			Client sampling date / time	30-May-2018 14:00	30-May-2018 15:00	30-May-2018 15:00	----	----
Compound	CAS Number	LOR	Unit	HK1832181-001	HK1832181-002	HK1832181-003	--------	--------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	20.7	21.0	21.8	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	19	17	19	----	----

Sub-Matrix: WATER			Client sample ID	Field Blank 20180530	Equipment Blank 20180530	----	----	----
			Client sampling date / time	30-May-2018 15:00	30-May-2018 15:00	----	----	----
Compound	CAS Number	LOR	Unit	HK1832181-004	HK1832181-005	-------	-------	-------
EG: Metals and Major Cations - Filtered								
EG020: Lead	7439-92-1	1	µg/L	<1	<1	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1701725)								
HK1832174-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	<0.1	<0.1	0.00
HK1832192-004	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	16.1	16.1	0.00
EG: Metals and Major Cations (QC Lot: 1694270)								
HK1832181-002	EBH1-1.5m	**EG020: Lead**	7439-92-1	1	mg/kg	17	19	8.71

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 1694264)								
HK1832181-005	Equipment Blank 20180530	**EG020: Lead**	7439-92-1	1	µg/L	<1	<1	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1694270)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	106	----	85	115	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 1694264)											
EG020: Lead	7439-92-1	1	µg/L	<1	100 µg/L	100	----	81	107	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1694270)										
HK1832181-001	EBH1-0.5m	**EG020: Lead**	7439-92-1	5 mg/kg	83.0	----	75	125	----	----

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 1694264)										
HK1832181-004	Field Blank 20180530	**EG020: Lead**	7439-92-1	100 µg/L	98.6	----	75	125	----	----

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1832661
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 02-Jun-2018
Order number	: ----	Quote number	: HKE/1752a/2017	Issue Date	: 15-Jun-2018
C-O-C number	: ----			No. of samples received	: 2
Site	:			No. of samples analysed	: 2

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 02-Jun-2018 to 13-Jun-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1832661

Sample(s) were picked up from client by ALS Technichem (HK) staff in chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH1 3.00-3.45m	EBH1 5.00-5.45m	----	----	----
			Client sampling date / time	02-Jun-2018 11:05	02-Jun-2018 13:45	----	----	----
Compound	CAS Number	LOR	Unit	HK1832661-001	HK1832661-002	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	23.7	18.2	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	17	27	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1704792)								
HK1832537-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	13.6	14.2	4.39
HK1832783-005	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	23.2	23.4	0.837
EG: Metals and Major Cations (QC Lot: 1701093)								
HK1832661-002	EBH1 5.00-5.45m	**EG020: Lead**	7439-92-1	1	mg/kg	27	22	19.5

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1701093)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	110	----	85	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1701093)										
HK1832661-001	EBH1 3.00-3.45m	**EG020: Lead**	7439-92-1	5 mg/kg	115	----	75	125	----	----

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1832797
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 04-Jun-2018
Order number	: ----	Quote number	: HKE/1752a/2017	Issue Date	: 19-Jun-2018
C-O-C number	: H013093			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

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This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Leung Chak Cheong , Mike	Senior Chemist	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 04-Jun-2018 to 15-Jun-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1832797

Sample(s) were received in chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH1 7.00-7.45m	EBH1 9.00-9.45m	EBH1 10.70-11.15m	EBH1 12.00-12.45m	----
			Client sampling date / time	04-Jun-2018 10:40	04-Jun-2018 12:00	04-Jun-2018 15:15	04-Jun-2018 16:00	----
Compound	CAS Number	LOR	Unit	HK1832797-001	HK1832797-002	HK1832797-003	HK1832797-004	--------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	13.7	25.5	19.2	14.8	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	4	373	40	104	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1704792)								
HK1832537-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	13.6	14.2	4.39
HK1832783-005	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	23.2	23.4	0.837
EG: Metals and Major Cations (QC Lot: 1701093)								
HK1832661-002	Anonymous	**EG020: Lead**	7439-92-1	1	mg/kg	27	22	19.5

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1701093)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	110	----	85	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1701093)										
HK1832661-001	Anonymous	**EG020: Lead**	7439-92-1	5 mg/kg	115	----	75	125	----	----

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1833022
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 05-Jun-2018
Order number	: ----	Quote number	: HKE/1752a/2017	Issue Date	: 20-Jun-2018
C-O-C number	: H013094			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

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This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Leung Chak Cheong , Mike	Senior Chemist	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 05-Jun-2018 to 13-Jun-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1833022

Sample(s) were received in chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH1 14.00-14.45m	EBH1 15.00-15.30m	EBH1 16.00-16.30m	EBH1 17.00-17.16m	----
			Client sampling date / time	05-Jun-2018 09:30	05-Jun-2018 10:30	05-Jun-2018 11:20	05-Jun-2018 14:00	----
Compound	CAS Number	LOR	Unit	HK1833022-001	HK1833022-002	HK1833022-003	HK1833022-004	--------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	16.2	14.1	10.9	13.5	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	43	12	9	15	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1704792)								
HK1832537-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	13.6	14.2	4.39
HK1832783-005	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	23.2	23.4	0.837
EG: Metals and Major Cations (QC Lot: 1704415)								
HK1833022-002	EBH1 15.00-15.30m	**EG020: Lead**	7439-92-1	1	mg/kg	12	13	11.4

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1704415)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1704415)										
HK1833022-001	EBH1 14.00-14.45m	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1825497
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 14-Apr-2018
Order number	:	Quote number	: HKE/1752a/2017	Issue Date	: 26-Apr-2018
C-O-C number	: H013081			No. of samples received	: 2
Site	:			No. of samples analysed	: 2

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This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Leung Chak Cheong , Mike	Senior Chemist	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 14-Apr-2018 to 24-Apr-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1825497

Sample(s) were picked up from client by ALS Technichem (HK) staff in chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH2-0.5m	EBH2-1.5m	----	----	----
			Client sampling date / time	14-Apr-2018 15:30	14-Apr-2018 15:45	----	----	----
Compound	CAS Number	LOR	Unit	HK1825497-001	HK1825497-002	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	13.3	18.1	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	110	145	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1577720)								
HK1825359-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	18.4	18.0	1.91
HK1825481-002	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	39.8	39.3	1.16
EG: Metals and Major Cations (QC Lot: 1572104)								
HK1825497-001	EBH2-0.5m	**EG020: Lead**	7439-92-1	1	mg/kg	110	104	5.70

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1572104)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	107	----	85	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1572104)										
HK1825491-001	Anonymous	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 6
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1826098
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 18-Apr-2018
Order number	:	Quote number	: HKE/1752a/2017	Issue Date	: 03-May-2018
C-O-C number	: H013082			No. of samples received	: 7
Site	:			No. of samples analysed	: 7

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This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Leung Chak Cheong , Mike	Senior Chemist	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 18-Apr-2018 to 03-May-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1826098

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH2 3.0-3.45m	EBH2 5.0-5.45m	EBH2 6.8-7.25m	EBH2 9.0-9.45m	EBH2 5.0-5.45m (Duplicate)
			Client sampling date / time	18-Apr-2018 10:30	18-Apr-2018 11:30	18-Apr-2018 14:30	18-Apr-2018 15:45	18-Apr-2018 11:30
Compound	CAS Number	LOR	Unit	HK1826098-001	HK1826098-002	HK1826098-003	HK1826098-004	HK1826098-005
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	17.0	20.8	23.4	20.3	20.4
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	24	28	16	20	28

Sub-Matrix: WATER			Client sample ID	Field Blank 20180418	Equipment Blank 20180418	----	----	----
			Client sampling date / time	18-Apr-2018	18-Apr-2018	----	----	----
Compound	CAS Number	LOR	Unit	HK1826098-006	HK1826098-007	-------	-------	-------
EG: Metals and Major Cations - Filtered								
EG020: Lead	7439-92-1	1	µg/L	<1	<1	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1588664)								
HK1826098-001	EBH2 3.0-3.45m	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	17.0	17.1	0.00
HK1826114-003	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	49.9	53.1	6.33
EG: Metals and Major Cations (QC Lot: 1579190)								
HK1826098-002	EBH2 5.0-5.45m	**EG020: Lead**	7439-92-1	1	mg/kg	28	24	14.2

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 1579110)								
HK1826098-007	Equipment Blank 20180418	**EG020: Lead**	7439-92-1	1	µg/L	<1	<1	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1579190)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 1579110)											
EG020: Lead	7439-92-1	1	µg/L	<1	100 µg/L	102	----	81	107	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1579190)										
HK1826098-001	EBH2 3.0-3.45m	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 1579110)										
HK1826098-006	Field Blank 20180418	**EG020: Lead**	7439-92-1	100 µg/L	95.7	----	75	125	----	----

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1826291
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 19-Apr-2018
Order number	: ----	Quote number	: HKE/1752a/2017	Issue Date	: 04-May-2018
C-O-C number	: H013084			No. of samples received	: 3
Site	:			No. of samples analysed	: 3

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This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals

General Comments

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Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1826291

Sample(s) were received in chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH2 11.00-11.45m	EBH2 12.00-12.45m	EBH2 14.00-14.45m	----	----
			Client sampling date / time	19-Apr-2018 09:45	19-Apr-2018 14:30	19-Apr-2018 15:30	----	----
Compound	CAS Number	LOR	Unit	HK1826291-001	HK1826291-002	HK1826291-003	--------	--------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	26.6	29.3	26.6	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	13	41	40	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1588665)								
HK1826163-003	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	18.5	18.7	1.27
HK1826433-006	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	60.2	60.6	0.717
EG: Metals and Major Cations (QC Lot: 1583163)								
HK1826291-002	EBH2 12.00-12.45m	**EG020: Lead**	7439-92-1	1	mg/kg	41	41	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1583163)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	95.6	----	85	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1583163)										
HK1826291-001	EBH2 11.00-11.45m	**EG020: Lead**	7439-92-1	5 mg/kg	92.5	----	75	125	----	----

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 5
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1826519
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 20-Apr-2018
Order number	: ----	Quote number	: HKE/1752a/2017	Issue Date	: 07-May-2018
C-O-C number	: H013085			No. of samples received	: 6
Site	:			No. of samples analysed	: 6

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 20-Apr-2018 to 07-May-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1826519

Sample(s) were received in chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH-2 15.00-15.45m	EBH-2 16.00-16.45m	EBH-2 17.00-17.45m	EBH-2 18.00-18.45m	EBH-2 19.00-19.45m
			Client sampling date / time	20-Apr-2018 09:00	20-Apr-2018 10:00	20-Apr-2018 10:40	20-Apr-2018 11:20	20-Apr-2018 14:00
Compound	CAS Number	LOR	Unit	HK1826519-001	HK1826519-002	HK1826519-003	HK1826519-004	HK1826519-005
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	27.5	23.3	16.9	14.1	21.3
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	47	28	30	18	12

Sub-Matrix: SOIL			Client sample ID	EBH-2 20.00m	----	----	----	----
			Client sampling date / time	20-Apr-2018 16:00	----	----	----	----
Compound	CAS Number	LOR	Unit	HK1826519-006	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	15.8	----	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	18	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1588666)								
HK1826433-016	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	69.0	68.9	0.00
HK1826519-002	EBH-2 16.00-16.45m	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	23.3	22.9	1.90
EG: Metals and Major Cations (QC Lot: 1587021)								
HK1826519-002	EBH-2 16.00-16.45m	**EG020: Lead**	7439-92-1	1	mg/kg	28	34	17.2

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1587021)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1587021)										
HK1826519-001	EBH-2 15.00-15.45m	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 16
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1827997
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	Amendment	: 2
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 02-May-2018
Order number	: ----	Quote number	: HKE/1752a/2017	Issue Date	: 18-Jul-2018
C-O-C number	: H013087			No. of samples received	: 3
Site	:			No. of samples analysed	: 3

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Leung Chak Cheong , Mike	Senior Chemist	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 02-May-2018 to 16-May-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1827997

Sample(s) were received in chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH3 0.5m	EBH3 1.5m	---	---	---
			Client sampling date / time	02-May-2018 13:00	02-May-2018 13:30	----	----	----
Compound	CAS Number	LOR	Unit	HK1827997-001	HK1827997-002	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	17.5	13.9	---	---	---
EG: Metals and Major Cations								
EG020: Antimony	7440-36-0	1	mg/kg	8	<1	---	---	---
EG020: Arsenic	7440-38-2	1	mg/kg	17	5	---	---	---
EG020: Barium	7440-39-3	1.0	mg/kg	196	30.1	---	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.5	<0.2	---	---	---
EG020: Cobalt	7440-48-4	1.0	mg/kg	9.8	1.3	---	---	---
EG020: Copper	7440-50-8	1	mg/kg	48	4	---	---	---
EG020: Lead	7439-92-1	1	mg/kg	58	21	---	---	---
EG020: Manganese	7439-96-5	1.0	mg/kg	460	418	---	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.05	---	---	---
EG020: Molybdenum	7439-98-7	1	mg/kg	2	1	---	---	---
EG020: Nickel	7440-02-0	1	mg/kg	24	2	---	---	---
EG020: Tin	7440-31-5	1.0	mg/kg	5.5	2.9	---	---	---
EG020: Zinc	7440-66-6	1	mg/kg	182	78	---	---	---
EG049: Trivalent Chromium	16065-83-1	1.0	mg/kg	56.6	3.4	---	---	---
EG3060: Hexavalent Chromium	18540-29-9	1.0	mg/kg	<1.0	<1.0	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	---	---	---

