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1 INTRODUCTION

1.1 Background

- 1.1.1.1 To support social and economic development in Hong Kong, there is a pressing need to optimize the supply of land for various uses by sustainable and innovative approaches. One possible approach is rock cavern development. In the 2009-10 Policy Agenda, the Development Bureau (DEVB) put forward a new initiative to launch strategic planning and technical studies aiming at promoting the enhanced use of rock caverns as part of Hong Kong's pursuit of sustainable development.
- 1.1.1.2 The Relocation of Sha Tin Sewage Treatment Works (STSTW) to Caverns (the Project) is implemented so as to release the existing site, of a size about 28 hectares, for other uses.
- 1.1.1.3 In 2011, CEDD completed a study under Agreement No. CE 66/2009 (GE) "Enhanced Use of Underground Space in Hong Kong Feasibility Study" for land supply initiatives. The study identified the STSTW as a potentially suitable facility to be relocated to caverns.
- 1.1.1.4 In May 2012, DSD commenced a detailed feasibility study under Agreement No. CE 43/2011 (DS) "Relocation of Sha Tin Sewage Treatment Works to Caverns Feasibility Study" (the Feasibility Study). The findings of Feasibility Study affirmed that relocating the STSTW to caverns to be constructed at Nui Po Shan of A Kung Kok is technically feasible and financially viable. Figure 60334056/CAP/1.01 shows the location of the relocated STSTW.
- 1.1.1.5 In November 2013, DSD consulted the Health and Environment Committee of the Sha Tin District Council (STDC) on the findings and recommendations of the Feasibility Study and the Committee generally supported the Government to proceed with the investigation and design of the Project.
- 1.1.1.6 AECOM Asia Co Ltd. was commissioned by Drainage Services Department (DSD) on 29 September 2014 to carry out this Assignment for the investigation, design and construction supervision for the relocation of the STSTW to caverns.

1.2 The Assignment

- 1.2.1.1 The investigation, design and construction of the relocation of STSTW to caverns is part of the overall programme to enhance the land supply strategy for HK and to build up a sufficient large land reserve to meet future social, environmental and economic needs. The primary objective of this Assignment is to carry out preliminary and detailed design of relocating the existing STSTW in caverns. This would release 28 hectares of land for balanced housing and mixed use development. Since the existing STSTW has been in operation for about 30 years, most of the STSTW facilities will be approaching their design life in the next one to two decades, a secondary objective would be to devise a "rejuvenation" scheme meeting the increasing safety, social, environmental and economical demands.
- 1.2.1.2 The scope of relocation of the STSTW to caverns (the Project) comprises the following components:

Component of the Project	Scope of the Component
(a) Sha Tin Cavern Sewage Treatment Works (CSTW)	(i) Caverns, portals, tunnels, adits, ventilation shafts, etc.
	(ii) Associated facilities of (i) above including ventilation systems, fire services, safety measures, smoke management and control systems, communication

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Component of the Project		Scope of the Component
		systems, utilities, etc.
	(iii)	Sewage and sludge treatment facilities
	(iv)	Associated facilities to (iii) above including pipeworks and utilities, pipe and utility galleries, odour control and de-odorisation systems, supervisory control and data acquisition systems, laboratories, transformer and switchgear houses, workshops, storage, etc.
	(v)	Modifications to and sewerage connections with the THEES in relation to effluent discharge from the CSTW
	(vi)	Ancillary facilities
	(vii)	Rehabilitation, modification and improvement of the existing emergency submarine outfall and/or construction of a new emergency outfall connecting to the relocated STSTW
	(viii)	Associated slope stabilisation, natural terrain hazard mitigation and geotechnical works
	(ix)	Landscaping and architectural works and amenity areas
	(x)	Operation and maintenance facilities
	(xi)	Decommissioning and demolition of the existing STSTW
	(xii)	All related works including but not limited to environmental control measures and impact mitigation works, TTMS and road improvement works, utility diversions, site office(s), project liaison office, explosives magazine, public-interface facilities, etc. and works incidental to the construction and commissioning of the sub-items (i) to (xi) above
(b) Upstream Sewerage and Pumping Stations (USPS)	(i)	Modification, improvement and reprovisioning of existing sewerage facilities upstream of the existing STSTW, including pumping stations, sewers and rising mains
	(ii)	Modification, improvement and reprovisioning of existing facilities related to the conveyance of treated effluent from the TPSTW to the THEES
	(iii)	All related works including but not limited to environmental mitigation works, TTMS, utility diversions, etc. and works incidental to the construction and commissioning of the sub-items (i) to (ii) above

1.3 Scope and Objectives

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- 1.3.1.1 Under the context of Environment Impact Assessment Study Brief No. ESB-273/2014, the "Project" is referring to "Sha Tin Cavern Sewage Treatment Works" only. The environmental impacts caused by the construction and operation of USPS will be covered by a separate submission. Based on the EIA Study Brief, an assessment on the potential land contamination issues arising from the CSTW will be required.
- 1.3.1.2 This Contamination Assessment Plan (CAP) is prepared for the EIA study. The purposes of the CAP are to present the findings of the site appraisal on the past and present potentially contaminative land uses and hotspot areas within the CSTW Site and to propose the sampling and testing programme for the subsequent site investigation (SI) works. The CSTW Site along with the scope of the various components and works areas are shown in Figure 60334056/CAP/1.01.

1.4 Structure of the Report

- 1.4.1.1 Apart from this introductory section, the other sections of the CAP are as follows:
 - Section 2 presents the findings of the site appraisal
 - Section 3 proposes the sampling and testing plan for subsequent SI works
 - Section 4 discusses the analytical testing requirements for the subsequent SI works
 - Section 5 discusses the adopted land contamination assessment criteria
 - Section 6 evaluate the potential land contamination impact and the possible remediation measures
 - Section 7 presents the conclusion and way forward

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2 SITE APPRAISAL

2.1 General

2.1.1.1 The CSTW Site, scope of the component and Works Areas as discussed in **Section 1.2.1.2** are illustrated in **Figure 60334056/CAP/1.01**. For the purpose of this assessment, the CSTW Site is divided into the following 3 areas:

(i) Existing STSTW

The area included the existing STSTW but excluded the WSD Salt Water Pumping Station to the north of STSTW (refer to **Figure 60334056/CAP/2.02**).

(ii) Part of existing Vehicle Detention Centre (VDC) and its surrounding areas (for proposed temporary works area).

The area comprises part of existing Vehicle Detention Centre (VDC) (i.e. the temporary works area on Area 73) and its surrounding areas (refer to as 'Area A'). The areas are shown in **Figure 60334056/CAP/2.02.** Surrounding areas of VDC mainly include a small section of A Kung Kok Street near the entrance of THEES portal, vacant area adjacent to VDC, landscape area south of VDC (between Ma On Shan Road and A Kung Kok Road), and cycling tracks and footpaths northeast of VDC.

(iii) Nui Po Shan North (for proposed cavern sewage treatment works, emergency portal area, cavern portal area, Ah Kung Kok Shan Road surface magazine site and proposed area for Natural Terrain Hazard Study).

The area mainly covered the northern portion of existing Nui Po Shan, bounded to the north by Mui Tsz Lam Road and northwest by A Kung Kok Street (refer to Figure 60334056/CAP/2.02).

2.2 Previous Land Contamination Assessment

- 2.2.1.1 A review on the land contamination concern for the Project had been conducted under the Feasibility Study. The review included a desktop study on the following sources of information as well as a preliminary intrusive site investigation (SI) within the existing STSTW.
 - Relevant ground investigation reports from the Civil Engineering and Development Department (CEDD) civil engineering library;
 - Hong Kong Geological Survey Map (Series HGM20) Sheet No. 7 (1:20,000); and
 - Selected aerial photographs and topographic map held by the Lands Department.
- 2.2.1.2 The areas of potential land contamination concerns related to this assessment identified under the Feasibility Study include the existing STSTW and VDC. As the construction of caverns, tunnels and the relocated STSTW / ancillary facilities would be mainly conducted within bedrock, land contamination issues were not anticipated in the area at the time.
- 2.2.1.3 For the existing STSTW site, information regarding dangerous goods (DG) storages and spillages was acquired from the Fire Service Department (FSD) at the time. FSD confirmed that there has been no recorded incident of spillages or leakage of dangerous good. DG license record was also acquired from FSD. Among the chemicals listed in FSD's DG license record, only diesel fuel is identified as a potential contaminant. Other chemicals are either gaseous or highly water-soluble which are not considered to pose any land contamination concerns.
- 2.2.1.4 Preliminary soil and groundwater sampling works within the existing STSTW were carried out from 28 June to 29 July 2013. Inspection pits were excavated to retrieve the soil

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samples. A total of 35 soil samples (including 2 duplicate samples) and 9 groundwater samples were collected from 13 sampling locations and analyzed for semi volatile organic compounds (SVOCs) and petroleum carbon ranges (PCR). The as-built sampling locations and the preliminary laboratory results extracted from the Feasibility Study are shown in **Appendix 2.01**.

2.2.1.5 The preliminary results of the sample analyzed indicate no exceedance in the risk-based remediation goals (RBRBs) for soil and groundwater under the Urban Residential Land Use Scenario. No contaminants under the investigation were detected in the testing.

2.3 Review of Historical Land Uses

General

2.3.1.1 A comprehensive review of aerial photographs has been undertaken under this Assignment to confirm the findings from the Feasibility Study. The aim of the review is to evaluate the likelihood of potential contamination associated with past land uses within the CSTW Site. The development history of the CSTW Site is summarised below and the list of aerial photographs reviewed is shown in **Table 2.1**. Selected aerial photos are provided in **Appendix 2.02**.

Year	Height (Feet)	Photograph Reference Number
1963	7000	0237
1963(2)	3900	63_5313
1974	12500	8246
1979	10000	28624
1981	2200	37599
1982	10000	44629
1983	4000	48577
1985	5000	CN973
1989	4000	A16196
1991	4000	A27102
1993	4000	A34676
1994	9000	CN6447
1995	2500	CN10812
2004	4000	CW62791
2009	6000	CS25120
2014	2000	CW109254
2015	8000	CW111916

2.3.1.2 Based on the review of the aerial photographs, both the existing STSTW and Vehicle Detention Centre sites are reclaimed land. The earliest available aerial photograph taken in 1963 indicated that the areas of the 2 sites were part of Sha Tin Hoi.

Existing STSTW

2.3.1.3 The reclamation works in the area was first noted in 1974 and completed around 1981. The construction of STSTW began around 1979 and the Stage I construction was nearly completed in 1982 with the main facilities constructed. The STSTW Stage II and III extension works were noted from 1983 until completion in 2004. No significant changes at the study area were noted after the construction of the UV disinfection chamber within the Site in 2009.

Existing Vehicle Detention Centre (VDC) and Its Surrounding Areas

Existing VDC

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2.3.1.4 Reclamation of the VDC and Area A was completed in 1985. The area of the existing VDC remained vacant until structures were observed from 1989 to 1993. The actual uses of these structures were likely for nearby construction works as according to the topographic maps dated June 1989 and July 1992, the areas were labeled as "Construction in Progress" and "Work in Progress". The whole area was vacant again after 1993 and then became a car park in 1995 until 2004 when the footprint of the VDC was noted. No change in land uses were observed since then.

Area A

- 2.3.1.5 A Kung Kok Street was first observed in 1982. The landscape area (between Ma On Shan Road and A Kung Kok Road) was remained vacant after reclamation in 1985 and was observed covered with vegetation in 2009.
- 2.3.1.6 Similar to VDC, the remaining area of Area A appeared to be a construction site from 1989 until 1993 when the area turned vacant. Cycling tracks and footpaths at northeast of VDC were observed in 1995 and the vacant area adjacent to VDC were observed in 1993. No major changes in land use were noted since then.

Nui Po Shan North

2.3.1.7 The Nui Po Shan North has generally not been developed, with most of the area covered with vegetation, from 1963 until the latest aerial available in 2015. There are two developments noted in the aerial photographs: a construction site office in 1994 along Mui Tsz Lam Road and the THEES portal in 1993 located just south of A Kung Kok Street. No significant change was observed for both developments since then.

Summary of Historical Land Uses

2.3.1.8 Based on the historical land uses review, the main area of land contamination concern is the existing STSTW. For part of existing VDC within the Project boundary and THEES portal, site reconnaissance were conducted to confirm the presence of any on-site contaminating activities for these types of land uses.

2.4 Site Reconnaissance

2.4.1.1 Site walkovers were conducted on 7 and 14 November 2014 and 28 January, 17 and 24 July 2015 to investigate any contaminative issues associated with current land uses and activities within the CSTW Site. Questionnaires, if possible, were conducted with available site representatives.

Existing STSTW

- 2.4.1.2 Site walkover was conducted on 7 November 2014 and 28 January 2015. The completed Site Walkover Checklists and photographic records are annexed in **Appendix 2.03a**.
- 2.4.1.3 Based on the site observations and confirmation from the review of aerial photographs, a large portion of the site was covered by vegetation with less than half of the area occupied by facilities and buildings.
- 2.4.1.4 Except for the vegetated areas, all facilities/buildings and access roads within the site were paved with intact concrete and no oil stains or stressed vegetations were observed. The site condition is considered orderly and well managed.
- 2.4.1.5 Based on the site condition and nature of sewage treatment operations, widespread contamination is not envisaged across the site. The potential land contamination concerns are likely restricted to facilities / buildings that handle hazardous chemicals or chemical wastes. The facilities / buildings with potential for handling hazardous substances were identified during the site walkover and discussed in Table 2.4. Locations of these potential hotspots areas are shown in Figure 60334056/CAP/2.01. A total of 27

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transformers (labeled as Transformer No. 1 to No. 24, Transformer A and CLP No. 1 to CLP No. 2) were identified within STSTW as shown in **Figure 60334056/CAP/2.01.**

Chemicals of Concern

2.4.1.6 Details of DG and chemical wastes handled within the site were obtained from FSD and DSD respectively (refer to **Section 2.5** below for details) and are summarized below:

Dangerous Goods

- Sodium Hydroxide Solution (in various above-ground storage tanks);
- Sodium Hypochlorite Solution (in various above-ground storage tanks);
- Diesel (in a 1000L above-ground storage tank);
- Acetylene (in gas cylinders);
- Hydrogen (in gas cylinders);
- Compressed Air (in gas cylinders);
- Argon (in gas cylinders);
- Helium (in gas cylinders);
- Nitrogen (in gas cylinders);
- Oxygen (in gas cylinders);
- Carbon dioxide (in gas cylinders);
- 40% carbon dioxide balanced in methane (in gas cylinders);
- Nitrous oxide (in gas cylinders);
- Hydrochloric acid (in 2.5L cylinders);
- Sulphuric acid (in 2.5L cylinders);
- Phosphoric acid (in 2.5L cylinders); and
- Nitric acid (in 2.5L cylinders)

Other Chemicals / Chemical Wastes

- Lubricating oil;
- Transformer oil;
- Battery
- Mineral oil
- Organic solvent
- Ferric chloride (iron (III) chloride)
- 2.4.1.7 Of the above chemicals, acetylene, hydrogen, compressed air, argon, helium, nitrogen, oxygen, carbon dioxide and nitrous oxide are gaseous and insoluble in water and not considered to be land contaminants.
- 2.4.1.8 Hydrochloric acid, sulphuric acid, phosphoric acid and nitric acid are common acids. Sodium Hydroxide is a common base. Both are highly soluble in water. The primary effect of leakage of these chemicals to the ground would be lowering or raising of soil pH respectively. Acids or bases are not considered to be land contaminants.
- 2.4.1.9 Sodium hypochlorite is a strong oxidize, once expose to the environment, it rapidly reduces to chloride which is not considered to be a land contaminant.
- 2.4.1.10 When dissolved in water ferric chloride forms highly charged ionic solution which is used as flocculant in sewage treatment. Iron (III) may reduce to Iron (II), however neither iron (II/III) nor chloride ions are considered as potentially land contaminating.
- 2.4.1.11 Diesel fuel is commonly known as land contaminant and is used primarily for power generation. Relevant chemicals of concern (COCs) for diesel include lead, BTEX, polyaromatic hydrocarbons (PAHs) and petroleum carbon ranges (PCR).
- 2.4.1.12 Other chemicals include lubricating oil, transformer oil, mineral oil and organic solvent The COCs are metals, VOCs, PAHs, PCRs and PCBs.

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Existing VDC and its Surrounding Areas

- 2.4.1.13 Site walkover was conducted on 14 November 2014 and 17 July 2015. The completed Site Walkover Checklists and photographic records are annexed in **Appendix 2.03b**.
- 2.4.1.14 VDC was operated by the Customs and Excise Department (C&ED). Site walkover was conducted with representative staff from DSD and C&ED on 14 November 2014. The main activities carried out at the site were storage of detained vehicles and seized goods. Based on the site visit and C&ED's email dated 14 October 2015, the detained vehicles are in good condition and the seized goods are only empty containers. The area is only used for storage and neither vehicle nor equipment repairing activity was conducted. Apart from the pest control used on-site, no chemicals were observed stored or handled on site. The area was concrete paved and no apparent stains were observed during the site walkover.
- 2.4.1.15 According to C&ED's email dated 14 October 2015 and letter dated 04 November 2015, one lot of spent vehicle batteries was temporarily stored on site in 2012 and was later collected from VDC by EPD's licensed chemical waste collector. No past records of battery leakage were reported within the VDC. A Registration of Waste Producers for spent battery was issued to C&ED by EPD on 09 October 2012. Details of the C&ED's replies are attached in Appendix 2.05.
- 2.4.1.16 In order to identify the location of the spent batteries temporary storage area, further site walkover to VDC was conducted with C&ED's representative on 30 November 2015. Based on the further site walkover, the area was paved with additional layer of concrete above the concrete paved ground. No stain and stressed vegetation were observed.
- 2.4.1.17 Based on the site condition and nature of VDC, widespread contamination is not envisaged across the site. The potential land contamination concerns are likely restricted to the temporary storage area for the spent batteries and storage area for seized goods, both located within the Project boundary. The COCs for seized goods storage area are metals, VOCs, SVOCs, PCRs and PCBs. Metals, such as lead, can be commonly found in vehicle batteries and are considered to be the COCs for the temporary spent batteries storage area. Locations of the potential hotspots are shown in Figure 60334056/CAP/2.03.

Area A

2.4.1.18 Site walkover for Area A was conducted on 17 July 2015. Based on the site walkover, the areas were vacant / undeveloped or used as footpath or cycling track. No land contamination issue was identified within Area A.

Nui Po Shan North

- 2.4.1.19 The area mainly covered the northern portion of the undeveloped Nui Po Shan. Based on the site walkover, there are 3 areas that had been developed, viz. Contractor's Works Area at Mui Tsz Lam Road, the THEES Portal and the Evangelical Lutheran Church of Hong Kong (David Camp). The 3 areas are shown in **Figure 60334056/CAP/2.02.**
- 2.4.1.20 Site walkover was conducted on 24 July 2014 and the completed Site Walkover Checklists for Contractor's Works Area and THEES Portal as well as photographic records are annexed in **Appendix 2.03c**.
- 2.4.1.21 The Contractor's Works Area at Mui Tsz Lam Road was managed by Welcome Construction Co. Ltd.. The works area was used as site offices, car parking area and storage of construction materials. Based on the site walkover, the site was paved with intact concrete with absence of stains on ground. No chemicals / chemical wastes were reportedly or observed stored on-site.

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- 2.4.1.22 The THEES Portal commenced operation in 1994 and was operated by DSD to serve as the inlet point to convey the treated effluent to Victoria Harbour. Based on the site walkover, the area only comprises of an access road, valve chamber, concrete inlet chamber and a switch room. The site was paved with intact concrete with absence of stains on ground. No chemicals / chemical wastes were reportedly or observed stored onsite.
- 2.4.1.23 The David Camp was not accessible at the time of the site walkover. However, according to Leisure and Cultural Services Department (LCSD) website, David Camp is a holiday camp site operated by Evangelical Lutheran Church of Hong Kong. The site is likely to be used for non-contaminating activities such as recreation activities, classrooms, place of worship and accommodations.
- 2.4.1.24 No land contamination issue was identified during the site walkover within the Nui Po Shan North.

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2.5 Acquisition of Information from Government Departments

2.5.1.1 The Environmental Protection Department (EPD) and FSD have been contacted for (i) records on any release of chemicals and chemical waste, (ii) records of DG, (iii) records of Chemical Waste Producer(s) and (iv) records of reported fire incidents within the CSTW Site. EPD and FSD's replies on the request have been received and attached in **Appendix 2.04**. Information is summarized below.

Environmental Protection Department

- 2.5.1.2 Further to the EPD's replies, visits to EPD's Southorn Centre Office were undertaken on 19 November 2014 and 26 October 2015 to review the available Chemical Wastes Producers records. There are chemical producer records within STSTW but no records were noted within the remaining CSTW Site.
- 2.5.1.3 Details of the records within STSTW were not available for inspection. Instead, copies of the Chemical Waste Producer records were obtained from DSD on 24 July 2015 for the STSTW and details are summarized in **Table 2.2**.
- 2.5.1.4 In addition to the above and as discussed in **Section 2.4**, a copy of the Chemical Waste Producer records were provided by C&ED on 14 October 2015 for the VDC and details are summarized in **Table 2.2**.
- 2.5.1.5 Based on the replies given by EPD, EPD has no record of reported accident of spillage / leakage within the CSTW Site.

Table 2.2 Summary of CWPs within the CSTW Site

CWPs (CWP No.)	Status	Type of Chemical Wastes	Year of Application
STSTW			
Director of Drainage Services (0014-753-D2226-10)	Inactive	Spent lubricating oil;Transformer oil;Diesel oil;Alkaline solutionBattery	1999
	Active	 Spent lubricating oil; Spent mineral oil; Unwanted battery; and Wastes containing lubricating/mineral oil 	2013
Director of Drainage Services (0014-753-D2153-02)	Active	- Spent acid with oxidizer; - Spent acid; - Spent alkali; and - Spent organic solvent	1992
VDC			
Commissioner of Customs and Excise (0012-756-C3760-01)	Active	- Spent battery	2012

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Fire Services Department

- 2.5.1.6 FSD had provided the DGs records and were the same as those acquired under the Feasibility Study for STSTW. There are no DG records within the remaining CSTW Site. Details of the DGs are provided in **Appendix 2.04**.
- 2.5.1.7 FSD also reported that there has been no incidents of spillage/leakage of DGs reported at the CSTW Site.

2.6 Summary of Site Appraisal

2.6.1.1 Findings of the site appraisal are summarised below:

Existing STSTW

2.6.1.2 A number of hotspots, including, for example, workshop, transformers, generators, diesel tanks and chemical / chemical waste storage area, were identified during the site walkover. There could be land contamination impacts if the underlying soil / groundwater were contaminated during the handling and storage of hazardous substances. SI works are recommended within the existing STSTW and the COCs include metals, VOCs, SVOCs, PCRs and PCBs.

Geology and Hydrogeology of Existing STSTW

- 2.6.1.3 According to the 1:20,000 Geological Map Sheet 7, the existing STSTW is generally underlain by granite with minor intrusions of fine grained granite with rhyolite, tuff and granodiorite recorded.
- 2.6.1.4 Ground investigation (GI) works as well as the review of past GI data had been undertaken at or in the vicinity of the existing STSTW under the Feasibility Study. The GI works were carried out in the period from September to November 2013. Findings of the GI works and data review were documented in the Feasibility Study prepared by AECOM in 2014.
- 2.6.1.5 With reference to the abovementioned report, the superficial geology of the existing STSTW site generally comprises fill materials of average thickness equals to 13.3m, which is then underlaid by a layer of slightly sandy, highly or very highly plastic clay. Isolated beach deposits and estuarine deposits were observed below the marine deposits. Alluvium with average thickness of 7.6m was found in the majority of the site. Rockhead levels generally fall from west to east across the existing STSTW with highest rock head lies at -11mPD, while the deepest lies at -40 mPD.

Existing Vehicle Detention Centre and its Surrounding Areas

- 2.6.1.6 Based on the site appraisal, there were no apparent or historical evidence of contamination within Area A. Land contamination impacts are therefore not anticipated within the area.
- 2.6.1.7 Two hotspots (the temporary storage of spent batteries and storage of seized goods) were identified in the site appraisal. There could be land contamination impacts if the underlying soil / groundwater were contaminated during the handling and storage of hazardous substances. SI works are recommended within the 2 storage areas. The COCs are metals (for spent batteries storage area) and metals, VOCs, SVOCs, PCRs and PCBs (for seized goods storage area).

Nui Po Shan North

2.6.1.8 Based on the site appraisal, there were no apparent or historical evidence of contamination within Nui Po Shan North. There were 3 areas that had been developed

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for use as works area for the contractor, the effluent inlet point for the THEES and a holiday camp site managed by Evangelical Lutheran Church of Hong Kong. Based on the site walkover, there were no contaminating activities identified within the 3 developed areas. Land contamination impacts are therefore not anticipated within Nui Po Shan North

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Summary of Site Appraisal Table 2.3

Proposed Borehole ID*	ENV-BH01	ENV-BH02	ENV-BH03	ENV-BH04	ENV-BH05	ENV-BH06 ENV-BH07 ENV-BH08 ENV-BH09 ENV-BH10 ENV-BH11
Necessity and Rationale for Intrusive Site Investigation (SI)	1 sampling location proposed. COCs includes metals, VOCs, SVOCs and PCRs.	1 sampling location proposed. COCs includes metals, VOCs, SVOCs and PCRs.	1 sampling location proposed. COCs includes metals, VOCs, SVOCs and PCRs.	1 sampling location proposed. COCs includes metals, VOCs, SVOCs and PCRs.	1 sampling location proposed. COCs includes metals, VOCs, SVOCs and PCRs.	6 sampling locations proposed according to the area. COCs includes metals, VOCs, SVOCs and PCRs.
Photo Reference in Appendix 2.03a	A1	A2 and A3	A4	A5	A6	A7
Summary of Site Appraisal	 Empty chemical containers are stored on shelf in the Chemical Waste Store. The floor of the store is concrete paved and were observed in good condition without stain. Chemicals observed included spent sulfuric acid, nitric acid and alkali. 	 No report of spillage or leakage of dangerous goods was reported from FSD records The floor of the DG Store is concrete paved and was observed in good condition. The DG containers are observed to be in good condition. Chemicals stored include paints and thinner. 	 The Chemical Waste Area has a metal roof and the floor of the area is concrete paved with bunding. The concrete pavement and bunding are in good condition. Empty lubrication oil, grease container, bleach drum and waste battery are temporary stored in this area until collection by registered chemical waste collector. 	- Metal scraps such as machine parts are temporary stored in this area till collection by contractor. The area is paved with intact concrete.	 The chemical waste collecting tank is placed on top of a concrete paved area with concrete bunding to prevent spilling and leakage. Chemical containers and oil drums would be emptied to this collecting tank before placing them in the chemical waste store and chemical waste area. 	- The workshop is concrete paved with no oil stain observed. Repair and maintenance of valve bodies, spindles pumps and other light machine take place in the workshop Typical maintenance may include greasing and lubrication involving lubrication oil.
Concerned Area (approx. area)	Chemical Wastes Store (26 m²)	Dangerous Goods (DG) Store (28m²)	Chemical Waste Area (42 m²)	Scrap Iron Storage Area (21m²)	Chemical Waste Collecting Tank (34 m²)	Mechanic Workshop (1090 m²)
Location (Site Area)	Existing STSTW (280,000m²) (Inspection Date: 7 Nov 2014 & 28 Jan 2015)					

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Proposed Borehole ID* ENV-BH12 ENV-BH12A ENV-BH12B ENV-BH13 ENV-BH14 ENV-BH15 ENV-BH16 ENV-BH17 ENV-BH18 ENV-BH19 ENV-BH20 ENV-BH21 ENV-BH22 ENV-BH24 ENV-BH26 ENV-BH26 ENV-BH27 ENV-BH29 ENV-BH30 ENV-BH31 ENV-BH31 ENV-BH31 within the ground floor of the Administration and Laboratory Buildings. Intrusive SI was considered not necessary. 14 sampling locations proposed (6 for generator room, 5 for the air blower room, 2 for each of the transformers and 1 for the chemical waste collecting point). VOCs, 3 sampling locations proposed based on the area. 3 sampling locations are proposed (2 at each storage tank and 1 at the diesel filling point). COCs include metals, VOCs, SVOCs and PCRs. COCs include metals, VOCs, SVOCs and PCRs. 3 sampling location is proposed for the transformer CLP No. 1, No.19 and No. 20 Necessity and Rationale for Intrusive Site Investigation (SI) COCs includes metals, SVOCs, PCRs and PCBs. A12 and A13 A14 and A15 A11 - The area housed offices and laboratory. The laboratory is located on the first floor of the Laboratory Building.

- The ground floor of the Laboratory Building.

- The ground floor of the Laboratory Building is used only as an exhibition center and general storeroom (e.g. brand new plastic tubes and wooden sticks). No chemicals were found.

- There are a total of 3 transformers (labeled as 'CLP Transformer No. 1' and 'Transformer No. 19' and 'No. 20') in the area.

- CLP Transformer No. 1 is operated by CLP and located within the substation. Ground are concrete paved and without stains.

- Transformer rooms. The transformer rooms are elevated on an approximately 0.5m concrete platform.

- The Chemical Store is fully enclosed and the floor of the store is concrete paved. No sign of spillage or stain was observed.

- Mainly lubrication oil was stored in the area. The Power House consisted of a (i) generator room, (ii) control room / office and (iii) air blower rooms.

The generator room (approximately 1,525 m²) housed 6 generators. Lubrication oil bottles and oil drums are observed at the temporary chemical waste collecting point (approx 6m²), at the southern corner of the generator room. The room is tiled and paved with concrete. No stains were observed.

The air blower rooms (approximately 675 m²) housed 5 air blowers and are located at the northern portion of the building. The room is paved with intact concrete with no stains observed.

Two transformers (labeled as 'Transformer No. 21' and '22') were located at the western side of the Power House. There are two 1000 L above-ground diesel storage tanks to fuel the nearby generators.
The 2 storage tanks are placed on concrete paved ground with bunding. The paved ground and bunding are observed to be in good condition.
A diesel filling point was also observed near the diesel storage tank. Summary of Site Appraisal Concerned Area (approx. area)
Administration and Laboratory
Buildings, CLP
Transform No. 1,
Transformer No. 19
and No. 20 Power House +
Transformer No. 21
and No. 22
(2470 m²) Chemical Store (166 m²) Fuel Oil Tanks

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COCs include metals, VOCs, SVOCs, PCRs and PCBs (for transformer only).