Sub-Matrix: SOIL			Client sample ID	EBH3 0.5m	EBH3 1.5m	----	----	----
			Client sampling date / time	02-May-2018 13:00	02-May-2018 13:30	----	----	----
Compound	CAS Number	LOR	Unit	HK1827997-001	HK1827997-002	-------	-------	-------
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued								
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	----	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate								
EP076HK: Phenol	108-95-2	0.50	mg/kg	<0.50	<0.50	----	----	----
EP076HK: Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg	<0.200	<0.200	----	----	----
EP076HK: Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg	<5.00	<5.00	----	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)								
EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	<5	----	----	----
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	<200	----	----	----
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	1900	<500	----	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)								
EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	----	----	----
EP074_SR: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	----	----	----
EP-074_SR-B: Oxygenated Compounds								
EP074_SR: 2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	----	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	----	----	----
EP-074_SR-E: Halogenated Aliphatics								
EP074_SR: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	----	----	----
EP074_SR: Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	----	----	----
EP-074_SR-G: Trihalomethanes (THM)								

Sub-Matrix: SOIL			Client sample ID	EBH3 0.5m	EBH3 1.5m	----	----	----
			Client sampling date / time	02-May-2018 13:00	02-May-2018 13:30	----	----	----
Compound	CAS Number	LOR	Unit	HK1827997-001	HK1827997-002	-------	-------	-------
EP-074_SR-G: Trihalomethanes (THM) - Continued								
EP074_SR: Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	----	----	----
EP074_SR: Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	----	----	----
EP-074_SR-I: Methyl-tert-butyl Ether								
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates								
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	75.5	73.2	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	74.6	72.4	----	----	----
EP-080_SRS: TPH(Volatile)/BTEX Surrogate								
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	93.1	93.0	----	----	----
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	99.7	102	----	----	----
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	96.2	96.5	----	----	----
EP-074_SR-S: VOC Surrogates								
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	93.1	93.0	----	----	----
EP074_SR: Toluene-D8	2037-26-5	0.1	%	99.7	102	----	----	----
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	96.2	96.5	----	----	----

Sub-Matrix: WATER				Client sample ID	Trip Blank 20180502	---	---	---	---
				Client sampling date / time	02-May-2018	----	----	----	----
Compound	CAS Number	LOR	Unit		HK1827997-003	-------	-------	-------	-------
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	5.0	µg/L		<5.0	---	---	---	---
EP074_SR: Toluene	108-88-3	5.0	µg/L		<5.0	---	---	---	---
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L		<5.0	---	---	---	---
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L		<10	---	---	---	---
EP074_SR: Styrene	100-42-5	5.0	µg/L		<5.0	---	---	---	---
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L		<5.0	---	---	---	---
EP074_SR: Xylenes (Total)	----	20	µg/L		<20	---	---	---	---
EP-074_SR-B: Oxygenated Compounds									
EP074_SR: 2-Propanone (Acetone)	67-64-1	500	µg/L		<500	---	---	---	---
EP074_SR: 2-Butanone (MEK)	78-93-3	50	µg/L		<50	---	---	---	---
EP-074_SR-E: Halogenated Aliphatics									
EP074_SR: Methylene chloride	75-09-2	50	µg/L		<50	---	---	---	---
EP074_SR: Trichloroethene	79-01-6	5.0	µg/L		<5.0	---	---	---	---
EP074_SR: Tetrachloroethene	127-18-4	5.0	µg/L		<5.0	---	---	---	---
EP-074_SR-G: Trihalomethanes (THM)									
EP074_SR: Chloroform	67-66-3	5.0	µg/L		<5.0	---	---	---	---
EP074_SR: Bromodichloromethane	75-27-4	5.0	µg/L		<5.0	---	---	---	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L		<5.0	---	---	---	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%		95.3	---	---	---	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%		102	---	---	---	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		96.8	---	---	---	---

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1638710)								
HK1827997-001	EBH3 0.5m	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	17.5	17.4	0.598
HK1828722-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	56.3	56.6	0.466
EG: Metals and Major Cations (QC Lot: 1613681)								
HK1827997-002	EBH3 1.5m	**EG3060: Hexavalent Chromium**	18540-29-9	0.5	mg/kg	<1.0	<1.0	0.00
EG: Metals and Major Cations (QC Lot: 1613694)								
HK1827997-002	EBH3 1.5m	**EG020: Mercury**	7439-97-6	0.05	mg/kg	0.05	0.05	0.00
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.00
		EG020: Barium	7440-39-3	0.5	mg/kg	30.1	35.9	17.7
		EG020: Cobalt	7440-48-4	0.5	mg/kg	1.3	1.5	10.2
		EG020: Manganese	7439-96-5	0.5	mg/kg	418	486	15.1
		EG020: Tin	7440-31-5	0.5	mg/kg	2.9	3.3	12.5
		EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	0.00
		EG020: Arsenic	7440-38-2	1	mg/kg	5	5	0.00
		EG020: Copper	7440-50-8	1	mg/kg	4	5	0.00
		EG020: Lead	7439-92-1	1	mg/kg	21	24	11.9
		EG020: Molybdenum	7439-98-7	1	mg/kg	1	1	0.00
		EG020: Nickel	7440-02-0	1	mg/kg	2	2	0.00
		EG020: Zinc	7440-66-6	1	mg/kg	78	82	5.03
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1614866)								
HK1827997-001	EBH3 0.5m	**Naphthalene**	91-20-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthene	83-32-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluorene	86-73-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Phenanthrene	85-01-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Anthracene	120-12-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluoranthene	206-44-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Pyrene	129-00-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benz(a)anthracene	56-55-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Chrysene	218-01-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(b)fluoranthene	205-99-2	50	µg/kg	<0.500 mg/kg	<500	0.00

Matrix: **SOIL**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1614866) - Continued								
HK1827997-001	EBH3 0.5m	**Benzo(k)fluoranthene**	207-08-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(a)pyrene	50-32-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<0.500 mg/kg	<500	0.00
		Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<0.500 mg/kg	<500	0.00
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1614866)								
HK1827997-001	EBH3 0.5m	**Bis(2-ethylhexyl)phthalate**	117-81-7	1000	µg/kg	<5.00 mg/kg	<5000	0.00
		Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<0.200 mg/kg	<200	0.00
		Phenol	108-95-2	500	µg/kg	<0.50 mg/kg	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1614867)								
HK1827997-001	EBH3 0.5m	**C9 - C16 Fraction**	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	1900	1720	9.96
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1614875)								
HK1827997-001	EBH3 0.5m	**C6 - C8 Fraction**	----	5	mg/kg	<5	<5	0.00
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1614877)								
HK1827997-001	EBH3 0.5m	**Benzene**	71-43-2	0.1	mg/kg	<0.2	<0.2	0.00
		Toluene	108-88-3	0.2	mg/kg	<0.5	<0.5	0.00
		Ethylbenzene	100-41-4	0.2	mg/kg	<0.5	<0.5	0.00
		Styrene	100-42-5	0.2	mg/kg	<0.5	<0.5	0.00
		ortho-Xylene	95-47-6	0.2	mg/kg	<0.5	<0.5	0.00
		meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<1.0	<1.0	0.00
		Xylenes (Total)	----	1	mg/kg	<2.0	<2.0	0.00
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1614877)								
HK1827997-001	EBH3 0.5m	**2-Propanone (Acetone)**	67-64-1	2	mg/kg	<50	<50	0.00
		2-Butanone (MEK)	78-93-3	2	mg/kg	<5	<5	0.00
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1614877)								
HK1827997-001	EBH3 0.5m	**Tetrachloroethene**	127-18-4	0.04	mg/kg	<0.04	<0.04	0.00
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.00
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.00
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1614877)								

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1614877) - Continued								
HK1827997-001	EBH3 0.5m	**Chloroform**	67-66-3	0.04	mg/kg	<0.04	<0.04	0.00
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.00
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1614877)								
HK1827997-001	EBH3 0.5m	**Methyl tert-Butyl Ether (MTBE)**	1634-04-4	0.2	mg/kg	<0.5	<0.5	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1613681)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	99.9	----	85	115	----	----
EG: Metals and Major Cations (QC Lot: 1613694)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	96.4	----	85	115	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----
EG020: Barium	7440-39-3	0.5	mg/kg	<0.5	5 mg/kg	97.3	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.9	----	85	115	----	----
EG020: Cobalt	7440-48-4	0.5	mg/kg	<0.5	5 mg/kg	105	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	105	----	85	115	----	----
EG020: Manganese	7439-96-5	0.5	mg/kg	<0.5	5 mg/kg	95.7	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	108	----	85	115	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	101	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	99.8	----	85	115	----	----
EG020: Tin	7440-31-5	0.5	mg/kg	<0.5	5 mg/kg	93.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1614866)											
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	81.4	----	60	99	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	80.6	----	57	91	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	81.5	----	59	97	----	----
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	85.6	----	61	99	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1614866) - Continued											
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	90.4	----	62	100	----	----
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	70.4	----	54	87	----	----
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	87.4	----	66	103	----	----
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	85.9	----	62	105	----	----
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	90.1	----	63	102	----	----
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	88.6	----	65	101	----	----
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	93.7	----	63	102	----	----
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	88.3	----	60	107	----	----
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	71.6	----	50	90	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	93.2	----	49	99	----	----
Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	95.3	----	46	97	----	----
Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	94.6	----	38	97	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1614866)											
Phenol	108-95-2	500	µg/kg	<500	25 µg/kg	78.3	----	67	117	----	----
Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	25 µg/kg	91.8	----	66	112	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<1000	25 µg/kg	104	----	104	124	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1614867)											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	104	----	62	128	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	87.4	----	51	115	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1614875)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	101	----	73	123	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1614877)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	93.2	----	79	115	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	101	----	77	117	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	99.2	----	82	115	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.5 mg/kg	104	----	85	117	----	----
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	94.3	----	81	115	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	99.7	----	80	113	----	----
Xylenes (Total)	----	1	mg/kg	<1.0	0.75 mg/kg	103	----	85	114	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1614877)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	99.0	----	79	126	----	----
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	95.8	----	76	115	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1614877)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	90.2	----	78	121	----	----
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	93.9	----	76	116	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	96.1	----	76	114	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1614877)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	91.5	----	77	115	----	----
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	94.6	----	77	115	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1614877)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	88.3	----	74	121	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1615367)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	89.7	----	57	126	----	----
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	101	----	70	112	----	----
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	99.2	----	66	124	----	----
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	102	----	70	117	----	----
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	87.6	----	68	120	----	----
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	96.8	----	65	125	----	----
Xylenes (Total)	----	2	µg/L	<2	6 µg/L	100	----	70	119	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1615367)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	111	----	74	130	----	----
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	89.7	----	67	126	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1615367)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	97.3	----	67	131	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1615367) - Continued											
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	95.0	----	64	122	----	----
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	97.9	----	67	113	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1615367)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	89.1	----	65	127	----	----
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	89.6	----	65	115	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1615367)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	78.5	----	63	124	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1613681)										
HK1827997-001	EBH3 0.5m	**EG3060: Hexavalent Chromium**	18540-29-9	2.5 mg/kg	105	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 1613694)										
HK1827997-001	EBH3 0.5m	**EG020: Antimony**	7440-36-0	5 mg/kg	98.2	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	92.3	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	96.8	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	104	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	80.8	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	106	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	90.0	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	92.3	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1614866)										
HK1827997-002	EBH3 1.5m	**Naphthalene**	91-20-3	250 µg/kg	74.5	----	50	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	79.5	----	50	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	73.5	----	50	130	----	----
		Fluorene	86-73-7	250 µg/kg	75.6	----	50	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	77.1	----	50	130	----	----
		Anthracene	120-12-7	250 µg/kg	75.0	----	50	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	75.2	----	50	130	----	----

Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number		MS	MSD	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1614866) - Continued										
HK1827997-002	EBH3 1.5m	Pyrene	129-00-0	250 µg/kg	73.7	----	50	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	81.8	----	50	130	----	----
		Chrysene	218-01-9	250 µg/kg	76.7	----	50	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	78.4	----	50	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	81.3	----	50	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	79.2	----	50	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	86.2	----	50	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	75.9	----	50	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	74.3	----	50	130	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1614866)										
HK1827997-002	EBH3 1.5m	Phenol	108-95-2	250 µg/kg	72.4	----	50	130	----	----
		Hexachlorobenzene (HCB)	118-74-1	250 µg/kg	83.8	----	50	130	----	----
		Bis(2-ethylhexyl)phthalate	117-81-7	250 µg/kg	71.3	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1614867)										
HK1827997-002	EBH3 1.5m	C9 - C16 Fraction	----	31.5 mg/kg	130	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	126	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1614875)										
HK1827997-002	EBH3 1.5m	C6 - C8 Fraction	----	4.5 mg/kg	112	----	50	130	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1614877)										
HK1827997-002	EBH3 1.5m	Benzene	71-43-2	0.25 mg/kg	95.5	----	50	130	----	----
		Toluene	108-88-3	0.25 mg/kg	104	----	50	130	----	----
		Ethylbenzene	100-41-4	0.25 mg/kg	109	----	50	130	----	----
		meta- & para-Xylene	108-38-3 106-42-3	0.5 mg/kg	112	----	50	130	----	----
		Styrene	100-42-5	0.25 mg/kg	84.8	----	50	130	----	----
		ortho-Xylene	95-47-6	0.25 mg/kg	102	----	50	130	----	----
		Xylenes (Total)	----	0.75 mg/kg	103	----	50	130	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1614877)										
HK1827997-002	EBH3 1.5m	2-Propanone (Acetone)	67-64-1	2.5 mg/kg	96.0	----	50	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1614877) - Continued										
HK1827997-002	EBH3 1.5m	**2-Butanone (MEK)**	78-93-3	2.5 mg/kg	85.3	----	50	130	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1614877)										
HK1827997-002	EBH3 1.5m	**Methylene chloride**	75-09-2	0.25 mg/kg	99.4	----	50	130	----	----
		Trichloroethene	79-01-6	0.25 mg/kg	103	----	50	130	----	----
		Tetrachloroethene	127-18-4	0.25 mg/kg	107	----	50	130	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1614877)										
HK1827997-002	EBH3 1.5m	**Chloroform**	67-66-3	0.25 mg/kg	90.6	----	50	130	----	----
		Bromodichloromethane	75-27-4	0.25 mg/kg	89.5	----	50	130	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1614877)										
HK1827997-002	EBH3 1.5m	**Methyl tert-Butyl Ether (MTBE)**	1634-04-4	0.25 mg/kg	85.6	----	50	130	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP-074_SR-S: VOC Surrogates			

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-074_SR-S: VOC Surrogates - Continued			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 18
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1828962
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	Amendment	: 1
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 08-May-2018
Order number	:	Quote number	: HKE/1752a/2017	Issue Date	: 18-Jul-2018
C-O-C number	: H013090			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics
Leung Chak Cheong , Mike	Senior Chemist	Metals
Lin Wai Yu , Iris	Assistant Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 08-May-2018 to 23-May-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1828962

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH3 1.5m (duplicate)	---	---	---	---
			Client sampling date / time	08-May-2018 10:00	----	----	----	----
Compound	CAS Number	LOR	Unit	HK1828962-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	20.0	---	---	---	---
EG: Metals and Major Cations								
EG020: Antimony	7440-36-0	1	mg/kg	4	---	---	---	---
EG020: Arsenic	7440-38-2	1	mg/kg	13	---	---	---	---
EG020: Barium	7440-39-3	1.0	mg/kg	124	---	---	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.3	---	---	---	---
EG020: Cobalt	7440-48-4	1.0	mg/kg	6.5	---	---	---	---
EG020: Copper	7440-50-8	1	mg/kg	27	---	---	---	---
EG020: Lead	7439-92-1	1	mg/kg	43	---	---	---	---
EG020: Manganese	7439-96-5	1.0	mg/kg	534	---	---	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	---	---	---	---
EG020: Molybdenum	7439-98-7	1	mg/kg	1	---	---	---	---
EG020: Nickel	7440-02-0	1	mg/kg	14	---	---	---	---
EG020: Tin	7440-31-5	1.0	mg/kg	4.7	---	---	---	---
EG020: Zinc	7440-66-6	1	mg/kg	109	---	---	---	---
EG049: Trivalent Chromium	16065-83-1	1.0	mg/kg	31.9	---	---	---	---
EG3060: Hexavalent Chromium	18540-29-9	1.0	mg/kg	<1.0	---	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	---	---	---	---
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	---	---	---	---

Sub-Matrix: SOIL			Client sample ID	EBH3 1.5m (duplicate)	----	----	----	----
			Client sampling date / time	08-May-2018 10:00	----	----	----	----
Compound	CAS Number	LOR	Unit	HK1828962-001	-------	-------	-------	-------
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued								
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	----	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	----	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	----	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	----	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	----	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	0.500	mg/kg	<0.500	----	----	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate								
EP076HK: Phenol	108-95-2	0.50	mg/kg	<0.50	----	----	----	----
EP076HK: Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg	<0.200	----	----	----	----
EP076HK: Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg	<5.00	----	----	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)								
EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	----	----	----	----
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	----	----	----	----
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	**1130**	----	----	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)								
EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	----	----	----	----
EP074_SR: Styrene	100-42-5	0.5	mg/kg	<0.5	----	----	----	----
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	----	----	----	----
EP-074_SR-B: Oxygenated Compounds								
EP074_SR: 2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	----	----	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	----	----	----	----
EP-074_SR-E: Halogenated Aliphatics								
EP074_SR: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	----	----	----	----
EP074_SR: Trichloroethene	79-01-6	0.1	mg/kg	<0.1	----	----	----	----

Sub-Matrix: SOIL				Client sample ID	EBH3 1.5m (duplicate)	---	---	---	---
				Client sampling date / time	08-May-2018 10:00	----	----	----	----
Compound	CAS Number	LOR	Unit		HK1828962-001	-------	-------	-------	-------
EP-074_SR-E: Halogenated Aliphatics - Continued									
EP074_SR: Tetrachloroethene	127-18-4	0.04	mg/kg		<0.04	---	---	---	---
EP-074_SR-G: Trihalomethanes (THM)									
EP074_SR: Chloroform	67-66-3	0.04	mg/kg		<0.04	---	---	---	---
EP074_SR: Bromodichloromethane	75-27-4	0.1	mg/kg		<0.1	---	---	---	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg		<0.5	---	---	---	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		**74.7**	---	---	---	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		**71.2**	---	---	---	---
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%		**93.1**	---	---	---	---
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%		**101**	---	---	---	---
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		**95.2**	---	---	---	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%		**93.1**	---	---	---	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%		**101**	---	---	---	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		**95.2**	---	---	---	---

Sub-Matrix: WATER			Client sample ID	Field Blank 20180508	Equipment Blank 20180508	Trip Blank 20180508	----	----
			Client sampling date / time	08-May-2018 10:00	08-May-2018 10:00	08-May-2018 10:00	----	----
Compound	CAS Number	LOR	Unit	HK1828962-002	HK1828962-003	HK1828962-004	-------	-------
EG: Metals and Major Cations - Filtered								
EG020: Antimony	7440-36-0	1	µg/L	<1	<1	----	----	----
EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	----	----	----
EG020: Barium	7440-39-3	1	µg/L	<1	<1	----	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	----	----	----
EG020: Cobalt	7440-48-4	1	µg/L	<1	<1	----	----	----
EG020: Copper	7440-50-8	1	µg/L	<1	<1	----	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	<1	----	----	----
EG020: Manganese	7439-96-5	1	µg/L	<1	<1	----	----	----
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	----	----	----
EG020: Molybdenum	7439-98-7	1	µg/L	<1	<1	----	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	<1	----	----	----
EG020: Tin	7440-31-5	1	µg/L	<1	<1	----	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	15	----	----	----
EG049: Trivalent Chromium	16065-83-1	20	µg/L	<20	<20	----	----	----
EG050: Hexavalent Chromium	18540-29-9	20	µg/L	<20	<20	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Acenaphthylene	208-96-8	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Acenaphthene	83-32-9	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Fluorene	86-73-7	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Phenanthrene	85-01-8	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Anthracene	120-12-7	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Fluoranthene	206-44-0	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Pyrene	129-00-0	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	2.0	µg/L	<2.0	<2.0	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	2.0	µg/L	<2.0	<2.0	----	----	----

Sub-Matrix: WATER				Client sample ID	Field Blank 20180508	Equipment Blank 20180508	Trip Blank 20180508	----	----
				Client sampling date / time	08-May-2018 10:00	08-May-2018 10:00	08-May-2018 10:00	----	----
Compound	CAS Number	LOR	Unit		HK1828962-002	HK1828962-003	HK1828962-004	-------	-------
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued									
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	2.0	µg/L		<2.0	<2.0	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	2.0	µg/L		<2.0	<2.0	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	2.0	µg/L		<2.0	<2.0	----	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate									
EP076HK: Phenol	108-95-2	2.0	µg/L		<2.0	<2.0	----	----	----
EP076HK: Hexachlorobenzene (HCB)	118-74-1	4.0	µg/L		<4.0	<4.0	----	----	----
EP076HK: Bis(2-ethylhexyl)phthalate	117-81-7	20.0	µg/L		<20.0	<20.0	----	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	20	µg/L		<20	<20	----	----	----
EP071HK_SR: C9 - C16 Fraction	----	500	µg/L		<500	<500	----	----	----
EP071HK_SR: C17 - C35 Fraction	----	500	µg/L		<500	<500	----	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Toluene	108-88-3	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L		<10	<10	<10	----	----
EP074_SR: Styrene	100-42-5	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Xylenes (Total)	----	20	µg/L		<20	<20	<20	----	----
EP-074_SR-B: Oxygenated Compounds									
EP074_SR: 2-Propanone (Acetone)	67-64-1	500	µg/L		<500	<500	<500	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	<50	----	----
EP-074_SR-E: Halogenated Aliphatics									
EP074_SR: Methylene chloride	75-09-2	50	µg/L		<50	<50	<50	----	----
EP074_SR: Trichloroethene	79-01-6	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Tetrachloroethene	127-18-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP-074_SR-G: Trihalomethanes (THM)									
EP074_SR: Chloroform	67-66-3	5.0	µg/L		<5.0	<5.0	<5.0	----	----

Sub-Matrix: WATER				Client sample ID	Field Blank 20180508	Equipment Blank 20180508	Trip Blank 20180508	----	----
				Client sampling date / time	08-May-2018 10:00	08-May-2018 10:00	08-May-2018 10:00	----	----
Compound	CAS Number	LOR	Unit		HK1828962-002	HK1828962-003	HK1828962-004	-------	-------
EP-074_SR-G: Trihalomethanes (THM) - Continued									
EP074_SR: Bromodichloromethane	75-27-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		52.3	67.6	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		74.9	66.6	----	----	----
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%		91.1	93.2	----	----	----
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%		101	102	----	----	----
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		94.7	94.9	----	----	----
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%		91.1	93.2	95.5	----	----
EP074_SR: Toluene-D8	2037-26-5	0.1	%		101	102	103	----	----
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		94.7	94.9	96.2	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 1641059)								
HK1828962-001	EBH3 1.5m (duplicate)	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	20.0	20.5	2.73
HK1829043-005	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	11.6	11.4	1.40
EG: Metals and Major Cations (QC Lot: 1626389)								
HK1828962-001	EBH3 1.5m (duplicate)	**EG3060: Hexavalent Chromium**	18540-29-9	0.5	mg/kg	<1.0	<1.0	0.00
EG: Metals and Major Cations (QC Lot: 1626392)								
HK1828962-001	EBH3 1.5m (duplicate)	**EG020: Mercury**	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.00
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.3	0.4	0.00
		EG020: Barium	7440-39-3	0.5	mg/kg	124	145	15.8
		EG020: Cobalt	7440-48-4	0.5	mg/kg	6.5	7.4	11.5
		EG020: Manganese	7439-96-5	0.5	mg/kg	534	604	12.4
		EG020: Tin	7440-31-5	0.5	mg/kg	4.7	4.7	0.00
		EG020: Antimony	7440-36-0	1	mg/kg	4	4	0.00
		EG020: Arsenic	7440-38-2	1	mg/kg	13	16	17.5
		EG020: Copper	7440-50-8	1	mg/kg	27	30	9.60
		EG020: Lead	7439-92-1	1	mg/kg	43	39	11.5
		EG020: Molybdenum	7439-98-7	1	mg/kg	1	2	0.00
		EG020: Nickel	7440-02-0	1	mg/kg	14	17	17.0
		EG020: Zinc	7440-66-6	1	mg/kg	109	132	18.8
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1630475)								
HK1828962-001	EBH3 1.5m (duplicate)	**Naphthalene**	91-20-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthene	83-32-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluorene	86-73-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Phenanthrene	85-01-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Anthracene	120-12-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluoranthene	206-44-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Pyrene	129-00-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benz(a)anthracene	56-55-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Chrysene	218-01-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(b)fluoranthene	205-99-2	50	µg/kg	<0.500 mg/kg	<500	0.00

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1630475) - Continued								
HK1828962-001	EBH3 1.5m (duplicate)	**Benzo(k)fluoranthene**	207-08-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(a)pyrene	50-32-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<0.500 mg/kg	<500	0.00
		Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<0.500 mg/kg	<500	0.00
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1630475)								
HK1828962-001	EBH3 1.5m (duplicate)	**Bis(2-ethylhexyl)phthalate**	117-81-7	1000	µg/kg	<5.00 mg/kg	<5000	0.00
		Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<0.200 mg/kg	<200	0.00
		Phenol	108-95-2	500	µg/kg	<0.50 mg/kg	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1630476)								
HK1828962-001	EBH3 1.5m (duplicate)	**C9 - C16 Fraction**	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	1130	1100	2.95