Location (Site Area)	Concerned Area (approx. area)	Summary of Site Appraisal	Photo Reference in Appendix 2.03a	Necessity and Rationale for Intrusive Site Investigation (SI)	Proposed Borehole ID*
	Boiler House (231 m²)	 The Boiler House is connected with the Power House. Four set of hot water boiler were observed in the building. Site supervisor reported neither fuel nor lubricant is needed for the boiler to operate. 	A16	No land contamination were found within the ground floor, intrusive SI was considered not necessary.	N/A
	Transformer No. 11 to No. 18	- There are 8 transformers (labeled as Transformer No. 11 to 18) near the Power House for the operation of the Power House and	A17 and A18	8 sampling locations proposed for each of the transformer.	ENV-BH-T1 ENV-BH-T2 ENV-BH-T3
		Poller House. All 8 transformers are housed within the transformer rooms. The transformer rooms are elevated on an approximately 1.0m concrete platform. No stains were observed on the floor.		COCs include metals, VOCs, SVOCs, PCRs and PCBs.	ENV-BH-T4 ENV-BH-T5 ENV-BH-T6 ENV-BH-T7 ENV-BH-T7
	Waste Gas Burners (36 m²)	 There are 2 sets of waste gas burners to burn the methane (biogas) generated from wastewater process. The facility is in good condition, no stress of vegetation or stain was observed in surrounding area. 	A19	No land contamination were found within the ground floor, intrusive SI was considered not necessary.	N/A
	Sludge Thickening House $(890m^2)$ + Transformer No. 5, No. 6 and	 6 set of consolidated sludge pumps were situated in the basement of the building. The building is fully concrete paved (included the basement), pipe lines, centrifuge feed tanks, thickened sludge receiving 	A20 and A21	9 sampling locations (6 for the consolidated sludge pumps in the basement and 3 for each of the transformers).	ENV-BH33 ENV-BH33A ENV-BH34 ENV-BH34A FNV-BH35
	Transformer A.	tanks and cold water receiving tanks were observed on the ground floor. There are 3 transformers (labeled as Transformer No. 5, No. 6 and A) near the Sludge Thickening House. The transformers are on an elevated concrete platform of approximately 1.0m thick. No stains were observed on the floor.		COCs include metals, VOCs, SVOCs, PCRs and PCBs (for transformers only).	ENV-BH35A ENV-BH36 ENV-BH36A ENV-BH36B
	Air Blower House (1307 m²) + Transformer No. 1 to No. 4	 The Air Blower House consisted of air blower room to the east and switch / transformer room to the west. The air blower room (approximately 504 m²) housed 6 air blowers. Diesel and lubrication oil were used for their operation. Temporary oil drums storage were observed to the north of the air blower room. The room is paved with concrete and no stains. 	A22 and A23	11 sampling locations proposed (6 for air blower room, 4 for each of the transformers and 1 for the temporary oil drums storage). COCs include metals, VOCs, SVOCs,	ENV-BH37 ENV-BH38 ENV-BH39 ENV-BH40 ENV-BH40A ENV-BH41
		were observed. The switch room is located to the north of the switch / transformer room whereas the transformer room is located to the south. There are 4 transformers (labeled as Transformer No. 1 to No. 4). The room is paved with concrete and no stains were		PCKs and PCBs (for transformers only).	ENV-BH42 ENV-BH42A ENV-BH43 ENV-BH43

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ENV-BH51 ENV-BH52 ENV-BH49 ENV-BH50 Necessity and Rationale for Intrusive
Site Investigation (SI)
5 sampling locations proposed for
Transformer No. 7 to No. 10 and CLP
Transformer No. 2. No land contamination was found within the Effluent Pumping Station. 2 sampling locations proposed for Transformer No. 25 and No. 26. No land contamination were found within the ground floor, intrusive SI was considered not necessary. No land contamination were found within the Water Reclamation House. COCs include metals, VOCs, SVOCs, PCRs and PCBs. 2 sampling locations proposed for Transformer No. 23 and No. 24. COCs include metals, VOCs, SVOCs, PCRs and PCBs. COCs include metals, VOCs, SVOCs, PCRs and PCBs. A25 and A26 A28 and A29 A27 Visitor.

The remaining portion are used for water reclamation (e.g. ultrafiltration and reverse osmosis system).

There are 2 transformers (labeled as Transformer No. 23 and 24) for the Water Reclamation House. The transformers are on an elevated concrete platform of approximately 0.5m thick. No stains were observed on the floor.

Sludge transfer pumping station performs as a hub for sludge treatment, incoming sludge transfer to those sludge holding tanks through the station.

The whole building is concrete paved, sludge feed pumps are located on the first floor of the building and transferring water pipes are situated on the ground floor and basement.

No apparent stains were observed. - Reported by the site supervisor, the switchgear house were rarely been used.

- Control panels were placed at the southeastern half of the building whereas 4 transformers (labeled as Transformer No. 7 to 10) were housed at the northwestern portion of the building.

- The transformer rooms were concrete paved and no stains were observed on the floor.

- There is a CLP Substation (labeled as 'CLP Transformer No. 2') near the Switchgear House. The substation was locked at the time of site inspection and access were not available.

- Four effluent pumps are situated in the station with size approximately 100m² (Water pump)

- Site supervisor reported turbines that required use of lubricant is on the first floor and, the part based on ground floor is only use as a pipe for water transfer - There are 2 transformers (labeled as Transformer No. 25 to No. 26) near the Effluent Pumping Station. The transformers are on an elevated concrete platform of approximately 0.5m thick. No stains were observed on the floor.

- The whole building is concrete paved and no stain or spillage was observed during the site walk.

- Eight centrifuges were situated on the first floor and only control panels are on the ground floor. Summary of Site Appraisal Concerned Area (approx. area)
Switchgear House (288 m²) +
Transformer No. 7 to 10 + CLP
Transformer No. 2 Effluent Pumping Station (619 m²) + Transformer No. 25 and No. 26 Sludge Dewatering House (1340 m²) Water Reclamation House (312 m²) + Transformer No. 23 and No. 24

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No land contamination was found within the ground floor of the Sludge Transfer Pumping Station.

Sludge Pumping (475 m²)

Contaminatio

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Location (Site Area)	Concerned Area (approx. area)	Summary of Site Appraisal	Photo Reference in Appendix 2.03a	Necessity and Rationale for Intrusive Site Investigation (SI)	Proposed Borehole ID*
	RAS Pumping Stations (168 m² per station)	 5 RAS pumping stations were located in the treatment plant. All five stations are concrete paved, control panels and pipe lines are located on the ground floor, pumps are located on the 	A31	No land contamination were found within the ground floor, intrusive SI was considered not necessary.	N/A
		first floor of the station. As reported by the site supervisor no lubricant was being used for pumps.			
Part of Existing	Temporary Storage	- The whole area was paved with additional layer of concrete	B6.1	3 sampling location proposed for the	ENV-BH53
VDC within the		above the concrete ground.		temporary storage area of spent	ENV-BH54
(approx. 36,000m²)	Batteries (100 m²)	 No stain and stressed vegetation were observed and no past records of leakage of battery solution. 		COCs include metals.	
(Inspection Date:		'	B5	3 sampling locations proposed for the	ENV-BH56 FNV-BH57
14 Nov 2014 & 30 Nov 2015)	(100 m^2)	 Ittle whole area was concrete paved. No stain and stressed vegetation were observed and no past records of leakage of chemicals. 		COCs include metals, VOCs, SVOCs,	ENV-BH58
				PCRs and PCRs	

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3 SAMPLING AND TESTING PLAN FOR SITE INVESTIGATION

3.1 Site Investigation Location

- 3.1.1.1 Sampling points are proposed at the hotspot areas as shown in **Table 2.3**. In addition, a 100 x 100m regular grid sampling arrangement, complying with Table 2.1 of EPD Practice Guide, is proposed for the remaining areas of STSTW.
- 3.1.1.2 From the above, a total of 108 sampling locations are proposed to study the vertical profile of possible contamination within existing STSTW and part of existing VDC within the Project boundary. The sampling locations are illustrated in **Figure 60334056/CAP/2.01** and detailed in **Table 3.1**. The exact sampling locations are subject to fine adjustment according to the actual site conditions and existence of underground structures/utilities. Chemicals of Concern (COCs) proposed for laboratory analysis included metals, VOCs, SVOCs, PCRs and PCBs. The sampling and testing plan with rationale are summarized in **Table 3.1**.

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Sampling and Testing Plan Table 3.1

Sampling	Sampling and Testing	Sampling	Ó			Paran	Parameters to be Tested ³	rested ³	
Location ID ¹	Rationale	Method	Sampi	Sample Matrix/ Deptn⁴	PCR	VOC	SVOC	PCBs	Metals
STSTW									
ENV-BH01	Target potential hotspot area at the Chemical	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>	^	<i>></i>		\ <u></u>
	wastes store	or 6m bgs	GW	If present ⁴	<i>_</i>	^	\ <u></u>		Mercury only
ENV-BH02	Target potential hotspot area at the Dangerous	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>		\		<u> </u>
	D 000 80000	or 6m bgs	GW	If present ⁴	\	\ <u></u>	\		Mercury only
ENV-BH03	Target potential hotspot area at the Chemical	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>	^	<i></i>		\ <u></u>
	waste Area	or 6m bgs	GW	If present ⁴	<u> </u>	^	>		Mercury only
ENV-BH04	Target potential hotspot area at the Scrap Iron	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\	\ <u></u>	>		>
	Storage Alea	or 6m bgs	GW	If present ⁴	<i>_</i>		<i>_</i>		Mercury only
ENV-BH05	Target potential hotspot area at the Chemical	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>	_	<i></i>		\ <u></u>
	Waste Collecting Lank	or 6m bgs	GW	If present ⁴	\nearrow	^	\nearrow		Mercury only
ENV-BH06 ENV-BH07 ENV-BH08 ENV-BH09	Target potential hotspot area at the Mechanic Workshop	Borehole drilling to 2m below the groundwater table or 6m bgs	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>	`	\ <u></u>		`

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Sampling	Sampling and Testing	Sampling				Param	Parameters to be Tested ³	ested ³	
Location ID ¹	Rationale	Method	Sample	Sample Matrix/ Deptn*	PCR	voc	SVOC	PCBs	Metals
ENV-BH10 ENV-BH11			GW	If present ⁴	\	>			Mercury
ENV-BH12 ENV-BH12A	Target potential hotspot area at CLP Transformer No.1, Transformer No. 19		Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\-\	\ <u></u>	\ <u></u>	\ <u></u>	\
07 LIQ-^NI3	and No. 20		GW	If present ⁴	>	>	√	\	Mercury only
ENV-BH13 ENV-BH14	Target potential hotspot area at the Chemical	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>	\ <u></u>	\ <u></u>		\
	Đ Đ Đ	or 6m bgs	МÐ	If present ⁴	\ <u></u>	^			Mercury only
ENV-BH16 ENV-BH17	Target potential hotspot area at the Fuel Oil Tanks	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\	`^	\ \		\ <u></u>
		or 6m bgs	GW	If present ⁴	>	>	\ <u></u>		Mercury only
ENV-BH18	Target potential hotspot area the Diesel Filling	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ \	`^	\		\
	Pollic	or 6m bgs	MĐ	If present ⁴	<i>_</i>	^			Mercury only
ENV-BH19 ENV-BH20 ENV-BH21	Target potential hotspot	Borehole drilling to	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\-\	\ <u></u>	\ <u></u>		\ <u></u>
ENV-BH22 ENV-BH23 ENV-BH24 ENV-BH25	Room of the Power House groundwater table or 6m bgs	groundwater table or 6m bgs	GW	If present ⁴	\	>	<i>\</i>		Mercury only

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Sampling	Sampling and Testing	Sampling				Param	Parameters to be Tested ³	ested ³	
Location ID ¹	Rationale	Method	Sample	Sample Matrix/ Depth²	PCR	VOC	SVOC	PCBs	Metals
ENV-BH26 ENV-BH27 ENV-BH28		Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	>	>	>		\ <u></u>
ENV-BH29	Koom of the Power House	or 6m bgs	GW	If present ⁴	<i>></i>	\nearrow	\nearrow		Mercury only
ENV-BH31 ENV-BH32	Target potential hotspot area at Transformers	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	>	<i>></i>	>	✓	
	ואס. בין מומ ואס. בב	or 6m bgs	GW	If present ⁴	\	\	\ <u></u>	\ <u></u>	Mercury only
ENV-BH-T1 ENV-BH-T2 ENV-BH-T3 ENV-BH-T4	Target potential hotspot	Borehole drilling to 2m below the	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	>	\ <u></u>	>	\\	, , , , , , , , , , , , , , , , , , ,
ENV-BH-75 ENV-BH-76 ENV-BH-77 ENV-BH-78	11 to 18	groundwater table or 6m bgs	M9	If present ⁴	\	\ <u></u>	\ <u></u>	>	Mercury only
ENV-BH33 ENV-BH33A ENV-BH34 ENV-BH34A		Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	>	>	>		<u> </u>
ENV-BH35 ENV-BH36	basement of the Sludge Thickening House	or 6m bgs	GW	If present ⁴	<i></i>	√	^		Mercury only
ENV-BH35A ENV-BH36A		Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	<i>></i>	<u> </u>	<i>^</i>	\checkmark	<i></i>
000CLG- > NII	No. 6 and Transformer A	or 6m bgs	GW	If present ⁴	\ <u></u>	\searrow	\	√	Mercury only
ENV-BH37 ENV-BH38 ENV-BH39 ENV-BH40A	Target potential hotspot area at the Air Blower Room	Borehole drilling to 2m below the groundwater table or 6m bgs	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>	\ <u></u>	\ <u></u>		` \

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Mercury only Mercury only Mercury only Metals \searrow PCBs Parameters to be Tested³
OC SVOC PCE > Voc PCR or 6m bgs⁴ or 6m bgs⁴ or 6m bgs⁴ Sample Matrix/ Depth² (i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level of (i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level of (i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level of (i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level of If present⁴ If present⁴ If present⁴ If present⁴ Soil Ø₩ β Soil ΘW Soil βM Soil Borehole drilling to S 2m below the groundwater table or 6m bgs Borehole drilling to 22m below the groundwater table or 6m bgs Borehole drilling to g 2m below the groundwater table — or 6m bgs Borehole drilling to 22m below the groundwater table or 6m bgs Sampling Method Target potential hotspot area at Transformer No.7 to No.10 Target potential hotspot area at Transformer No.1 to No.4 Target potential hotspot area at CLP Transformer No.2 Target potential hotspot area at Transformer No.25 to No.26 Sampling and Testing Rationale Sampling Location ID¹ ENV-BH41A ENV-BH42A ENV-BH43A ENV-BH40 ENV-BH41 ENV-BH42 ENV-BH43 ENV-BH44 ENV-BH45 ENV-BH46 ENV-BH47 ENV-BH49 ENV-BH50 ENV-BH48

Mercury only

Mercury only

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>

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If present⁴

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(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs⁴

Soil

Borehole drilling to games 2m below the groundwater table or 6m bgs

Target potential hotspot area at Transformer No.23 to No.24

ENV-BH51 ENV-BH52

or 6m bgs⁴

If present⁴

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Sampling	Sampling and Testing	Sampling	d			Param	Parameters to be Tested ³	rested ³	
Location ID¹	Rationale	Method	Sample	Sample Matrix/ Deptn*	PCR	NOC	SVOC	PCBs	Metals
ENV-G1 to ENV-G31	Grid Sampling points for the whole STSTW	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\	>	\		\ <u></u>
	(280,000m-)	or 6m bgs	MĐ	If present ⁴	\nearrow	\checkmark	\checkmark		Mercury only
VDC									
ENV-BH53 ENV-BH54	Target potential hotspot area at Temporary Storage Area of Spent	Borehole drilling to 2m below the groundwater table	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴					\
ENV-BH55	Battery	or 6m bgs	MĐ	If present ⁴					Mercury only
ENV-BH56 ENV-BH57	Target potential hotspot Borehole drilling to area at Storage Area of 2m below the Seized Goods (Empty proundwater table	Borehole drilling to 2m below the	Soil	(i) 0.5m bgs (ii) 1.5m bgs (iii) 3.0m bgs (iv) GW level or 6m bgs ⁴	\ <u></u>	<i>></i>	→	_^	\ <u></u>
ENV-BH58	Containers)	or 6m bgs	MĐ	If present ⁴	\ <u></u>	<i>\</i>	\nearrow	_^	Mercury only

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3.2 Soil Sampling Method and Depth of Sampling

- 3.2.1.1 All soil boring / excavation and sampling shall be supervised by a land contamination specialist.
- 3.2.1.2 Boreholes should be advanced by dry rotary drilling, i.e. without the use of flushing medium, to prevent cross-contamination during sampling. For safety reasons, an inspection pit should be excavated to 1.5m below ground level (m bgl) to confirm the absence of underground utilities at the proposed borehole location and disturbed soil samples, using stainless steel hand tools or other appropriate equipments, should be collected at depth of 0.5m bgl. Soil boring using drill rigs should then be performed from depth of 1.5m bgl to the maximum boring depth. Undisturbed U100/U76 soil samples should be collected at depths from 1.5m and onwards. Boreholes are proposed to be advanced to approximately 2m below the stabilized water table or if no groundwater were encountered, a depth of 6m bgl. Where there are suspected signs of contamination, extra samples should be taken for laboratory analysis.
- For area where drilling of borehole is not possible (e.g. presence of underground utilizes, 3.2.1.3 limitation of headroom space, etc.), trail pit to 3m bgl should be conducted as an alternative. At each trial pit sampling location, disturbed soil samples, using stainless steel hand tools, shall be taken at 0.5 m, 1.5 m and 3.0m below the prevailing ground level in order to delineate the vertical profile of contamination.
- 3.2.1.4 At each sampling location/depth, sufficient quantity of soil (as specified by the laboratory) should be recovered to facilitate analyses of the specified suite of parameters. All soil samples should be uniquely labelled. Backup samples should be retained and stored at 0 4 °C in laboratory.

3.3 **Strata Logging**

3.3.1.1 Strata logging for boreholes should be undertaken during the course of drilling/digging and sampling by a qualified geologist. The logs should include the general stratigraphic description, depth of soil sampling, sample notation and level of groundwater (if encountered). The presence of rocks/boulders/cobbles and foreign materials such as metals, wood and plastics should also be recorded.

3.4 **Groundwater Sampling and Free Product Measurement**

- 3.4.1.1 Groundwater samples should be collected at each of the sampling location if groundwater were encountered.
- 3.4.1.2 At each borehole location, a groundwater sampling well should be installed unless agreed otherwise by the land contamination specialist. A typical design of a groundwater monitoring well is shown in Appendix 3.01. After installation of the monitoring wells, the depth to water table at all monitoring wells should be measured with an interface probe in order to assess groundwater gradients and predominant flow direction. Prior to sampling activities, wells should be fully developed to ensure formation water is flowing into and out of the wells. The wells should then be allowed to stand for a day to permit groundwater conditions to equilibrate.
- 3.4.1.3 For trial pit, if groundwater is encountered, a groundwater sample should be taken after all required soil samples at each trial pit have been collected. The trial pits shall be pumped to near dry and allowed to stand for 24 hours before sampling.
- 3.4.1.4 Groundwater level and thickness of free product layer, if present, should be measured at each well before groundwater samples are taken. In the unlikely event that measurable thicknesses of free product were encountered, a sample should be collected for laboratory analysis to determine the composition.

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^{60334056/}CAP/2.01 and 60334056/CAP/2.03 for locations. refer to **Figure 6** slow ground surfa

captioned chemicals Please refer to Figure 60334056/CAP/2.01 and 60334056/CAP/2.03 for locations.

bgs: below ground surface; GW: groundwater

The testing parameters refer to the parameters as shown in Table 2.1 – RBRGs for Soil & Soil Saturation Limit and Table 2.2 – RBRGs for Groundwater and Solubility Limit under PCR, VOCs, SVOCs, PCBs and Metals in the Guidance Manual. Since RBRG value of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene,

Benzo(k)fluoranthene, bis-(2-Ethylhexyl)phthalate, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene and Phenol were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.

The deepest depth of sampling should be above/near groundwater table or 6m bgs, whichever is shallower. Groundwater sample would only be collected if encountered.

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- 3.4.1.5 Prior to groundwater sampling, the monitoring wells should be purged to collect representative fresh groundwater samples.
- 3.4.1.6 After purging, one groundwater sample should be collected at each well using Teflon bailer and decanted immediately into appropriate sample containers in a manner that minimises agitation and volatilization of VOCs from the samples for the purpose of storage and transportation. The sample containers should be supplied by the laboratory and should be new, clean and made of 'amber glass'. Groundwater samples should be placed in the glass containers with zero headspace and promptly sealed with a septumlined cap. All samples should be uniquely labelled.
- 3.4.1.7 Immediately after collection, samples should be placed in ice chests, cooled and maintained at temperature of about 0-4°C until delivered to the analytical laboratory.

3.5 Sample Size and Decontamination Procedures

- 3.5.1.1 All down hole or digging equipments should be decontaminated between drilling, digging and sampling event to minimise the potential for cross contamination. The equipments (including drilling pit, digging tools and soil/groundwater samplers) should be decontaminated by washing with phosphate-free detergent and rinsed with distilled / deionised water.
- 3.5.1.2 Prior to sampling, the laboratory responsible for analysis should be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis.
- 3.5.1.3 The sample containers should be laboratory cleaned, sealable, water-tight, made of glass or other suitable materials with aluminum or Teflon-lined lids, so that the container surface will not react with the sample or adsorb contaminants. No headspace should be allowed in the containers which contain samples to be analysed for VOCs, petroleum carbon ranges or other volatile chemicals.
- 3.5.1.4 The containers should be marked with the sampling location codes and the depths at which the samples were taken. If the contents are hazardous, this should be clearly marked on the container and precautions taken during transport. Samples should be stored at between 0-4 °C but never frozen. Samples should be delivered to the laboratory on the same day the sample being taken and analysed within the respective holding time, but, in any case, not more than 10 days after samples being taken.

3.6 QA/QC Procedures

- 3.6.1.1 QA/QC samples should be collected in the following frequency during the SI works. Chain of Custody protocol should be adopted.
 - 1 equipment blank per 20 samples for full suite analysis as shown in Table 3.1;
 - 1 field blank per 20 samples for full suite analysis as shown in Table 3.1;
 - 1 duplicate soil sample per 20 soil samples and 1 duplicate groundwater sample per 20 groundwater samples for corresponding parameters analysis as shown in Table 3.1; and
 - 1 trip blank sample per 10 trips for petroleum carbon range C₆-C₈.
- 3.6.1.2 Based on the sampling and testing plan as outlined in Table 3.1 and depending on the site condition, approximately 324 soil samples and 108 groundwater samples will be collected. The total number of equipment blanks and field blanks would therefore be about 21 each and the number of duplicate soil samples and groundwater samples would be 16 and 5 respectively. The number of trip blanks will be dependent on the number of trips for sample delivery.

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3.7 Health and Safety

- 3.7.1.1 The specific safety measures to be taken depend on the nature and content of contamination, the site conditions and the regulations related to site safety requirements. Workmen Compensation Insurance and third party insurance must be provided for the site investigation (SI).
- 3.7.1.2 Extreme care should be exercised in the event that potentially toxic gases or other suspected hazardous materials are encountered. Any abnormal conditions found shall be reported immediately to the safety officer and the land contamination specialist.
- 3.7.1.3 The SI contractor shall establish and maintain a Health and Safety Plan before commencement of the SI that will include the following:
 - (a) Instruction of works on work procedures, safe practices, emergency duties, and applicable regulations;
 - (b) Regularly scheduled meetings of the workers in which the possible hazards, problems of the job, and related safe practices are emphasized and discussed;
 - (c) Good housekeeping practices; and
 - (d) Availability of and instruction in the location, use and maintenance of personal protective equipment.
- 3.7.1.4 The SI contractor shall maintain equipment and supplies reasonably required in an emergency, including lifesaving, evacuation, rescue and medical equipment in good working order and condition at all times. The SI contractor shall use all reasonable means to control and prevent fires and explosions, injury to personnel and damage to equipment of property. Without limiting the foregoing, the SI contractor shall:
 - (a) Maintain proper safety devices, barriers to minimize hazards during performance of the work;
 - (b) Prohibit smoking and open flames and the carrying of matches and lighters;
 - (c) Develop and maintain a written emergency plan applicable to the Work and Site;
 - (d) Maintain equipment in good operating condition and have emergency and first aid equipment ready for immediate use, where applicable;
 - (e) Conduct equipment tests to ensure that equipment is properly placed and in good operating condition, and that workers are able to respond to emergency situations;
 - (f) Require all workers employed or retained by the Contractor, or a subcontractor, to at all time wear clothing suitable for existing work, weather and environmental conditions; and
 - (g) The personnel are required to wear respirator and gloves for vapour exposure protection, if necessary. Safety helmet and protective boots should be worn.

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LABORATORY ANALYSIS

Table 4.1 summarizes the parameters, the recommended reporting limits and reference 4.1.1.1 methods for the laboratory analyses of soil and groundwater samples for the COCs under this land contamination assessment.

Table 4.1 Parameters, Reporting Limits and Reference Methods for Laboratory **Analysis**

r –		So	oil	Ground	dwater
Item	Parameter	Reporting Limit (mg/kg) or otherwise specified	Reference Method*	Reporting Limit (µg/L) or otherwise specified	Reference Method*
SVOC	s				
1	Acenaphthene	0.5		2	
2	Acenaphthylene	0.5]	2	
3	Anthracene	0.5]	2	
4	Benzo(a)anthracene	0.5]	NA	
5	Benzo(a)pyrene	0.5	1	NA	
6	Benzo(b)fluoranthene	0.5]	1	
7	Benzo(g,h,i)perylene	0.5	1	NA	
8	Benzo(k)fluoranthene	0.5	1	NA	
9	bis-(2-Ethylhexyl)phthalate	5	1	NA	
10	Chrysene	0.5	USEPA 8270	1	USEPA 8270
11	Dibenzo(a,h)anthracene	0.5	8270	NA	0270
12	Fluoranthene	0.5	1	2	
13	Fluorene	0.5	1	2	
14	Hexachlorobenzene	0.2	1	4	
15	Indeno(1,2,3-cd)pyrene	0.5	1	NA	
16	Naphthalene	0.5	1	2	
17	Phenanthrene	0.5	1	2	
18	Phenol	0.5	1	NA	
19	Pyrene	0.5	1	2	
VOCs			•	•	
20	Acetone	50		500	
21	Bromodichloromethane	0.1	1	5	
22	2-Butanone	5]	50	
23	Chloroform	0.04]	5	
24	Methyl tert-Butyl Ether	0.5]	5	
25	Methylene Chloride	0.5		50	
26	Styrene	0.5	USEPA 8260	5	USEPA 8260
27	Tetrachloroethene	0.04] 0200	5	0200
28	Trichloroethene	0.1		5	
29	Benzene	0.2		5	
30	Toluene	0.5		5	
31	Ethylbenzene	0.5		5	
32	Xylenes	2		20	
Metals	<u> </u>				

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		Sc	oil	Ground	lwater	
Item	Parameter	Reporting Limit (mg/kg) or otherwise specified	Reference Method*	Reporting Limit (µg/L) or otherwise specified	Reference Method*	
33	Antimony	1		NA		
34	Arsenic	1	USEPA	NA		
35	Barium	1	6020	NA		
36	Cadmium	0.2		NA		
37	Chromium III^	1	By calculation	NA	NA	
38	Chromium VI	1	APHA 3500Cr: D	NA	NA NA	
39	Cobalt	1		NA		
40	Copper	1	USEPA	NA		
41	Lead	1	6020	NA		
42	Manganese	1]	NA		
43	Mercury	0.2	APHA 3112B	0.5	APHA 3112B	
44	Molybdenum	1		NA		
45	Nickel	1	USEPA	NA	NA NA	
46	Tin	1	6020	NA	INA	
47	Zinc	1		NA		
Petrol	eum Carbon Ranges					
48	C ₆ - C ₈	5		20		
49	C ₉ - C ₁₆	200	USEPA 8015/8260	500	USEPA 8015/8260	
50	C ₁₇ - C ₃₅	500	3010,0200	500	3010/0200	
PCBs						
51	PCBs	0.1	USEPA 8270	1	USEPA 8270	

- NA = Not Applicable

 ^ Chromium III is quantified by calculation based on Chromium VI and Total Chromium measured under
- HOKLAS accredited methods.

 * Alternative testing methods with accreditation by HOKLAS or its Mutual Recognition Arrangement partners are also accepted.
- 4.1.1.2 All laboratory testing methods for the above parameters should be accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or one of its Mutual Recognition Arrangement partners.

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5 INTERPRETATION OF RESULTS

- 5.1.1.1 With reference to the Guidance Note, interpretation of results should make reference to the Guidance Manual. The laboratory results for the soil and groundwater samples collected for this assessment will be compared with Risk-based Remediation Goals (RBRGs) as stipulated in Table 2.1 and Table 2.2 of the Guidance Manual.
- 5.1.1.2 The RBRGs are developed based on a risk assessment approach to suit the local environmental conditions and community needs in Hong Kong. Decisions on contaminated soil and groundwater remediation are based on the nature and extent of the potential risks that are posed to human receptors as a result of exposure to chemicals in the soil and/or groundwater. RBRGs are developed for four different land use scenarios reflecting the typical physical settings in Hong Kong under which people could be exposed to contaminated soil and groundwater. A description of each land use scenario is as follows:
 - Urban residential Sites located in an urban area where main activities involve habitation by individuals. The typical physical setting is a high rise residential building situated in a housing estate that has amenity facilities such as landscaped yards and children's playgrounds. The receptors are residents who stay indoors most of the time except for a short period each day, during which they are outdoors and have the chance of being in direct contact with soil at landscaping or play areas within the estate.
 - Rural residential Sites located in a rural area where the main activities involve habitation by individuals. These sites typically have village-type houses or low rise residential blocks surrounded by open space. The receptors are rural residents who stay at home and spend some time each day outdoors on activities such as gardening or light sports. The degree of contact with the soil under the rural setting is more than that under the urban setting both in terms of the intensity and frequency of contact.
 - Industrial Any site where activities involve manufacturing, chemical or
 petrochemical processing, storage of raw materials, transport operations, energy
 production or transmission, etc. Receptors include those at sites where part of the
 operation is carried out directly on land and the workers are more likely to be exposed
 to soil than those working in multi-storey factory buildings.
 - Public parks Receptors include individuals and families who frequent parks and play areas where there is contact with soil present in lawns, walkways, gardens and play areas. Parks are considered to be predominantly hard covered with limited areas of predominantly landscaped soil. Furthermore, public parks are not considered to have buildings present on them.
- 5.1.1.3 In addition to the RBRGs, screening criteria (soil saturation limits, Csat, developed for Non-aqueous Phase Liquid (NAPL) in soil and water solubility limits for NAPL in groundwater) for the more mobile organic chemicals must be considered to determine whether a site requires further action.
- 5.1.1.4 For the existing STSTW, the preliminary idea at present is that the site would be used for housing development or other beneficial uses to improve the community and environment. Community facilities and recreation areas such as waterfront promenade would also be considered. The Urban Residential Land Use Scenario (i.e. the more stringent of Urban Residential / Public Parks) is recommended as the land contamination assessment criteria for this type of land uses. However, in case where the re-development include more sensitive land uses (e.g. village-type houses, low-rise residential blocks surrounded by open space and schools), the Rural Residential Land Use Scenario will be appropriate

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for the assessment. For the existing VDC, as the future land uses had not been determined at this stage in time, the most stringent set of RBRGs is recommended as the land contamination assessment criteria. Referring to **Section 7** below, a review of the validity of this CAP will be carried out prior to the site investigation works at existing STSTW and part of existing VDC within the Project boundary. A review of the appropriate Land Use Scenario for the land contamination assessment is also recommended to be conducted at the time.

5.1.1.5 The corresponding RBRGs levels, Soil Saturation Limit and the Solubility Limit are presented in **Appendix 5.01**.

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6 EVALUATION OF POTENTIAL LAND CONTAMINATION IMPACT AND POSSIBLE REMEDIATION MEASURES

6.1 Evaluation of Potential Land Contamination Impact

- Based on the site appraisal, contamination (if any) would likely be restricted to the identified hotspots within the existing STSTW and the temporary spent batteries / seized goods storage areas within VDC. Although the STSTW had been operated for over 30 years, preliminary SI works conducted under the Feasibility Study did not indicate any contamination exceeding the relevant RBRGs. Together with the fact that a large portion of the STSTW was only vegetation or access roads, extensive contamination is not expected within the site. For VDC, the size of the temporary spent batteries storage area and seized goods storage area are small (approximately 100m² for each area) and there were no past records and apparent chemical leakage, extensive contamination within the part of existing VDC within the Project boundary are therefore not expected.
- 6.1.1.2 The land contamination assessment and remediation works for STSTW and part of existing VDC within the Project boundary would need to follow EPD's Guidance Manual, Guidance Note and Practice Guide and any soil/groundwater contamination would be identified and properly treated prior to the commencement of works under the project. Land contamination impacts are therefore considered not insurmountable to future occupants if the recommended actions as outlined in Section 7 were followed and contaminated soil and groundwater (if any) were properly treated using appropriate remediation methods and according to EPD's approved RAP.
- 6.1.1.3 For the remaining areas of CSTW Site, no land contaminating activities associated with current or historical land uses were identified. Land contamination impacts are therefore not anticipated within these areas. Having said that, as David Camp is inaccessible at the time of reporting, further site walkover is recommended to be conducted within the site when access to the camp site is available in order to confirm the presence of any land contamination. Recommended actions for these sites are also outlined in Section 7.