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 1626293)								
HK1828962-003	Equipment Blank 20180508	**EG020: Cadmium**	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00
		EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	0.00
		EG020: Antimony	7440-36-0	1	µg/L	<1	<1	0.00
		EG020: Barium	7440-39-3	1	µg/L	<1	2	0.00
		EG020: Cobalt	7440-48-4	1	µg/L	<1	<1	0.00
		EG020: Copper	7440-50-8	1	µg/L	<1	<1	0.00
		EG020: Lead	7439-92-1	1	µg/L	<1	<1	0.00
		EG020: Manganese	7439-96-5	1	µg/L	<1	<1	0.00
		EG020: Molybdenum	7439-98-7	1	µg/L	<1	<1	0.00
		EG020: Nickel	7440-02-0	1	µg/L	<1	<1	0.00
		EG020: Tin	7440-31-5	1	µg/L	<1	<1	0.00
		EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	0.00
		EG020: Zinc	7440-66-6	10	µg/L	15	20	0.00
EG: Metals and Major Cations - Filtered (QC Lot: 1626372)								
HK1828962-003	Equipment Blank 20180508	**EG050: Hexavalent Chromium**	18540-29-9	20	µg/L	<20	<20	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1626389)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	98.3	----	85	115	----	----
EG: Metals and Major Cations (QC Lot: 1626392)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	94.0	----	85	115	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----
EG020: Barium	7440-39-3	0.5	mg/kg	<0.5	5 mg/kg	91.0	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	98.9	----	85	115	----	----
EG020: Cobalt	7440-48-4	0.5	mg/kg	<0.5	5 mg/kg	110	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	101	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	100	----	85	115	----	----
EG020: Manganese	7439-96-5	0.5	mg/kg	<0.5	5 mg/kg	108	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	98.9	----	85	115	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	97.4	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	107	----	85	115	----	----
EG020: Tin	7440-31-5	0.5	mg/kg	<0.5	5 mg/kg	102	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	103	----	85	115	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1630475)											
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	83.0	----	60	99	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	76.7	----	57	91	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	79.4	----	59	97	----	----
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	86.4	----	61	99	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	88.2	----	62	100	----	----
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	66.8	----	54	87	----	----
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	85.1	----	66	103	----	----
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	82.4	----	62	105	----	----
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	80.4	----	63	102	----	----
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	85.7	----	65	101	----	----
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	87.6	----	63	102	----	----
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	89.2	----	60	107	----	----
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	52.3	----	50	90	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1630475) - Continued											
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	95.4	----	49	99	----	----
Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	96.9	----	46	97	----	----
Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	91.6	----	38	97	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1630475)											
Phenol	108-95-2	500	µg/kg	<500	25 µg/kg	68.5	----	67	117	----	----
Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	25 µg/kg	92.0	----	66	112	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<1000	25 µg/kg	105	----	104	124	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1630476)											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	108	----	62	128	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	104	----	51	115	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 1626293)											
EG020: Antimony	7440-36-0	1	µg/L	<1	100 µg/L	96.6	----	75	107	----	----
EG020: Arsenic	7440-38-2	10	µg/L	<10	100 µg/L	95.2	----	77	109	----	----
EG020: Barium	7440-39-3	1	µg/L	<1	100 µg/L	93.0	----	79	109	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	100 µg/L	99.4	----	79	109	----	----
EG020: Cobalt	7440-48-4	1	µg/L	<1	100 µg/L	97.0	----	78	106	----	----
EG020: Copper	7440-50-8	1	µg/L	<1	100 µg/L	102	----	79	107	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	100 µg/L	102	----	81	107	----	----
EG020: Manganese	7439-96-5	1	µg/L	<1	100 µg/L	93.2	----	79	109	----	----
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	2 µg/L	102	----	77	117	----	----
EG020: Molybdenum	7439-98-7	1	µg/L	<1	100 µg/L	99.3	----	76	108	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	100 µg/L	98.1	----	78	108	----	----
EG020: Tin	7440-31-5	1	µg/L	<1	100 µg/L	102	----	77	107	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	100 µg/L	96.7	----	77	109	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 1626372)											
EG050: Hexavalent Chromium	18540-29-9	20	µg/L	<20	100 µg/L	92.5	----	80	106	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 1626372) - Continued											
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1621606)											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	68.4	----	44	69	----	----
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	79.7	----	37	81	----	----
Acenaphthene	83-32-9	0.2	µg/L	<0.2	0.5 µg/L	55.6	----	44	67	----	----
Fluorene	86-73-7	0.2	µg/L	<0.2	0.5 µg/L	54.0	----	39	73	----	----
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	52.9	----	41	77	----	----
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	53.1	----	38	79	----	----
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	76.1	----	51	112	----	----
Pyrene	129-00-0	0.2	µg/L	<0.2	0.5 µg/L	76.9	----	51	113	----	----
Benz(a)anthracene	56-55-3	0.2	µg/L	<0.2	0.5 µg/L	91.3	----	67	110	----	----
Chrysene	218-01-9	0.2	µg/L	<0.2	0.5 µg/L	84.2	----	64	110	----	----
Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	0.5 µg/L	92.0	----	73	113	----	----
Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<0.2	0.5 µg/L	84.9	----	65	111	----	----
Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.2	0.5 µg/L	84.9	----	62	109	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<0.2	0.5 µg/L	99.4	----	56	112	----	----
Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<0.2	0.5 µg/L	90.1	----	53	110	----	----
Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<0.2	0.5 µg/L	91.8	----	40	123	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1621606)											
Phenol	108-95-2	5	µg/L	<5.0	0.5 µg/L	32.1	----	0	78	----	----
Hexachlorobenzene (HCB)	118-74-1	4	µg/L	<4.0	0.5 µg/L	57.9	----	36	82	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	10	µg/L	<10.0	0.5 µg/L	132	----	91	133	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1622521)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	86.8	----	65	119	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1627917)											
C9 - C16 Fraction	----	0.5	mg/L	<0.5	0.21 mg/L	79.9	----	55	109	----	----
C17 - C35 Fraction	----	0.5	mg/L	<0.5	0.45 mg/L	104	----	49	129	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1638764)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	93.4	----	57	126	----	----
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	99.9	----	70	112	----	----
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	101	----	66	124	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 1638764) - Continued											
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	105	----	70	117	----	----
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	90.0	----	68	120	----	----
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	99.1	----	65	125	----	----
Xylenes (Total)	----	2	µg/L	<2	6 µg/L	103	----	70	119	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 1638764)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	110	----	74	130	----	----
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	97.1	----	67	126	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 1638764)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	106	----	67	131	----	----
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	95.7	----	64	122	----	----
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	100.0	----	67	113	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 1638764)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	89.6	----	65	127	----	----
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	84.4	----	65	115	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 1638764)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	95.7	----	63	124	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 1626389)										
HK1828888-001	Anonymous	**EG3060: Hexavalent Chromium**	18540-29-9	2.5 mg/kg	92.0	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 1626392)										
HK1828888-001	Anonymous	**EG020: Antimony**	7440-36-0	5 mg/kg	97.9	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	103	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	101	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	104	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	98.0	----	75	125	----	----
		EG020: Lead	7439-92-1	50 mg/kg	87.8	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	1 mg/kg	89.8	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	100	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	104	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	103	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1630475)										
HK1828962-001	EBH3 1.5m (duplicate)	**Naphthalene**	91-20-3	250 µg/kg	70.1	----	50	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	90.5	----	50	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	81.2	----	50	130	----	----
		Fluorene	86-73-7	250 µg/kg	82.0	----	50	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	84.2	----	50	130	----	----
		Anthracene	120-12-7	250 µg/kg	76.8	----	50	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	57.0	----	50	130	----	----
		Pyrene	129-00-0	250 µg/kg	50.5	----	50	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 1630475) - Continued										
HK1828962-001	EBH3 1.5m (duplicate)	**Benz(a)anthracene**	56-55-3	250 µg/kg	73.8	----	50	130	----	----
		Chrysene	218-01-9	250 µg/kg	66.4	----	50	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	65.8	----	50	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	90.2	----	50	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	70.6	----	50	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	75.1	----	50	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	82.6	----	50	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	67.6	----	50	130	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 1630475)										
HK1828962-001	EBH3 1.5m (duplicate)	**Phenol**	108-95-2	250 µg/kg	86.3	----	50	130	----	----
		Hexachlorobenzene (HCB)	118-74-1	250 µg/kg	94.8	----	50	130	----	----
		Bis(2-ethylhexyl)phthalate	117-81-7	250 µg/kg	121	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 1630476)										
HK1829039-001	Anonymous	**C9 - C16 Fraction**	----	31.5 mg/kg	58.3	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	# Not Determined	----	50	130	----	----

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 1626293)										
HK1828962-002	Field Blank 20180508	**EG020: Antimony**	7440-36-0	100 µg/L	95.9	----	75	125	----	----
		EG020: Arsenic	7440-38-2	100 µg/L	94.3	----	75	125	----	----
		EG020: Barium	7440-39-3	100 µg/L	91.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	100 µg/L	98.2	----	75	125	----	----
		EG020: Cobalt	7440-48-4	100 µg/L	97.3	----	75	125	----	----
		EG020: Copper	7440-50-8	100 µg/L	102	----	75	125	----	----
		EG020: Lead	7439-92-1	100 µg/L	104	----	75	125	----	----
		EG020: Manganese	7439-96-5	100 µg/L	92.1	----	75	125	----	----

Matrix: **WATER**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Spike Concentration*	*Spike Recovery (%)*		*Recovery Limits (%)*		*RPD (%)*	
					MS	*MSD*	*Low*	*High*	*Value*	*Control Limit*
EG: Metals and Major Cations - Filtered (QC Lot: 1626293) - Continued										
HK1828962-002	Field Blank 20180508	**EG020: Mercury**	7439-97-6	2 µg/L	105	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	100 µg/L	98.0	----	75	125	----	----
		EG020: Nickel	7440-02-0	100 µg/L	97.6	----	75	125	----	----
		EG020: Tin	7440-31-5	100 µg/L	101	----	75	125	----	----
		EG020: Zinc	7440-66-6	100 µg/L	98.9	----	75	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 1626372)										
HK1828962-002	Field Blank 20180508	**EG050: Hexavalent Chromium**	18540-29-9	100 µg/L	91.8	----	75	125	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	*CAS Number*	*Recovery Limits (%)*	
		Low	*High*
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: **WATER**

Compound	*CAS Number*	*Recovery Limits (%)*	
		Low	*High*
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

HOKLAS 066 TEST

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 21
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1864925
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 13-Dec-2018
Order number	:	Quote number	: HKE/1752b/2017	Issue Date	: 31-Dec-2018
C-O-C number	: H013086			No. of samples received	: 5
Site	:			No. of samples analysed	: 5

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics
Leung Chak Cheong , Mike	Senior Chemist	Metals
Lin Wai Yu , Iris	Assistant Manager - Inorganics	Inorganics

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 13-Dec-2018 to 31-Dec-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1864925

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

Sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Sample(s) as received, digested by In-house method E-3060 prior to the determination of Hexavalent Chromium (Cr6+). The In-house method is developed based on USEPA method 3060A.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH3 3-3.45m	EBH3 3-3.45m (Duplicate)	----	----	----
			Client sampling date / time	13-Dec-2018 15:15	13-Dec-2018 15:15	----	----	----
Compound	CAS Number	LOR	Unit	HK1864925-004	HK1864925-005	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	19.0	16.8	----	----	----
EG: Metals and Major Cations								
EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	----	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	5	5	----	----	----
EG020: Barium	7440-39-3	1.0	mg/kg	66.0	65.1	----	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	----	----	----
EG020: Cobalt	7440-48-4	1.0	mg/kg	2.0	2.2	----	----	----
EG020: Copper	7440-50-8	1	mg/kg	14	95	----	----	----
EG020: Lead	7439-92-1	1	mg/kg	59	42	----	----	----
EG020: Manganese	7439-96-5	1.0	mg/kg	186	404	----	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	0.15	0.09	----	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	1	3	----	----	----
EG020: Nickel	7440-02-0	1	mg/kg	3	4	----	----	----
EG020: Tin	7440-31-5	1.0	mg/kg	2.8	4.4	----	----	----
EG020: Zinc	7440-66-6	1	mg/kg	103	95	----	----	----
EG049: Trivalent Chromium	16065-83-1	1.0	mg/kg	6.9	7.5	----	----	----
EG3060: Hexavalent Chromium	18540-29-9	1.0	mg/kg	<1.0	<1.0	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	----	----	----

Sub-Matrix: SOIL			Client sample ID	EBH3 3-3.45m	EBH3 3-3.45m (Duplicate)	----	----	----
			Client sampling date / time	13-Dec-2018 15:15	13-Dec-2018 15:15	----	----	----
Compound	CAS Number	LOR	Unit	HK1864925-004	HK1864925-005	-------	-------	-------
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued								
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	----	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate								
EP076HK: Phenol	108-95-2	0.50	mg/kg	<0.50	<0.50	----	----	----
EP076HK: Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg	<0.200	<0.200	----	----	----
EP076HK: Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg	<5.00	<5.00	----	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)								
EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	<5	----	----	----
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	<200	----	----	----
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	<500	<500	----	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)								
EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	----	----	----
EP074_SR: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	----	----	----
EP-074_SR-B: Oxygenated Compounds								
EP074_SR: 2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	----	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	----	----	----
EP-074_SR-E: Halogenated Aliphatics								
EP074_SR: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	----	----	----

Sub-Matrix: SOIL				Client sample ID	EBH3 3-3.45m	EBH3 3-3.45m (Duplicate)	----	----	----
				Client sampling date / time	13-Dec-2018 15:15	13-Dec-2018 15:15	----	----	----
Compound	CAS Number	LOR	Unit		HK1864925-004	HK1864925-005	-------	-------	-------
EP-074_SR-E: Halogenated Aliphatics - Continued									
EP074_SR: Tetrachloroethene	127-18-4	0.04	mg/kg		<0.04	<0.04	----	----	----
EP-074_SR-G: Trihalomethanes (THM)									
EP074_SR: Chloroform	67-66-3	0.04	mg/kg		<0.04	<0.04	----	----	----
EP074_SR: Bromodichloromethane	75-27-4	0.1	mg/kg		<0.1	<0.1	----	----	----
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg		<0.5	<0.5	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		66.3	66.8	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		65.8	64.3	----	----	----
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%		105	98.5	----	----	----
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%		104	104	----	----	----
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		94.7	97.6	----	----	----
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%		105	98.5	----	----	----
EP074_SR: Toluene-D8	2037-26-5	0.1	%		104	104	----	----	----
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		94.7	97.6	----	----	----

Sub-Matrix: WATER			Client sample ID	Field Blank 20181213	Equipment Blank 20181213	Trip Blank	---	---
			Client sampling date / time	13-Dec-2018 14:00	13-Dec-2018 14:00	13-Dec-2018 14:00	----	----
Compound	CAS Number	LOR	Unit	HK1864925-001	HK1864925-002	HK1864925-003	-------	-------
EG: Metals and Major Cations - Filtered								
EG020: Antimony	7440-36-0	1	µg/L	<1	<1	---	---	---
EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	---	---	---
EG020: Barium	7440-39-3	1	µg/L	<1	<1	---	---	---
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	---	---	---
EG020: Cobalt	7440-48-4	1	µg/L	<1	<1	---	---	---
EG020: Copper	7440-50-8	1	µg/L	<1	<1	---	---	---
EG020: Lead	7439-92-1	1	µg/L	<1	<1	---	---	---
EG020: Manganese	7439-96-5	1	µg/L	<1	<1	---	---	---
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	---	---	---
EG020: Molybdenum	7439-98-7	1	µg/L	<1	<1	---	---	---
EG020: Nickel	7440-02-0	1	µg/L	<1	<1	---	---	---
EG020: Tin	7440-31-5	1	µg/L	<1	<1	---	---	---
EG020: Zinc	7440-66-6	10	µg/L	<10	<10	---	---	---
EG049: Trivalent Chromium	16065-83-1	20	µg/L	<20	<20	---	---	---
EG050: Hexavalent Chromium	18540-29-9	20	µg/L	<20	<20	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Acenaphthylene	208-96-8	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Acenaphthene	83-32-9	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Fluorene	86-73-7	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Phenanthrene	85-01-8	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Anthracene	120-12-7	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Fluoranthene	206-44-0	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Pyrene	129-00-0	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	---	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	---	---	---
EP076HK: Benzo(k)fluoranthene	207-08-9	2.0	µg/L	<2.0	<2.0	---	---	---
EP076HK: Benzo(a)pyrene	50-32-8	2.0	µg/L	<2.0	<2.0	---	---	---