6.2 Possible Remediation Measures

- 6.2.1.1 The actual remediation methods could only be determined after completion of the SI works and EPD's agreement on the Contamination Assessment Report (CAR) and Remediation Action Plan (RAP) at the later stage of the Project. The latter will provide details of the remedial actions for the identified contaminated soil and groundwater.
- Nevertheless, based on the site appraisal, hotspots were identified within the existing STSTW and part of the existing VDC within the Project boundary. The potential COCs include metals, VOCs, SVOCs, PCRs and PCBs. For contaminated soil, there are a number of technologies commercially available to tackle the identified COCs. Technologies that are commonly used in Hong Kong are biopiling and cement solidification/stabilization. These ex-situ methods were proven to be effective in treating the target COCs and the treated soil could then be reused on site (e.g. backfilling materials). Given the size of the existing STSTW (approximately 28 ha), there would be sufficient space available to handle and treat the contaminated soil and the two methods are considered to be appropriate for the Project.
- 6.2.1.3 For groundwater, remediation is not commonly required as contaminants in groundwater seldom exceed the land contamination criteria (i.e. Risk-Based-Remediation Goals (RBRGs)) and non-aqueous phase liquid (NAPL) do not often present in groundwater. Contaminants in groundwater are often below the respective RBRGs as the potential risks that are posed to human receptors as a result of exposure to chemicals in groundwater is relatively low. This may be due to the fact that according to the EPD's Guidance Manual, groundwater in Hong Kong were not for drinking purposes and the

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exposure pathway of contaminants in groundwater to human receptors would be associated with inhalation of volatiles rather than direct exposure. Having said that, there are examples of remediation techniques as shown in EPD's Practice Guide (e.g. air sparging, recovery trenches / wells, in-ground containment/capping and permeable reactive barriers) that could be applied to this Project if contaminated groundwater were indeed identified.

7 CONCLUSION AND WAY FORWARD

- 7.1.1.1 This CAP covered the CSTW Site and is prepared for the EIA Study.
- 7.1.1.2 A site appraisal, in the form of desktop review and site walkover, had been carried out to identify the potential contaminative land uses and hotspot areas within the CSTW Site. Based on the site appraisal, the existing STSTW and the temporary spent batteries / seized goods storage areas within VDC is considered to be areas with land contamination concerns.
- 7.1.1.3 A sampling and testing programme, targeting the existing STSTW and part of existing VDC within the Project boundary had been proposed. A total of 108 locations were proposed for soil and groundwater sample collection. The collected samples will be tested for the COCs: SVOCs, VOCs, metals, petroleum carbon ranges and/or PCBs.
- Based on the latest programme, the existing STSTW and VDC will continue to operate 7.1.1.4 until decommissioning in 2027 and 2017 respectively. Since the sites will continue to operate for quite some time, the change in operation which lead to any new or the relocation of contamination hotspots or occurrence of spillage or accident is not foreseeable, therefore, the proposed SI works and any necessary remediation action are recommended to be carried out after decommissioning of existing STSTW and part of the existing VDC within the Project boundary but prior to the re-development. Prior to the commencement of the SI works, a review on this CAP will be conducted to confirm whether the proposed SI works (e.g. sampling locations, testing parameters etc.) are still valid and to determine the appropriateness of the RBRGs land use scenario for the development. A supplementary CAP, presenting the findings of the review, will be submitted to EPD for endorsement. The supplementary CAP, SI works and the subsequent submission of CAR/RAP would tentatively be carried out around 2027 to 2028 for STSTW and 2017 for VDC. Remediation action, if necessary, will be carried out according to EPD endorsed RAP and a Remediation Report (RR) will be submitted after completion of the remediation action but prior to the commencement of any construction works or re-development of the site for EPD's endorsement.
- 7.1.1.5 For David Camp, further site walkover is recommended within the site when access to the camp site is available to confirm any apparent land contamination. If apparent land contamination were noted, detailed land contamination assessment, including submission of supplementary CAP, SI works and subsequent submission of CAR/RAP to EPD for endorsement, would be required. If necessary, remediation action and submission of RR to EPD will be carried out prior to the commencement of any construction works or redevelopment of the sites. The further site walkover and, if required, detailed land contamination assessment, are expected to be carried in 2018.

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Sha Tin Cavern Sewage Treatment Works

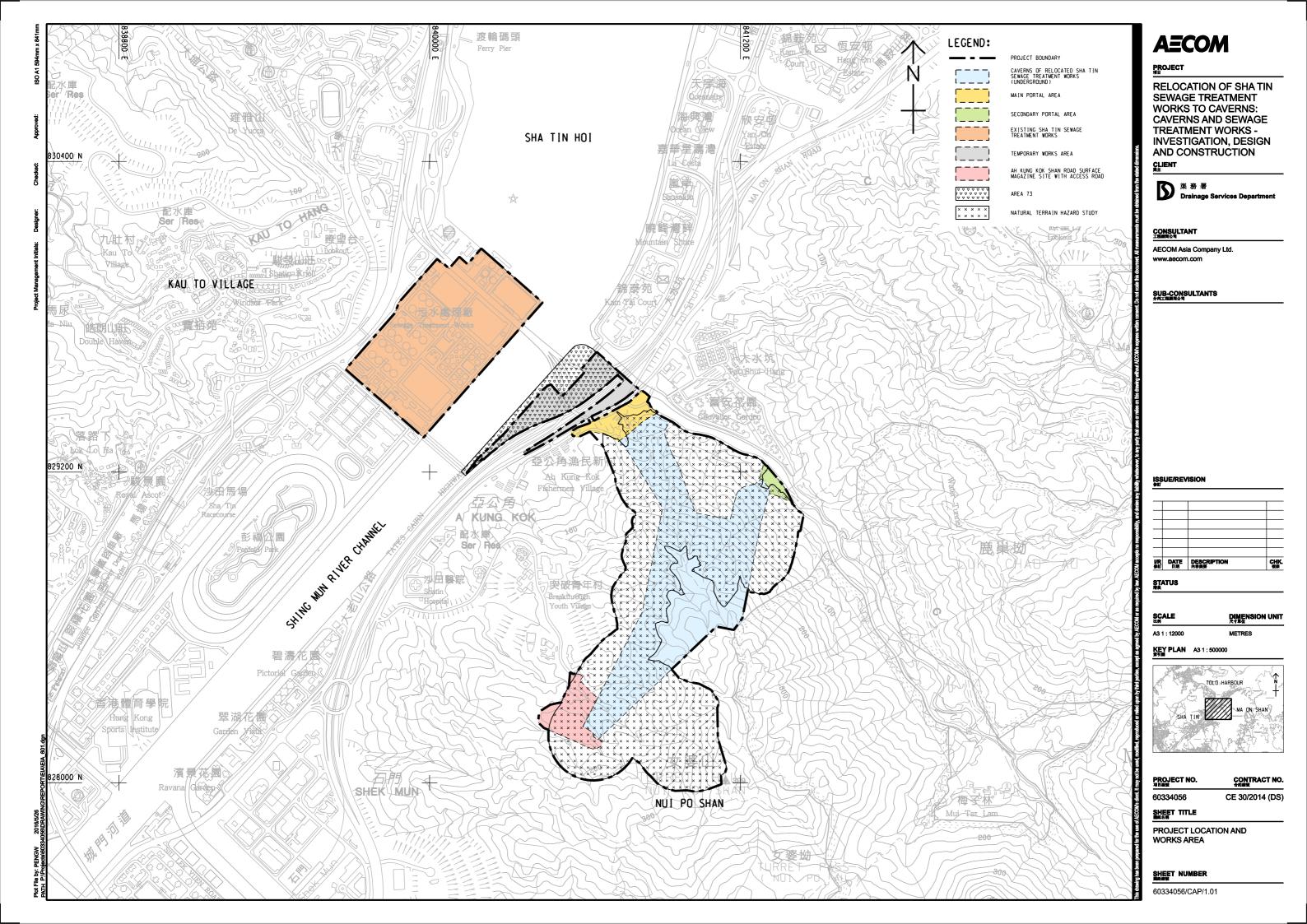
CAP Figures

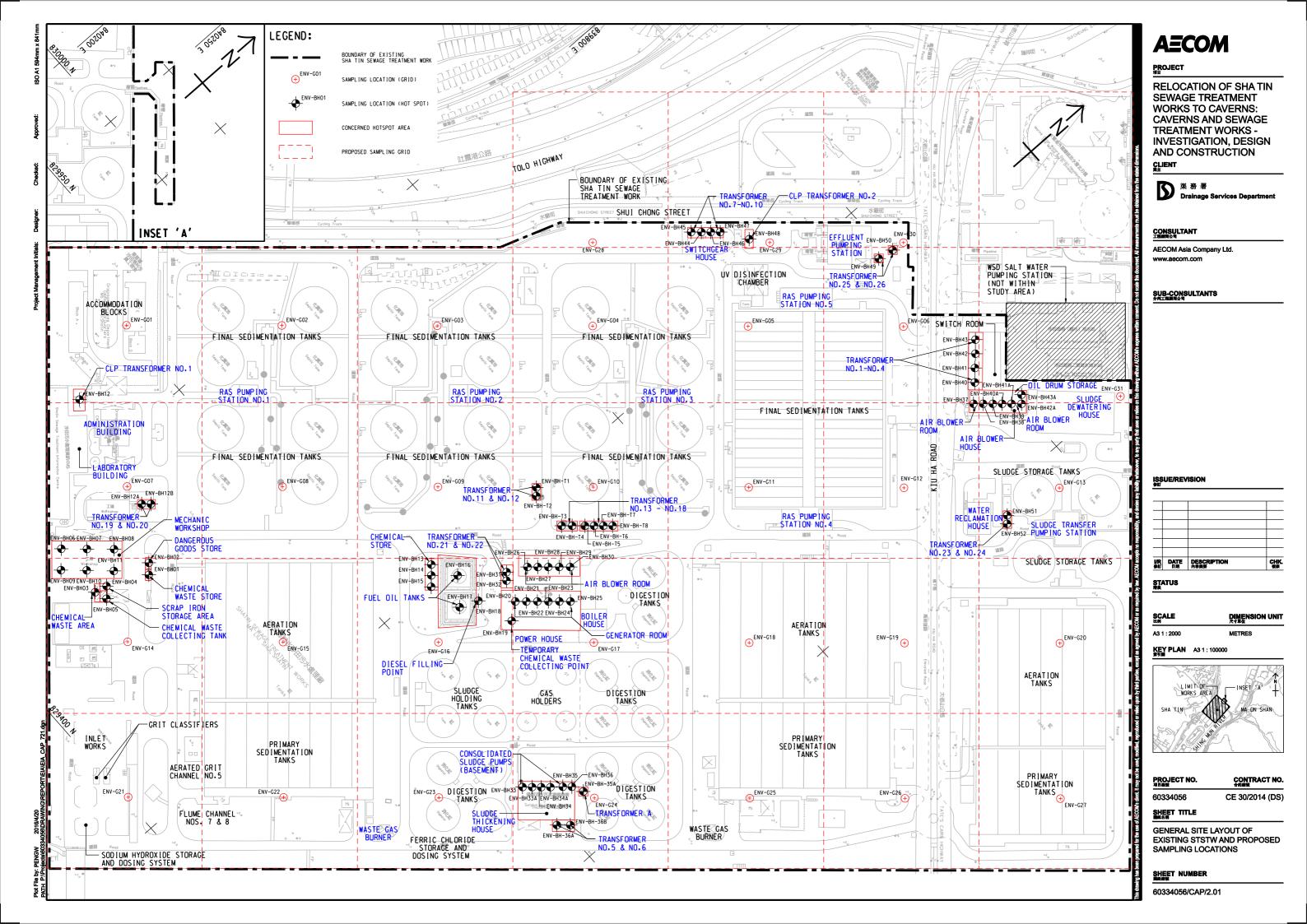
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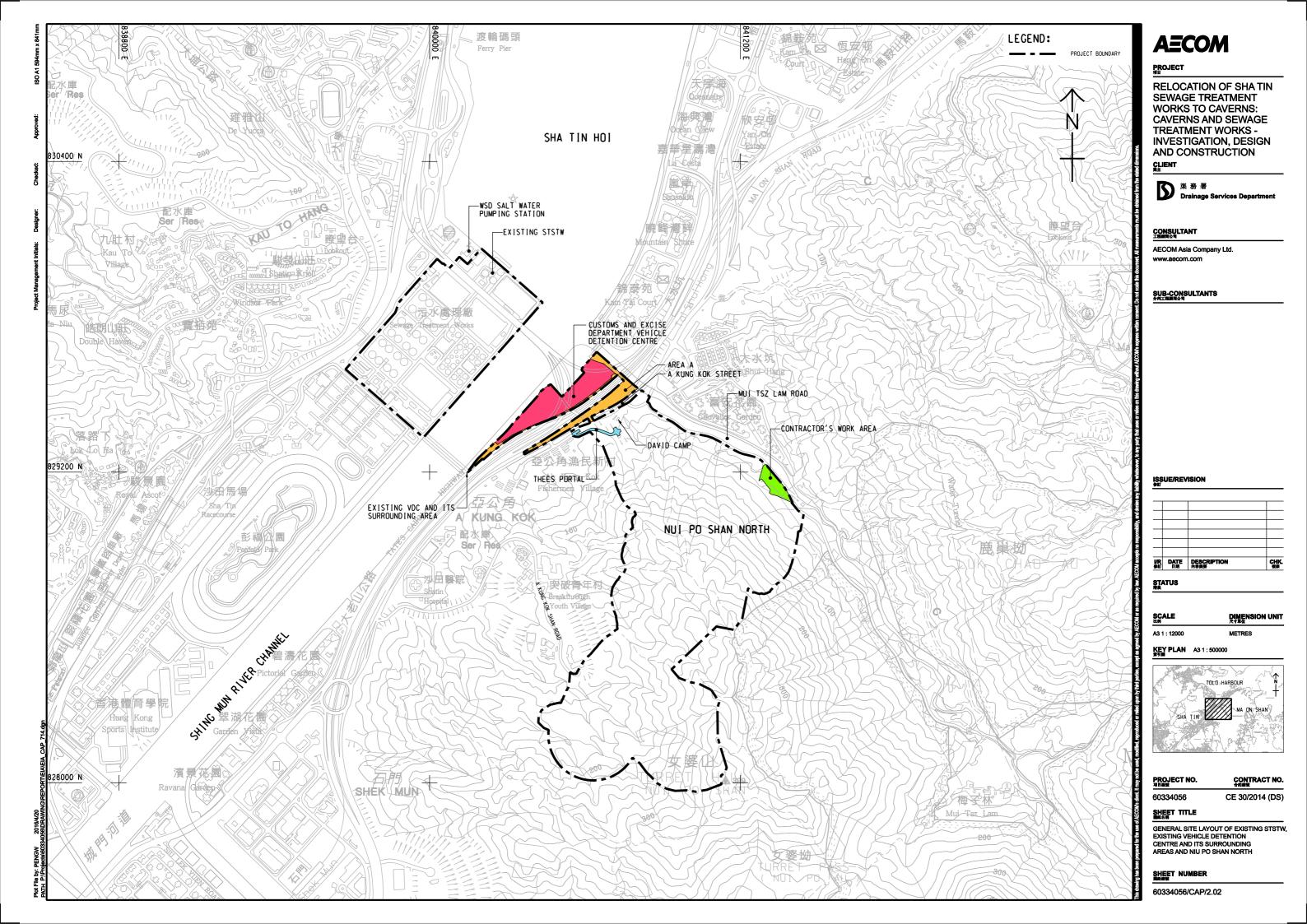
Sha Tin Cavern Sewage Treatment Works

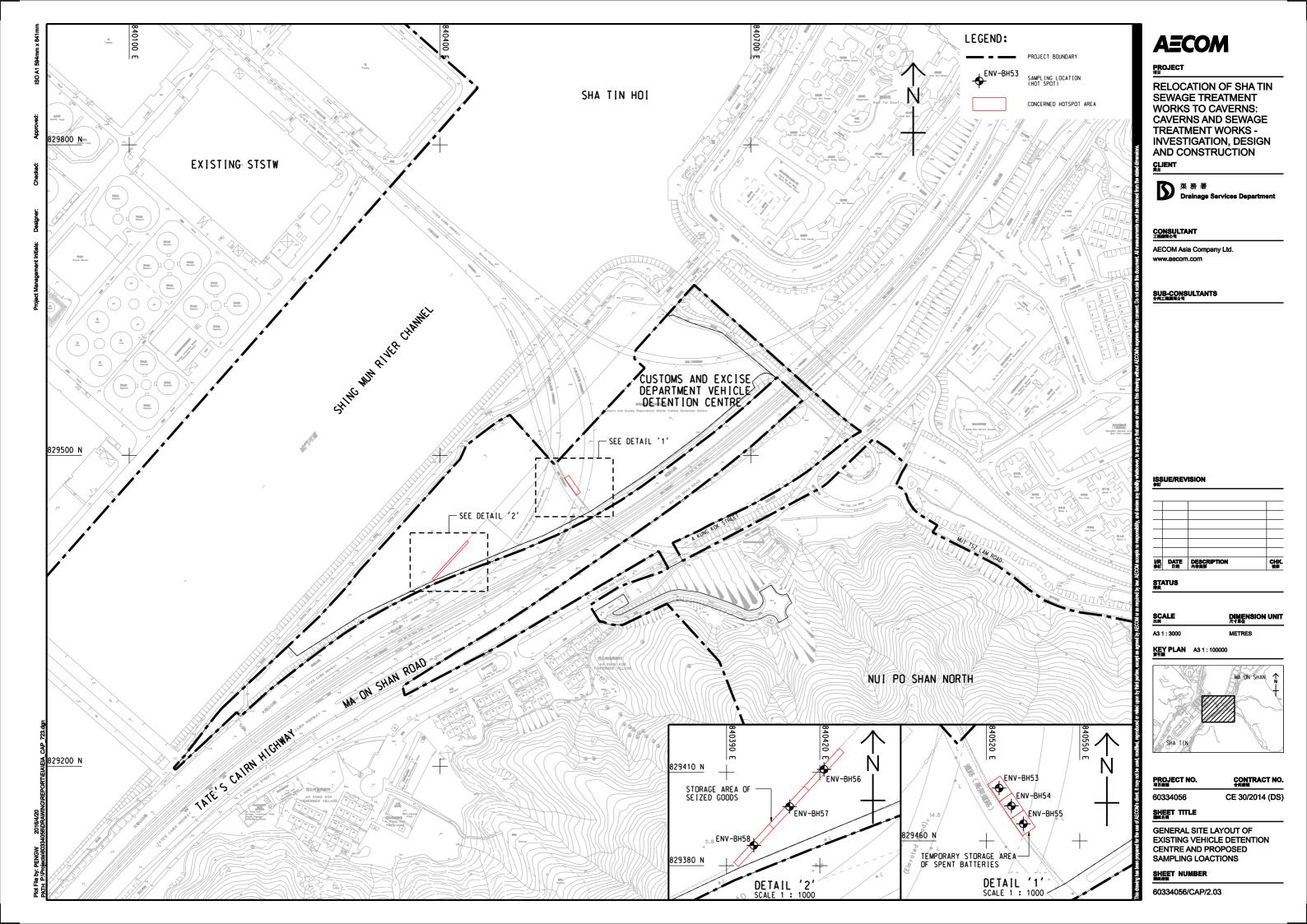
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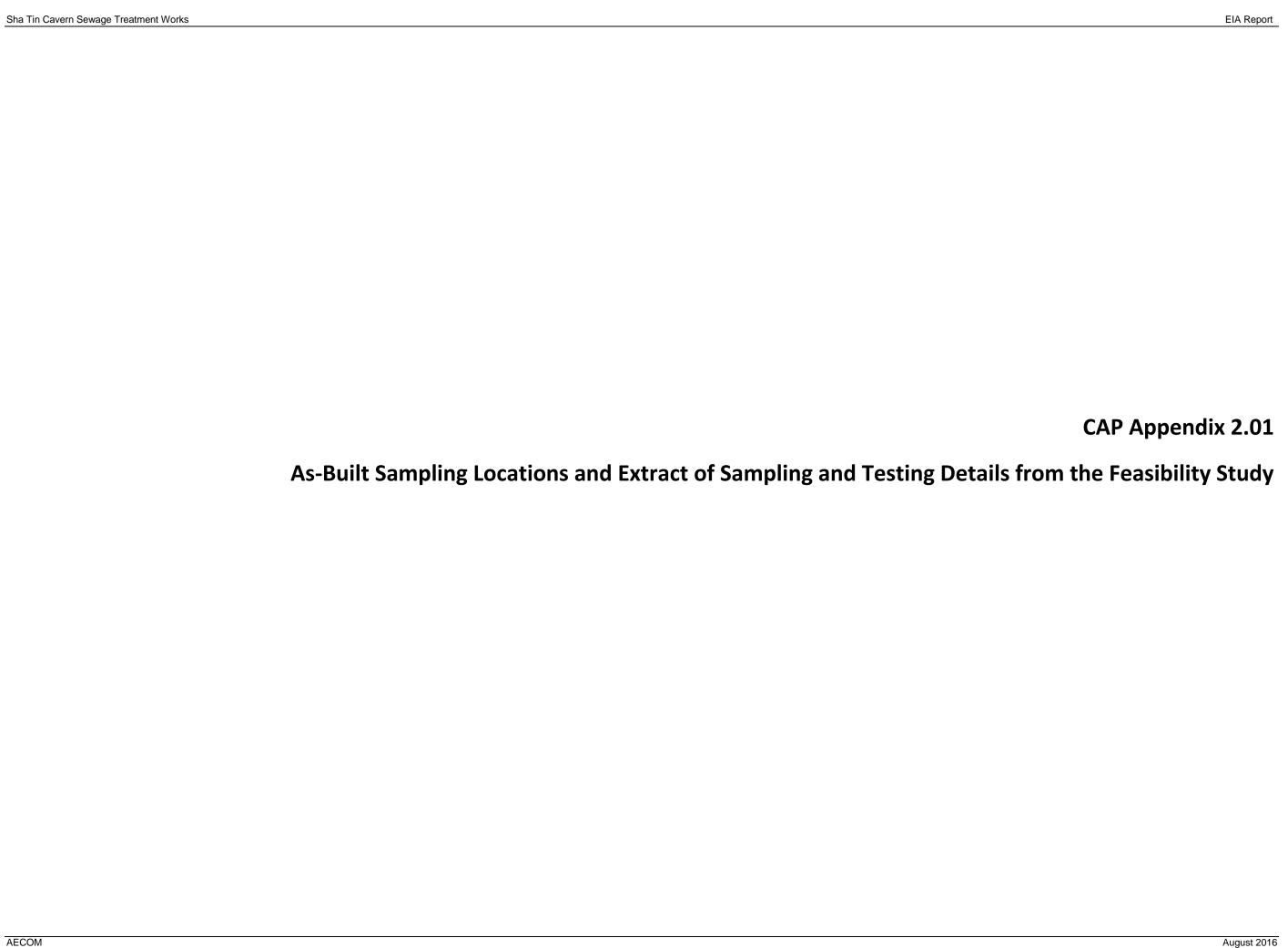
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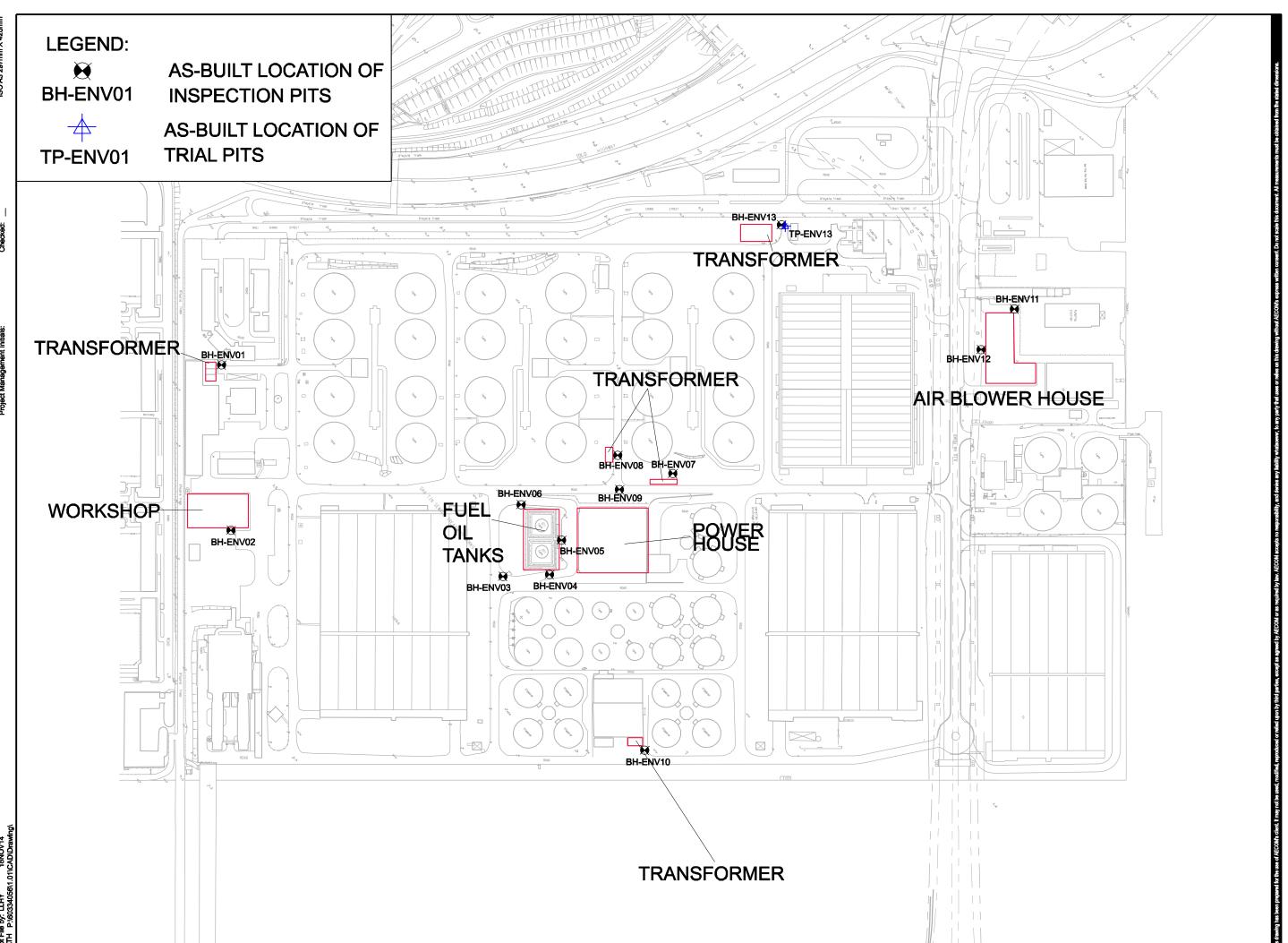


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Appendix 10.02 of the Feasibility Study

Schedule of Laboratory Chemical Testing on Soil Samples

CIVIL ENGINEERING DEVELOPMENT DEPARTMENT CONTRACT NO. GE/2009/16 – CHEMICAL AND BIOLOGICAL TESTING (SERVICE CONTRACT) SERVICE ORDER NO. GE/2009/16.XX

Agreement No. CE 43/2011 (DS)
Relocation of Sha Tin Sewerage Treatment Works to Caverns – Feasibility Study CE/SP, DSD Project:

Client:

Schedule of Laboratory Chemical Test on Soil Samples

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		C17 - C35 Fraction	×	×	×	×	×	×	×	×	×
		C9 - C16 Fraction	×	×	×	×	×	×	×	×	×
200	ב צ	C6 - C8 Fraction	×	×	×	×	×	×	×	×	×
		Pyrene	×	×	×	×	×	×	×	×	×
		Phenanthrene	×	×	×	×	×	×	×	×	×
		Naphthalene	×	×	×	×	×	×	×	×	×
		Indeno(1,2,3-cd)pyrene	×	×	×	×	×	×	×	×	×
		Flnorene	×	×	×	×	×	×	×	×	×
		Fluoranthene	×	×	×	×	×	×	×	×	×
		Dibenzo(a,h)anthracene	×	×	×	×	×	×	×	×	×
		Chrysene	×	×	×	×	×	×	×	×	×
		Benzo(k)fluoranthene	×	×	×	×	×	×	×	×	×
		Benzo(g,h,i)perylene	×	×	×	×	×	×	×	×	×
		Benzo(b)fluoranthene	×	×	×	×	×	×	×	×	×
		Benzo(a)pyrene	×	×	×	×	×	×	×	×	×
		Benzo(a)anthracene	×	×	×	×	×	×	×	×	×
		Anthracene	×	×	×	×	×	×	×	×	×
	,	Acenaphthylene	×	×	×	×	×	×	×	×	×
	ر ا	Acenaphthene	×	×	×	×	×	×	×	×	×
ľ	,	Xylenes (Total)									
		Toluene									
		Ethylbenzene									
\ 		Benzene									
ľ	-	t c g			e ace			ace Se			e ge
		Sample Depth (from -m to m below existing ground level	0.5	1.0	3.0 or interface of water table	0.5	1.0	3.0 or interface of water table	0.5	1.0	3.0 or interface of water table
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		Sample type (grab, vibrocore etc.) & sample diameter (if applicable)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)
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		, ation No.	/01	/01	707	702	702	702	/03	/03	/03
		Sample location/ Investigation Station No.	BH-ENV01	BH-ENV01	BH-ENV01	BH-ENV02	BH-ENV02	BH-ENV02	BH-ENV03	BH-ENV03	BH-ENV03
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Date: __11 June 2013

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Department/Consultant*:

William Wong

Form completed by:

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Relocation of Sha Tin Sewerage Treatment Works to Caverns – Feasibility Study CE/SP, DSD Project:

Client:

	C17 - C35 Fraction	×	×	×	×	×	×	×	×	×	×
	C9 - C16 Fraction	×	×	×	×	×	×	×	×	×	×
PCR	C6 - C8 Fraction	×	×	×	×	×	×	×	×	×	×
	Pyrene	×	×	×	×	×	×	×	×	×	×
	Phenanthrene	×	×	×	×	×	×	×	×	×	×
	Naphthalene	×	×	×	×	×	×	×	×	×	×
	Indeno(1,2,3-cd)pyrene	×	×	×	×	×	×	×	×	×	×
	Fluorene	×	×	×	×	×	×	×	×	×	×
	Fluoranthene	×	×	×	×	×	×	×	×	×	×
	Dibenzo(a,h)anthracene	×	×	×	×	×	×	×	×	×	×
	Chrysene	×	×	×	×	×	×	×	×	×	×
	Benzo(k)fluoranthene	×	×	×	×	×	×	×	×	×	×
	Benzo(g,h,i)perylene	×	×	×	×	×	×	×	×	×	×
	Benzo(b)fluoranthene	×	×	×	×	×	×	×	×	×	×
	Benzo(a)pyrene	×	×	×	×	×	×	×	×	×	×
	Benzo(a)anthracene	×	×	×	×	×	×	×	×	×	×
	Anthracene	×	×	×	×	×	×	×	×	×	×
ပ	Acenaphthylene	×	×	×	×	×	×	×	×	×	×
svoc	Acenaphthene	×	×	×	×	×	×	×	×	×	×
	Xylenes (Total)										
	-Toluene										
	Ethylbenzene										
BTEX	Benzene										
В	n	╁		e e			e e			e e	
	Sample Depth (from -m to m below existing			3.0 or interface of water table			3.0 or interface of water table	10		3.0 or interface of water table	
	Sample Dep (from -m to r below existir	0.5	1.0	or in	0.5	1.0	or in	0.5	7	or in	0.5
		5		3.0 of			3.0 of \			3.0 of \	
	rab, s er (if	g g	g	D.	g g	D.	þ	D.	D.	D	g
	e (gi	ibute	ibute	ibute	ibute	ibute	ibute	ibute	ibute	ibute	ibute
	e typ ore e e dia	Distr e)	Distr e)	Distr e)	Distr e)	Distr e)	Distr e)	Distr e)	Distr e)	Distr e)	Distr e)
	Sample type (grab, vibrocore etc.) & sample diameter (if	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)
		10 W	(Q) (Q)	(D) (Q)	(D) (Q)	O W	<u> </u>	(J) (Q)	(D) (Q)	Ο̈́	0 0
	ر عtion کام	40/	40/	704	705	705	405	90/	90/	90/	20/
	Sample location/ Investigation Station No	BH-ENV04	BH-ENV04	BH-ENV04	BH-ENV05	BH-ENV05	BH-ENV05	BH-ENV06	BH-ENV06	90/N3-H8	BH-ENV07
	Sar loce Investa	BH	BH	BH	BH	BH	BH	BH	BH	BH	BH

Department/Consultant*: <u>AECOM</u> Form completed by: William Wong

Date: _ 11 June 2013

CIVIL ENGINEERING DEVELOPMENT DEPARTMENT CONTRACT NO. GE/2009/16 – CHEMICAL AND BIOLOGICAL TESTING (SERVICE CONTRACT) SERVICE ORDER NO. GE/2009/16.XX

Project:

Agreement No. CE 43/2011 (DS)
Relocation of Sha Tin Sewerage Treatment Works to Caverns – Feasibility Study CE/SP, DSD

Client:

	C17 - C35 Fraction										
		×	×	×	×	×	×	×	×	×	×
	C9 - C16 Fraction	×	×	×	×	×	×	×	×	×	×
PCR	C6 - C8 Fraction	×	×	×	×	×	×	×	×	×	×
	Pyrene	×	×	×	×	×	×	×	×	×	$ $ \times $ $
	Phenanthrene	×	×	×	×	×	×	×	×	×	×
	Naphthalene	×	×	×	×	×	×	×	×	×	×
	Indeno(1,2,3-cd)pyrene	×	×	×	×	×	×	×	×	×	×
	Flnorene	×	×	×	×	×	×	×	×	×	×
	Fluoranthene	×	×	×	×	×	×	×	×	×	×
	Dibenzo(a,h)anthracene	×	×	×	×	×	×	×	×	×	×
	Chrysene	×	×	×	×	×	×	×	×	×	×
	Benzo(k)fluoranthene	×	×	×	×	×	×	×	×	×	×
	Benzo(g,h,i)perylene	×	×	×	×	×	×	×	×	×	×
	Benzo(b)fluoranthene	×	×	×	×	×	×	×	×	×	×
	Benzo(a)pyrene	×	×	×	×	×	×	×	×	×	×
	Benzo(a)anthracene	×	×	×	×	×	×	×	×	×	×
	Anthracene	×	×	×	×	×	×	×	×	×	×
ပ	ycenaphthylene Acenaphthylene	×	×	×	×	×	×	×	×	×	×
svoc	Acenaphthene	×	×	×	×	×	×	×	×	×	×
<u> </u>	Xylenes (Total)										
	Toluene										
	Ethylbenzene										
BTEX	Benzene										
	Sample Depth (from -m to m below existing ground level	1	3.0 or interface of water table	0.5	1	3.0 or interface of water table	0.5	1	3.0 or interface of water table	0.5	~
	Sample type (grab, vibrocore etc.) & sample diameter (if applicable)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)
	Sample location/ Investigation Station No.	BH-ENV07	BH-ENV07	BH-ENV08	BH-ENV08	BH-ENV08	BH-ENV09	BH-ENV09	BH-ENV09	BH-ENV10	BH-ENV10

AECOM Department/Consultant*: William Wong Form completed by:

Date: 11 June 2013

CIVIL ENGINEERING DEVELOPMENT DEPARTMENT CONTRACT NO. GE/2009/16 – CHEMICAL AND BIOLOGICAL TESTING (SERVICE CONTRACT) SERVICE ORDER NO. GE/2009/16.XX

P4 of 4

Project:

Agreement No. CE 43/2011 (DS)
Relocation of Sha Tin Sewerage Treatment Works to Caverns – Feasibility Study CE/SP, DSD

Client:

	C17 - C35 Fraction									
		×	×	×	×	×	×	×	×	×
	C9 - C16 Fraction	×	×	×	×	×	×	×	×	×
PCR	C6 - C8 Fraction	×	×	×	×	×	×	×	×	×
	Pyrene	×	×	×	×	×	×	×	×	×
П	Phenanthrene	×	×	×	×	×	×	×	×	×
П	Naphthalene	×	×	×	×	×	×	×	×	×
	Indeno(1,2,3-cd)pyrene	×	×	×	×	×	×	×	×	×
П	Fluorene	×	×	×	×	×	×	×	×	×
П	Fluoranthene	×	×	×	×	×	×	×	×	×
П	Dibenzo(a,h)anthracene	×	×	×	×	×	×	×	×	×
	Chrysene	×	×	×	×	×	×	×	×	×
П	Benzo(k)fluoranthene	×	×	×	×	×	×	×	×	×
П	Benzo(g,h,i)perylene	×	×	×	×	×	×	×	×	×
	Benzo(b)fluoranthene	×	×	×	×	×	×	×	×	×
П	Benzo(a)pyrene	×	×	×	×	×	×	×	×	×
П	Benzo(a)anthracene	×	×	×	×	×	×	×	×	×
П	Anthracene	×	×	×	×	×	×	×	×	×
ပ္က	Yceusbytyyleue Yceusbytyyleue	×	×	×	×	×	×	×	×	×
svoc	Acenaphthene	×	×	×	×	×	×	×	×	×
	Xylenes (Total)									
П	Toluene									
	Ethylbenzene									
ВТЕХ	Benzene									
	Sample Depth (from -m to m below existing ground level	3.0 or interface of water table	0.5	_	3.0 or interface of water table	0.5	_	3.0 or interface of water table	0.5	-
	Sample type (grab, vibrocore etc.) & sample diameter (if	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)	Grab (Distributed Sample)
	Sample location/ Investigation Station No.	BH-ENV10	BH-ENV11	BH-ENV11	BH-ENV11	BH-ENV12	BH-ENV12	BH-ENV12	BH-ENV13	BH-ENV13

Department/Consultant*: <u>AECOM</u> Form completed by: William Wong

Date: _ 11 June 2013

CIVIL ENGINEERING DEVELOPMENT DEPARTMENT CONTRACT NO. GE/2009/16 – CHEMICAL AND BIOLOGICAL TESTING (SERVICE CONTRACT) SERVICE ORDER NO. GE/2009/16.XX

Agreement No. CE 43/2011 (DS)
Relocation of Sha Tin Sewerage Treatment Works to Caverns – Feasibility Study CE/SP, DSD Project:

Client:

	C17 - C35 Fraction	×	×	×	
	C9 - C16 Fraction	×	×	×	
PCR	C6 - C8 Fraction	×	×	×	×
Ā	Pyrene	×	×	×	
	Phenanthrene	×	×	×	
	Naphthalene				
	Indeno(1,2,3-cd)pyrene	×	×	×	
	Fluorene	×	×	×	
	Fluoranthene	×	×	×	
	Dibenzo(a,h)anthracene	×	×	×	
	Chrysene	×	×	×	
	Benzo(k)fluoranthene	×	×	×	
	Benzo(g,h,i)perylene	×	×	×	
	Benzo(b)fluoranthene	×	×	×	
	Benzo(a)pyrene	×	×	×	
	Benzo(a)anthracene	×	×	×	
	Anthracene	×	×	×	
	Acenaphthylene	×	×	×	
၁င		×	×	×	
svoc	Acenaphthene	×	×	×	
	Xylenes (Total)				×
	Toluene				×
	Ethylbenzene				×
BTEX	Benzene				×
	Sample Depth (from -m to m below existing ground level	3.0 or interface of water table	To be selected on site	NA	NA
	Sample type (grab, 8 vibrocore etc.) & sample diameter (if bapplicable)	Grab (Distributed Sample)	Will be selected Duplicate soil samples (i.e. total two (2)	Will be selected Equipment Blank on site one (1.e. total	Will be selected Trip Blank samples on site (i.e. total one (1))
	Sample location/ Investigation Station No.	BH-ENV13	Will be selected on site	Will be selected on site	Will be selected on site

Department/Consultant*: AECOM Form completed by: William Wong

Date: _ 11 June 2013



Appendix 10.03 of the Feasibility Study

Soil Boring Logs

DI	R	7		EC			-	FRIAL PIT		i i	TRIAL PIT N	
								CONTRACT N	O. GE/2011/	2ປ	SHEET	1 of 1
EXCAVATION DATES: 22.07.2013 to 24.07.2013 BACKFILL DATES: 02.08.2013 to 02.08.2013	RIPTION	Black (10YR 2/1), ASPHALT. (TRAFFIC ROAD)	Angular, greyish brown (10YR 5/2), sandy fine to coarse GRAVEL of rock fragments. (FILL)	Firm, brown (7.5YR 4/4) spotted grey and black, slightly silty sandy CLAY with some angular fine to coarse gravel and cobble of quartz and rock fragments and with occasional refuse,	asphait and concrete fragments. (FILL) Angular, brown (7.5YR 4/4) mottled pink, slightly sandy fine to coarse GRAVEL of rock fragments. (FILL)	At 0.95m: P1: Grey (10YR 5/1), a concrete pipe with 700mm in diameter.	End of trial pit at maximum depth of 1.15 m.					REMARKS Maximum Depth: 1.15 m Average Depth: 1.15 m Shoring: NO Water Seepage: NO 1. Small disturbed samples were taken at 0.50m and 1.00m.
R. Chu // 31.07.2013	GRADE		Ang	of a	Ang	At C diar	딮					R M S S S S S S S S S S S S S S S S S S
	EGEN	0.00	¥	***	1.15							SECTION (not to scale) D B B Compared to the scale) B Compared to the scale to th
LOGGED S.L. Chiu M-CHECKED DATE 30.07.2013 DATE	7.0	D					·					DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
GROUND LEVEL: +5.28 mPD	100			1 / 0 0	4.4		- 1					PLAN (not to scale) A D Start B C C C C C C C C C C C C C C C C C C
N 829937.42	SKETCH EACE B: 4 50 m				4 4 4 9 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		· 					PLAN (not:
E 839961.59	DEPTH FACE A: 1 50 m			1.6 4	1.15							ALL DISTURBED SAMPLE GGE DISTURBED SAMPLE U76 SAMPLE (VERTICAL / HORIZONTAL) U100 SAMPLE (VERTICAL / HORIZONTAL) SCK SAMPLE SITU DENSITY TEST TER SAMPLE
CO-ORDINATES	SAMPLES DE and TESTS (i	<u>"</u>	, ,								



CONTRACT NO. GE/2011/25

PIT NO. BH-ENV01

SHEET 1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to

WORKS OF	RDER NO.	GE/2011/2	25.15A	\		-	CO-ORDINATES E 839763.11	METHOD MANU	AL EXCAVATION
DATE	29	.06.2013 to	02.	.07.20	13		N 829554.48	GROUND LEVEL	+6.33 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade	-	Description	
29.06.2013			+6.23	0.00	M		Black (10YR 2/1), ASPHAL	T. (TRAFFIC ROAD)	
	Dry at			-			Angular, greyish brown (10 coarse GRAVEL of rock fra	YR 5/2), slightly clayey sil agments. (FILL)	ty sandy fine to
29.06.2013 02.07.2013	1800 Dry at	1 🗘 0.45	+5.88	0.45			Dense, yellowish red (5YR with some angular fine to c	5/8), slightly silty clayey fir	ne to coarse SANI
	0800			-					
	Dry			-			At bottom: Grey (10YR 6/1)) mottled brown, CONCRE	:TE.
02.07.2013	Dry at 1800	2 1 0.80	+5,48	0.85		٠	E 1 (1) 11 11 12 12 12 12 12 12 12 12 12 12 12		-
1							End of inspection pit at 0.8	5 m.	
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- [ŀ						
SMALL DIST	JRBED SAMPLE	□ U76 SA	MDI E		+		LOGGED S.L. Chiu Ch		
		_					DATE 05.07.2013		
LAHGE DISTL	JRBED SAMPLE	₩ U100 SA	MPLE				CHECKED R. Chu		
WATER SAME	PLE						DATE 15.07.2013	*	

- Small disturbed samples were taken at 0.50m and 0.85m.
 Environmental samples were taken at 0.50m and 0.83m.
 The inspection pit was backfilled on 12 July 2013.

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de la composición dela composición de la composición dela composición dela composición dela composición de la composición de la composición dela compos		<i>J</i> I
		ILTE(

BH-ENV02 PIT NO.

SHEET

CONTRACT NO. GE/2011/25

1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (Gi inside STSTW)

PROJECT	Cavers - Feasib	ility (GI inside ST	STW)	Easi (Term CC	milac	ti), Agreement No. CE 43/2011(D3	,, nelocation of ona	Till Sewage Trea	Milletti Works to
WORKS O	RDER NO.	GE/2011/2	5.15A	\			CO-ORDINATES E 839860.82	METHOD	MANUAL EX	CAVATION
DATE	27	7.06.2013 to	29.	06.20	13		N 829473.24	GROUND LEV	EL	+6.37 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description		
27.06.2013			+6.37	0.00	H		Black (10YR 2/1), ASPHAL	T. (TRAFFIC RC	AD)	
-			+6.09	0.28	4 4 4 4 4 4 4 4 4 7 4 4		Grey (10YR 6/1), CONCRE	ETE. (CONCRET	E SUBBASE)	
27.06.2013 28.06.2013	Dry at 1800 Dry at 0800	1 🗘 0.45					Dense, brown (7.5YR 5/4), some angular to subangula of rock fragments. (FILL)	slightly clayey sil ar fine to coarse g	ty fine to coars ravel and occa	e SAND with isional cobble
128.06.2013 29.06.2013	Dry at 1800 Dry av 0800	2 🕽 0.95								
- - - 29.06.2013	1.15 at 1800	3 \$\pm\$ 1.45	+4.62	1.75						
2				-			End of inspection pit at 1.7	5 m.		
	TURBED SAMPLE STURBED SAMPLE MPLE	U100 S		=			DATE 29.06.2013 CHECKED R. Chu DATE DATE 06.07.2013	, ,		·

REMARKS

Small disturbed samples were taken at 0.50m, 1.00m, 1.50m and 1.75m.
 Environmental samples were taken at 0.50m, 1.00m and 1.10m.
 Groundwater sample was taken at 1.15m.
 The inspection pit was backfilled on 11 July 2013.

DRILTECH

INSPECTION PIT RECORD

PIT NO.

BH-ENV03

CONTRACT NO. GE/2011/25

SHEET 1 of 1

	RDER NO.	GE/2011/2	.O. 10A				CO-ORDINATES 1 E 840016.15	METHOD MANUAL EXCAVATION			
DATE	26	.06.2013 to	26.	06.20	13		N 829611.81 GROUND LEVEL				
Excavation Progress	Shift Start Dep Had Carade						Description				
26.06.2013	Dny		+5.23	0.00	S		Black (10YR 2/1), ASPHALT. (TRAFFIC ROAD)			
26.06.2013	Dry at 1800	1 1 0.28	+4.90	- 0.33			Angular to subangular, greyish coarse GRAVEL of rock fragme At bottom: Grey (10YR 6/1) mo End of inspection pit at 0.33 m.	ttled brown, CONCRET			
				-							
		-	-				·				
						,					
			-								
			- - - -								
	URBED SAMPLE URBED SAMPLE	☑ U76 SAM				(OGGED S.L. Chiu M. 28.06.2013 CHECKED R. Chu ATE 06.07.2013				

.					
D	2 A	10000	Part I		
			2018	I	Name of
	9 8	_ 8			R 8

BH-ENV03A PIT NO.

CONTRACT NO. GE/2011/25

SHEET of

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to

		ulity (GI Inside 51	51 W)					·		
WORKS OF	RDER NO.	GE/2011/2	25.15A	١			CO-ORDINATES E 840009.62	METHOD	MANUAL EXCAVATION	N
DATE	11	1.07.2013 to	12.	07.20	13		N 829614.33	GROUND LEV	EL +5.19 mPI	D
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description		
11.07.2013	Dry at 1800 Dry 0800 0.85 at 1800	1	+5.19	0.00			Dense, brown (10YR 5/3), some angular fine to coars roots. (FILL) From 0.45m to 0.60m: Gre			vith
112.07.2013	1800	2 1 0.95	+4.19	1.00			End of inspection pit at 1.0	0 m		
							Life of inspection pit at 1.0	O III.		
	TURBED SAMPLE TURBED SAMPLE	☑ U76 S/	AMPLE SAMPLE				DATE 12.07.2013 CHECKED R. Chu // DATE 13.07.2013	-	-	
REMARKS					l					

1. Small disturbed samples were taken at 0.50m and 1.00m. 2. Environmental samples were taken at 0.50m and 0.80m. 3. Groundwater sample was taken at 0.85m. 4. The inspection pit was backfilled on 2 August 2013.

INSPECTION PIT RECORD

PIT NO.

BH-ENV04

CONTRACT NO. GE/2011/25

SHEET 1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (Gl inside STSTW) WORKS ORDER NO. GE/2011/25.15A CO-ORDINATES METHOD MANUAL EXCAVATION E 840036.89 DATE 26.06.2013 to 28.06.2013 N 829634.61 GROUND LEVEL +6.20 mPD Ê Water Level Excavation Samples (m) Shift Start Description Depth Progress 26.06.2013 Black (10YR 2/1), ASPHALT. (TRAFFIC ROAD) Angular to subangular, grey (10YR 5/1), slightly silty sandy fine to coarse GRAVEL of rock fragments. (FILL) Dense, brown (7.5YR 5/4), slightly silty fine to coarse SAND with occasional to some angular to subangular fine to coarse gravel and cobble of rock fragments and with occasional refuse fragments. (FILL) At bottom: Angular to subangular, greyish brown (10YR 5/2), coarse GRAVEL and occasional cobble of rock fragments. (FILL) 2 🗘 0.95 127.06.2013 ³ I ^{1.45} 4 _ 1.60 28.06.2013 End of inspection pit at 1.65 m. LOGGED S.L. Chiu &h. U76 SAMPLE DATE 29.06.2013 LARGE DISTURBED SAMPLE U100 SAMPLE R. Chu CHECKED ▲ WATER SAMPLE DATE 06.07.2013

REMARKS

Small disturbed samples were taken at 0.50m, 1.00m, 1.50m and 1.65m.
 Environmental samples were taken at 0.50m and 1.00m.
 The inspection pit was backfilled on 2 August 2013.

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CONTRACT NO. GE/2011/25

PIT NO.	ВН-	ENV	04A	
SHEET	1	of	1	

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to

	Oavers - reasibility (at itiside 515147)							
WORKS OF	RDER NO.	GE/2011/2	5.15A				CO-ORDINATES	METHOD MANUAL EXCAVATION
DATE	23	3.07.2013 to	29.	07.20 ⁻	13		E 840038.91 N 829625.63	GROUND LEVEL +5.98 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description
23.07.2013			+5.98	0.00	N		Black (10YR 2/1), ASPHAL	T. (TRAFFIC ROAD)
	Dry at		+5.82	0.16				spotted light brown and grey, slightly silty 0 with some to much angular fine to coarse ragments. (FILL)
23.07.2013 29.07.2013	1800 Dry at 0800	1 🕽 0.45	+5.08	- 0.90			coarse gravel of quartz and	d rock fragments. (FILL)
_1		2 🕇 0.95					gravel and cobble of rock f	spotted light brown and grey, slightly silty of with some to much angular fine to coarse ragments. (FILL) sially with a boulder (<350mm) sized concrete forcement.
29.07.2013	1.80 at 1800	3 I 1.45	+4.08	1.90				
_2							End of inspection pit at 1.90	0 m.
	TURBED SAMPLE STURBED SAMPLE	_	AMPLE				LOGGED S.L. Chiu // DATE 30.07.2013 CHECKED R. Chu // DATE 31.07.2013	<i>L</i> .

REMARKS

INSPECTION PIT RECORD

CONTRACT NO. GE/2011/25

BH-ENV05 PIT NO.

SHEET

of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (GI inside STSTW) WORKS ORDER NO. GE/2011/25.15A **CO-ORDINATES** METHOD MANUAL EXCAVATION E 840026.61 DATE 26.06.2013 to 29.06.2013 N 829661.33 **GROUND LEVEL** +6.91 mPD Water Level Excavation Samples (m) Shift Start Description Depth Progress 26.06.2013 Black (10YR 2/1), ASPHALT. (TRAFFIC ROAD) Angular to subangular, brown (7.5YR 5/4), slightly clayey silty sandy fine to coarse GRAVEL of rock fragments and with some concrete fragments. (FILL) ₵ 0.45 26.06.2013 27.06.2013 Firm, brown (7.5YR 4/4), silty sandy CLAY with some angular to subangular fine to coarse gravel and occasional cobble of rock fragments and with some concrete fragments. (FILL) 127.06.2013 Dense, brown (7.5YR 4/4), slightly clayey silty fine to coarse SAND with some angular to subangular fine to coarse gravel and cobble of rock fragments and with some concrete fragments. (FILL) From 1.40m to 2.40m: Partially with grey (10YR 6/1) mottled brown, CONCRETE. 4 1 1.95 0800 ⁵ ‡ ^{2,45} 2.73 at 29.06.2013 End of inspection pit at 2.75 m. U76 SAMPLE LOGGED S.L. Chiu β -DATE 29.06.2013 LARGE DISTURBED SAMPLE U100 SAMPLE CHECKED R. Chu ▲ WATER SAMPLE DATE 06.07.2013 REMARKS

- Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 2.75m.
 Environmental samples were taken at 0.50m, 1.00m and 2.50m.
 Groundwater sample was taken at 2.73m.
 The inspection pit was backfilled on 11 July 2013.

^{1.} Small disturbed samples were taken at 0.50m, 1.00m and 1.50m. 2. Environmental samples were taken at 0.50m, 1.00m and 1.80m. 3. Groundwater sample was taken at 1.80m. 4. The inspection pit was backfilled on 2 August 2013.

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CONTRACT NO. GE/2011/25

PIT NO. **BH-ENV06** SHEET 1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to

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WORKS OF	RDER NO.	GE/2011/2	5.15A				CO-ORDINATES	METHOD MANUAL EXCAVATION
DATE	26	6.06.2013 to	27.	06.20	13] · ·	E 839985.50 N 829654.19	GROUND LEVEL +5.21 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Puegend	Grade		Description
26.06.2013			+5.21	0.00			Black (10YR 2/1), ASPHAL	
26.06.2013 27.06.2013	Dry at 1800 Dry at 0800 Dry at 1800	1 🕽 0.45		-				y (10YR 5/1) spotted brown, slightly sandy rock fragments. (FILL)) mottled brown, CONCRETE.
27.06.2013	1800	2 1 0.69	+4,47	0.74	****		End of inspection pit at 0.74	4 m.
	-							
	TURBED SAMPLE TURBED SAMPLE	☑ U76 SA		-			LOGGED S.L. Chiu U DATE 28.06.2013 CHECKED R. Chu U DATE 06.07.2013	· · · · · · · · · · · · · · · · · · ·

REMARKS

Small disturbed samples were taken at 0.50m and 0.74m.
 Environmental samples were taken at 0.50m and 0.73m.
 The inspection pit was backfilled on 12 July 2013.



INSPECTION PIT RECORD

CONTRACT NO. GE/2011/25

PIT NO. **BH-ENV07**

SHEET 1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (Gl inside STSTW)

	VORKS ORDER NO. GE/2011/25.15A ATE 26.06.2013 to 02.07.2013						-	CO-ORDINATES E 840048.60	METHOD MANUAL EXCAVATION		
DATE	26	.06.2013	to		07.20	13		N 829755.53	GROUND LEVEL	+5.66 mPD	
Excavation Progress	Water Level (m) Shift Start / End	Sampl	es	Reduced Level	Depth (m)	Legend	Grade		Description		
26.06.2013 27.06.2013 27.06.2013 28.06.2013 28.06.2013 02.07.2013	Dry at 1800 Dry at 1800 Dry at 1800 Dry at 1800 Dry at 1800 Dry at 1800 1.60 at 1800	1 \(\pi \) 0. 2 \(\pi \) 0.1 3 \(\pi \) 1.6 4 \(\pi \) 1.7	95	+3.66	1.80			Firm, reddish brown (5YR E CLAY with occasional angurock fragments and with oc At 1.20m: Dark grey, a stee	el pipe with approx. 450mm		
	JRBED SAMPLE JRBED SAMPLE . PLE	_	76 SAN	MPLE MPLE			i (DATE 29.06.2013 CHECKED R. Chu (1) DATE 06.07.2013		,	

- Small disturbed samples were taken at 0.50m, 1.00m, 1.50m and 1.80m.
 Environmental samples were taken at 0.50m, 1.00m and 1.50m.
 Groundwater sample was taken at 1.60m.
 The inspection pit was backfilled on 9 July 2013.

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CONTRACT NO GF/2011/25

PIT NO. **BH-ENV08**

							1 NO. GE/2011/25	SHEET	1 0	
PROJECT	Ground Investic Cavers - Feasib	gation - New Terri ility (GI inside ST	tories STW)	East (Term Co	ntrac	et), Agreement No. CE 43/2011(DS), Relocation of Sha T	in Sewage T	reatment Works to
WORKS OF	RDER NO.	GE/2011/2	5.15A			·	CO-ORDINATES E 839996.83	METHOD	MANUAL	EXCAVATION
DATE	26	6.06.2013 to	26.	06.201	13		N 829738.67	GROUND LEVE	L	+5.07 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description		
26.06.2013		,	+5.07	0.00	H		Black (10YR 2/1), ASPHAL	T. (TRAFFIC ROA	AD)	
-	Dry at 1800	1 🛧 0.30		-	H		At bottom: Grey (10YR 6/1)) mottled brown, C	ONCRETE	:.
26.06.2013	1800	1	+4.72	0.35			End of inspection pit at 0.3	5 m.		
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3										
	TURBED SAMPLE	☑ U76 S	AMPLE				LOGGED S.L. Chiu $\ell \nu$			
1 LARGE DIS	TURBED SAMPLE		SAMPLE	.			DATE 29.06.2013	-		
▲ WATER SA							CHECKED R. Chu	,		
							DATE 06.07.2013			

REMARKS

Small disturbed sample was taken at 0.35m.
 The inspection pit was backfilled on 11 July 2013.



INSPECTION PIT RECORD

CONTRACT NO. GE/2011/25

PIT NO. **BH-ENV08A**

SHEET 1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (Gl inside STSTW)

WORKS OF		GE/2011/2					CO-ORDINATES E 839995.69	METHOD MANUAL EXCAVATION
DATE	11	1.07.2013 to	_	.07.20	13		N 829740.88	GROUND LEVEL +5.09 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description
11.07.2013			+5.09	0.00	H		Black (10YR 2/1), ASPHAI	LT. (TRAFFIC ROAD)
			+4.74	0.35			Angular, greyish brown (10 GRAVEL of rock fragments	OYR 5/2), slightly silty sandy fine to coarse s. (FILL)
11.07.2013 12.07.2013	Dry at 1800 Dry at 0800	1 🛨 0.45		-			Dense, brown (7.5YR 4/4) silty fine to coarse SAND w fragments. (FILL)	spotted light reddish brown, slightly clayey with some angular fine to coarse gravel of roo
1 12.07.2013	0.90 at 1800	▲ 0.90 2 → 0.95	+4.04	1.05				
				-			End of inspection pit at 1.0	5 m.
				-	-			
2				-				
			- - - -	-				
					_			
SMALL DISTU	IRBED SAMPLE	U100 SA				I	DATE 12.07.2013 CHECKED R. Chu	~
WATER SAMP	LC					[DATE 13.07.2013	

REMARKS

- Small disturbed samples were taken at 0.50m and 1.00m.
 Environmental samples were taken at 0.50m and 0.85m.
 Groundwater sample was taken at 0.90m.
 The inspection pit was backfilled on 2 August 2013.

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CONTRACT NO. GE/2011/25

PIT NO.	BH-	-ENV	/09	
SHEET	1	of	1	

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (GI inside STSTW)

WORKS OF	RDER NO.	GE/2011/2	25.15A	١			CO-ORDINATES E 840025.49	METHOD MA	NUAL EXCAVATION
DATE	26	5.06.2013 to	28.	06.20	13		N 829724.22	GROUND LEVEL	+5.07 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description	
26.06.2013	·		+5.07 +4.99	0.00			Black (10YR 2/1), ASPHA		
-			+4.72	0.35			Angular to subangular, bro to coarse GRAVEL of rock		
26.06.2013 27.06.2013	Dry at 1800 Dry at 0800	¹ \$\Pi\$ 0.45		-			Firm, light reddish brown (sto some angular fine to confragments. (FILL)	5YR 6/3), clayey sandy arse gravel and occasio	SILT with occasional anal cobble of rock
127.06.2013 28.06.2013	1.00 at 1800 1.00 at 0800	² 🛣 0.95							
- 28.06.2013	1.00 at 1800	3	+3.47	1.60					
_2							End of inspection pit at 1.6	0 m.	
	TURBED SAMPLE TURBED SAMPLE	_	AMPLE SAMPLE				DATE 29.06.2013 CHECKED R. Chu DATE 06.07.2013	h.	

REMARKS

INSPECTION PIT RECORD

CONTRACT NO. GE/2011/25

BH-ENV10 PIT NO.

SHEET 1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (GI inside STSTW)

WORKS OF	RDER NO.	GE/2011/	25.15	1			CO-ORDINATES	METHOD MAN	IUAL EXCAVATION
DATE	27	.06.2013 to	11.	07.20	13		E 840187.38 N 829602.99	GROUND LEVEL	+6.34 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description	
27.06.2013			+6.34	0.00	X		Black (10YR 2/1), ASPHAL	T. (TRAFFIC ROAD)	
	Dry		+6.12	- 0.42			Angular to subangular, grey to coarse GRAVEL of rock	rish brown (10YR 5/2), s fragments. (FILL)	slightly silty sandy fine
27.06.2013 28.06.2013	Dry at 1800 Dry ar 1800 Dry ar 0800	1 🕽 0.45		-			Stiff, brown (10YR 5/3), slig angular to subangular fine t	htly sandy silty CLAY w o coarse gravel of rock	ith occasional fragments. (FILL)
128.06.2013 29.06.2013	Dry at 1800 Dry at	2 🗘 0.95		-					
	0800			-					
		3 🕽 1.45	+4.74	1.60			Dense, brown (10YR 5/3), s	lightly clavey silty fine to	coarse SAND with
2		⁴ ‡ ^{1.95}		-			Dense, brown (10YR 5/3), s much angular to subangular (FILL) At 1.80m: Partially with a bo fragments.		
-		A 2.20					•		
29.06.2013 11.07.2013	2.20 at 1800 2.20 at 0800	⁵ 🕽 ^{2,45}	-	-					
11.07.2013	2.20 at 1800	6 1 2.95	+3.34	3.00			End of inspection pit at 3.00	m.	
SMALL DISTU	JRBED SAMPLE	☑ U76 SA	MPLE				LOGGED S.L. Chiu	-	
LARGE DISTU		⊞ U100 S	AMPLE				DATE 29.06.2013 CHECKED R. Chu D DATE 06.07.2013		

Small disturbed samples were taken at 0.50m, 1.00m, 1.50m and 1.60m.
 Environmental samples were taken at 0.50m and 0.90m.
 Groundwater sample was taken at 1.00m.
 The inspection pit was backfilled on 11 July 2013.

Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m.
 Environmental samples were taken at 0.50m, 1.00m and 3.00m.
 Groundwater sample was taken at 2.20m.
 The inspection pit was backfilled on 2 August 2013.

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CONTRACT NO. GE/2011/25

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PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (GI inside STSTW)

WORKS O	RDER NO.	GE/2011/2	5.15A				CO-ORDINATES	METHOD MANUAL EXCAVATION
DATE	29	9.06.2013 to	03.	07.20	13		E 840117.20 N 830025.06	GROUND LEVEL +5.43 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description
29.06.2013			+5.43	0.00	D D D D D D D D D D D D D D D D D D D		(ROAD)	ETE with steel reinforcement. (TRAFFIC
29.06.2013	Dry at	1 1 0.45	+4.95	0.48			of rock fragments. (FILL)	nottled brown, sandy fine to coarse GRAVEL
29.06.2013 02.07.2013 - - - - 1	1800 Day 0800	² ‡ ^{0.95}	7.00	-		-	Dense, yellowish red (5YR clayey silty fine to coarse smedium gravel of rock frag	5/6) and dark brown (7.5YR 3/4), slightly SAND with some to much angular fine to gments. (FILL)
.		³ 🗘 ^{1,45}		-				
202.07.2013 03.07.2013	Dry at 1800 Dry at 0800	4 \$\pm\$ 1.95 5 \$\pm\$ 2.45		-				
	Dry at 1800 STURBED SAMPLE STURBED SAMPLE		+2.43 AMPLE SAMPLE	3.00			End of inspection pit at 3.00 LOGGED S.L. Chiu D DATE 05.07.2013 CHECKED R. Chu D DATE 15.07.2013	

INSPECTION PIT RECORD

CONTRACT NO. GE/2011/25

PIT NO. **BH-ENV12**

SHEET 1 of 1

PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to Cavers - Feasibility (Gl inside STSTW)

				OATE 29.06.2013 to 03.07.2013			1	E 840108.15		····
DATE	29	0.06.2013	to	03.	07.20	113		N 829999.93	GROUND LEVE	L +5.36 mPD
Excavation Progress	Water Level (m) Shift Start / End	Sample	es	Reduced Level	Depth (m)	Puegel	Grade		Description	
29.06.2013				+5.36	0.00			Grey (10YR 5/1), CONCRE ROAD)	ETE with steel reinf	orcement. (TRAFFIC
29.06.2013 02.07.2013	Dry at 1800	¹ ‡ ^{0,4}	15	+4.85	- 0.51			Angular, grey (10YR 5/1) m of rock fragments. (FILL)	nottled brown, sand	y fine to coarse GRAVE
02.07.2013	1800 Dry ar 0800	,			-			Dense, yellowish red (5YR clayey fine to coarse SAND rock fragments. (FILL)	5/8) and brown (10) with some angula	YR 5/3), slightly silty r fine to coarse gravel o
1		² 🗘 ^{0.9}	5		-					
		³ I ^{1.48}	5	+3.86	1.50			Firm, yellowish red (5YR 5/8 with some angular fine grav	B) spotted yellowishel of quartz and roo	n brown, silty sandy CLA ck fragments. (FILL)
02.07.2013 03.07.2013	Dry at 1800 Dry at 0800	4 🕽 1.95		-	_					
03.07.2013	2.30 at 1800	A 2.30		+3.04	2,32			End of inspection pit at 2.32	m.	
				-						
	IRBED SAMPLE	_	6 SAM					DATE S.L. Chiu (h		
WATER SAMP	JRBED SAMPLE	⊠ U1	00 SAI	MPLE			(CHECKED R. Chu // DATE 15.07.2013		

- Small disturbed samples were taken at 0.50m, 1.00m, 1.50m and 2.00m.
 Environmental samples were taken at 0.50m, 1.00m and 2.20m.
 Groundwater sample was taken at 2.30m.
 The inspection pit was backfilled on 11 July 2013.

Small disturbed samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m.
 Environmental samples were taken at 0.50m, 1.00m and 3.00m.
 The inspection pit was backfilled on 11 July 2013.

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PROJECT Ground Investigation - New Territories East (Term Contract), Agreement No. CE 43/2011(DS), Relocation of Sha Tin Sewage Treatment Works to

PROJECT	Ground Investic Cavers - Feasib	ation - New Te ility (GI inside	rritories STSTW)	East (Term Co	ontrac	t), Agreement No. CE 43/2011(DS	S), Relocation of Sha Tin Sev	vage Treatment Works to
WORKS O	RDER NO.	GE/2011	1/25.15A	١			CO-ORDINATES E 839961.69	METHOD MAN	NUAL EXCAVATION
DATE	29	9.06.2013 to	o 02.	07.20	13		N 829936.22	GROUND LEVEL	+5.29 mPD
Excavation Progress	Water Level (m) Shift Start / End	Samples	Reduced Level	Depth (m)	Legend	Grade		Description	
29.06.2013			+5.29	- 0.22			Black (10YR 2/1), ASPHA		
	Dry at	1 0.45	+4.84	0.45			Angular, greyish brown (10 GRAVEL of rock fragment	OYR 5/2), slightly silty sar s. (FILL)	ndy fine to coarse
29.06.2013 02.07.2013	1800 Dry at 0800	1 🗊 0.45		-		-	Dense, yellowish red (5YR with some angular fine gra	5/8), slightly clayey silty vel of rock fragments. (F	fine to coarse SAND
							At bottom: With some med	lium to coarse gravel of r	rock fragments.
_1		2 🗘 0.95					*		
02.07.2013	Dry at 1800	3 <u>1</u> 1.15	+4.09	1.20					
_				-			End of inspection pit at 1.2	0 m.	
-				-					
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3									
	TURBED SAMPLE	U 76	SAMPLE				LOGGED S.L. Chiu	n	
‡ LARGE DIS	TURBED SAMPLE	₩ U100	O SAMPLE				DATE 05.07.2013	·	
▲ WATER SAI	MPLE						DATE 15.07.2013		
REMARKS									

Small disturbed samples were taken at 0.50m, 1.00m and 1.20m.
 Environmental samples were taken at 0.50m and 1.00m.
 The inspection pit was backfilled on 2 August 2013.



Appendix 10.04 of the Feasibility Study

Summary of The Laboratory Testing Results of Soil and Groundwater

			SVOC																		Ranges
																			i ca oicai	i Garbon	Ranges
		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	C6 - C8 Fraction	C9 - C16 Fraction	C17 - C35 Fraction	
	Parameters Unit		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	тg/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	5	200	500
RBI	RGs of Urban Residentail		3510	2340	10000*	12	1.2	9.88	1800	120	871	1.2	2400	2380	12	182	10000		1410	2240	10000*
1,5.	Saturation Limit		60.2	19.8	2.56									54.7		125	28		1000	3000	5000
Sample Location	Sampling Depth (m bgs)	Date of Sampling	VV.2	10.0										V					.000	-	
BH-ENV01	0.50	2-Jul-13	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.50	0<0.500	<5	<200	<500
BHENV01	0.83	11-Jul-13							ļ									0<0.500		<200	<500
BH-ENV02	0.50	28-Jun-13																0<0.500		<200	1040
BH-ENV02	1.00	28-Jun-13	_													_		0<0.500		<200	<500
BH-ENV02	1.10	2-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV3A	0.50	11-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV3A	0.80	12-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV4A	0.50	29-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV4A	1.00	29-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV4A	1.80	29-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV05	0.50	27-Jun-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV05	1.00	27-Jun-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV05	2.50	3-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV06	0.50	27-Jun-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV06	0.73	11-Jul-13	<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	<0.50	0<0.500	<5	<200	<500
BH-ENV07	0.50	27-Jun-13																0<0.500		<200	<500
BH-ENV07	1.00	27-Jun-13							1	1	1	1			1	1		0<0.500		<200	<500
BH-ENV07	1.50	28-Jun-13							<u> </u>									0<0.500		<200	<500
BH-ENV8A	0.50	11-Jul-13							ļ			1			1			0<0.500		<200	<500
BH-ENV8A	0.85	12-Jul-13									ļ							0<0.500		<200	<500
BH-ENV09	0.50	27-Jun-13								+		-			-	-		0<0.500		<200	<500
BH-ENV09	0.90	28-Jun-13																0<0.500		<200	<500
BH-ENV10	0.50	27-Jun-13																0<0.500		<200	<500
BH-ENV10	1.00	28-Jun-13																0<0.500		<200	<500
BH-ENV10	3.00	11-Jul-13																0<0.500		<200	<500
BH-ENV11	0.50	2-Jul-13																0 < 0.500		<200	<500
BH-ENV11 BH-ENV11	1.00	2-Jul-13 3-Jul-13							1	1	1	1			1	1		0 < 0.500 0 < 0.500		<200	<500 <500
BH-ENV11 BH-ENV12	3.00 0.50	3-Jul-13 2-Jul-13																0 < 0.500		<200 <200	<500 <500
BH-ENV12 BH-ENV12	1.00	2-Jul-13 2-Jul-13																0<0.500		<200	<500 <500
BH-ENV12	2.20	3-Jul-13																0<0.500		<200	<500
BH-ENV13	0.50	2-Jul-13																0 < 0.500		<200	<500
BH-ENV13	1.00	2-Jul-13																0<0.500		<200	<500

Note: bgs = Below ground surface

LOR= Level of Reporting

			SVOC										Petroleui	m Carbon	Ranges
	Parameters		Acenaphthene	Acenaphthylene	Anthracene	Benzo(b)fluoranthene	Chrysene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	C6 - 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
	LOR		2	2	2	1	1	2	2	2	2	2	20	500	500
RBR	Gs of Urban Residentail		10000000*	1410000	10000000*	539	58100	10000000*	10000000*	61700	10000000*	10000000	82200	714000	12800
	Saturation Limit		4240	3930	43.4	1.5	1.6	206	1980	31000	1000	135	5230	2800	2800
Sample Location	Sampling Depth (m bgs)	Date of Sampling	g												
BH-ENV02	1.15	2-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	1200
BH-ENV3A	0.85	12-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500
BH-ENV4A	1.85	29-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500
BH-ENV05	2.73	3-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500
BH-ENV07	1.60	2-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500
BH-ENV8A	0.90	12-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500
BH-ENV09	1.00	2-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500
BH-ENV10	2.20	16-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500
BH-ENV12	2.30	3-Jul-13	<2.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<20	<500	<500

Note: bgs= below ground surface
LOR= Level of Reporting







CEDD Contract No. GE/2012/24

Chemical and Biological Testing (Service Contract)

Service Order No. GE/2012/24.11

Agreement No. CE 43/2011(DS)

Relocation of Sha Tin Sewage Treatment Works to Caverns –

Feasibility Study

Provision of Chemical and Biological Testing Service

Laboratory Chemical Testing Report (Final Report)

Prepared for

Civil Engineering and Development Department

Prepared By

ALS Technichem (HK) Pty Ltd

August 23, 2013



CEDD Contract No. GE/2012/24

Chemical and Biological Testing (Service Contract)

Service Order No. GE/2012/24.11

Agreement No. CE 43/2011(DS)

Relocation of Sha Tin Sewage Treatment Works to Caverns –

Feasibility Study

Provision of Chemical and Biological Testing Service

Laboratory Chemical Testing Report (Final Report)

CLIENT:

Civil Engineering and Development Department Ground Investigation Sections 23/F, Kwun Tong View 410 Kwun Tong Road Kowloon, Hong Kong Tel: 852-2716 8609 Fax: 852-2715 7572

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CERTIFIED BY:

Mr Fung Lim Chee, Richard

Person Appointed to Act for the Contractor

Date: August 23, 2013

Contract No. GE/2012/24 Chemical and Biological Testing Service Order No. GE/2012/24.11 Agreement No. CE 43/2011(DS) Relocation of Sha Tin Sewage Treatment Works to Caverns – Feasibility Study Provision of Chemical and Biological Testing Service



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Section 1
Summary Reports

Summary of Soil Analytical Results

Date of Issue:

23/08/2013

Client:

Civil Engineering and Development Department GE/2012/24.11

Service Order No.:

Project:

Agreement No. CE43/2011 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns - Feasibility Study Provision of Chemical and Biological Testing Service



			Total P	etroleum Hydrocarl	oons (TPH)
		Analytes	C6 - C8 Fraction	C9 - C16 Fraction	C17 - C35 Fraction
		Units	mg/kg	mg/kg	mg/kg
		LOR	5	200	500
ALS Lab ID	Sample ID	Sampling Date			
HK1317305002	BH-ENV05/ 0.5M	27/06/2013	<5	<200	<500
HK1317305003	BH-ENV06/ 0.5M	27/06/2013	<5	<200	<500
HK1317305004	BH-ENV07/ 0.5M	27/06/2013	<5	<200	<500
HK1317305005	BH-ENV09/ 0.5M	27/06/2013	<5	<200	<500
HK1317305006	BH-ENV10/ 0.5M	27/06/2013	<5	<200	<500
HK1317305008	BH-ENV05/ 1.0M	27/06/2013	<5	<200	<500
HK1317305009	BH-ENV07/ 1.0M	27/06/2013	<5	<200	<500
HK1317464001	BH-ENV10/ 1.0M	28/06/2013	<5	<200	<500
HK1317464002	BH-ENV02/ 0.5M	28/06/2013	<5	<200	1040
HK1317464003	BH-ENV02/ 1.0M	28/06/2013	<5	<200	<500
HK1317464004	BH-ENV09/ 0.9M	28/06/2013	<5	<200	<500
HK1317464005	BH-ENV07/ 1.5M	28/06/2013	<5	<200	<500
HK1317464006	BH-ENV07/ 1.5M(A)	28/06/2013	<5	<200	<500
HK1317464007	BH-ENV07/ 1.5M(B)	28/06/2013	<5	<200	<500
HK1317593001	BH-ENV12/ 0.5M	2/07/2013	<5	<200	<500
HK1317593002	BH-ENV11/ 0.5M	2/07/2013	<5	<200	<500
HK1317593003	BH-ENV13/ 0.5M	2/07/2013	<5	<200	<500
HK1317593004	BH-ENV01/ 0.5M	2/07/2013	<5	<200	<500
HK1317593005	BH-ENV12/ 1.0M	2/07/2013	<5	<200	<500
HK1317593006	BH-ENV11/ 1.0M	2/07/2013	<5	<200	<500
HK1317593007	BH-ENV13/ 1.0M	2/07/2013	<5	<200	<500
HK1317598001	BH-ENV11/ 3.0M	3/07/2013	<5	<200	<500
HK1317598002	BH-ENV12/ 2.2M	3/07/2013	<5	<200	<500
HK1317598003	BH-ENV5/ 2.5M	3/07/2013	<5	<200	<500
HK1317598004	BH-ENV2/ 1.1M	3/07/2013	<5	<200	<500
HK1318887002	BH-ENV3A 0.80M	12/07/2013	<5	<200	<500
HK1318887004	BH-ENV8A 0.85M	12/07/2013	<5	<200	<500
HK1318896001	BH-ENV10 3.0M	11/07/2013	<5	<200	<500
HK1318896002	BH-ENV06 0.73M	11/07/2013	<5	<200	<500
HK1318896003	BH-ENV01 0.83M	11/07/2013	<5	<200	<500
HK1318896004	BH-ENV3A 0.5M	11/07/2013	<5	<200	<500
HK1318896005	BH-ENV8A 0.5M	11/07/2013	<5	<200	<500
HK1320318001	BH-ENV4A 0.5M	29/07/2013	<5	<200	<500
HK1320318002	BH-ENV4A 1.0M	29/07/2013	<5	<200	<500
HK1320318003	BH-ENV4A 1.8M	29/07/2013	<5	<200	<500

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Benzola	-			v	ľ	v	V	٧	٧	ľ	٧	V	ľ	v	ľ	٧	V	ľ	V	V	٧	v	V	V	*	V	ľ	ľ	Y	V	ľ	V	ľ	V	Ť	ľ	ľ
Dibenzía hlanthracene	mg/kg	0.5		<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	<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	<0.500	<0.500
Indepo(12.3 cd)nyrene	mg/kg	0.5		<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	<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	<0.500	<0.500
Benzo/alnyrene	mg/kg	9.0		<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	<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	<0.500	<0.500
Bonzo/k/fluoranthana	ma/kg	0.5		<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	<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	<0.500	<0.500
Bonzo(b)(increnthone	ma/ka	0.5		<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	<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	<0.500	<0.500
		0.5		<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	<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	<0.500	<0.500
Benzialenthroone Chrisens	ma/kg	0.5		<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	<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	<0.500	<0.500
Direction	ma/ka	0.5		<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	<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	<0.500	<0.500
Channelhane	ma/ka	0.5		<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	<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	<0.500	<0.500
Authoriza	Anthracene mg/kg	0.5		<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	<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	<0.500	<0.500
	Phenanthrene mg/kg	0.5		<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	<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	<0.500	<0.500
н		0.5		<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	<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	<0.500	<0.500
	Acenaphthene	0.5		<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	<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	<0.500	<0.500
	Acenaphthylene	0.5		<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	<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	<0.500	<0.500
	Naphthalene	0.5		<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	<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	<0.500	<0.500
	Analytes	LOR	Sampling Date	27/06/2013	27/06/2013	27/06/2013	27/06/2013	27/06/2013	27/06/2013	27/06/2013	28/06/2013	28/06/2013	28/06/2013	28/06/2013	28/06/2013	28/06/2013	28/06/2013	2/02//2013	2/02/2013	2/07/2013	2/02/2013	2/02/2013	2/02//2013	2/02/2013	3/02/2013	3/07/2013	3/07/2013	3/07/2013	12/07/2013	12/07/2013	11/02/2013	11/02/2013	11/07/2013	11/02/2013	11/02/2013	29/07/2013	29/07/2013
			Cample ID	RH-ENVOS/ 0.5M	BH-ENVOG/ 0.5M	BH-ENVOZ/ 0.5M	BH-ENVO9/ 0.5M	RH-ENV10/ 0.5M	RH-ENVOS/ 1.0M	BH-ENVOZ/ 1.0M	BH-ENV10/ 1.0M	BH-ENV02/ 0.5M	BH-ENV02/ 1.0M	BH-FNV09/ 0.9M	BH-ENV07/ 1.5M	RH-ENVOZ/ 1.5M(A)	RH-ENVOZ/ 1 SM(B)	BH-ENV12/ 0.5M	RH-ENV11/ 0.5M	RH-ENV13/ 0.5M	RH-ENVO1/ 0.5M	BH-ENV12/ 1 0M	BH-ENV11/ 1.0M	BH-ENV13/ 1 OM	RH-FNV11/3 OM	RH-ENV12/ 2.2M	BH-ENVS/ 2.5M	BH-ENV2/ 1.1M	BH-ENV3A 0.80M	RH-FNV8A 0.85M	BH-ENV10 3.0M	BH-FNVO6 0.73M	BH-ENVOI 0.83M	BH-ENV3A 0.5M	BH-ENV8A 0.5M	BH-ENV4A 0.5M	BH-ENV4A 1.0M
			Oldel SIA	HK1317305009	HK1317305003	HK1317305004	HK1317305005	HK1317305006	HK1317305008	HK1317305009	HK1317464001	HK1317464002	HK1317464003	HK1317464004	HK1317464005	HK1317464006	HK1317464007	HK1317593001	HK1317593002	HK1317593003	HK1317503004	HK1317593005	HK1317593006	HK1317593007	HK1317598001	HK1317598002	HK1317598003	HK1317598004	HK1318887002	HK131887004	HK1318896001	HK131896002	HK1318896003	HK1318896004	HK1318896005	HK1320318001	HK1320318002

Summary of Water Analytical Results

Date of Issue:

Client: Service Order No.:

Project:

Civil Engineering and Development Department 23/08/2013

GE/2012/24.11 Agreement No. CE43/2011 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns - Feasibility Study Provision of Chemical and Biological Testing Service

			Total Pe	Total Petroleum Hydrocarbons (TPH)	ons (TPH)
		Analytes	C6 - C8 Fraction	C9 - C16 Fraction	C6 - C8 Fraction C9 - C16 Fraction C17 - C35 Fraction
		Units	hg/L	hg/L	µg/L
		LOR	20	200	200
ALS Lab ID	Sample ID	Sampling Date			
HK1317305011	TRIP BLANK	27/06/2013	<20	:	:
HK1317464008	EQUIPMENT BLANK	28/06/2013	<20	<500	<500
HK1317593008	BH-ENV07 (G.W) 1.6M	2/07/2013	<20	<500	<500
HK1317593009	BH-ENV09 (G.W) 1.0M	2/07/2013	<20	<500	<500
HK1317593010	BH-ENV02 (G.W) 1.15M	2/07/2013	<20	<500	1200
HK1317598005	BH-ENV12 (G.W) 2.3M	3/07/2013	<20	<500	<500
HK1317598006	BH-ENV5 (G.W) 2.73M	3/07/2013	<20	<500	<500
HK1318887001	BH-ENV3A (GW) 0.85M	12/07/2013	<20	<500	<500
HK1318887003	BH-ENV8A (GW) 0.9M	12/07/2013	<20	<500	<500
HK1319351001	BH-ENV10 (GW) 2.2M	17/07/2013	<20	<500	<500
HK1320318004	BH-ENV4A 1.85M (G.W)	29/07/2013	<20	<500	<500

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nary of Water

Date of Issue: Client: Service Order No.: Project:



Summary of Water Analytical Results

Date of Issue: Client: Service Order No.: Project:

23/08/2013
Civil Engineering and Development Department
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Provision of Chemical and Biological Testing Service



					Monocyclic	Monocyclic Aromatic Hydrocarbons (MAH)	(MAH)	
		Analytes	Benzene	Benzene Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	ortho-Xylene Xylenes (Total)
		Units	hg/L	hg/L	hg/L	hg/L	µg/L	µg/L
		LOR	2	5	2	10	5	20
ALS Lab ID	Sample ID	Sampling Date						
HK1317305011	TRIP BLANK	27/06/2013	<5.0	<5.0	<5.0	<10	<5.0	<20
HK1317464008	EQUIPMENT BLANK	28/06/2013	-		;	1	:	;
HK1317593008	BH-ENV07 (G.W) 1.6M	2/07/2013	1	1	1	-	:	:
HK1317593009	BH-ENV09 (G.W) 1.0M	2/07/2013	1	1	1	:	:	:
HK1317593010	BH-ENV02 (G.W) 1.15M	2/07/2013	1	1	1	-	:	:
HK1317598005	BH-ENV12 (G.W) 2.3M	3/07/2013	-	-	;	1	:	:
HK1317598006	BH-ENV5 (G.W) 2.73M	3/07/2013	1		:	-	:	:
HK1318887001	BH-ENV3A (GW) 0.85M	12/07/2013	1	1	:	:	:	:
HK1318887003	BH-ENV8A (GW) 0.9M	12/07/2013	1	1	1	:	1	:
HK1319351001	BH-ENV10 (GW) 2.2M	17/07/2013	-	1	:	:	:	:
HK1320318004	BH-ENV4A 1.85M (G.W)	29/07/2013	1		:	-	:	:

Section 2

Certificate of Analysis

Technichem (HK) Pty Ltd ALS

ALS Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES





CERTIFICATE OF ANALYSIS

	10							
: 1 of 8	: HK1317305				: 27-JUN-2013	: 15-AUG-2013	11	· · ·
Page	Work Order	Amendment			Date Samples Received	Issue Date	No. of samples received	No. of samples analysed
: ALS Technichem HK Pty Ltd	: Fung Lim Chee, Richard	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	: Richard.Fung@alsglobal.com : +852 2610 1044	: +852 2610 2021	1			
Laboratory	Contact	Address	E-mail Telephone	Facsimile	Quote number			
: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	: MR SUN NG	GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	: sunng@cedd.gov.hk :		: RELOCATION OF SHA TIN SEWERAGE TREATMENT WORKS TO CAVERNS	: GE/2012/24.11	: H025602	: SHA TIN SEWAGE TREATMENT PLANT
Client	Contact	Address	E-mail Telephone	racsimile	Project	Order number	C-O-C number	Site

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Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6. Senior Chemist - Organics Chemist - Inorganics Signatories
Anh Ngoc Huynh
Ng Chun Hoi, Michael

Organics Inorganics

ALS Laboratory Group
Trading Name: ALS Technichem (HK) Pty Ltd
14F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsenviro.com

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Work Order

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. The completion date of analysis is: 04-JUL-2013

Key. Lor = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Service is a division of the American Chemical Society. Specific comments for Work Order: HK1317305

Project Name: Agreement No. CE 43/2011 (DS) Relocation of Sha Tin Sewerage Treatment Works to Caverns - Feasibility Study. Soil sample(s) were received in a chilled condition.

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

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



: 3 of 8 : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1317305, Amendment 1



The Martin		•						
Sub-Matrix: SOIL		5	Client sample ID	BH-ENV05/ 0.5M	BH-ENV06/ 0.5M	BH-ENV07/ 0.5M	BH-ENV09/ 0.5M	BH-ENV10/ 0.5M
		Client sam	Client sampling date / time	[27-JUN-2013]	[27-JUN-2013]	[27-JUN-2013]	[27-JUN-2013]	[27-JUN-2013]
Compound	CAS Number	LOR	Unit	HK1317305-002	HK1317305-003	HK1317305-004	HK1317305-005	HK1317305-006
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)		0.1	%	5.4	3.1	15.5	18.7	6.6
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	(PAHs)							
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Chrysene	218-019	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	202-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	507-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	(TPH)							
C6 - C8 Fraction	****	2	mg/kg	<5	<5	<5	<5	<5
C9 - C16 Fraction	-	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	1	200	mg/kg	<500	<500	<500	<500	<200
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	(PAHs) Sur	rogates					Surrogate control limits I	Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%	104	102	101	93.0	108
4-Terphenyl-d14	1718-51-0	0.1	%	103	101	100	100	806
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits I	Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	90.0	91.4	91.4	89.8	89.9
Toluene-D8	2037-26-5	0.1	%	101	103	8.66	104	98.5
4-Bromofluorobenzene	460-00-4	0.1	%	100	07.3	7 00	0 00	0

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: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1317305, Amendment 1

Sub-Matrix: SOIL			Client sample ID	BH-ENV05/	BH-FNV07/	
				1.0M	1.0M	
		Client sar	Client sampling date / time	[27-JUN-2013]	[27-JUN-2013]	
Compound	CAS Number	LOR	Unit	HK1317305-008	HK1317305-009	
EA/ED: Physical and Aggregate Properties	8					
EA055: Moisture Content (dried @ 103°C)		0.1	%	13.4	16.1	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	ins (PAHs)					
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	
Phenanthrene	82-01-8	0.500	mg/kg	<0.500	<0.500	
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	ions (TPH)					
C6 - C8 Fraction	1	2	mg/kg	\$	<5	
C9 - C16 Fraction	1	200	mg/kg	<200	<200	
C17 - C35 Fraction	-	200	mg/kg	<500	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	ons (PAHs) Su	rrogates				Surrogate control limits listed at end of this report
2-Fluorobiphenyl	32160-8	0.1	%	108	102	
4-Terphenyl-d14	1718-51-0	0.1	%	104	98.8	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	ø					Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	90.6	90.1	
Toluene-D8	2037-26-5	0.1	%	2.66	99.4	
4-Bromofluorobenzene	460-00-4	0.1	%	6.96	97.0	

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		1

Sub-iviatrix: WAIEK			Client sample ID	TRIP BLANK	
		Client sam	Client sampling date / time	[27-JUN-2013]	
Compound	CAS Number	LOR	Unit	HK1317305-011	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	arbons (TPH)				
C6 - C8 Fraction		20	μg/L	<20	
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)	drocarbons (MAH				
Benzene	7143-2	5.0	µg/L	<5.0	
Toluene	108-88-3	5.0	µg/L	<5.0	
Ethylbenzene	100-41-4	5.0	hg/L	<5.0	
meta- & para-Xylene	108-38-3	10	hg/L	<10	
ortho-Xylene	95-47-6	5.0	µg/L	<5.0	
Xylenes (Total)	-	20	hg/L	<20	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate				Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	97.8	
Toluene-D8	2037-26-5	0.1	%	103	
4-Bromofluorobenzene	460-00-4	0.1	%	96.2	
EP-074_SR-S: VOC Surrogates					Surrogate control limits listed at end of this report
Dibromofluoromethane	1868-53-7	0.1	%	97.8	Carlogado Como Distante de Carlo Carlogado Car
Toluene-D8	2037-26-5	0.1	%	103	
4-Bromofluorobenzene	460-00-4	0.1	%	96.2	

Page Number Client Work Order

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Laboratory Duplicate (DUP) Report

Matrix: SOIL					79	Laboratory Duplicate (DUP) Report	eport	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
√ED: Physical ar √ED: Ph	EA/ED: Physical and Aggregate Properties	es (QC Lot: 2946160)						
HK1317305-001	BH-ENV04/ 0.5M	EA055: Moisture Content (dried @ 103°C)		0.1	%	7.2	6.7	6.9
HK1317350-002	Anonymous	EA055: Moisture Content (dried @ 103°C)		0.1	%	12.3	12.3	0.0
-076A: Polycycli	c Aromatic Hydrocarb	EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2945371)						
HK1317305-001	BH-ENV04/ 0.5M	Naphthalene	91-20-3	200	µg/kg	<500	<200	0.0
		Acenaphthylene	208-96-8	200	µg/kg	<500	<200	0.0
		Acenaphthene	83-32-9	200	hg/kg	<500	<500	0.0
		Fluorene	86-73-7	200	hg/kg	<500	<200	0.0
		Phenanthrene	85-01-8	200	ng/kg	<500	<500	0.0
		Anthracene	120-12-7	200	hg/kg	<500	<200	0.0
		Fluoranthene	206-44-0	200	hg/kg	<500	<500	0.0
		Pyrene	129-00-0	200	hg/kg	<500	<500	0.0
		Benz(a)anthracene	26-55-3	200	µg/kg	<200	<200	0.0
		Chrysene	218-01-9	200	µg/kg	<200	<200	0.0
		Benzo(b)fluoranthene	202-99-2	200	µg/kg	<200	<200	0.0
		Benzo(k)fluoranthene	207-08-9	200	µg/kg	<200	<200	0.0
		Benzo(a)pyrene	50-32-8	200	µg/kg	<200	<200	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	200	hg/kg	<200	<200	0.0
		Dibenz(a.h)anthracene	53-70-3	200	µg/kg	<200	<200	0.0
		Benzo(g.h.i)perylene	191-24-2	200	µg/kg	<200	<200	0.0
-071HK_SR: Tota	al Petroleum Hydrocar	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367)						
HK1317305-001	BH-ENV04/ 0.5M	C6 - C8 Fraction	1	2	mg/kg	<5	~	0.0
-071HK_SR: Tota	al Petroleum Hydrocar	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945372)						
HK1317305-001	BH-ENV04/ 0.5M	C9 - C16 Fraction	-	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	-	200	mg/kg	<500	<500	0.0
Matrix: WATER					Lal	Laboratory Duplicate (DUP) Report	sport	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
-071HK_SR: Tota	al Petroleum Hydrocar	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945385)						
HK1317305-011	TRIP BLANK	C6 - C8 Fraction		0.02	mg/L	<0.02	<0.02	0.0
-074_SR-A: Mon	ocyclic Aromatic Hydr	EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2945160)						
HK1317270-001	Anonymous	Benzene	71-43-2	0.5	µg/L	<0.5	<0.5	0.0
		Toluene	108-88-3	0.5	µg/L	31.4	33.2	5.7
		Ethylbenzene	100-41-4	0.5	hg/L	<0.5	<0.5	0.0
		ortho-Xylene	92-47-6	0.5	hg/L	<0.5	<0.5	0.0
		meta- & para-Xylene	108-38-3	τ-	hg/L	7	7	0.0
		Xvlenes (Total)		2	1/011	0	C	00

	meta- & para-Ayrene	-vyierie			106-42-3	_	µg/L	,	<u>v</u>		0.
	Xylenes (Total)	al)			-	2	hg/L	~	?		0.0
Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	Spike (LC:	S) and L	aboratory C	Control Spike	Duplicate (Do	S) Report					
Matrix: SOIL			Method Blank (MB) Report	Report		Laboratory Contr	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control S	pike Duplicate (I	DCS) Report	
					Spike		Spike Recovery (%)	Recovery Limits (%)	Limits (%)	RP	RPD (%)
Method: Compound C/	CAS Number LOR	LOR	Unit	Result	Concentration	SO7 ,	DCS	Tow	Low High	Value	Value Control Limit
	THE RESERVE THE PARTY OF THE PA	The state of the s		The second of th	and a regulation of the second	The same area and have the same of the same and the same same same same same same same sam			The state of the s	the state of the spirits of the little world of the state of	And the second state of the second se