Sub-Matrix: WATER				Client sample ID	Field Blank 20181213	Equipment Blank 20181213	Trip Blank	----	----
				Client sampling date / time	13-Dec-2018 14:00	13-Dec-2018 14:00	13-Dec-2018 14:00	----	----
Compound	CAS Number	LOR	Unit		HK1864925-001	HK1864925-002	HK1864925-003	-------	-------
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued									
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	2.0	µg/L		<2.0	<2.0	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	2.0	µg/L		<2.0	<2.0	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	2.0	µg/L		<2.0	<2.0	----	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate									
EP076HK: Phenol	108-95-2	2.0	µg/L		<2.0	<2.0	----	----	----
EP076HK: Hexachlorobenzene (HCB)	118-74-1	4.0	µg/L		<4.0	<4.0	----	----	----
EP076HK: Bis(2-ethylhexyl)phthalate	117-81-7	20.0	µg/L		<20.0	<20.0	----	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	20	µg/L		<20	<20	----	----	----
EP071HK_SR: C9 - C16 Fraction	----	500	µg/L		<500	<500	----	----	----
EP071HK_SR: C17 - C35 Fraction	----	500	µg/L		<500	<500	----	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Toluene	108-88-3	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L		<10	<10	<10	----	----
EP074_SR: Styrene	100-42-5	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Xylenes (Total)	----	20	µg/L		<20	<20	<20	----	----
EP-074_SR-B: Oxygenated Compounds									
EP074_SR: 2-Propanone (Acetone)	67-64-1	500	µg/L		<500	<500	<500	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	50	µg/L		<50	<50	<50	----	----
EP-074_SR-E: Halogenated Aliphatics									
EP074_SR: Methylene chloride	75-09-2	50	µg/L		<50	<50	<50	----	----
EP074_SR: Trichloroethene	79-01-6	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP074_SR: Tetrachloroethene	127-18-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP-074_SR-G: Trihalomethanes (THM)									
EP074_SR: Chloroform	67-66-3	5.0	µg/L		<5.0	<5.0	<5.0	----	----

Sub-Matrix: WATER				Client sample ID	Field Blank 20181213	Equipment Blank 20181213	Trip Blank	----	----
				Client sampling date / time	13-Dec-2018 14:00	13-Dec-2018 14:00	13-Dec-2018 14:00	----	----
Compound	CAS Number	LOR	Unit		HK1864925-001	HK1864925-002	HK1864925-003	-------	-------
EP-074_SR-G: Trihalomethanes (THM) - Continued									
EP074_SR: Bromodichloromethane	75-27-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L		<5.0	<5.0	<5.0	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		51.2	54.8	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		62.2	95.0	----	----	----
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%		105	110	----	----	----
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%		92.2	105	----	----	----
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		92.9	92.9	----	----	----
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%		105	110	108	----	----
EP074_SR: Toluene-D8	2037-26-5	0.1	%		92.2	105	106	----	----
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		92.9	92.9	94.2	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2101694)								
HK1864129-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	25.6	25.6	0.00
HK1864947-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	21.8	21.8	0.00
EG: Metals and Major Cations (QC Lot: 2098692)								
HK1864925-005	EBH3 3-3.45m (Duplicate)	EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<1.0	<1.0	0.00
EG: Metals and Major Cations (QC Lot: 2098696)								
HK1864925-005	EBH3 3-3.45m (Duplicate)	EG020: Mercury	7439-97-6	0.05	mg/kg	0.09	0.09	0.00
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.00
		EG020: Barium	7440-39-3	0.5	mg/kg	65.1	62.2	4.44
		EG020: Cobalt	7440-48-4	0.5	mg/kg	2.2	2.1	4.67
		EG020: Manganese	7439-96-5	0.5	mg/kg	404	426	5.30
		EG020: Tin	7440-31-5	0.5	mg/kg	4.4	4.4	0.00
		EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	0.00
		EG020: Arsenic	7440-38-2	1	mg/kg	5	4	0.00
		EG020: Copper	7440-50-8	1	mg/kg	95	93	2.47
		EG020: Lead	7439-92-1	1	mg/kg	42	42	0.00
		EG020: Molybdenum	7439-98-7	1	mg/kg	3	3	0.00
		EG020: Nickel	7440-02-0	1	mg/kg	4	4	0.00
		EG020: Zinc	7440-66-6	1	mg/kg	95	95	0.00
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787)								
HK1864051-001	Anonymous	Naphthalene	91-20-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthene	83-32-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluorene	86-73-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Phenanthrene	85-01-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Anthracene	120-12-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluoranthene	206-44-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Pyrene	129-00-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benz(a)anthracene	56-55-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Chrysene	218-01-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(b)fluoranthene	205-99-2	50	µg/kg	<0.500 mg/kg	<500	0.00

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787) - Continued								
HK1864051-001	Anonymous	Benzo(k)fluoranthene	207-08-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(a)pyrene	50-32-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<0.500 mg/kg	<500	0.00
		Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<0.500 mg/kg	<500	0.00
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 2090787)								
HK1864051-001	Anonymous	Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<500	<500	0.00
		Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	<50	0.00
		Phenol	108-95-2	500	µg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2090786)								
HK1864051-001	Anonymous	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2094013)								
HK1864557-004	Anonymous	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.00
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2085982)								
HK1864039-011	Anonymous	Benzene	71-43-2	0.1	mg/kg	<0.2	<0.2	0.00
		Toluene	108-88-3	0.2	mg/kg	<0.5	<0.5	0.00
		Ethylbenzene	100-41-4	0.2	mg/kg	<0.5	<0.5	0.00
		Styrene	100-42-5	0.2	mg/kg	<0.2	<0.2	0.00
		ortho-Xylene	95-47-6	0.2	mg/kg	<0.5	<0.5	0.00
		meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<1.0	<1.0	0.00
		Xylenes (Total)	----	1	mg/kg	<2.0	<2.0	0.00
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2085982)								
HK1864039-011	Anonymous	2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	<2	0.00
		2-Butanone (MEK)	78-93-3	2	mg/kg	<2	<2	0.00
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2085982)								
HK1864039-011	Anonymous	Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.00
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.00
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.00
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2085982)								

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2085982) - Continued								
HK1864039-011	Anonymous	**Chloroform**	67-66-3	0.04	mg/kg	<0.04	<0.04	0.00
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.00
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2085982)								
HK1864039-011	Anonymous	**Methyl tert-Butyl Ether (MTBE)**	1634-04-4	0.2	mg/kg	<0.2	<0.2	0.00

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 2098708)								
HK1864925-002	Equipment Blank 20181213	**EG020: Cadmium**	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00
		EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	0.00
		EG020: Antimony	7440-36-0	1	µg/L	<1	<1	0.00
		EG020: Barium	7440-39-3	1	µg/L	<1	<1	0.00
		EG020: Cobalt	7440-48-4	1	µg/L	<1	<1	0.00
		EG020: Copper	7440-50-8	1	µg/L	<1	<1	0.00
		EG020: Lead	7439-92-1	1	µg/L	<1	<1	0.00
		EG020: Manganese	7439-96-5	1	µg/L	<1	<1	0.00
		EG020: Molybdenum	7439-98-7	1	µg/L	<1	<1	0.00
		EG020: Nickel	7440-02-0	1	µg/L	<1	<1	0.00
		EG020: Tin	7440-31-5	1	µg/L	<1	<1	0.00
		EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	0.00
		EG020: Zinc	7440-66-6	10	µg/L	<10	<10	0.00
EG: Metals and Major Cations - Filtered (QC Lot: 2118957)								
HK1864925-002	Equipment Blank 20181213	**EG050: Hexavalent Chromium**	18540-29-9	20	µg/L	<20	<20	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2098692)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	25 mg/kg	96.5	----	85	115	----	----

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2098696)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	91.8	----	85	106	----	----
EG020: Barium	7440-39-3	0.5	mg/kg	<0.5	5 mg/kg	85.5	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.1	----	87	110	----	----
EG020: Cobalt	7440-48-4	0.5	mg/kg	<0.5	5 mg/kg	92.6	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.7	----	89	114	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	95.2	----	92	115	----	----
EG020: Manganese	7439-96-5	0.5	mg/kg	<0.5	5 mg/kg	92.0	----	85	114	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	98.8	----	87	115	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	93.3	----	88	113	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	93.8	----	85	112	----	----
EG020: Tin	7440-31-5	0.5	mg/kg	<0.5	5 mg/kg	93.0	----	86	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787)											
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	68.2	----	59	107	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	65.4	----	51	104	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	72.3	----	59	106	----	----
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	76.1	----	66	108	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	87.9	----	68	106	----	----
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	63.8	----	46	89	----	----
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	89.8	----	66	111	----	----
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	88.1	----	62	110	----	----
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	82.8	----	64	100	----	----
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	90.6	----	68	109	----	----
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	93.9	----	61	109	----	----
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	102	----	65	113	----	----
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	57.8	----	47	87	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	106	----	50	115	----	----
Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	107	----	52	110	----	----
Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	110	----	49	120	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 2090787)											
Phenol	108-95-2	500	µg/kg	<500	25 µg/kg	56.2	----	55	120	----	----
Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	25 µg/kg	79.8	----	76	107	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<1000	25 µg/kg	130	----	94	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2090786)											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	90.2	----	62	128	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	79.1	----	51	115	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2094013)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	115	----	78	131	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2085982)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	82.7	----	80	122	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	84.1	----	82	120	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	86.7	----	86	121	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.5 mg/kg	85.3	----	83	128	----	----
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	85.0	----	80	118	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	85.2	----	81	126	----	----
Xylenes (Total)	----	1	mg/kg	<1.0	0.75 mg/kg	85.3	----	85	125	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2085982)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	84.3	----	76	128	----	----
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	86.1	----	78	117	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2085982)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	81.9	----	81	120	----	----
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	82.4	----	81	114	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	83.1	----	81	117	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2085982)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	84.1	----	75	124	----	----
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	83.2	----	73	118	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2085982)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	81.3	----	74	121	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 2098708)											
EG020: Antimony	7440-36-0	1	µg/L	<1	100 µg/L	98.0	----	89	110	----	----
EG020: Arsenic	7440-38-2	10	µg/L	<10	100 µg/L	90.3	----	85	112	----	----
EG020: Barium	7440-39-3	1	µg/L	<1	100 µg/L	88.1	----	85	111	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	100 µg/L	91.3	----	85	111	----	----
EG020: Cobalt	7440-48-4	1	µg/L	<1	100 µg/L	89.4	----	85	113	----	----
EG020: Copper	7440-50-8	1	µg/L	<1	100 µg/L	91.8	----	85	113	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	100 µg/L	91.2	----	85	113	----	----
EG020: Manganese	7439-96-5	1	µg/L	<1	100 µg/L	101	----	85	114	----	----
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	2 µg/L	96.9	----	85	115	----	----
EG020: Molybdenum	7439-98-7	1	µg/L	<1	100 µg/L	95.6	----	89	110	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	100 µg/L	89.7	----	85	113	----	----
EG020: Tin	7440-31-5	1	µg/L	<1	100 µg/L	96.1	----	88	110	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	100 µg/L	112	----	85	113	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 2118957)											
EG050: Hexavalent Chromium	18540-29-9	20	µg/L	<20	100 µg/L	101	----	80	106	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2095588)											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	93.5	----	27	121	----	----
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	87.5	----	24	128	----	----
Acenaphthene	83-32-9	0.2	µg/L	<0.2	0.5 µg/L	91.4	----	23	122	----	----
Fluorene	86-73-7	0.2	µg/L	<0.2	0.5 µg/L	97.5	----	13	141	----	----
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	104	----	22	139	----	----
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	56.5	----	16	136	----	----
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	112	----	68	124	----	----
Pyrene	129-00-0	0.2	µg/L	<0.2	0.5 µg/L	109	----	71	121	----	----
Benz(a)anthracene	56-55-3	0.2	µg/L	<0.2	0.5 µg/L	95.6	----	76	111	----	----
Chrysene	218-01-9	0.2	µg/L	<0.2	0.5 µg/L	116	----	73	125	----	----
Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	0.5 µg/L	103	----	75	129	----	----
Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<0.2	0.5 µg/L	116	----	77	118	----	----
Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.2	0.5 µg/L	54.0	----	52	123	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<0.2	0.5 µg/L	105	----	60	129	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2095588) - Continued											
Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<0.2	0.5 µg/L	114	----	61	130	----	----
Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<0.2	0.5 µg/L	119	----	47	144	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 2095588)											
Phenol	108-95-2	5	µg/L	<5.0	0.5 µg/L	50.8	----	0	153	----	----
Hexachlorobenzene (HCB)	118-74-1	4	µg/L	<4.0	0.5 µg/L	110	----	17	146	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	10	µg/L	<10.0	0.5 µg/L	137	----	86	154	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2096792)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	83.0	----	69	131	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2096853)											
C9 - C16 Fraction	----	0.5	mg/L	<0.5	0.21 mg/L	74.3	----	55	109	----	----
C17 - C35 Fraction	----	0.5	mg/L	<0.5	0.45 mg/L	87.7	----	54	129	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2088036)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	94.2	----	68	126	----	----
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	87.4	----	71	127	----	----
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	97.0	----	77	118	----	----
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	92.8	----	73	122	----	----
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	91.1	----	74	115	----	----
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	93.3	----	78	122	----	----
Xylenes (Total)	----	2	µg/L	<2	6 µg/L	93.0	----	78	119	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2088036)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	87.9	----	77	131	----	----
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	88.7	----	66	126	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2088036)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	82.4	----	71	135	----	----
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	86.6	----	73	119	----	----
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	86.5	----	73	119	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2088036)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	96.2	----	65	130	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2088036) - Continued											
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	85.6	----	59	117	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2088036)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	79.5	----	67	117	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2098692)										
HK1864925-004	EBH3 3-3.45m	**EG3060: Hexavalent Chromium**	18540-29-9	25 mg/kg	91.2	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 2098696)										
HK1864925-004	EBH3 3-3.45m	**EG020: Antimony**	7440-36-0	5 mg/kg	98.6	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	79.5	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.2	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	85.9	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	90.8	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	79.9	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	100	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.8	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	94.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787)										
HK1864051-001	Anonymous	**Naphthalene**	91-20-3	250 µg/kg	73.5	----	50	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	72.2	----	50	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	77.0	----	50	130	----	----
		Fluorene	86-73-7	250 µg/kg	74.1	----	50	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	81.7	----	50	130	----	----
		Anthracene	120-12-7	250 µg/kg	83.9	----	50	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	78.0	----	50	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787) - Continued										
HK1864051-001	Anonymous	**Pyrene**	129-00-0	250 µg/kg	77.8	----	50	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	77.1	----	50	130	----	----
		Chrysene	218-01-9	250 µg/kg	77.7	----	50	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	83.5	----	50	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	80.5	----	50	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	81.6	----	50	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	87.0	----	50	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	91.2	----	50	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	90.0	----	50	130	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 2090787)										
HK1864051-001	Anonymous	**Phenol**	108-95-2	250 µg/kg	87.4	----	50	130	----	----
		Hexachlorobenzene (HCB)	118-74-1	250 µg/kg	80.6	----	50	130	----	----
		Bis(2-ethylhexyl)phthalate	117-81-7	250 µg/kg	84.2	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2090786)										
HK1864051-001	Anonymous	**C9 - C16 Fraction**	----	31.5 mg/kg	88.5	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	64.4	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2094013)										
HK1864557-004	Anonymous	**C6 - C8 Fraction**	----	4.5 mg/kg	122	----	50	130	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2085982)										
HK1864039-012	Anonymous	**Benzene**	71-43-2	0.25 mg/kg	102	----	50	130	----	----
		Toluene	108-88-3	0.25 mg/kg	112	----	50	130	----	----
		Ethylbenzene	100-41-4	0.25 mg/kg	105	----	50	130	----	----
		meta- & para-Xylene	108-38-3 106-42-3	0.5 mg/kg	97.0	----	50	130	----	----
		Styrene	100-42-5	0.25 mg/kg	88.7	----	50	130	----	----
		ortho-Xylene	95-47-6	0.25 mg/kg	106	----	50	130	----	----
		Xylenes (Total)	----	0.75 mg/kg	100	----	50	130	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2085982)										
HK1864039-012	Anonymous	**2-Propanone (Acetone)**	67-64-1	2.5 mg/kg	107	----	50	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2085982) - Continued										
HK1864039-012	Anonymous	**2-Butanone (MEK)**	78-93-3	2.5 mg/kg	114	----	50	130	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2085982)										
HK1864039-012	Anonymous	**Methylene chloride**	75-09-2	0.25 mg/kg	105	----	50	130	----	----
		Trichloroethene	79-01-6	0.25 mg/kg	109	----	50	130	----	----
		Tetrachloroethene	127-18-4	0.25 mg/kg	98.8	----	50	130	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2085982)										
HK1864039-012	Anonymous	**Chloroform**	67-66-3	0.25 mg/kg	109	----	50	130	----	----
		Bromodichloromethane	75-27-4	0.25 mg/kg	92.6	----	50	130	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2085982)										
HK1864039-012	Anonymous	**Methyl tert-Butyl Ether (MTBE)**	1634-04-4	0.25 mg/kg	115	----	50	130	----	----