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Matrix: SOIL			mentod plant (ma) vebout	a codour (The country of the control of the co	1000	Daniel Daniel		
					Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)	B	RPD (%)
Method: Compound CAS	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Control Limit
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2945374)	(PAHs)	(QC Lot: 2	945371)								
Naphthalene	91-20-3	25	hg/kg	"	25 µg/kg	90.0	-	63	117		
Accessive	0 00 000	0		00,	1	1		-			1
	0-06-007	2	hg/kg	06	25 Halka	9 20		4	7	-	
Acananhthana	83 33 0	25	2//21		Bylyd 25	0.70		4, 0	2 2	-	
	6-70-00	S	6V/6H		ga/gd cz	92.0		n	77.	-	-
Fluorene	86-73-7	20	na/ka	<50							
		3		8	25 ua/ka	84.8		9	126		
Phenanthrene	85-01-8	20	ua/ka	<50				3	2		
		}		8	25 ua/ka	97.3		09	127		
Anthracene 1	120-12-7	25	ua/ka		25 ua/kg	97.4	-	25 25	124		
		ì		<50	D	.	-	8	17.		
Fluoranthene	206-44-0	25	µg/kg		25 µg/kg	97.3		61	132	1	
)	<50	2				!	-	1
Pyrene 1	129-00-0	25	µg/kg		25 µg/kg	101	1	61	133	-	-
				<20	1	-		-	-	-	1
Benz(a)anthracene	26-55-3	20	µg/kg	<20		-		-	-	-	1
					25 µg/kg	94.7	-	22	124	-	
Chrysene	218-01-9	20	µg/kg	<20	-	-	1	1	-	-	-
					25 µg/kg	99.5		09	128		1
Benzo(b)fluoranthene	205-99-2	20	µg/kg	<20			-	1	-	1	-
					25 µg/kg	94.8	-	48	135	-	-
Benzo(k)fluoranthene	207-08-9	20	µg/kg	<20	-			-	-	1	1
					25 µg/kg	97.6		28	133	1	1
Benzo(a)pyrene	50-32-8	25	µg/kg	5	25 µg/kg	2.96		20	124		1
				<50	-	-					
Indeno(1.2.3.cd)pyrene	193-39-5	25	µg/kg		25 µg/kg	80.7		48	134	1	1
				<50	1	-	-	-			
Dibenz(a.h)anthracene	53-70-3	20	µg/kg	<20	;	-				-	
					25 µg/kg	86.0	-	20	137		
Benzo(g.n.i)perylene	191-24-2	20	µg/kg	<20	1	1	-		-		-
				1	25 µg/kg	91.8		22	140		-
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)		(QC Lot: 2945367)	945367)								
C6 - C8 Fraction	1	2	mg/kg	<5	4.5 mg/kg	87.2		69	139		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945372)	(TPH) (QC Lot: 2	945372)								
C9 - C16 Fraction	-	200	mg/kg	<200	32 mg/kg	62.2		53	104		
C17 - C35 Fraction	1	200	mg/kg	<500	90 mg/kg	53.7		43	66		
Matrix: WATER			Method Blank (MB) Report	Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control S	Spike Duplicate	(DCS) Report	nd deriverse des data reconstructions reconstructions des constructions reconstructions described to the construction of the constructions of the construction of the
					Spike	Spike Rec	Spike Recovery (%)	Recovery	Recovery Limits (%)	RP	RPD (%)
Method: Compound CASN	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Том	High	Value	Control Limit
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945385)	(TPH)	QC Lot: 2	945385)								

A Campbell Brothers Limited Company

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Matrix: WATER			Method Blank (MB) Report	Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicate	(DCS) Report	
					Spike	Spike Rec	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound	CAS Number LOR	LOR	Unit	Result	Concentration	SOT	DCS	TOW	High	Value	Value Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2945160)	matic Hydrocarbons (M.	AH) (QC	Lot: 2945160)								
Benzene	71-43-2	0.5	hg/L	<0.5	2 µg/L	106		58	126	-	-
Toluene	108-88-3	0.5	hg/L	<0.5	2 µg/L	101	1	63	124	1	-
Ethylbenzene	100-41-4	0.5	hg/L	<0.5	2 µg/L	93.0	1	62	123	1	1
meta- & para-Xylene	108-38-3	-	hg/L	⊽	4 µg/L	102	1	99	126	1	I
ortho-Xylene	95-47-6	0.5	hg/L	<0.5	2 µg/L	7.66	1	62	125	-	-
Xylenes (Total)		2	hg/L	<2>	6 µg/L	102	1	65	126		

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

Matrix: SOIL					Matrix Spike	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report	ix Spike Dupli	icate (MSD)	Report	
				Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)		RPD (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS	Concentration	MS	MSD	Том	High	Value	Control
EP-071HK_SR	R: Total Petroleum Hydrocar	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367)								
HK1317305-002	HK1317305-002 BH-ENV05/ 0.5M	C6 - C8 Fraction		4.5 mg/kg	88.4		50	130	1	-
EP-071HK_SR	R: Total Petroleum Hydrocar	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945372)								
HK1317305-002	HK1317305-002 BH-ENV05/ 0.5M	C9 - C16 Fraction		32 mg/kg	74.5		20	130	1	1
		C17 - C35 Fraction	-	90 mg/kg	73.4		20	130	1	1

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	s (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
Sub-Matrix: WATER	Transcond Control of the Control of	Recovery	Recovery Limits (%)
Compound	CAS Number	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





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	HK1317464				1-2013	3-2013		
: 1 of 8	HK1				: 28-JUN-2013	: 15-AUG-2013	œ.	
Page	Work Order	Amendment			Date Samples Received	Issue Date	No. of samples received	No. of samples analysed
: ALS Technichem HK Pty Ltd	: Fung Lim Chee, Richard	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	: Richard.Fung@alsglobal.com : +852 2610 1044	: +852 2610 2021	1			
Laboratory	Contact	Address	E-mail Telephone	Facsimile	Quote number			
: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	: MR SUN NG	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	: sunng@cedd.gov.hk :		: RELOCATION OF SHA TIN SEWERAGE TREATMENT WORKS TO CAVERNS	: GE/2012/24.11	: H 025603	: SHA TIN SEWAGE TREATMENT PLANT
Client	Contact	Address	E-mail Telephone	Facsimile	Project	Order number	C-O-C number	Site

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. The completion date of analysis is: 08-JUL-2013

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.

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

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Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory
Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories

Authorised results for Position

Anh Ngoc Huynh

Senior Chemist - Organics

Chemist - Inorganics

Inorganics

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Sub-Matrix: SOIL			Client sample ID	BH-ENV10/ 1.0M	BH-ENV02/ 0.5M	BH-ENV02/ 1.0M	BH-ENV09/ 0.9M	BH-ENV07/ 1.5M
		Client san.	Client sampling date / time	[28-JUN-2013]	[28-JUN-2013]	[28-JUN-2013]	[28-JUN-2013]	[28-JUN-2013]
Compound	CAS Number	TOR	Unit	HK1317464-001	HK1317464-002	HK1317464-003	HK1317464-004	HK1317464-005
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	I	0.1	%	16.0	11.7	12.8	14.0	19.2
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	(PAHs)							
Naphthalene	9120-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	202-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	s (TPH)							
C6 - C8 Fraction	-	2	mg/kg	<5	<5	<5	<5	<5 45
C9 - C16 Fraction	-	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	-	200	mg/kg	<500	1040	<200	<200	<500
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	(PAHs) Sur	rogates					Surrogate control limits	Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	99.5	97.9	84.9	99.5	95.7
4-Terphenyl-d14	1718-510	0.1	%	91.6	86.6	89.0	94.2	87.4
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits	Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	97.3	101	99.3	99.5	92.6
Toluene-D8	2037-26-5	0.1	%	92.6	98.5	98.5	98.7	97.5
4-Bromofluorobenzene	460-00-4	0.1	%	94.5	92.1	6 76	03.7	0.50

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Sub-Matrix: SOIL			Client sample ID	BH-ENV07/ 1.5M(A)	BH-ENV07/ 1.5M(B)	
отничения предведава положения на населения поставления поста		Client sar	Client sampling date / time	[28-JUN-2013]	[28-JUN-2013]	
Compound	CAS Number	LOR	Unit	HK1317464-006	HK1317464-007	
EA/ED: Physical and Aggregate Properties						
EA055: Moisture Content (dried @ 103°C)	1	0.1	%	16.7	18.7	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	(PAHs)					
Naphthalene	9120-3	0.500	mg/kg	<0.500	<0.500	
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	
Chrysene	218-019	0.500	mg/kg	<0.500	<0.500	
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	IS (TPH)					
C6 - C8 Fraction	-	2	mg/kg	<5	<5	
C9 - C16 Fraction	1	200	mg/kg	<200	<200	
C17 - C35 Fraction	1	200	mg/kg	<500	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	s (PAHs) Sui	rogates				Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	95.0	102	
4-Terphenyl-d14	1718-51-0	0.1	%	86.3	93.5	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate						Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	98.1	95.8	
Toluene-D8	2037-26-5	0.1	%	7.76	98.2	
4-Bromofluorobenzene	460-00-4	0.1	%	95.4	95.6	

Page Number Client Work Order

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Sub-Matrix: WATER		Client sar	Client sample ID Client sampling date / time	EQUIPMENT BLANK [28-JUN-2013]	
Compound	CAS Number	LOR	Unit	HK1317464-008	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	arbons (PAHs)				
Naphthalene	91-20-3	2.0	hg/L	<2.0	
Acenaphthylene	208-96-8	2.0	hg/L	<2.0	
Acenaphthene	83-32-8	2.0	hg/L	<2.0	
Fluorene	86-73-7	2.0	µg/L	<2.0	
Phenanthrene	85-01-8	2.0	µg/L	<2.0	
Anthracene	120-12-7	2.0	hg/L	<2.0	
Fluoranthene	206-44-0	2.0	hg/L	<2.0	
Pyrene	129-00-0	2.0	hg/L	<2.0	
Benz(a)anthracene	56-55-3	2.0	hg/L	<2.0	
Chrysene	218-019	1.0	hg/L	<1.0	
Benzo(b)fluoranthene	205-99-2	1.0	hg/L	<1.0	
Benzo(k)fluoranthene	207-08-9	1.0	hg/L	<1.0	
Benzo(a)pyrene	50-32-8	2.0	µg/L	<2.0	
Indeno(1.2.3.cd)pyrene	193-39-5	2.0	hg/L	<2.0	
Dibenz(a.h)anthracene	53-70-3	2.0	hg/L	<2.0	
Benzo(g.h.i)perylene	19124-2	2.0	hg/L	<2.0	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	carbons (TPH)				
C6 - C8 Fraction	-	20	hg/L	<20	
C9 - C16 Fraction		200	hg/L	<500	
C17 - C35 Fraction	1	200	hg/L	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	carbons (PAHs) Su	rrogates			Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	51.2	
4-Terphenyl-d14	1718-510	0.1	%	82.8	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	ogate				Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	110	
Toluene-D8	2037-26-5	0.1	%	99.2	
4-Bromofluorobenzene	460-00-4	0.1	%	95.3	

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Laboratory Duplicate (DUP) Report

					Ţ	Laboratory Duplicate (DUP) Report	сероп	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
A/ED: Physical	EA/ED: Physical and Aggregate Properties (QC Lot: 2950514)	(QC Lot: 2950514)					THE MISSISSISSISSISSISSISSISSISSISSISSISSISS	
HK1317385-001	Anonymous	EA055: Moisture Content (dried @ 103°C)		0.1	%	7.9	7.7	3.0
HK1317606-001	Anonymous	EA055: Moisture Content (dried @ 103°C)		0.1	%	31.6	31.7	0.4
P-076A: Polycyc	lic Aromatic Hydrocarbon	EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2950554)						
HK1317606-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	ng/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		Naphthalene	91-20-3	20	µg/kg	<50	<50	0.0
	7	Acenaphthylene	208-96-8	20	µg/kg	<50	<50	0.0
	7	Acenaphthene	83-32-9	20	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	20	µg/kg	<50	<50	0.0
	-	Phenanthrene	82-01-8	20	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	20	hg/kg	<50	<50	0.0
P-071HK_SR: To	tal Petroleum Hydrocarboi	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367)						
HK1317305-001	Anonymous	C6 - C8 Fraction		2	mg/kg	<5	<5	0.0
P-071HK_SR: To	tal Petroleum Hydrocarboi	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614)						
HK1317593-001	Anonymous	C9 - C16 Fraction		200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	1	200	mg/kg	<500	<500	0.0
Matrix: WATER					, Ta	Laboratory Duplicate (DUP) Report	eport	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
P-071HK_SR: To	tal Petroleum Hydrocarbor	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945385)						
HK1317305-011	Anonymous	C6 - C8 Fraction		0.02	l/pm	<0.02	20.02	00

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

Matrix: SOIL			Method Blank (MB) Report	Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicate	(DCS) Report	
					Spike	Spike Rec	Spike Recovery (%)	Recovery	Recovery Limits (%)	RF	RPD (%)
Method: Compound	CAS Number LOR	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Value Control Limit
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2950554)	rocarbons (PAHs)	(QC Lot:	2950554)								
Naphthalene	91-20-3	25	µg/kg	1	25 µg/kg	86.6		63	117	1	
				<20	1		-	-			1
Acenaphthylene	208-96-8	25	µg/kg	1	25 µg/kg	79.2		54	119	-	
				<20	-	1		-	-		1
Acenaphthene	83-32-9	25	µg/kg	1	25 µg/kg	92.5	1	29	122	-	
				<20	1	-				-	-
Fluorene	86-73-7	25	µg/kg	-	25 µg/kg	9.96	-	09	126	1	1

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Method: Compound EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) Fluorene R9-73-7 Phenanthrene R5-01-8 Anthracene Fluoranthene 206-44-0 Pyrene	1					: 1					1/1/1
A: Polycyclic Aromatic Hydrocarb interest thene ithene	The Manual Party				Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
EP-076A: Polycyclic Aromatic Hydrocarbon Fluorene Phenanthrene Anthracene Fluoranthene Pyrene	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Control Limit
Fluorene Phenanthrene Anthracene Fluoranthene Pyrene	SEC.	(QC Lot: 2950554)	- 1	Continued							
Anthracene Fluoranthene		20	3	<50	-	-					
Inoranthene yrene	85-01-8	25	hg/kg	-	25 µg/kg	98.9	1	09	127	-	-
inoranthene yrene				<20	-		-		-		-
luoranthene yrene	120-12-7	25	µg/kg	-	25 µg/kg	97.9		56	124		-
luoranthene yrene				<20	-	-			-	-	-
yrene	206-44-0	25	µg/kg		25 µg/kg	93.6	1	61	132	1	1
yrene				<50	2	-	-	-	-	-	
7	129-00-0	20	ug/kg	<50	1		-		-	-	-
the state of the s)	-	25 ug/kg	91.6		61	133	-	1
anziantniacene	56-55-3	25	ua/ka		25 ua/ka	0 66		57	124		
		l	0	<50				5	1		
Charcono	0 10 010	C	- Mail	000							1
2000	0.0	3	SV/SH		200		-	6	5	-	1
		(ga/gd cz	90.0		00	971	-	
benzo(b)riuorantnene	7-66-907	90	hg/kg	<20	-		1		-	-	
					25 µg/kg	8.06	-	48	135		-
Benzo(k)fluoranthene	207-08-9	25	hg/kg	-	25 µg/kg	96.7		28	133	1	
				<20		-	1	1			-
Benzo(a)pyrene	50-32-8	25	µg/kg		25 µg/kg	86.3	1	20	124	1	-
				<20		-	1		1		-
Indeno(1.2.3.cd)pyrene	193-39-5	20	ug/kg	<50	-				*****		1
)		25 µg/kg	90.0	-	48	134		1
Dibenz(a.h)anthracene	53-70-3	25	ua/ka		25 ua/ka	101		20	137	1	1
)	<50	2		-	-		-	-
Benzo(g.h.i)perylene	191-24-2	25	µg/kg	1	25 µg/kg	102	-	55	140		
				<50	.	1	1		1	-	
EP-071HK SR: Total Petroleum Hydrocarbons (TPH) (OC Lot: 2945367)	ons (TPH)	OC Lot: 2	945367)								
C6 - C8 Eraction		ייייייייייייייייייייייייייייייייייייייי	na/ha	4/	A F maile	07.0		G	700		
- Co Flaction		C	IIIg/kg	6	4.5 mg/kg	2.78		69	139		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)		(QC Lot: 2950614)	950614)								
C9 - C16 Fraction	1	200	mg/kg	<200	32 mg/kg	92.1	-	53	104	1	
C17 - C35 Fraction	1	200	mg/kg	<200	90 mg/kg	95.3	-	43	66	1	1
Matrix: WATER			Method Blank (MB) Report	Report		Laboratory Contro	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control S	spike Duplicate	(DCS) Report	A THE CONTRACT OF THE CONTRACT
					Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)	RP	RPD (%)
Method: Compound CA	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Tow	High	Value	Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617)	ns (PAHs) ((C Lot: 29	50617))		
Naphthalene	91-20-3	0.2	na/L	<0.2	0.5 ua/L	77.0		34	106		
Acenaphthylene	208-96-8	0.2	na/L	<0.2	0.5 ug/L	70.3	-	38	65		
Acenaphthene	83-32-9	0.2	na/L	<0.2	0.5 ua/L	71.9	1	34	100	-	
Fluorene	86-73-7	0.2	1/011	<0.5	0.5 110/1	75.5		3 5	2 8		
Phenanthrene	85-01-8	0.2	l'al	<0.5	0.5 ua/l	76.7		2 8	8 8		
Anthracene	120-12-7	0.0	1/01	<0.0>	1/61/40	63.7		5 5	100		
Finoranthone	206.44-0	2.0	1/61	207	0.0 pg/L	7.70		747	102		-
	420.004	7.0	hg/L	7.0.5	U.S µg/L	0.4.0		22	201		



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Matrix: WATER			Method Blank (MB) Report) Report		Laboratory Contro	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control :	Spike Duplicate	(DCS) Report	
					Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Tow	High	Value	Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617) - Continued	Hydrocarbons (PAHs) (QC Lot: 2	950617) - Col	ntinued							
Benz(a)anthracene	56-55-3	0.2	hg/L	<0.2	0.5 µg/L	94.4	-	45	107	1	1
Chrysene	218-01-9	0.2	hg/L	<0.2	0.5 µg/L	94.9		65	121	1	-
Benzo(b)fluoranthene	202-99-2	0.2	hg/L	<0.2	0.5 µg/L	95.4	-	52	102	-	-
Benzo(k)fluoranthene	207-08-9	0.2	hg/L	<0.2	0.5 µg/L	104		99	121	1	1
Benzo(a)pyrene	50-32-8	0.2	hg/L	<0.2	0.5 µg/L	8.06	-	55	115	1	1
Indeno(1.2.3.cd)pyrene	193-39-5	0.2	hg/L	<0.2	0.5 µg/L	0.66		40	127	-	1
Dibenz(a.h)anthracene	53-70-3	0.2	hg/L	<0.2	0.5 µg/L	100		14	109		-
Benzo(g.h.i)perylene	191-24-2	0.2	hg/L	<0.2	0.5 µg/L	94.8		47	115		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945385)	m Hydrocarbons (TPH)	(QC Lot: 2	2945385)								
C6 - C8 Fraction		0.02	mg/L	<0.02	0.03 mg/L	0.06		92	1134		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945439)	m Hydrocarbons (TPH)	(QC Lot: 2	2945439)								
C9 - C16 Fraction		0.5	mg/L	<0.5	0.21 mg/L	52.6	-	12	112	-	
C17 - C35 Fraction	-	0.5	mg/L	<0.5	0.60 mg/L	49.6		4	130		

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

Matrix: SOIL					Matrix Spike	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report	ix Spike Dupli	cate (MSD)	Report	
				Spike		Spike Recovery (%)	Recovery Limits (%)	Limits (%)		RPD (%)
Laboratory Clie sample ID	Client sample ID	Method: Compound	CAS	CAS Concentration	MS	MSD	Гом	High	Value	Control
EP-071HK_SR: T	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367)	ns (TPH) (QC Lot: 2945367)								
HK1317305-002 Anonymous	onymous	C6 - C8 Fraction		4.5 mg/kg	88.4		20	130	-	-
EP-071HK_SR: T	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614)	ns (TPH) (QC Lot: 2950614)	The Property of the State of th							
HK1317593-002 Anonymous	onymous	C9 - C16 Fraction		32 mg/kg	85.0		20	130		-
		C17 - C35 Fraction		90 mg/kg	78.3	-	20	130	-	-

Clic Aromatics Hydrocarbons (PAHs) Surrogates 1	Sub-Matrix: SOIL		Recovery	Recovery Limits (%)
Clic Aromatics Hydrocarbons (PAHs) Surrogates 1	Compound	CAS Number	Low	High
## 321-60-8 50 H(Volatile)/BTEX Surrogate 1868-53-7 80 ethane 2037-26-5 81 enzene 460-00-4 74 CASNumber 1 000	P-076S: Polycyclic Aromatics Hydro	carbons (PAHs) Surrogates		
H(Volatile)/BTEX Surrogate H(Volatile)/BTEX Surrogate 1868-53-7 2037-26-5 81 80 80 80 80 80 80 80 80 80	2-Fluorobiphenyl	321-60-8	20	130
H(Volatile)/BTEX Surrogate 1868-53-7 80 2037-26-5 81 460-00-4 74 Recovery Limits (%)	4-Terphenyl-d14	1718-51-0	20	130
ethane 1868-53-7 80 2037-26-5 81 460-00-4 74 Recovery Limits (%	P-080_SRS: TPH(Volatile)/BTEX Sur	ogate		
2037-26-5 81 enzene 460-00-4 74 Recovery Limits (%	Dibromofluoromethane	1868-53-7	80	120
enzene 460-00-4 74 Recovery Limits (%	Toluene-D8	2037-26-5	81	117
CAS Number 1 out	4-Bromofluorobenzene	460-00-4	74	121
CAS Number	Sub-Matrix: WATER	and the state of t	Recovery	Limits (%)
	Compound	CASNumber	Low	High
	2-Fluorohiphenyl	321-60-8	20	130

Page Number Client Work Order

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Sub-Matrix: WATER		Recovery Limits (%)	mits (%)
Compound	CASNumber	Tow	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates - Continued	(PAHs) Surrogate	s - Continued	•
4-Terphenyl-d14	1718-51-0	20	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



Technichem (HK) Pty Ltd

ALS Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES





CERTIFICATE OF ANALYSIS

: 1 of 9	: HK1317503	1.		: 02-JUL-2013	: 15-AUG-2013	: 10	: 10	This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried or compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.	Authorised results for	Organics Inorganics
Page	Work Order	Amendment		Date Samples Received	Issue Date	No. of samples received	No. of samples analysed	ort and are the authorised signate ig Kong, Chapter 553, Section 6.		Organics ics
m HK Pty Ltd	Richard	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	alsglobal.com					This document has been electronically signed by those names that appear on this report and are the authorised signat compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.	Position	Senior Chemist - Organics Chemist - Inorganics
: ALS Technichem HK Pty Ltd	: Fung Lim Chee, Richard	: 11/F., Chung Sh Wing Yip Street, Kong	: Richard.Fung@alsglobal.com : +852 2610 1044 : +852 2610 2021					nt has been electronically signed by vith procedures specified in the Elec		Anh Ngoc Huynh UN ON Chun Hoi, Michael
Laboratory	Contact	Address	E-mail Telephone Facsimile	Quote number				This docume compliance v	Signatories	Anh Ngoc Huynh Ng Chun Hoi, Mic
: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	: MR SUN NG	GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	: sunng@cedd.gov.hk :	RELOCATION OF SHA TIN SEWERAGE TREATMENT WORKS TO CAVERNS	: GE/2012/24.11	HUZDOU4	SHA IIN SEWAGE TREATMENT PLANT	This report may not be reproduced except with prior written approval from the testing laboratory.	Hong Kong Accreditation Service (HKAS) has accedited this laboratory	Accreditation (Int.) Fty Ltd.) under hong knong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.
Client	Contact	Address	E-mail Telephone Facsimile	Project Order number	C-O-C number	Site		This report n from the test	Hong Kong /	Accreditation listed in the I shown in this accordance v

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Work Order

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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. The completion date of analysis is: 08-JUL-2013
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.

Project Name: Agreement No. CE 43/2011 (DS) Relocation of Sha Tin Sewerage Treatment Works to Caverns - Feasibility Study. Sample(s) were received in a chilled condition. Water sample(s) analysed and reported on an as received basis. Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.



Page Number : 3 of 9
Client : CIVIL |
Work Order HK131
Analytical Results



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«	ALS

13.8	Sub-Matrix: SOIL			Client sample ID	BH-ENV12/ 0.5M	BH-ENV11/ 0.5M	BH-ENV13/ 0.5M	BH-ENV01	BH-ENV12/
CARS Number CARS Number			Client san	npling date / time	[02-JUL-2013]	[02-JUL-2013]	[02-JUL-2013]	[02-JUL-2013]	[02-JUL-2013]
s (PAHs) % 8.7 13.8 11.9 9 1	Compound	CAS Number	LOR	Unit	HK1317593-001	HK1317593-002	HK1317593-003	HK1317593-004	HK1317593-005
= F(PAFS) % 8.7 13.8 11.9 8 F(PAFS) 13.8 11.9 11.9 8 F PAPS 0.500 mg/kg <0.500 <0.500 <0.500 8 F 24.2 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 8 5.24.2 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 8 5.74.2 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 8 5.74.2 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 12 12 10.12 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 12 10.12 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 12 10.12 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 12 10.12 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 12 10.2 0.500 mg/kg <0.500 <0.500	EA/ED: Physical and Aggregate Properties								
S (PAH5) CO. 500 <	EA055: Moisture Content (dried @ 103°C)	44 11	0.1	%	8.7	13.8	11.9	6.8	16.6
1242.0.2 0.500 mg/kg ~ (-0.500 ~	EP-076A: Polycyclic Aromatic Hydrocarbon:	s (PAHs)							
120-90-90 0.500 mg/kg 0.500 0.0,500	Naphthalene	9120-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
8-3-32-4 0.500 mg/kg <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500	Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
86-73-7 0.500 mg/kg <0.560 <0.500 <0.500 86-73-8 0.500 mg/kg <0.500	Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
85-0148 0.500 mg/kg <0.500 <0.500 <0.500 120-127 0.500 mg/kg <0.500	Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
120-12-7 0.500 mg/kg <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-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 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500 <-0.500	Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
206444 0.500 mg/kg <0.500 <0.500 <0.500 129-00-6 0.500 mg/kg <0.500	Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
129-00-0 0.500 mg/kg <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 <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 <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 <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 <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 <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 <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 <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 <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 <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 <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 <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 <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 <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 <	Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
56-5-3 0.500 mg/kg <0.500 <0.500 <0.500 218-0149 0.500 mg/kg <0.500	Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
218-019 0.500 mg/kg <0.500 <0.500 <0.500 205-99-2 0.500 mg/kg <0.500	Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
205-08-2 0.500 mg/kg <0.500	Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
207-08-9 0.500 mg/kg <0,500 <0,500 <0,500 50-32-8 0.500 mg/kg <0,500	Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
50-32-8 0.500 mg/kg < 0.500 < 0.500 < 0.500 193-39-5 0.500 mg/kg < 0.500	Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
193-39-5 0.500 mg/kg <0.500 <0.500 <0.500 <0.500 63-70-3 0.500 mg/kg <0.500	Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
63-70-3 0.500 mg/kg <0.500 <0.500 <0.500 ns (TPH) 5 mg/kg <0.500 <0.500 <0.500 5 mg/kg <5 <5 <5 5 mg/kg <200 <200 <200 <200 5 mg/kg <5 <5 <5 <5 5 mg/kg <200 <200 <200 <500 <500 5 mg/kg <5 91.0 <500 <500 <500 5 77.4 83.6 91.0 94.7 1718-510 0.1 % 77.6 88.6 94.7 <td< td=""><td>Indeno(1.2.3.cd)pyrene</td><td>193-39-5</td><td>0.500</td><td>mg/kg</td><td><0.500</td><td>. <0.500</td><td><0.500</td><td><0.500</td><td><0.500</td></td<>	Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	. <0.500	<0.500	<0.500	<0.500
ns (TPH) < 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 < 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 < 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 < 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 < 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	Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Figure F	Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
5 mg/kg <5 <5 <5 <5 200 mg/kg <200 <200 <200 <200 500 mg/kg <200 <200 <200 <200 500 mg/kg <200 <500 <500 32460-8 0.1 % 77.4 83.6 91.0 1868-53-7 0.1 % 97.3 98.2 96.5 2037-26-5 0.1 % 98.0 99.2 98.4 460-00-4 0.1 % 96.0 96.1 96.1 95.8	EP-071HK_SR: Total Petroleum Hydrocarbo	ns (TPH)							
200 mg/kg <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200 <200	C6 - C8 Fraction	1	2	mg/kg	<5	<5	<5	<5	<5
500 mg/kg <500 <500 <500 <500 <500 <500 <500 <50	C9 - C16 Fraction	1	200	mg/kg	<200	<200	<200	<200	<200
1s (PAHs) Surrogates 321460-8 0.1 % 77.4 83.6 91.0 1718-54-0 0.1 % 74.6 88.6 94.7 1868-53-7 0.1 % 97.3 98.2 96.5 2037-26-5 0.1 % 98.0 99.2 98.4 460-00-4 0.1 % 96.0 96.1 95.8	C17 - C35 Fraction	I	200	mg/kg	<500	<500	<500	<500	<500
32460-8 0.1 % 77.4 83.6 91.0 1718-51-0 0.1 % 74.6 88.6 94.7 1868-53-7 0.1 % 97.3 98.2 96.5 2037-26-5 0.1 % 98.0 99.2 98.4 460-00-4 0.1 % 96.0 96.1 95.8	EP-076S: Polycyclic Aromatics Hydrocarbor	is (PAHs) Su	rrogates					Surrogate control limits	listed at end of this report.
1718-510 0.1 % 74.6 88.6 94.7 1868-53-7 0.1 % 97.3 98.2 96.5 2037-26-5 0.1 % 98.0 99.2 98.4 460-00-4 0.1 % 96.0 96.1 95.8	2-Fluorobiphenyl	32160-8	0.1	%	77.4	83.6	91.0	77.1	82.2
1868-53-7 0.1 % 97.3 98.2 96.5 2037-26-5 0.1 % 98.0 99.2 98.4 460-00-4 0.1 % 96.0 96.1 95.8	4-Terphenyl-d14	1718-51-0	0.1	%	74.6	88.6	94.7	80.4	87.9
1868-53-7 0.1 % 97.3 98.2 96.5 96.0 2037-26-5 0.1 % 98.0 99.2 98.4 96.9 460-00-4 0.1 % 96.0 96.1 95.8 94.2	EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits	listed at end of this report.
2037-26-5 0.1 % 98.0 99.2 98.4 96.9 460-00-4 0.1 % 96.0 96.1 95.8 94.2	Dibromofluoromethane	1868-53-7	0.1	%	97.3	98.2	96.5	96.0	101
460-00-4 0.1 % 96.0 96.1 95.8 94.2	Toluene-D8	2037-26-5	0.1	%	98.0	99.2	98.4	96.9	98.5
	4-Bromofluorobenzene	460-00-4	0.1	%	0.96	96.1	95.8	94.2	96.4