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 2098708)										
HK1864925-001	Field Blank 20181213	**EG020: Antimony**	7440-36-0	100 µg/L	98.4	----	75	125	----	----
		EG020: Arsenic	7440-38-2	100 µg/L	90.3	----	75	125	----	----
		EG020: Barium	7440-39-3	100 µg/L	87.3	----	75	125	----	----
		EG020: Cadmium	7440-43-9	100 µg/L	92.0	----	75	125	----	----
		EG020: Cobalt	7440-48-4	100 µg/L	88.9	----	75	125	----	----
		EG020: Copper	7440-50-8	100 µg/L	91.2	----	75	125	----	----
		EG020: Lead	7439-92-1	100 µg/L	91.9	----	75	125	----	----
		EG020: Manganese	7439-96-5	100 µg/L	109	----	75	125	----	----
		EG020: Mercury	7439-97-6	2 µg/L	91.6	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	100 µg/L	95.8	----	75	125	----	----
		EG020: Nickel	7440-02-0	100 µg/L	88.5	----	75	125	----	----
		EG020: Tin	7440-31-5	100 µg/L	96.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	100 µg/L	91.9	----	75	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 2118957)										

Matrix: **WATER**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report									
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number		MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 2118957) - Continued										
HK1864925-001	Field Blank 20181213	**EG050: Hexavalent Chromium**	18540-29-9	100 µg/L	103	----	75	125	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	86	118

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-074_SR-S: VOC Surrogates - Continued			
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

HOKLAS 066 TEST

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 16
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1865181
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 14-Dec-2018
Order number	: ----	Quote number	: HKE/1752b/2017	Issue Date	: 02-Jan-2019
C-O-C number	: H013096			No. of samples received	: 7
Site	:			No. of samples analysed	: 3

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 14-Dec-2018 to 31-Dec-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1865181

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.

Sample(s) as received, digested by In-house method E-3060 prior to the determination of Hexavalent Chromium (Cr6+). The In-house method is developed based on USEPA method 3060A.

Analytical Results

Sub-Matrix: SOIL			Client sample ID	EBH3 6.45-6.90m	EBH3 9.00-9.45m	----	----	----
			Client sampling date / time	14-Dec-2018 09:45	14-Dec-2018 15:40	----	----	----
Compound	CAS Number	LOR	Unit	HK1865181-001	HK1865181-006	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	19.4	17.0	----	----	----
EG: Metals and Major Cations								
EG020: Antimony	7440-36-0	1	mg/kg	1	<1	----	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	7	6	----	----	----
EG020: Barium	7440-39-3	1.0	mg/kg	75.1	49.5	----	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	----	----	----
EG020: Cobalt	7440-48-4	1.0	mg/kg	4.1	1.9	----	----	----
EG020: Copper	7440-50-8	1	mg/kg	59	10	----	----	----
EG020: Lead	7439-92-1	1	mg/kg	52	22	----	----	----
EG020: Manganese	7439-96-5	1.0	mg/kg	288	234	----	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	0.10	<0.05	----	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	4	<1	----	----	----
EG020: Nickel	7440-02-0	1	mg/kg	15	4	----	----	----
EG020: Tin	7440-31-5	1.0	mg/kg	4.7	2.4	----	----	----
EG020: Zinc	7440-66-6	1	mg/kg	92	47	----	----	----
EG049: Trivalent Chromium	16065-83-1	1.0	mg/kg	14.3	8.0	----	----	----
EG3060: Hexavalent Chromium	18540-29-9	1.0	mg/kg	<1.0	<1.0	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	----	----	----

Sub-Matrix: SOIL			Client sample ID	EBH3 6.45-6.90m	EBH3 9.00-9.45m	----	----	----
			Client sampling date / time	14-Dec-2018 09:45	14-Dec-2018 15:40	----	----	----
Compound	CAS Number	LOR	Unit	HK1865181-001	HK1865181-006	-------	-------	-------
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued								
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	----	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate								
EP076HK: Phenol	108-95-2	0.50	mg/kg	<0.50	<0.50	----	----	----
EP076HK: Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg	<0.200	<0.200	----	----	----
EP076HK: Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg	<5.00	<5.00	----	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)								
EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	<5	----	----	----
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	<200	----	----	----
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	<500	<500	----	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)								
EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	----	----	----
EP074_SR: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	----	----	----
EP-074_SR-B: Oxygenated Compounds								
EP074_SR: 2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	----	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	----	----	----
EP-074_SR-E: Halogenated Aliphatics								
EP074_SR: Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074_SR: Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	----	----	----
EP074_SR: Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	----	----	----
EP-074_SR-G: Trihalomethanes (THM)								

Sub-Matrix: SOIL			Client sample ID	EBH3 6.45-6.90m	EBH3 9.00-9.45m	----	----	----
			Client sampling date / time	14-Dec-2018 09:45	14-Dec-2018 15:40	----	----	----
Compound	CAS Number	LOR	Unit	HK1865181-001	HK1865181-006	-------	-------	-------
EP-074_SR-G: Trihalomethanes (THM) - Continued								
EP074_SR: Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	----	----	----
EP074_SR: Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	----	----	----
EP-074_SR-I: Methyl-tert-butyl Ether								
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates								
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	68.8	65.7	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	69.8	69.9	----	----	----
EP-080_SRS: TPH(Volatile)/BTEX Surrogate								
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	106	108	----	----	----
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	103	104	----	----	----
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	98.9	96.4	----	----	----
EP-074_SR-S: VOC Surrogates								
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	106	108	----	----	----
EP074_SR: Toluene-D8	2037-26-5	0.1	%	103	104	----	----	----
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	98.9	96.4	----	----	----

Sub-Matrix: WATER				Client sample ID	Trip Blank 14/12/2018	----	----	----	----
				Client sampling date / time	14-Dec-2018	----	----	----	----
Compound	CAS Number	LOR	Unit		HK1865181-007	-------	-------	-------	-------
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	5.0	µg/L		<5.0	----	----	----	----
EP074_SR: Toluene	108-88-3	5.0	µg/L		<5.0	----	----	----	----
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L		<5.0	----	----	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L		<10	----	----	----	----
EP074_SR: Styrene	100-42-5	5.0	µg/L		<5.0	----	----	----	----
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L		<5.0	----	----	----	----
EP074_SR: Xylenes (Total)	----	20	µg/L		<20	----	----	----	----
EP-074_SR-B: Oxygenated Compounds									
EP074_SR: 2-Propanone (Acetone)	67-64-1	500	µg/L		<500	----	----	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	50	µg/L		<50	----	----	----	----
EP-074_SR-E: Halogenated Aliphatics									
EP074_SR: Methylene chloride	75-09-2	50	µg/L		<50	----	----	----	----
EP074_SR: Trichloroethene	79-01-6	5.0	µg/L		<5.0	----	----	----	----
EP074_SR: Tetrachloroethene	127-18-4	5.0	µg/L		<5.0	----	----	----	----
EP-074_SR-G: Trihalomethanes (THM)									
EP074_SR: Chloroform	67-66-3	5.0	µg/L		<5.0	----	----	----	----
EP074_SR: Bromodichloromethane	75-27-4	5.0	µg/L		<5.0	----	----	----	----
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L		<5.0	----	----	----	----
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%		110	----	----	----	----
EP074_SR: Toluene-D8	2037-26-5	0.1	%		105	----	----	----	----
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%		93.8	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2104362)								
HK1865176-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	4.2	4.3	3.25
HK1865462-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	12.5	12.0	4.18
EG: Metals and Major Cations (QC Lot: 2098692)								
HK1864925-005	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<1.0	<1.0	0.00
EG: Metals and Major Cations (QC Lot: 2098696)								
HK1864925-005	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.09	0.09	0.00
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.00
		EG020: Barium	7440-39-3	0.5	mg/kg	65.1	62.2	4.44
		EG020: Cobalt	7440-48-4	0.5	mg/kg	2.2	2.1	4.67
		EG020: Manganese	7439-96-5	0.5	mg/kg	404	426	5.30
		EG020: Tin	7440-31-5	0.5	mg/kg	4.4	4.4	0.00
		EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	0.00
		EG020: Arsenic	7440-38-2	1	mg/kg	5	4	0.00
		EG020: Copper	7440-50-8	1	mg/kg	95	93	2.47
		EG020: Lead	7439-92-1	1	mg/kg	42	42	0.00
		EG020: Molybdenum	7439-98-7	1	mg/kg	3	3	0.00
		EG020: Nickel	7440-02-0	1	mg/kg	4	4	0.00
		EG020: Zinc	7440-66-6	1	mg/kg	95	95	0.00
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787)								
HK1864051-001	Anonymous	Naphthalene	91-20-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthene	83-32-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluorene	86-73-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Phenanthrene	85-01-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Anthracene	120-12-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluoranthene	206-44-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Pyrene	129-00-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benz(a)anthracene	56-55-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Chrysene	218-01-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(b)fluoranthene	205-99-2	50	µg/kg	<0.500 mg/kg	<500	0.00

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787) - Continued								
HK1864051-001	Anonymous	Benzo(k)fluoranthene	207-08-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(a)pyrene	50-32-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<0.500 mg/kg	<500	0.00
		Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<0.500 mg/kg	<500	0.00
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 2090787)								
HK1864051-001	Anonymous	Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<500	<500	0.00
		Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	<50	0.00
		Phenol	108-95-2	500	µg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2090786)								
HK1864051-001	Anonymous	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2094013)								
HK1864557-004	Anonymous	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.00
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2099808)								
HK1865341-009	Anonymous	Benzene	71-43-2	0.1	mg/kg	<0.2	<0.2	0.00
		Toluene	108-88-3	0.2	mg/kg	<0.5	<0.5	0.00
		Ethylbenzene	100-41-4	0.2	mg/kg	<0.5	<0.5	0.00
		Styrene	100-42-5	0.2	mg/kg	<0.2	<0.2	0.00
		ortho-Xylene	95-47-6	0.2	mg/kg	<0.5	<0.5	0.00
		meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<1.0	<1.0	0.00
		Xylenes (Total)	----	1	mg/kg	<2.0	<2.0	0.00
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2099808)								
HK1865341-009	Anonymous	2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	<2	0.00
		2-Butanone (MEK)	78-93-3	2	mg/kg	<2	<2	0.00
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2099808)								
HK1865341-009	Anonymous	Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.00
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.00
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.00
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2099808)								

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2099808) - Continued								
HK1865341-009	Anonymous	**Chloroform**	67-66-3	0.04	mg/kg	<0.04	<0.04	0.00
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.00
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2099808)								
HK1865341-009	Anonymous	**Methyl tert-Butyl Ether (MTBE)**	1634-04-4	0.2	mg/kg	<0.2	<0.2	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2098692)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	25 mg/kg	96.5	----	85	115	----	----
EG: Metals and Major Cations (QC Lot: 2098696)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	91.8	----	85	106	----	----
EG020: Barium	7440-39-3	0.5	mg/kg	<0.5	5 mg/kg	85.5	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.1	----	87	110	----	----
EG020: Cobalt	7440-48-4	0.5	mg/kg	<0.5	5 mg/kg	92.6	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.7	----	89	114	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	95.2	----	92	115	----	----
EG020: Manganese	7439-96-5	0.5	mg/kg	<0.5	5 mg/kg	92.0	----	85	114	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	98.8	----	87	115	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	93.3	----	88	113	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	93.8	----	85	112	----	----
EG020: Tin	7440-31-5	0.5	mg/kg	<0.5	5 mg/kg	93.0	----	86	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787)											
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	68.2	----	59	107	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	65.4	----	51	104	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	72.3	----	59	106	----	----
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	76.1	----	66	108	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787) - Continued											
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	87.9	----	68	106	----	----
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	63.8	----	46	89	----	----
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	89.8	----	66	111	----	----
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	88.1	----	62	110	----	----
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	82.8	----	64	100	----	----
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	90.6	----	68	109	----	----
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	93.9	----	61	109	----	----
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	102	----	65	113	----	----
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	57.8	----	47	87	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	106	----	50	115	----	----
Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	107	----	52	110	----	----
Benzo(g.h.i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	110	----	49	120	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 2090787)											
Phenol	108-95-2	500	µg/kg	<500	25 µg/kg	56.2	----	55	120	----	----
Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	25 µg/kg	79.8	----	76	107	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<1000	25 µg/kg	130	----	94	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2090786)											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	90.2	----	62	128	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	79.1	----	51	115	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2094013)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	115	----	78	131	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2099808)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	104	----	80	122	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	104	----	82	120	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	104	----	86	121	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.5 mg/kg	110	----	83	128	----	----
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	106	----	80	118	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	107	----	81	126	----	----
Xylenes (Total)	----	1	mg/kg	<1.0	0.75 mg/kg	109	----	85	125	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2099808)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	105	----	76	128	----	----
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	88.3	----	78	117	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2099808)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	101	----	81	120	----	----
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	97.4	----	81	114	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	91.4	----	81	117	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2099808)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	99.3	----	75	124	----	----
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	107	----	73	118	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2099808)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	93.7	----	74	121	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2101385)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	114	----	68	126	----	----
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	93.7	----	71	127	----	----
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	101	----	77	118	----	----
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	92.9	----	73	122	----	----
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	89.5	----	74	115	----	----
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	106	----	78	122	----	----
Xylenes (Total)	----	2	µg/L	<2	6 µg/L	97.4	----	78	119	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2101385)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	109	----	77	131	----	----
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	103	----	66	126	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2101385)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	94.6	----	71	135	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2101385) - Continued											
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	107	----	73	119	----	----
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	104	----	73	119	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2101385)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	112	----	65	130	----	----
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	99.6	----	59	117	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2101385)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	101	----	67	117	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2098692)										
HK1864925-004	Anonymous	**EG3060: Hexavalent Chromium**	18540-29-9	25 mg/kg	91.2	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 2098696)										
HK1864925-004	Anonymous	**EG020: Antimony**	7440-36-0	5 mg/kg	98.6	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	79.5	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.2	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	85.9	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	90.8	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	79.9	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	100	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.8	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	94.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787)										
HK1864051-001	Anonymous	**Naphthalene**	91-20-3	250 µg/kg	73.5	----	50	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	72.2	----	50	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	77.0	----	50	130	----	----
		Fluorene	86-73-7	250 µg/kg	74.1	----	50	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	81.7	----	50	130	----	----
		Anthracene	120-12-7	250 µg/kg	83.9	----	50	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	78.0	----	50	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2090787) - Continued										
HK1864051-001	Anonymous	**Pyrene**	129-00-0	250 µg/kg	77.8	----	50	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	77.1	----	50	130	----	----
		Chrysene	218-01-9	250 µg/kg	77.7	----	50	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	83.5	----	50	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	80.5	----	50	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	81.6	----	50	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	87.0	----	50	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	91.2	----	50	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	90.0	----	50	130	----	----
EP-076HK: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 2090787)										
HK1864051-001	Anonymous	**Phenol**	108-95-2	250 µg/kg	87.4	----	50	130	----	----
		Hexachlorobenzene (HCB)	118-74-1	250 µg/kg	80.6	----	50	130	----	----
		Bis(2-ethylhexyl)phthalate	117-81-7	250 µg/kg	84.2	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2090786)										
HK1864051-001	Anonymous	**C9 - C16 Fraction**	----	31.5 mg/kg	88.5	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	64.4	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2094013)										
HK1864557-004	Anonymous	**C6 - C8 Fraction**	----	4.5 mg/kg	122	----	50	130	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2099808)										
HK1865341-010	Anonymous	**Benzene**	71-43-2	0.25 mg/kg	90.6	----	50	130	----	----
		Toluene	108-88-3	0.25 mg/kg	97.6	----	50	130	----	----
		Ethylbenzene	100-41-4	0.25 mg/kg	101	----	50	130	----	----
		meta- & para-Xylene	108-38-3 106-42-3	0.5 mg/kg	115	----	50	130	----	----
		Styrene	100-42-5	0.25 mg/kg	110	----	50	130	----	----
		ortho-Xylene	95-47-6	0.25 mg/kg	100.0	----	50	130	----	----
		Xylenes (Total)	----	0.75 mg/kg	118	----	50	130	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2099808)										
HK1865341-010	Anonymous	**2-Propanone (Acetone)**	67-64-1	2.5 mg/kg	102	----	50	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2099808) - Continued										
HK1865341-010	Anonymous	**2-Butanone (MEK)**	78-93-3	2.5 mg/kg	107	----	50	130	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2099808)										
HK1865341-010	Anonymous	**Methylene chloride**	75-09-2	0.25 mg/kg	102	----	50	130	----	----
		Trichloroethene	79-01-6	0.25 mg/kg	107	----	50	130	----	----
		Tetrachloroethene	127-18-4	0.25 mg/kg	108	----	50	130	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2099808)										
HK1865341-010	Anonymous	**Chloroform**	67-66-3	0.25 mg/kg	112	----	50	130	----	----
		Bromodichloromethane	75-27-4	0.25 mg/kg	111	----	50	130	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2099808)										
HK1865341-010	Anonymous	**Methyl tert-Butyl Ether (MTBE)**	1634-04-4	0.25 mg/kg	112	----	50	130	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-074_SR-S: VOC Surrogates			

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-074_SR-S: VOC Surrogates - Continued			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

CERTIFICATE OF ANALYSIS

Client	: GAMMON CONSTRUCTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 7
Contact	: MS ASHLEY FUNG	Contact	: Richard Fung	Work Order	: HK1865416
Address	: M/F GAMMON TECHNOLOGY PARK, 21 CHUN WANG STREET, TKO INDUSTRIAL ESTATE, TSEUNG KWAN O, N. T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Ashley.fung@gammonconstruction.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3191 5273	Telephone	: +852 2610 1044		
Facsimile	: +852 2564 6758	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. HY/2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST			Date Samples Received	: 17-Dec-2018
Order number	:	Quote number	: HKE/1752b/2017	Issue Date	: 31-Dec-2018
C-O-C number	: H013098			No. of samples received	: 3
Site	:			No. of samples analysed	: 3

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics
Leung Chak Cheong , Mike	Senior Chemist	Metals
Wong Wing , Kenneth	Manager - Metals	Metals

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 17-Dec-2018 to 28-Dec-2018.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1865416

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.

Water sample(s) were filtered prior to dissolved metal analysis.

Analytical Results

Sub-Matrix: WATER			Client sample ID	Trip Blank	EBH3 groundwater	EBH3 groundwater (Duplicate)	----	----
			Client sampling date / time	17-Dec-2018 10:00	17-Dec-2018 10:45	17-Dec-2018 10:45	----	----
Compound	CAS Number	LOR	Unit	HK1865416-001	HK1865416-002	HK1865416-003	-------	-------
EG: Metals and Major Cations - Filtered								
EG020: Mercury	7439-97-6	0.5	µg/L	----	<0.5	<0.5	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	2.0	µg/L	----	<2.0	<2.0	----	----
EP076HK: Acenaphthylene	208-96-8	2.0	µg/L	----	<2.0	<2.0	----	----
EP076HK: Acenaphthene	83-32-9	2.0	µg/L	----	<2.0	<2.0	----	----
EP076HK: Phenanthrene	85-01-8	2.0	µg/L	----	<2.0	<2.0	----	----
EP076HK: Anthracene	120-12-7	2.0	µg/L	----	<2.0	<2.0	----	----
EP076HK: Fluoranthene	206-44-0	2.0	µg/L	----	<2.0	<2.0	----	----
EP076HK: Chrysene	218-01-9	1.0	µg/L	----	<1.0	<1.0	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	1.0	µg/L	----	<1.0	<1.0	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)								
EP070HK_SR: C6 - C8 Fraction	----	20	µg/L	----	<20	<20	----	----
EP071HK_SR: C9 - C16 Fraction	----	500	µg/L	----	<500	<500	----	----
EP071HK_SR: C17 - C35 Fraction	----	500	µg/L	----	<500	<500	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)								
EP074_SR: Benzene	71-43-2	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP074_SR: Toluene	108-88-3	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L	<10	<10	<10	----	----
EP074_SR: Styrene	100-42-5	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP074_SR: Xylenes (Total)	----	20	µg/L	<20	<20	<20	----	----
EP-074_SR-B: Oxygenated Compounds								
EP074_SR: 2-Propanone (Acetone)	67-64-1	500	µg/L	<500	<500	<500	----	----
EP074_SR: 2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	<50	----	----
EP-074_SR-E: Halogenated Aliphatics								
EP074_SR: Methylene chloride	75-09-2	50	µg/L	<50	<50	<50	----	----

Sub-Matrix: WATER			Client sample ID	Trip Blank	EBH3 groundwater	EBH3 groundwater (Duplicate)	----	----
			Client sampling date / time	17-Dec-2018 10:00	17-Dec-2018 10:45	17-Dec-2018 10:45	----	----
Compound	CAS Number	LOR	Unit	HK1865416-001	HK1865416-002	HK1865416-003	-------	-------
EP-074_SR-E: Halogenated Aliphatics - Continued								
EP074_SR: Trichloroethene	79-01-6	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP074_SR: Tetrachloroethene	127-18-4	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP-074_SR-G: Trihalomethanes (THM)								
EP074_SR: Chloroform	67-66-3	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP074_SR: Bromodichloromethane	75-27-4	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP-074_SR-I: Methyl-tert-butyl Ether								
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L	<5.0	<5.0	<5.0	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates								
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	----	66.7	67.3	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	----	95.0	75.8	----	----
EP-080_SRS: TPH(Volatile)/BTEX Surrogate								
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	----	108	108	----	----
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	----	106	105	----	----
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	----	93.4	94.0	----	----
EP-074_SR-S: VOC Surrogates								
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	110	108	108	----	----
EP074_SR: Toluene-D8	2037-26-5	0.1	%	110	106	105	----	----
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	92.5	93.4	94.0	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 2101356)								
HK1865416-002	EBH3 groundwater	**EG020: Mercury**	7439-97-6	0.5	µg/L	<0.5	<0.5	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 2101356)											
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	2 µg/L	86.4	----	85	115	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2101514)											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	96.6	----	27	121	----	----
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	63.9	----	24	128	----	----
Acenaphthene	83-32-9	0.2	µg/L	<0.2	0.5 µg/L	72.2	----	23	122	----	----
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	97.6	----	22	139	----	----
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	87.0	----	16	136	----	----
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	100	----	68	124	----	----
Chrysene	218-01-9	0.2	µg/L	<0.2	0.5 µg/L	108	----	73	125	----	----
Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	0.5 µg/L	113	----	75	129	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2096792)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	83.0	----	69	131	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2101390)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	99.1	----	69	131	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2102415)											
C9 - C16 Fraction	----	0.5	mg/L	<0.5	0.21 mg/L	73.1	----	55	109	----	----
C17 - C35 Fraction	----	0.5	mg/L	<0.5	0.45 mg/L	77.6	----	54	129	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2101385)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	114	----	68	126	----	----
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	93.7	----	71	127	----	----
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	101	----	77	118	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2101385) - Continued											
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	92.9	----	73	122	----	----
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	89.5	----	74	115	----	----
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	106	----	78	122	----	----
Xylenes (Total)	----	2	µg/L	<2	6 µg/L	97.4	----	78	119	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 2101385)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	109	----	77	131	----	----
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	103	----	66	126	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 2101385)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	94.6	----	71	135	----	----
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	107	----	73	119	----	----
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	104	----	73	119	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 2101385)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	112	----	65	130	----	----
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	99.6	----	59	117	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2101385)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	101	----	67	117	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report							
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 2101356)										
HK1865341-011	Anonymous	**EG020: Mercury**	7439-97-6	2 µg/L	83.1	----	75	125	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%)	
		Low	High