Page Number Client Work Order

4 of 9 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1317593, Amendment 1

Sub-Matrix: SOIL			Client sample ID	BH-ENV11	BH-ENV13/	
				1.0M	1.0M	
		Client sam	Client sampling date / time	[02-JUL-2013]	[02-JUL-2013]	
punoduo	CAS Number LOR	LOR	Unit	HK1317593-006	HK1317593-007	

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 EA/ED: Physical and Aggregate Properties

 C)

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 9120-3

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 9120-3

 Naphthalene
 208-96-8

 Acenaphthylene
 83.32-9

 Acenaphthylene
 86-73-7

 Phenanthrene
 86-73-7

 Phenanthrene
 86-73-7

 Phranathrene
 85-01-8

 Pyrene
 120-02-0

 Benz(a)anthracene
 206-44-0

 Pyrene
 129-00-0

 Benzo(b)fluoranthene
 205-99-2

 Benzo(s)fluoranthene
 50-32-8

 Benzo(a)pyrene
 50-32-8

 Indeno(1.2.3.cd)pyrene
 50-32-8

 Dibenz(a.h)anthracene
 53-70-3

 Benzo(g.h.i)perylene
 53-70-3

 Benzo(g.h.i)perylene
 53-70-3

C9 - C16 Fraction		2	mg/kg	<5	<5	
7 DOO 1	I	200	mg/kg	<200	<200	
CI/ - C35 Fraction	1	200	mg/kg	<200	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	PAHs) Sur	rogates				Surrogate control limits listed at end of this report
2-Fluorobiphenyl	32160-8	0.1	%	80.4	81.2	
4-Terphenyl-d14	1718-51-0	0.1	%	83.2	85.9	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate						Surrogate control limits listed at end of this report
Dibromofluoromethane	1868-53-7	0.1	%	94.1	97.4	
Toluene-D8	2037-26-5	0.1	%	98.7	98.6	
4-Bromofluorobenzene	460-00-4	0.1	%	96.5	96.3	



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102-JUL-2013 [02-JUL-2013 [02-JUL-2013] [02-JUL-2013	Sub-Matrix: WATER			Client sample ID	BH-ENV07 (G.W) 1.6M	BH-ENV09 (G.W) 1.0M	BH-ENV02 (G.W) 1.15M	
S (PAHs) HK1317593-009 HK1317593-010 HK1317593-010 \$ (PAHs) \$ (2.0) </th <th></th> <th></th> <th>Client san</th> <th>pling date / time</th> <th>[02-JUL-2013]</th> <th>[02-JUL-2013]</th> <th>[02-JUL-2013]</th> <th></th>			Client san	pling date / time	[02-JUL-2013]	[02-JUL-2013]	[02-JUL-2013]	
F (PAHS) 91203 2.0 µg/L <2.0	Compound	CAS Number	LOR	Unit	HK1317593-008	HK1317593-009	HK1317593-010	
9120-3 2.0 µg/L <2.0	EP-076A: Polycyclic Aromatic Hydro	ocarbons (PAHs)						
208-96-8 2.0 μg/L <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0	Naphthalene	9120-3	2.0	hg/L	<2.0	<2.0	<20	
83-32-9 2.0 μg/L <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0	Acenaphthylene	208-96-8	2.0	hg/L	<2.0	<2.0	0.6>	
86-73-7 2.0 μg/L <2.0 <2.0 <2.0 85-016 2.0 μg/L <2.0	Acenaphthene	83-32-9	2.0	hg/L	<2.0	<2.0	<2.0	
86-016 2.0 μg/L <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0	Fluorene	86-73-7	2.0	hg/L	<2.0	<2.0	<2.0	
120-12-7 2.0 µg/L <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0	Phenanthrene	82-01-8	2.0	нg/L	<2.0	<2.0	<2.0	
206-44-0 2.0 μg/L <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0 <2.0	Anthracene	120-12-7	2.0	hg/L	<2.0	<2.0	<2.0	
129-00-0 2.0 μg/L <2.0 <2.0 <2.0 <2.0 218-019 1.0 μg/L <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0	Fluoranthene	206-44-0	2.0	hg/L	<2.0	<2.0	<2.0	
218-01-9 1.0 μg/L <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0	Pyrene	129-00-0	5.0	µg/L	<2.0	<2.0	<2.0	
205-99-2 1.0 μg/L <1.0 <1.0 <1.0 ns (TPH) 20 μg/L <20 <20 <20 500 μg/L <500 <500 <500 <500 500 μg/L <500 <500 <500 <500 100 μg/L <500 <500 <500 <500 1186-6-8 0.1 % 83.9 58.3 61.4 178-5-0 0.1 % 103 106 95.0 188-53-7 0.1 % 104 101 460-00-4 0.1 % 96.7 96.3 96.8	Chrysene	218-01-9	1.0	hg/L	<1.0	<1.0	<1.0	
ns (TPH) 20 μg/L <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20	Benzo(b)fluoranthene	202-99-2	1.0	hg/L	<1.0	<1.0	<1.0	
20 μg/L <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <20 <td>EP-071HK_SR: Total Petroleum Hydi</td> <td>rocarbons (TPH)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	EP-071HK_SR: Total Petroleum Hydi	rocarbons (TPH)						
500 μg/L <500 <500 <500 <500 <500 <500 1200 <td>C6 - C8 Fraction</td> <td></td> <td>20</td> <td>hg/L</td> <td><20</td> <td><20</td> <td><20</td> <td></td>	C6 - C8 Fraction		20	hg/L	<20	<20	<20	
rs (PAHs) Surrogates Page (PAHs) Surrogates 4500 <500 1200 32460-8 0.1 % 83.9 58.3 61.4 1718-540 0.1 % 103 106 95.0 1868-53-7 0.1 % 104 104 2037-26-5 0.1 % 102 100 101 460-00-4 0.1 % 96.7 96.3 96.8	C9 - C16 Fraction	1	200	hg/L	<200	<500	<500	
Is (PAHs) Surrogates 32160-8 0.1 % 83.9 58.3 61.4 1718-510 0.1 % 103 106 95.0 1868-53-7 0.1 % 104 104 2037-26-5 0.1 % 102 100 101 460-00-4 0.1 % 96.7 96.3 96.8	C17 - C35 Fraction		200	hg/L	<500	<200	1200	
32+60-8 0.1 % 83.9 58.3 61.4 1718-5+0 0.1 % 103 106 95.0 1868-53-7 0.1 % 104 104 2037-26-5 0.1 % 102 101 460-00-4 0.1 % 96.7 96.8	EP-076S: Polycyclic Aromatics Hydro	ocarbons (PAHs) Su	rrogates		•			Surrogate control limits listed at end of this report
1718-51-0 0.1 % 103 106 95.0 1868-53-7 0.1 % 104 104 2037-26-5 0.1 % 102 101 460-00-4 0.1 % 96.7 96.3	2-Fluorobiphenyl	32160-8	0.1	%	83.9	58.3	61.4	
1868-53-7 0.1 % 104 108 104 2037-26-5 0.1 % 102 101 460-00-4 0.1 % 96.7 96.3 96.8	4-Terphenyl-d14	1718-510	0.1	%	103	106	95.0	
1868-53-7 0.1 % 104 108 104 2037-26-5 0.1 % 102 100 101 460-00-4 0.1 % 96.7 95.3 96.8	EP-080_SRS: TPH(Volatile)/BTEX Su.	ırrogate						Surrogate control limits listed at end of this report
2037-26-5 0.1 % 102 100 460-00-4 0.1 % 96.7 95.3	Dibromofluoromethane	1868-53-7	0.1	%	104	108	104	
460-00-4 0.1 % 96.7 95.3	Toluene-D8	2037-26-5	0.1	%	102	100	101	
	4-Bromofluorobenzene	460-00-4	0.1	%	2.96	95.3	96.8	

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Laboratory Duplicate (DUP) Report

Junit	Topological Control of the Control o					THE RESIDENCE AND DESCRIPTION OF THE PERSON						
Concentration Concentratio	Laboratory sample ID	Cilent sample ID	Method: Compour	pı		CAS Number	LOR	Unit	Original Result	Duplicate Resi		PD (%)
% 19.7 19.8 % 18.6 17.5 % 16.6 17.5 µg/kg <150	EA/ED: Physical ar	nd Aggregate Properties	s (QC Lot: 29	53305)								
16.6 17.5	HK1317598-004	Anonymous	EA055: Moist	are Content (dri	ed @ 103°C)	-	0.1	%	19.7	19.8		0
16.6 17.2	HK1317598-001	Anonymous	EA055: Moist	ire Content (dri	ed @ 103°C)		0.1	%	α α	7.00		0.0
μg/kg <16.6	EA/ED: Physical ar	nd Aggregate Properties	s (QC Lot: 295	53306)			- -	2	2	S.		0.7
Hg/kg	HK1317593-005	BH-ENV12/ 1.0M	EA055: Moist	re Content (dri	ed @ 103°C)		0.1	%	16.6	17.0		3.3
нд/кд <150	EP-076A: Polycycli	ic Aromatic Hydrocarbo	ins (PAHs) (Q	C Lot: 295055	4)			2	2	7:7-		2.6
μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 <150 μg/kg <150 μg/kg <150 μg/kg <150	HK1317606-001	Anonymous	Fluoranthene			206-44-0	150	ug/ka	<150	<150		0.0
нg/kg <150			Pyrene			129-00-0	150	ng/kg	<150	<150		0.0
нg/kg <150			Benz(a)anthra	cene		56-55-3	150	µg/kg	<150	<150		0.0
µg/kg <150			Chrysene			218-01-9	150	ng/kg	<150	<150		0.0
нд/kg <150			Benzo(b)fluora	anthene		205-99-2	150	ng/kg	<150	<150		0.0
µg/kg <150			Benzo(k)fluora	anthene		207-08-9	150	µg/kg	<150	<150		0.0
µg/kg <150			Benzo(a)pyren	je		50-32-8	150	hg/kg	<150	<150		0.0
µg/kg <150			Indeno(1.2.3.c	d)pyrene		193-39-5	150	hg/kg	<150	<150		0.0
μg/kg <150			Dibenz(a.h)ant	thracene		53-70-3	150	µg/kg	<150	<150		0.0
μg/kg <50			Benzo(g.h.i)pe	rylene		191-24-2	150	µg/kg	<150	<150		0.0
μg/kg <50			Naphthalene			91-20-3	50	µg/kg	<50	<50		0.0
High by C C C C High High by C C C C High by C C C C High by C			Acenaphthyler	ЭС		208-96-8	20	µg/kg	<50	<50		0.0
µg/kg <50			Acenaphthene			83-32-9	50	µg/kg	<50	<50		0.0
µg/kg <50			Fluorene			86-73-7	90	hg/kg	<50	<50		0.0
mg/kg <50			Phenanthrene			82-01-8	20	µg/kg	<50	<50		0.0
mg/kg <5		ADDRESS CONTRACTOR OF THE STATE	Anthracene			120-12-7	20	hg/kg	<50	<50		0.0
mg/kg <5	P-071HK_SR: Tota	al Petroleum Hydrocarb	ons (TPH) (QC	C Lot: 2945367	2							
mg/kg <200	HK1317305-001	Anonymous	C6 - C8 Fractio	u.			2	ma/ka	^ 22	<5		0.0
mg/kg <200	P-071HK_SR: Tota	al Petroleum Hydrocarb	ons (TPH) (QC	C Lot: 295061	•					,		
mg/kg <500 <500 mg/kg <5 <5 <5 Laboratory Duplicate (DUP) Report Unit Original Result Duplicate Result mg/L <0.02 <0.02 Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report te Recovery (%) Recovery Limits (%) RPD DCS Low High Value	HK1317593-001	BH-ENV12/ 0.5M	C9 - C16 Fracti	ion			200	mg/kg	<200	<200		0.0
mg/kg <5 <5 <5 Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report			C17 - C35 Frac	tion		1	200	mg/kg	<500	<500		0.0
mg/kg <5 <5 <5 Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report Ce Recovery (%) Recovery Limits (%) Report	P-071HK_SR: Tota	al Petroleum Hydrocarbo	ons (TPH) (QC	C Lot: 2950620))				
Unit Original Result Duplicate Result Mg/L <0.02 <0.02 Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD DCS Low High Value 63 117	HK1317593-001	BH-ENV12/ 0.5M	C6 - C8 Fractio	Ľ			2	mg/kg	<5	<5		0.0
mg/L <0.02 <0.02 Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Ce Recovery (%) Recovery Limits (%) RPD DCS Low High Value	atrix: WATER					and the state of t			oratory Duplicate (DUP)			Marian de la principa del principa del la principa del la principa del la principa de la principa de la principa del la pri
mg/L <0.02 <0.02 Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Recovery (%) Recovery Limits (%) RPD DCS Low High Value 63 117		Client sample ID	Method: Compound	-		CAS Number	LOR		Original Result	Duplicate Resul		(%) 0
Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Recovery Limits (%) Recovery Limits (%) RPD Low High Value 63 117	EP-071HK_SR: Tota	al Petroleum Hydrocarbo	ons (TPH) (QC	: Lot: 2945385	(6							
Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Recovery (%) Recovery Limits (%) RPD DCS Low High Value 63 117	HK1317305-011	Anonymous	C6 - C8 Fractio	u.			0.02	mg/L	<0.02	<0.02		0.0
Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report THE RECOVERY (%) RECOVERY Limits (%) RPD BCS Low High Value 63 117 63 117	lethod Blank (ME	3), Laboratory Control	I Spike (LCS)	and Labora	tory Control Spik	e Duplicate (DCS) Rep		e de communicación des constitución de destra despresa de proceso, en de consequencia con entra consequencia d			
Spike Spike Recovery (%) Recovery Limits (%) RPD	atrix: SOIL			Method B	llank (MB) Report		Labora	tory Control Spike (LCS) an	d Laboratory Control Sp	ike Duplicate (DCS) I	Report	
Result Concentration LCS DCS Low High Value			_			Spike		Spike Recovery (%)	Recovery L	imits (%)	RPD (%	1
3 25 µg/kg 86.6 63 117 17 17 17 17 17 170	Tethod: Compound	Z)	_			Concentral					_	Control Limit
25 µg/kg 86.6 63 117 65 6.1 147 1.17 1.17 1.17 1.17 1.17 1.17 1.19	P-076A: Polycyclic	c Aromatic Hydrocarbon	is (PAHs) (QC	Lot: 2950554	(
208-96-8 25 Lia/kg 25 Lia/kg 79.2	aphthalene		91-20-3	25 µg/l		25 µg/kg			63			
	cenaphthylene		208-96-8			25 ua/kg				1 27		

				Spike	Spike Ke	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound	CAS Number LOR	Unit	Result	Concentration	SO7	DCS	TOW	High		Value Control Limit
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2950554)	s) (QC Lo	t: 2950554)								
Naphthalene 91-20-3	0-3 25	hg/kg		25 µg/kg	86.6	-	63	117	-	
			<50			-		-	-	
Acenaphthylene 208-96-8	3-8 25	µg/kg		25 µg/kg	79.2	1	24	119		



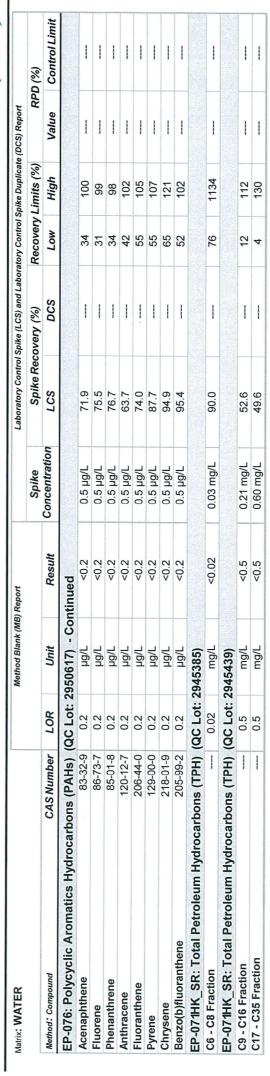
7 of 9
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
HK1317593, Amendment 1



Part Part							reactions of the feed with the control of the property of the control of the cont				
Concentration CAS Number LOR Unit Result Concentration Cols Number LOR Unit Result Concentration Cols Number Sa-32-8 Sa Light Cas					Spike	Spike Recovery (%)	overy (%)	Recover	Recovery Limits (%)	æ	RPD (%)
Part Part	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Гом	High	Value	Control Limit
Page Page	40045085	(QC Lot:	1	ontinued							
Part Part	208-96-8	20	µg/kg	<50		-		-	1	1	-
Per color Per color Per color Per color	83-32-9	25	µg/kg	1 0	25 µg/kg	92.5	-	29	122	1	
Part	7 67 90	100	200	000		1 0	1	8	1 5	1	-
Page	1-51-00	67	ру/кд	<50	6y/6rl c7	90.0		09	126		
120-12-7 25 µg/kg ~50	85-01-8	25	µg/kg	1	25 µg/kg	98.9	1	09	127	1	-
120-12-7 25 µg/kg 25 µg/kg				<50	:	-	1		1		-
129-00-0 129-00-0	120-12-7	25	µg/kg	1	25 µg/kg	97.9	1	26	124	1	-
e 206-44-0 25 μg/kg — 25 μg/kg racene 129-00-0 50 μg/kg <50 — 25 μg/kg ranthene 26-55-3 25 μg/kg <50 25 μg/kg rranthene 207-08-9 26 μg/kg <50 25 μg/kg and 207-08-9 25 μg/kg <50 25 μg/kg rranthene 207-08-9 25 μg/kg <50 25 μg/kg and 50-32-8 25 μg/kg <50 25 μg/kg colpyrene 193-39-5 50 μg/kg <50 25 μg/kg nthracene 53-70-3 25 μg/kg <50 25 μg/kg ser/ene 191-24-2 25 μg/kg <50 25 μg/kg ser/ene 191-24-2 25 μg/kg <50 25 μg/kg ser/ene 100 mg/kg <50 25 μg/kg ser/ene 100 mg/kg <50 45 mg/kg <				<50				1	1		1
129-00-0 50 199/kg 550 550 199/kg 550	206-44-0	25	µg/kg	1	25 µg/kg	93.6		61	132		
129-00-0 50 199/kg -50 25 199/kg -50 -50 199/kg -50 -50 -50 199/kg -50 -		C L		06>		-		1	-	-	1
Parameter Para	129-00-0	20	µg/kg	<50		1 3	-	;	5	-	
Taceine Se-55-3 25 Hg/kg					25 µg/kg	91.6	-	61	133	1	-
18-01-9 50 µg/kg <50	26-55-3	25	hg/kg		25 µg/kg	0.66	-	22	124		
ranthene 205-99-2 50 μg/kg -50 — 25 μg/kg ranthene 207-08-9 25 μg/kg -50 — 20 — 20 — 20 — 20 — 20 — 20 — 20 —	040040	0	100							-	
ranthene 205-99-2 50 μg/kg <50 25 μg/kg ranthene 207-08-9 25 μg/kg 25 μg/kg ene 50-32-8 25 μg/kg 25 μg/kg cd)pyrene 193-39-5 50 μg/kg 25 μg/kg cd)pyrene 53-70-3 25 μg/kg 25 μg/kg nthracene 53-70-3 25 μg/kg 25 μg/kg serylene 191-24-2 25 μg/kg 25 μg/kg sertion	8-10-012	00	pg/kg	06>	24/211 40	6			0	-	
ranthene 207-08-9 25 μg/kg —— 25 μg/kg —— 25 μg/kg =—	205-90-2	20	2//21	750	ga/gu cz	90.0	-	00	871	1	1
ranthene 50-32-8 25 μg/kg 250 μg/kg	7-00-007	3	54.55	20	25 Ha/kg	8 00		87	135	-	
Second Period	207-08-9	25	ua/ka	1	25 ua/ka	2.00		22 4	3 2		
colpyrene 50-32-8 25 μg/kg 25 μg/kg colpyrene 193-39-5 50 μg/kg 25 μg/kg nthracene 53-70-3 25 μg/kg 25 μg/kg serylene 191-24-2 25 μg/kg 25 μg/kg serylene 5 mg/kg <5 4.5 mg/kg ser Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620) 5 4.5 mg/kg sition 5 mg/kg <5 4.5 mg/kg sition 5 mg/kg <5 4.5 mg/kg sition 5 mg/kg 5 4.5 mg			9	<50			-	8	2		1
Concentration	50-32-8	25	µg/kg	-	25 µg/kg	86.3		20	124		-
cd/loyrene 193-39-5 50 μg/kg <50 — nthracene 53-70-3 25 μg/kg — 25 μg/kg serylene 191-24-2 25 μg/kg — 25 μg/kg serylene 191-24-2 25 μg/kg — 25 μg/kg serylene 191-24-2 25 μg/kg — 25 μg/kg ser Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367) <5				<20		1	-	1	1	-	-
nthracene 53-70-3 25 μg/kg —— 25 μg/kg 25 μg/kg —— 25 μg/kg —— 25 μg/kg —— 25 μg/kg —— 25 μg/kg —— 25 μg/kg —— 25 μg/kg —— 25 μg/kg —— 20 μg/kg <50 μg/kg <50 μg/kg —— 200 μg/kg <50 βη μg/kg ction —— 50 μg/kg <50 βη μg/kg ction —— 50 μg/kg <50 βη μg/kg ction —— 50 μg/kg <50 βη μg/kg sction —— 50 μg/kg <50 βη μg/kg sction —— 50 μg/kg <50 βη μg/kg sction —— 5 μg/kg <50 βη μg/kg sction —— 5 μg/kg <50 βη μg/kg sction —— 5 μg/k	193-39-5	20	µg/kg	<50			1	1	1	-	-
nthracene 53-70-3 25 µg/kg				-	25 µg/kg	0.06	-	48	134		-
191-24-2 25 µg/kg 25 µg/kg SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367) 5 mg/kg	53-70-3	25	µg/kg	1	25 µg/kg	101		20	137	****	
SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367) 25 µg/kg SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614) <5				<50		-		-		-	-
SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367) Capable	191-24-2	25	µg/kg		25 µg/kg	102	-	22	140	1	
SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367) <5 mg/kg				<50	-	-					
SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614) <5 4.5 mg/kg 4.5 mg/kg SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620) 32 mg/kg 00 mg/	um Hydrocarbons (TPH) ((QC Lot:	2945367)								
SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614) ction mg/kg <200 mg/kg <200 90 mg/kg SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620) 500 mg/kg <500 90 mg/kg sition 5 mg/kg <5 4.5 mg/kg sition Amethod Blank (MB) Report Spike md CAS Number LOR Unit Result Concentration ycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617) QC Lot: 2950617) Concentration		2	mg/kg	~ 2	4.5 mg/kg	87.2		69	139		
action —— 200 mg/kg <200 32 mg/kg section 500 mg/kg <500 90 mg/kg section 500 mg/kg (500 90 mg/kg section 500 mg/kg (500 90 mg/kg section 500 mg/kg section	um Hydrocarbons (TPH) ((QC Lot:	2950614)								
action mg/kg <500 mg/kg <500 90 mg/kg SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620) 4.5 mg/kg Spike stion Method Blank (MB) Report Spike Spike md CAS Number LOR Unit Result Concentration ycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617) Concentration Concentration		200	mg/kg	<200	32 mg/kg	92.1		53	104	-	
SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620) tion 5 mg/kg <5 4.5 mg/kg Method Blank (MB) Report Spike Spike COncentration ycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617)		200	mg/kg	<200	90 mg/kg	95.3		43	66	-	1
tion 5 mg/kg <5 4.5 mg/kg Method Blank (MB) Report Spike Spike Concentration ycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617)		QC Lot:	2950620)								
Method Blank (MB) Report Spike CAS Number LOR Unit Result Concentration ycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617)		2	mg/kg	<5	4.5 mg/kg	89.0		69	139		
COC Lot: 2950617)			Method Blank (MB)) Report		Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	pike (LCS) and Lab	oratory Control	Spike Duplicate	(DCS) Report	And the result of the contract
(QC Lot: 2950617) Result Concentration					Spike	Spike Recovery (%)	very (%)	Recovery	Recovery Limits (%)	RP	RPD (%)
(QC Lot: 2950617)	CAS Number	LOR	Unit	Result	Concentration	SO7	SOG	Low	High	Value	Control Limit
= 10000000		QC Lot: 3	950617)								
91-20-3 0.2 µg/L <0.2 0.5 µg/L	91-20-3	0.2	hg/L	<0.2	0.5 µg/L	77.0	-	34	106	1	1
µg/L <0.2	208-96-8	0.2	hg/L	<0.2	0.5 µg/L	70.3		38	92		-

Page Number Client Work Order

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

Matrix: SOIL				Matrix Spike	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report	x Spike Dupli	icate (MSD)	Report	
			Spike	Spike Re	Spike Recovery (%)	Recovery Limits (%)	Limits (%)		RPD (%)
Laboratory Client sample ID sample ID	Method: Compound	CAS	CAS Concentration	MS	MSD	Low	High	Value	Control
EP-071HK_SR: Total Petroleun	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945367)								
HK1317305-002 Anonymous	C6 - C8 Fraction		4.5 mg/kg	88.4		20	130		
EP-071HK_SR: Total Petroleun	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614)								
HK1317593-002 BH-ENV11/ 0.5M	C9 - C16 Fraction		32 mg/kg	85.0		20	130	-	
	C17 - C35 Fraction	-	90 mg/kg	78.3		20	130	-	
EP-071HK_SR: Total Petroleum	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620)								
HK1317593-002 BH-ENV11/ 0.5M	C6 - C8 Fraction	-	4.5 mg/kg	97.9	-	50	130		

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	arbons (PAHs) Surrogates	S	
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	ogate		
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
Sub-Matrix: WATER		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	Hiah





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Sub-Matrix: WATER		Recovery	Recovery Limits (%)
Compound	CASNumber	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	ocarbons (PAHs) Surrogates		,
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	ırrogate		
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
	The second secon		

Technichem (HK) Pty Ltd

ALS Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES

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: 1 of 7	: HK1317598			: 03-JUL-2013	: 15-AUG-2013	9	9
Page	Work Order	Amendment		Date Samples Received	Issue Date	No. of samples received	No. of samples analysed
: ALS Technichem HK Pty Ltd	: Fung Lim Chee, Richard	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	: Richard.Fung@alsglobal.com : +852 2610 1044				
Laboratory	Contact	Address	E-mail Telephone Facsimile	Quote number			
: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	: MR SUN NG	GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	: sunng@cedd.gov.hk :	RELOCATION OF SHA TIN SEWERAGE TREATMENT WORKS TO CAVERNS	: GE/2012/24.11	: H025605	: SHA TIN SEWAGE TREATMENT PLANT
Client	Contact	Address	E-mail Telephone Facsimile	Project	Order number	C-O-C number	Site

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Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory

Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories

Anh Ngoc Huynh

Senior Chemist - Organics

Chemist - Inorganics

Inorganics

ALS Laboratory Group

Trading Name: ALS Technichem (HK) Pty Ltd

1/1F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
Tet +852 2610 1044 Fax: +852 2610 2021 www.alsenviro.com

A Campbell Brothers Limited Company

: 2 of 7 : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1317598, Amendment 1



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. The completion date of analysis is: 08-JUL-2013

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: HK1317598

Project Name: Agreement No. CE 43/2011 (DS) Relocation of Sha Tin Sewerage Treatment Works to Caverns - Feasibility Study.

Sample(s) were received in a chilled condition.