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

Appendix F – Relevant RBRGs Land Use Scenarios, Soil Saturation Limit and Solubility Limit for the Assessment (extracted from EPD Guidance Manual)

Table 2.1
Risk-Based Remediation Goals (RBRGs) for Soil & Soil Saturation Limit

Chemical	Risk-Based Remediation Goals for Soil				Soil Saturation Limit (C_{sat}) (mg/kg)
	Urban Residential (mg/kg)	Rural Residential (mg/kg)	Industrial (mg/kg)	Public Parks (mg/kg)	
VOCs					
Acetone	9.59E+03	4.26E+03	1.00E+04*	1.00E+04*	***
Benzene	7.04E-01	2.79E-01	9.21E+00	4.22E+01	3.36E+02
Bromodichloromethane	3.17E-01	1.29E-01	2.85E+00	1.34E+01	1.03E+03
2-Butanone	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	***
Chloroform	1.32E-01	5.29E-02	1.54E+00	2.53E+02	1.10E+03
Ethylbenzene	7.09E+02	2.98E+02	8.24E+03	1.00E+04*	1.38E+02
Methyl tert-Butyl Ether	6.88E+00	2.80E+00	7.01E+01	5.05E+02	2.38E+03
Methylene Chloride	1.30E+00	5.29E-01	1.39E+01	1.28E+02	9.21E+02
Styrene	3.22E+03	1.54E+03	1.00E+04*	1.00E+04*	4.97E+02
Tetrachloroethene	1.01E-01	4.44E-02	7.77E-01	1.84E+00	9.71E+01
Toluene	1.44E+03	7.05E+02	1.00E+04*	1.00E+04*	2.35E+02
Trichloroethene	5.23E-01	2.11E-01	5.68E+00	6.94E+01	4.88E+02
Xylenes (Total)	9.50E+01	3.68E+01	1.23E+03	1.00E+04*	1.50E+02
SVOCs					
Acenaphthene	3.51E+03	3.28E+03	1.00E+04*	1.00E+04*	6.02E+01
Acenaphthylene	2.34E+03	1.51E+03	1.00E+04*	1.00E+04*	1.98E+01
Anthracene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	2.56E+00
Benzo(a)anthracene	1.20E+01	1.14E+01	9.18E+01	3.83E+01	
Benzo(a)pyrene	1.20E+00	1.14E+00	9.18E+00	3.83E+00	
Benzo(b)fluoranthene	9.88E+00	1.01E+01	1.78E+01	2.04E+01	
Benzo(g,h,i)perylene	1.80E+03	1.71E+03	1.00E+04*	5.74E+03	
Benzo(k)fluoranthene	1.20E+02	1.14E+02	9.18E+02	3.83E+02	
bis-(2-Ethylhexyl)phthalate	3.00E+01	2.80E+01	9.18E+01	9.42E+01	
Chrysene	8.71E+02	9.19E+02	1.14E+03	1.54E+03	
Dibenzo(a,h)anthracene	1.20E+00	1.14E+00	9.18E+00	3.83E+00	
Fluoranthene	2.40E+03	2.27E+03	1.00E+04*	7.62E+03	
Fluorene	2.38E+03	2.25E+03	1.00E+04*	7.45E+03	5.47E+01
Hexachlorobenzene	2.43E-01	2.20E-01	5.82E-01	7.13E-01	
Indeno(1,2,3-cd)pyrene	1.20E+01	1.14E+01	9.18E+01	3.83E+01	
Naphthalene	1.82E+02	8.56E+01	4.53E+02	9.14E+02	1.25E+02
Phenanthrene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	2.80E+01
Phenol	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	7.26E+03
Pyrene	1.80E+03	1.71E+03	1.00E+04*	5.72E+03	
Metals					
Antimony	2.95E+01	2.91E+01	2.61E+02	9.79E+01	
Arsenic	2.21E+01	2.18E+01	1.96E+02	7.35E+01	
Barium	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Cadmium	7.38E+01	7.28E+01	6.53E+02	2.45E+02	
Chromium III	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Chromium VI	2.21E+02	2.18E+02	1.96E+03	7.35E+02	
Cobalt	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Copper	2.95E+03	2.91E+03	1.00E+04*	9.79E+03	
Lead	2.58E+02	2.55E+02	2.29E+03	8.57E+02	
Manganese	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Mercury	1.10E+01	6.52E+00	3.84E+01	4.56E+01	
Molybdenum	3.69E+02	3.64E+02	3.26E+03	1.22E+03	
Nickel	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Tin	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Zinc	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Dioxins / PCBs					
Dioxins (I-TEQ)	1.00E-03	1.00E-03	5.00E-03	1.00E-03	
PCBs	2.36E-01	2.26E-01	7.48E-01	7.56E-01	
Petroleum Carbon Ranges					
C6 - C8	1.41E+03	5.45E+02	1.00E+04*	1.00E+04*	1.00E+03
C9 - C16	2.24E+03	1.33E+03	1.00E+04*	1.00E+04*	3.00E+03
C17 - C35	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	5.00E+03
Other Inorganic Compounds					
Cyanide, free	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Organometallics					
TBTO	2.21E+01	2.18E+01	1.96E+02	7.35E+01	

Notes:
(1) For Dioxins, the cleanup levels in USEPA Office of Solid Waste and Emergency Response (OSWER) Directive of 1998 have been adopted. The OSWER Directive value of 1 ppb for residential use has been applied to the scenarios of "Urban Residential", "Rural Residential", and "Public Parks", while the low end of the range of values for industrial, 5 ppb, has been applied to the scenario of "Industrial".
(2) Soil saturation limits for petroleum carbon ranges taken from the Canada-Wide Standards for Petroleum Hydrocarbons in Soil, CCME 2000.
(3) * indicates a 'ceiling limit' concentration.
(4) *** indicates that the C_{sat} value exceeds the 'ceiling limit' therefore the RBRG applies.

Table 2.2
Risk-Based Remediation Goals (RBRGs) for Groundwater and Solubility Limit

Chemical	Risk-Based Remediation Goals for Groundwater			Solubility Limit (mg/L)
	Urban Residential (mg/L)	Rural Residential (mg/L)	Industrial (mg/L)	
VOCs				
Acetone	1.00E+04*	1.00E+04*	1.00E+04*	***
Benzene	3.86E+00	1.49E+00	5.40E+01	1.75E+03
Bromodichloromethane	2.22E+00	8.71E-01	2.62E+01	6.74E+03
2-Butanone	1.00E+04*	1.00E+04*	1.00E+04*	***
Chloroform	9.56E-01	3.82E-01	1.13E+01	7.92E+03
Ethylbenzene	1.02E+03	3.91E+02	1.00E+04*	1.69E+02
Methyl tert-Butyl Ether	1.53E+02	6.11E+01	1.81E+03	***
Methylene Chloride	1.90E+01	7.59E+00	2.24E+02	***
Styrene	3.02E+03	1.16E+03	1.00E+04*	3.10E+02
Tetrachloroethene	2.50E-01	9.96E-02	2.95E+00	2.00E+02
Toluene	5.11E+03	1.97E+03	1.00E+04*	5.26E+02
Trichloroethene	1.21E+00	4.81E-01	1.42E+01	1.10E+03
Xylenes (Total)	1.12E+02	4.33E+01	1.57E+03	1.75E+02
SVOCs				
Acenaphthene	1.00E+04*	7.09E+03	1.00E+04*	4.24E+00
Acenaphthylene	1.41E+03	5.42E+02	1.00E+04*	3.93E+00
Anthracene	1.00E+04*	1.00E+04*	1.00E+04*	4.34E-02
Benzo(a)anthracene				
Benzo(a)pyrene				
Benzo(b)fluoranthene	5.39E-01	2.03E-01	7.53E+00	1.50E-03
Benzo(g,h,i)perylene				
Benzo(k)fluoranthene				
bis-(2-Ethylhexyl)phthalate				
Chrysene	5.81E+01	2.19E+01	8.12E+02	1.60E-03
Dibenzo(a,h)anthracene				
Fluoranthene	1.00E+04*	1.00E+04*	1.00E+04*	2.06E-01
Fluorene	1.00E+04*	1.00E+04*	1.00E+04*	1.98E+00
Hexachlorobenzene	5.89E-02	2.34E-02	6.95E-01	6.20E+00
Indeno(1,2,3-cd)pyrene				
Naphthalene	6.17E+01	2.37E+01	8.62E+02	3.10E+01
Phenanthrene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+00
Phenol				
Pyrene	1.00E+04*	1.00E+04*	1.00E+04*	1.35E-01
Metals				
Antimony				
Arsenic				
Barium				
Cadmium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Lead				
Manganese				
Mercury	4.86E-01	1.84E-01	6.79E+00	
Molybdenum				
Nickel				
Tin				
Zinc				
Dioxins / PCBs				
Dioxins (I-TEQ)				
PCBs	4.33E-01	1.71E-01	5.11E+00	3.10E-02
Petroleum Carbon Ranges				
C6 - C8	8.22E+01	3.17E+01	1.15E+03	5.23E+00
C9 - C16	7.14E+02	2.76E+02	9.98E+03	2.80E+00
C17 - C35	1.28E+01	4.93E+00	1.78E+02	2.80E+00
Other Inorganic Compounds				
Cyanide, free				
Organometallics				
TBTO				

Notes:
(1) Blank indicates that RBRG could not be calculated because the toxicity or physical/chemical values were unavailable, or the condition of Henry's Law Constant>1.00E-05 was not met for the inhalation pathway.
(2) Water solubilities for Petroleum Carbon Range aliphatic C9-C16 and greater than C16 generally are considered to be effectively zero and therefore the aromatic solubility for C9-C16 is used.
(3) * indicates a 'ceiling limit' concentration.
(4) *** indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies.

Appendix G – Site Investigation Photos

Site Investigation Photos

Description	Photo Records
Drilling Rig at EBH1	
Decontamination Process	

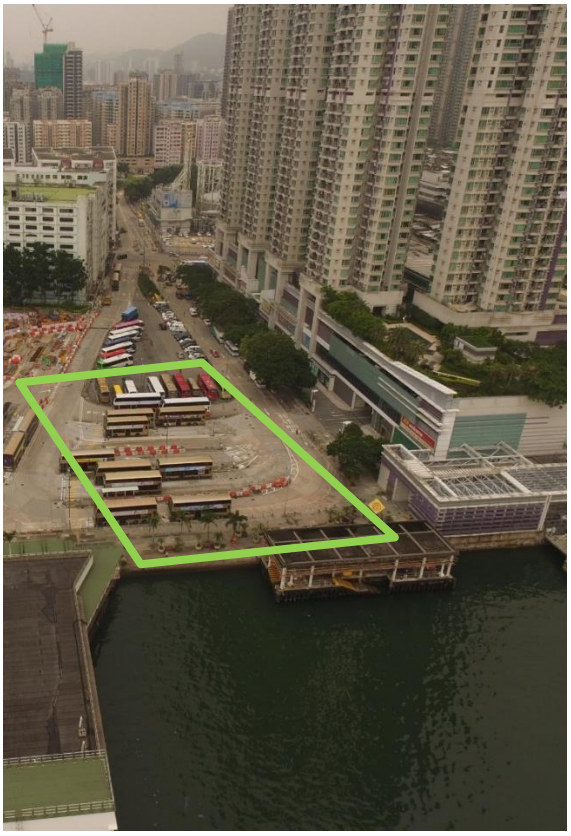
Site Investigation Photos

Description	Photo Records
Undisturbed U76 Soil Sample	
The Ice Box Keeping the Undisturbed U100 Soil Samples	

Site Investigation Photos

Description	Photo Records
Samples were Labelled right after Taken	
Undisturbed U100 Soil Sample (EBH1 9.00 to 9.45 m bgl) with Lead Exeedance	

Site Investigation Photos

Description	Photo Records
Proposed Backfilling Location	
QA/QC Samples at EBH3 (8 May 2018)	

Site Investigation Photos

Undisturbed U100 Soil Samples (EBH3 3.00 to 3.45 m bgl, 6.45 to 6.90 m bgl and 9.00 to 9.45 m bgl)	  

Site Investigation Photos

Groundwater Sampling at EBH3	
Groundwater Samples and Duplicate Samples (EBH3)	

Site Investigation Photos

QA/QC samples at EBH3 (13 December 2018)	

Appendix H – Response to Comments

Contract No. HY/2014/07

Central Kowloon Route – Kai Tak West

Supplementary Contamination Assessment Report (Submitted to EPD on 20 November 2018)

No.	Comments from EPD via Fax on 14 December 2018	Responses
1	I refer to your letter dated 20 November 2018 (ref: J3718/1001.2.1/D00785) enclosing the submission of revised CAR which has been duly certified by Environmental Team Leader and verified Independent Environmental Checker for our approval under Environmental Permit (EP) Condition 2.14 of Further Environmental Permit No. FEP-01/457/2013/C. Please find the comments in Annex 1 for your follow up.	Noted with thanks.
2	Should you have any queries, please contact Ms. Ada Lam at 2835 1310 or the undersigned at 2835 1125.	Noted with thanks.
Annex 1		
i.	It is noted that further site investigation works will be carried for EBH3. Please include the assessment result for the further site investigation works for EBH3 in this supplementary Contamination Assessment Report instead of separately reported in another CAR. For the revised CAR (Version 3 dated 18 November 2018), we have no further technical comments.	Noted. The assessment results of the Further SI works for EBH3 were included in this supplementary Contamination Assessment Report.