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

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

Page Number Client Work Order

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Analytical Results							
Sub-Matrix: SOIL		J	Client sample ID	3.0M	BH-ENV12/ 2.2M	BH-ENV5/ 2.5M	BH-ENV2/ 1.1M
		Client sam	Client sampling date / time	[03-JUL-2013]	[03-JUL-2013]	[03-JUL-2013]	[03-JUL-2013]
Compound	CAS Number	LOR	Unit	HK1317598-001	HK1317598-002	HK1317598-003	HK1317598-004
EA/ED: Physical and Aggregate Properties							
EA055: Moisture Content (dried @ 103°C)	1	0.1	%	18.6	23.7	18.9	19.7
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	(Hs)						
Naphthalene	9120-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	PH)						
C6 - C8 Fraction	-	5	mg/kg	<5	<5	\$	<5
C9 - C16 Fraction	1	200	mg/kg	<200	<200	<200	<200
C17 - C35 Fraction	-	200	mg/kg	<500	<500	<500	<500
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	AHs) Sur	rogates					Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	92.7	101	94.4	96.4
4-Terphenyl-d14	1718-51-0	0.1	%	85.7	8.06	87.4	91.0
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	99.3	98.7	8.96	98.2
Toluene-D8	2037-26-5	0.1	%	7.76	97.9	98.1	98.8
4-Bromofluorobanzana	460-00-4	7	70	0 10	CLC	7.10	0.00

: 4 of 7 : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1317598, Amendment 1



Sub-Matrix: WATER			Client sample ID	BH-ENV12 (G.W) 2.3M	BH-ENV5 (G.W) 2.73M	
		Client sam	Client sampling date / time	[03-JUL-2013]	[03-JUL-2013]	
Compound	CAS Number	LOR	Unit	HK1317598-005	HK1317598-006	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	ons (PAHs)					
Naphthalene	9120-3	2.0	hg/L	<2.0	<2.0	
Acenaphthylene	208-96-8	2.0	hg/L	<2.0	<2.0	
Acenaphthene	83-32-9	2.0	hg/L	<2.0	<2.0	
Fluorene	86-73-7	2.0	hg/L	<2.0	<2.0	
Phenanthrene	85-01-8	2.0	hg/L	<2.0	<2.0	
Anthracene	120-12-7	2.0	hg/L	<2.0	<2.0	
Fluoranthene	206-44-0	2.0	hg/L	<2.0	<2.0	
Pyrene	129-00-0	2.0	hg/L	<2.0	<2.0	
Chrysene	218-01-9	1.0	hg/L	<1.0	<1.0	
Benzo(b)fluoranthene	202-99-2	1.0	hg/L	<1.0	<1.0	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	rbons (TPH)					
C6 - C8 Fraction		20	hg/L	<20	<20	
C9 - C16 Fraction	-	200	hg/L	<500	<500	
C17 - C35 Fraction	1	200	hg/L	<500	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	bons (PAHs) Sur	rogates				Surrogate control limits listed at end of this report
2-Fluorobiphenyl	32160-8	0.1	%	81.8	70.1	
4-Terphenyl-d14	1718-51-0	0.1	%	95.3	113	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	ate					Surrogate control limits listed at end of this report
Dibromofluoromethane	1868-53-7	0.1	%	108	7.66	
Toluene-D8	2037-26-5	0.1	%	102	100	
4-Bromofluorobenzene	460-00-4	0.1	%	97.1	97.8	

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Laboratory Du	Laboratory Duplicate (DUP) Report		L					
Matrix: SOIL					Pa Ta	Laboratory Duplicate (DUP) Report	Report	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical	EA/ED: Physical and Aggregate Properties (QC Lot: 2953306)	s (QC Lot: 2953306)						
HK1317593-005	Anonymous	EA055: Moisture Content (dried @ 103°C)	-	0.1	%	16.6	17.2	3.2
EP-076A: Polycy	clic Aromatic Hydrocarbo	EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2945371)						
HK1317305-001	Anonymous	Naphthalene	91-20-3	200	µg/kg	<500	<500	0.0
		Acenaphthylene	208-96-8	200	µg/kg	<500	<200	0.0
		Acenaphthene	83-32-9	200	µg/kg	<500	<500	0.0
		Fluorene	86-73-7	200	µg/kg	<500	<200	0.0
		Phenanthrene	82-01-8	200	hg/kg	<500	<500	0.0
		Anthracene	120-12-7	200	µg/kg	<500	<500	0.0
		Fluoranthene	206-44-0	200	µg/kg	<500	<500	0.0
		Pyrene	129-00-0	200	ng/kg	<200	<500	0.0
		Benz(a)anthracene	26-55-3	200	ng/kg	<200	<500	0.0
		Chrysene	218-01-9	200	ng/kg	<200	<500	0.0
		Benzo(b)fluoranthene	202-99-2	200	hg/kg	<200	<500	0.0
		Benzo(k)fluoranthene	207-08-9	200	hg/kg	<200	<500	0.0
		Benzo(a)pyrene	20-35-8	200	hg/kg	<200	<500	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	200	hg/kg	<200	<500	0.0
		Dibenz(a.h)anthracene	53-70-3	200	ng/kg	<500	<500	0.0
THE PERSON OF TH	THE REPORT OF THE PROPERTY AND ADDRESS OF THE PROPERTY OF THE	Benzo(g.h.i)perylene	191-24-2	200	hg/kg	<200	<500	0.0
EP-071HK_SR: To	otal Petroleum Hydrocarb	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614)						
HK1317593-001	Anonymous	C9 - C16 Fraction	1	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	1	200	mg/kg	<500	<500	0.0
EP-071HK_SR: To	otal Petroleum Hydrocarb	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620)						
HK1317593-001	Anonymous	C6 - C8 Fraction		2	mg/kg	\$	<5	0.0
Matrix: WATER			and the second s			Laboratory Duplicate (DUP) Report	eport	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-071HK_SR: To	stal Petroleum Hydrocarb	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2945385)						
HK1317305-011	Anonymous	C6 - C8 Fraction		0.02	mg/L	<0.02	<0.02	0.0
				the same of the sa		Management of the Control of the Con	The state of the s	

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

Proposition of CAS Number LOR Unit Result Concentration LOS DCS Low High Value Control Limit EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) QC Lot: 2945371) Concentration LOS LOS Low High Value Control Limit Phythalene 91-20-3 25 µg/kg	Matrix: SOIL			Method Blank (MB) Report) Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicate	(DCS) Report	
Result Concentration LCS DCS Low High						Spike	Spike Rec	covery (%)	Recovery	Limits (%)	R	D (%)
3 25 µg/kg 90.0 63 117 4 5 25 µg/kg 97.8 54 119 7 25 µg/kg 82.6 59 122 8 1 <50 1 <50 1 <50	Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	TOW	High	Value	Control Limit
3 — 25 µg/kg 90.0 — 63 117 — 450 — — — — — — 50 — 25 µg/kg 97.8 — — — 450 — 25 µg/kg 82.6 — — — 450 — — — — — 450 — — — — 450 — — — — 450 — — — — 450 — — — — 450 — — — —	EP-076A: Polycyclic Aromatic	: Hydrocarbons (PAHs)	(QC Lot:	2945371)								
e 208-96-8 50 \text{light} \text{sol} =	Naphthalene	91-20-3	25	µg/kg		25 µg/kg	90.0	-	63	117	-	
e 208-96-8 50 µg/kg <50 54 119 54 119					<20		-	-	-	-	-	-
83-32-9 25 µg/kg —— 25 µg/kg 82.6 —— 54 119 —— 86-73-7 50 µg/kg < 50 —— 25 µg/kg 82.6 —— 59 122 —— —— 86-73-7 50 µg/kg < 50 —— 25 µg/kg 84.8 —— 60 126 ——	Acenaphthylene	208-96-8	20	µg/kg	<50	1	1					
83-32-9 25 µg/kg 25 µg/kg 82.6 59 122 86-73-7 50 µg/kg <50 25 µg/kg 84.8 60 126						25 µg/kg	87.8	1	24	119		1
86-73-7 50 µg/kg <50	Acenaphthene	83-32-9	25	µg/kg	-	25 µg/kg	82.6	1	59	122		
86-73-7 50 µg/kg <50 25 µg/kg 84.8 60 126					<20		1	1			-	1
25 µg/kg 84.8 60 126	Fluorene	86-73-7		µg/kg	<50	1	1					1
					1	25 µg/kg	84.8		09	126		-

A Campbell Brothers Limited Company

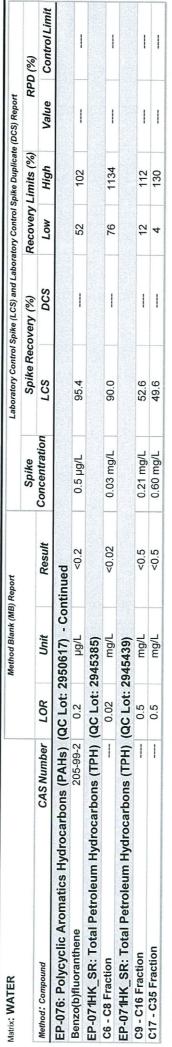
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Matrix: SOIL			Method Blank (MB) Report) Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicate	(DCS) Report	
					Spike	Spike Red	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	TOW	High	Value	Control Limit
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)		(QC Lot:	(QC Lot: 2945371) - Contin	ntinued							
Phenanthrene		20	µg/kg	<50			-	-			
			1		25 µg/kg	97.3		90	127		-
Anthracene	120-12-7	25	µg/kg	1	25 µg/kg	97.4	1	26	124	1	1
				<20				-	-		-
Fluoranthene	206-44-0	25	µg/kg		25 µg/kg	97.3	1	61	132	-	1
				<50			-	-		-	
Pyrene	129-00-0	25	µg/kg		25 µg/kg	101	-	61	133	-	-
				<50	: 1		1		ł		1
Benz(a)anthracene	56-55-3	20	ug/kg	<50	1	1		-	-	-	
)	-	25 µg/kg	94.7	-	22	124	-	-
Chrysene	218-01-9	20	ua/ka	<50	2	-	1	1	1	-	
		;			25 ua/ka	99.5	-	09	128	-	-
Benzo/b)fluoranthene	205-99-2	20	ua/ka	<50	2	-	-			-	-
					25 µg/kg	94.8	-	48	135	-	-
Benzo(k)fluoranthene	207-08-9	50	ua/ka	<50	2			1	-	-	Annual and the same of the sam
				3	25 ua/ka	97.6	-	28	133	-	-
Benzo(a)pyrene	50-32-8	25	ug/kg	-	25 ug/kg	96.7		20	124	-	
)	<20	2	-	-	-	-	-	1
Indeno(1.2.3.cd)pyrene	193-39-5	25	ug/kg	1	25 µg/kg	80.7	1	48	134	1	1
			1	<50	2		-	-	-		1
Dibenz(a.h)anthracene	53-70-3	20	µg/kg	<50	1	1	1	1	1	1	1
)		25 µg/kg	86.0	-	20	137		
Benzo(g.h.i)perylene	191-24-2	20	µg/kg	<50	-			-			
					25 µg/kg	91.8		55	140	-	
EP-071HK SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614)	carbons (TPH)	(QC Lot:)	2950614)								
C9 - C16 Fraction		200	ma/ka	<200	32 ma/kg	92.1		53	104		
C17 - C35 Fraction	1	500	ma/ka	<500	90 mg/kg	95.3	1	43	66	1	
ED 074UK SD. Total Botaloum Usus		, , , , , , ,	000000								
C. 20 C. Lotal Petroleum hydrocarbons (1PH)		(GC Lot: 295062U)	(0700067	U,	A F 20 20 10 20	0		Ç	7		
Co - C8 Fraction		C	mg/kg	65	4.5 mg/kg	88.0		80	139		
Matrix: WATER			Method Blank (MB) Repo	Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	spike Duplicate	(DCS) Report	
					Spike	Spike Rec	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2950617)	arbons (PAHs) (QC Lot: 2	950617)								
Naphthalene	91-20-3	0.2	hg/L	<0.2	0.5 µg/L	77.0		34	106	1	
Acenaphthylene	208-96-8	0.2	na/L	<0.2	0.5 µa/L	70.3		38	92		
Acenaphthene	83-32-9	0.2	ng/L	<0.2	0.5 µg/L	71.9		34	100		-
Fluorene	86-73-7	0.2	na/L	<0.2	0.5 µa/L	75.5		31	66		
Phenanthrene	85-01-8	0.2	na/l	<0.2	0.5 μα/Ι	767	1	34	86	-	1
Anthracene	120-12-7	0.2	1/011	<0.5	0.5 μα/Ι	63.7	1	42	102	1	-
Flioranthone	206-44-0	0.0	1/01	<0>	0.5 10/1	74.0		1 5	105	-	
Director	129-00-0	0.0	1 /0	200	1,61,40	27.78		2 4	107		
Character	218 01 0	2.0	ָבָּבְּרָבְּרָבְּרָבְּרָבְּרָבְּרָבְּרָב	20.7	ייייייייייייייייייייייייייייייייייייי	0.70		20 0	101		
Chrysene	2-10-217	0.7	hg/L	×0.7	0.5 µg/L	84.8		60	171		-

Page Number Client Work Order

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

Matrix: SOIL					Matrix Spike	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Benort	Y Snike Dunli	icate (MSD)	Sonort	
				Spike	Spike Rec	Spike Recovery (%)	Recovery Limits (%)	Limits (%)	RPD (%)	(%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS	CAS Concentration	MS	MSD	Low	High	Value	Control
EP-071HK_S	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950614)	s (TPH) (QC Lot: 2950614)								
HK1317593-002 Anonymous	2 Anonymous	C9 - C16 Fraction	1	32 mg/kg	85.0		20	130	-	
		C17 - C35 Fraction	-	90 mg/kg	78.3	1	20	130	-	
EP-071HK_SI	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2950620)	s (TPH) (QC Lot: 2950620)								
HK1317593-002 Anonymous	2 Anonymous	C6 - C8 Fraction	-	4.5 mg/kg	97.9		20	130	-	

Surrogate Control Limits

Sub-Matrix: SOIL	Name of the state	Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	arbons (PAHs) Surrogates		
2-Fluorobiphenyl	321-60-8	20	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate		
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
Sub-Matrix: WATER	The state of the s	Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	arbons (PAHs) Surrogates		·
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate		
Dibromofluoromethane	1868-53-7	98	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115



Technichem (HK) Pty Ltd

ALS Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS





: 1 of 7	: HK1318887			: 12-JUL-2013	: 15-AUG-2013 : 4 : 4
Page	Work Order	Amendment		Date Samples Received	issue Date No. of samples received No. of samples analysed
: ALS Technichem HK Pty Ltd	: Fung Lim Chee, Richard	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	: Richard.Fung@alsglobal.com : +852 2610 1044 : +852 2610 2021	:	
Laboratory	Contact	Address	E-mail Telephone Facsimile	Quote number	
: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	: MR SUN NG	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	: sunng@cedd.gov.hk :	: RELOCATION OF SHA TIN SEWERAGE TREATMENT WORKS TO CAVERNS	: GE/2012/24.11 : H025607 :
Client	Contact	Address	E-mail Telephone Facsimile	Project	Order number C-O-C number Site

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Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6. Senior Chemist - Organics Chemist - Inorganics Anh Ngoc Huynh (Ng Chun Hoi, Michael

Authorised results for Organics Inorganics

Page Number Client Work Order

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ALS Laboratory Group

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Teit +852 2610 1044 Fax: +852 2610 2021 www.alsenviro.com

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. The completion date of analysis is: 17-JUL-2013

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: HK131887

Project Name: Agreement No. CE 43/2011 (DS) Relocation of Sha Tin Sewerage Treatment Works to Caverns - Feasibility Study. Sample(s) were received in a chilled condition. Sample(s) analysed and reported on an as received basis. Result(s) reported on a dry weight basis. Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.





BH-ENV8A 0.85M Page Number: 3 of 7

Client: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Work Order: HK1318887, Amendment 1

Analytical Results

Sub-Matrix: SOIL

Client sample ID

			Cilent sample ID	BH-ENV3A 0.80M	BH-ENV8A 0.85M	
		Client san	Client sampling date / time	[12-JUL-2013]	[12-JUL-2013]	
Compound	CAS Number	LOR	Unit	HK1318887-002	HK1318887-004	
EA/ED: Physical and Aggregate Properties						
EA055: Moisture Content (dried @ 103° C)	-	0.1	%	21.2	18.8	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	is (PAHs)					
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	ins (TPH)					
C6 - C8 Fraction		2	mg/kg	\$	<5	
C9 - C16 Fraction	1	200	mg/kg	<200	<200	
C17 - C35 Fraction	-	200	mg/kg	<500	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	ns (PAHs) Sur	rogates				Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%	91.4	72.5	
4-Terphenyl-d14	1718-51-0	0.1	%	98.4	97.6	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate						Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	94.5	0.66	
Toluene-D8	2037-26-5	0.1	%	99.3	93.6	
4-Bromofluorobenzene	460-00-4	0.1	%	98.1	99.2	

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: 4 of 7 : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1318887, Amendment 1

Sub-Matrix: WATER			Client sample ID	BH-ENV3A (GW) 0.85M	BH-ENV8A (GW)	
		Client san	Client sampling date / time	[12-JUL-2013]	[12-JUL-2013]	
Compound	CAS Number	LOR	Unit	HK1318887-001	HK1318887-003	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	rbons (PAHs)					
Naphthalene	9120-3	2.0	hg/L	<2.0	<2.0	
Acenaphthylene	208-96-8	2.0	hg/L	<2.0	<2.0	
Acenaphthene	83-32-9	2.0	hg/L	<2.0	<2.0	
Fluorene	86-73-7	2.0	hg/L	<2.0	<2.0	
Phenanthrene	85-01-8	2.0	hg/L	<2.0	<2.0	
Anthracene	120-12-7	2.0	hg/L	<2.0	<2.0	
Fluoranthene	206-44-0	5.0	hg/L	<2.0	<2.0	
Pyrene	129-00-0	2.0	hg/L	<2.0	<2.0	
Chrysene	218-01-9	1.0	hg/L	<1.0	<1.0	
Benzo(b)fluoranthene	205-99-2	1.0	hg/L	<1.0	<1.0	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	arbons (TPH)					
C6 - C8 Fraction		20	hg/L	<20	<20	
C9 - C16 Fraction	1	200	hg/L	<500	<500	
C17 - C35 Fraction	1	200	hg/L	<500	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	arbons (PAHs) Su	rrogates				Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%	70.2	52.6	
4-Terphenyl-d14	1718-51-0	0.1	%	92.8	104	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate					Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	8.66	107	
Toluene-D8	2037-26-5	0.1	%	103	100	
4-Bromofluorohenzene	460-00-4	0.1	%	101	8 80	

∴ 5 of 7 ∴ CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1318887, Amendment 1



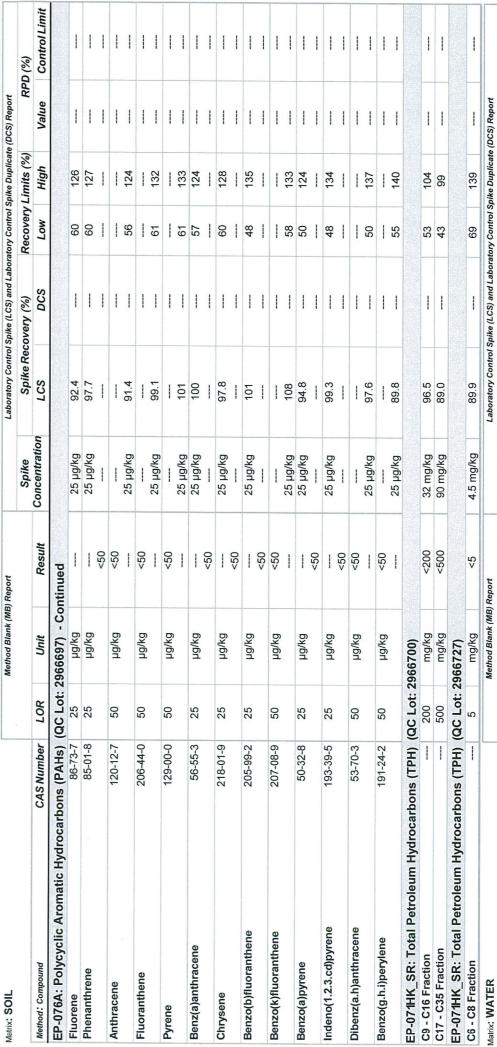
Laboratory Duplicate (DUP) Report

l'aboratory sample ID					La	Laboratory Duplicate (DUP) Report	чероп	
norderery sample is	Client sample ID	Method: Compound	CAS Number	TOR	Unit	Original Result	Duplicate Result	RPD (%)
A/ED: Physica	EA/ED: Physical and Aggregate Properties (QC Lot: 2966734)	es (QC Lot: 2966734)						
HK1318730-021	Anonymous	EA055: Moisture Content (dried @ 103°C)		0.1	%	16.6	16.2	2.5
HK1318730-026	Anonymous	EA055: Moisture Content (dried @ 103°C)		0.1	%	16.3	16.3	0.0
-076A: Polycy	/clic Aromatic Hydrocarb	EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2966697)						
HK1318970-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	333	317	4.9
		Pyrene	129-00-0	150	µg/kg	402	364	10.0
		Benz(a)anthracene	56-55-3	150	µg/kg	243	230	5.5
		Chrysene	218-01-9	150	µg/kg	234	228	2.7
		Benzo(b)fluoranthene	202-99-2	150	µg/kg	485	495	2.1
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	228	204	10.7
		Benzo(a)pyrene	50-32-8	150	µg/kg	371	336	6.6
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	355	349	1.8
		Dibenz(a.h)anthracene	53-70-3	150	hg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	348	350	0.7
		Naphthalene	91-20-3	20	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	20	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	20	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	20	µg/kg	114	117	2.3
		Anthracene	120-12-7	20	µg/kg	55	56	2.0
071HK_SR: 1	otal Petroleum Hydrocar	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966700)						
HK1318887-002	BH-ENV3A 0.80M	C9 - C16 Fraction	-	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction		200	mg/kg	<500	<200	0.0
071HK_SR: 1	otal Petroleum Hydrocar	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966727)						
HK1318887-002	BH-ENV3A 0.80M	C6 - C8 Fraction	-	5	mg/kg	<5	<5	0.0
Matrix: WATER					Paris	Laboratory Duplicate (DUP) Report	eport	Activitation (participal policy) and expensive terminate for eathering exp
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	TOR	Unit	Original Result	Duplicate Result	RPD (%)
071HK_SR: T	otal Petroleum Hydrocar	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2968462)						
HK1318887-001	BH-ENV3A (GW) 0.85M	C6 - C8 Fraction	-	0.02	mg/L	<0.02	<0.02	0.0

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

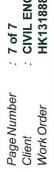
Method: Compound			10000	Today (Laboratory Confin	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Keport	olatory control	annual annual	anday (acc)	
					Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
	CAS Number LOR	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Value Control Limit
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2966697)	oons (PAHs) (QC Lot:	2966697)								
Naphthalene	91-20-3	25	hg/kg		25 µg/kg	102	-	63	117	1	
				<20					-	-	1
Acenaphthylene	208-96-8	25	hg/kg	1	25 µg/kg	91.0	-	54	119	1	
				<20	1	-		-			-
Acenaphthene	83-32-9	25	µg/kg	1	25 µg/kg	95.1		29	122	-	
				<20	-	-		-	1	-	
Fluorene	86-73-7	20	µg/kg	<50	-			1	1	-	1

. 6 of 7 Page Number Client Work Order





Mally: AZ						•					
					Spike	Spike Rec	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Tow	High	Value	Value Control Limit
EP-076: Polycyclic Aromati	EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2966724)	QC Lot: 2	966724)								
Naphthalene	91-20-3	0.2	hg/L	<0.2	0.5 µg/L	70.9		34	106		
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	82.8	1	38	92	-	-
Acenaphthene	83-32-9	0.2	hg/L	<0.2	0.5 µg/L	81.4	1	34	100	-	-
Fluorene	86-73-7	0.2	hg/L	<0.2	0.5 µg/L	70.7	1	31	66	-	
Phenanthrene	85-01-8	0.2	hg/L	<0.2	0.5 µg/L	75.7	1	34	86	-	
Anthracene	120-12-7	0.2	hg/L	<0.2	0.5 µg/L	79.4	1	42	102	-	-
Fluoranthene	206-44-0	0.2	hg/L	<0.2	0.5 µg/L	94.3	1	55	105		-
Pyrene	129-00-0	0.2	hg/L	<0.2	0.5 µg/L	96.7		55	107	-	



CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1318887, Amendment 1



Matrix: WATER		Method Blank (MB) Repo	B) Report		Laboratory Contro	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control S	Spike Duplicate	(DCS) Report	
				Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)	8	RPD (%)
Method: Compound	CAS Number LOR	Unit	Result	Concentration	SO7	DCS	Tow	High	Value	Value Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2966724) - Continu	Is) (QC Lot	. 2966724) - Co	ontinued							
Chrysene 218-0	218-01-9 0.2	hg/L	<0.2	0.5 µg/L	98.3	-	65	121	-	
Benzo(b)fluoranthene 205-99-2	9-2 0.2	hg/L	<0.2	0.5 µg/L	97.4		52	102	1	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966725)	H) (QC Lot	: 2966725)								
C9 - C16 Fraction	0.5	mg/L	<0.5	0.21 mg/L	49.4	1	12	112	1	1
C17 - C35 Fraction	0.5	mg/L	<0.5	0.60 mg/L	50.9		4	130		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2968462)	H) (QC Lot	: 2968462)								
C6 - C8 Fraction	0.02	mg/L	<0.02	0.03 mg/L	85.9		9/	1134	-	-

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

Matrix: SOIL					Matrix Spike	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report	ix Spike Dupl.	icate (MSD)	Report	A MARTINES COLOR AND A CONTRACTOR OF THE ACTION OF THE ACT
				Spike		Spike Recovery (%)	Recovery	Recovery Limits (%)	1	RPD (%)
Laboratory Cample ID	Client sample ID	Method: Compound	CAS	CAS Concentration	MS	MSD	Low	High	Value	Control Limit
EP-071HK_SR	: Total Petroleum Hydroca	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966700)								
HK1318887-004	HK1318887-004 BH-ENV8A 0.85M	C9 - C16 Fraction		32 mg/kg	73.7		20	130	-	
		C17 - C35 Fraction		90 mg/kg	74.2	-	20	130	l	l
EP-071HK_SR	: Total Petroleum Hydroca	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966727)								
HK1318887-004 I	HK1318887-004 BH-ENV8A 0.85M	C6 - C8 Fraction		4.5 mg/kg	91.1		20	130		

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	irbons (PAHs) Surrogates		
2-Fluorobiphenyl	321-60-8	20	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate		
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
Sub-Matrix: WATER		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	irbons (PAHs) Surrogates		
2-Fluorobiphenyl	321-60-8	20	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate		
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES







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ERTIFICATE OF ANALYSIS : ALS Technichem HK Pty Ltd

Client	CIVIL ENGINEERING AND DEVELOPMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 6
Contact	DEPARTMENT : MR SUN NG	Contact	: Fung Lim Chee, Richard	Work Order	HK1318896
Address	GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	Amendment	
E-mail Telephone	sunng@cedd.gov.hk	E-mail Telephone Facsimile	: Richard.Fung@alsglobal.com : +852 2610 1044		
Project	RELOCATION OF SHA TIN SEWERAGE	Quote number		Date Samples Received	: 12-JUL-2013
Order number	TREATMENT WORKS TO CAVERNS :: GE/2012/24.11			Issue Date	: 22-AUG-2013
C-O-C number	: H025606			No. of samples received	. 5
- 410				No. of samples analysed	4

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. The completion date of analysis is: 19-AUG-2013

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: HK131896

Project Name: Agreement No. CE 43/2011 (DS) Relocation of Sha Tin Sewerage Treatment Works to Caverns - Feasibility Study.

Sample(s) were received in a chilled condition.

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

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Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories
Anh Ngoc Huynh M.
Ng Chun Hoi, Michael

Senior Chemist - Organics Chemist - Inorganics

: 2 of 6 : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1318896, Amendment 1

Analytical Results			and a		на на полителната и Манта в файла обфессивава на постанизата фессирализации и постанизата на постанизата в пос			
Sub-Matrix: SOIL			Client sample ID	BH-ENV10 3.0M	BH-ENV06 0.73M	BH-ENV01 0.83M	BH-ENV3A 0.5M	BH-ENV8A 0.5M
		Client san	Client sampling date / time	[11-JUL-2013]	[11-JUL-2013]	[11-JUL-2013]	[11-JUL-2013]	[11-JUL-2013]
Compound	CAS Number	LOR	Unit	HK1318896-001	HK1318896-002	HK1318896-003	HK1318896-004	HK1318896-005
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)		0.1	%	18.5	17.9	16.3	15.5	16.1
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	is (PAHs)							
Naphthalene	9120-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Chrysene	218-019	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
EP-071HK SR: Total Petroleum Hydrocarbons (TPH)	ons (TPH)							
C6 - C8 Fraction		S	mg/kg	<5	<5	<5	<5	<5
C9 - C16 Fraction	1	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	1	200	mg/kg	<200	<200	<200	<200	<500
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	ins (PAHs) Su	rrogates					Surrogate control limits	Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	107	87.0	84.6	88.9	84.0
4-Terphenyl-d14	1718-51-0	0.1	%	110	9.96	96.2	98.1	89.4
EP-080 SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits	Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	93.5	92.6	92.5	96.4	98.8
Toluene-D8	2037-26-5	0.1	%	92.6	98.8	98.6	98.3	99.4
4-Bromofluorobenzene	460-00-4	0.1	%	101	8.96	7.76	9.96	98.6

Page Number Client Work Order

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t : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Corder HK1318896, Amendment 1	Laboratory Duplicate (DUP) Report
ent	ork Orde	Labo

				-		-		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Kesuit	Duplicate Result	RPD (%)
A/FD: Physica	EA/ED: Physical and Aggregate Properties	ies (QC Lot: 2966734)						
74040700004	odo: cargarda a	TAOFF. Mainting Contout (drind @ 103	ON THE PROPERTY CONTRINGED AND ADDRESS OF THE PARTY OF TH	10	%	16.6	16.2	2.5
HK 1318/30-021	Anonymous	EAU55; Moisture content (uried @ 103 c)			200	0000	1 0	ic
HK1318730-026	Anonymous	EA055: Moisture Content (dried @ 103°C)	BOARD STREET OF CLUB AND STREET STREET STREET	0.1	%	10.3	10.3	0.0
4/ED: Physica	EA/ED: Physical and Aggregate Properties	ies (QC Lot: 3018791)						
HK1318896-001	BH-ENV10 3.0M	EA055: Moisture Content (dried @ 103°		0.1	%	18.5	18.2	1.8
HK1322092-002	Anonymous	EA055: Moisture Content (dried @ 103°C)		0.1	%	9.6	9.5	1.1
2-076A: Polyc	velic Aromatic Hydrocar	FP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2966697)						
HK1318970-001	Anonymous	Fluoranthene	206-44-0	150	ug/kg	333	317	4.9
		Pyrene	129-00-0	150	ug/kg	402	364	10.0
		Benzíalanthracene	56-55-3	150	ug/kg	243	230	5.5
		Chrysene	218-01-9	150	ug/kg	234	228	2.7
		Benzo(h)filoranthene	205-99-2	150	ua/ka	485	495	2.1
		Benzo(k)flioranthene	207-08-9	150	ua/ka	228	204	10.7
		Bonzo(a) byrono	50-32-8	150	ua/ka	371	336	9.6
		Indeno(1.2.3.cd)pyrene	193-39-5	150	ua/ka	355	349	1.8
		Dibon-(a blanthracene	53-70-3	150	ua/ka	<150	<150	0.0
		Bonzo(a h i)nervlene	191-24-2	150	ua/ka	348	350	0.7
		Nanhthalan	91-20-3	20	ua/ka	<50	<50	0.0
		Aconsubthylone	208-96-8	20	ua/ka	<50	<50	0.0
		Acenanhthene	83-32-9	20	ug/kg	<50	<50	0.0
		Fliorene	86-73-7	20	ug/kg	<50	<50	0.0
		Dhenanthrana	85-01-8	50	ua/ka	114	117	2.3
		Anthracene	120-12-7	20	ug/kg	55	56	2.0
-076A · Polyc	velic Aromatic Hydrogan	FP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (OC Lot: 3013444)						
HK1318896-001	BH-ENV10 3 0M	Naphthalene	91-20-3	200	ug/kg	<500	<500	0.0
		Acenaphthylene	208-96-8	200	ng/kg	<500	<500	0.0
		Acenaphthene	83-32-9	200	ug/kg	<500	<500	0.0
		Fluorene	86-73-7	200	ug/kg	<500	<200	0.0
		Phenanthrene	82-01-8	200	µg/kg	<200	<200	0.0
		Anthracene	120-12-7	200	ug/kg	<200	<200	0.0
		Fluoranthene	206-44-0	200	µg/kg	<200	<200	0.0
		Pvrene	129-00-0	200	µg/kg	<200	<200	0.0
		Benz(a)anthracene	56-55-3	200	µg/kg	<200	<200	0.0
		Chrysene	218-01-9	200	µg/kg	<200	<500	0.0
		Benzo(b)fluoranthene	205-99-2	200	µg/kg	<200	<500	0.0
		Benzo(k)fluoranthene	207-08-9	200	µg/kg	<200	<200	0.0
		Benzo(a)byrene	50-32-8	200	ng/kg	<200	<200	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	200	ug/kg	<500	<200	0.0
		Dibenz(a.h)anthracene	53-70-3	200	ng/kg	<200	<200	0.0
		Benzo(q.h.i)perylene	191-24-2	200	µg/kg	<500	<500	0.0
9-071HK SR:	Total Petroleum Hydroca	EP-074HK SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966700)						
HK1318887-002	Anonymous	C9 - C16 Fraction		200	mg/kg	<200	<200	0.0
100)			

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Laboratory sample D	Method: Compound ydrocarbons (TPH) (QC Lo C6 - C8 Fraction C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C7 - COntrol Spike (LCS) an	(QC Lot: 2966727) action (QC Lot: 3004350) raction Fraction (QC Lot: 3004354) action CS) and Laborat Action Action 25 LOR Unit	66727)		CAS Number	LOR 5	<i>Unit</i> mg/kg	Original Result		Duplicate Result < > < >	RPD (%) 0.0
EP-071HK_SR: Total Petroleum Hy HK1318887-002 Anonymous EP-071HK_SR: Total Petroleum Hy HK1321360-001 Anonymous HK1321360-001 Anonymous HK1321360-001 Anonymous Method Blank (MB), Laboratory Method: Compound Method: Compound Acenaphthylene Acenaphthene Fluorene	rdrocarbons (TPH) (C6 - C8 Frac C6 - C8 Frac C9 - C16 Frac C17 - C35 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C6 - C8 Frac C9 Frac C9	2C Lot: 29 tion QC Lot: 30 ction action QC Lot: 30 ttion LOR LOR 25	66727)			5	mg/kg	<5	_	55	0.0
HK131887-002 Anonymous EP-071HK_SR: Total Petroleum Hy HK1321360-001 Anonymous HK1321360-001 Anonymous HK1321360-001 Anonymous Method Blank (MB), Laboratory Method: Compound Method: Compound Method: Compound Acenaphthylene Acenaphthene Fluorene	C6 - C8 Frac ydrocarbons (TPH) (C9 - C16 Fra C17 - C35 Frac C6 - C8 Frac C Control Spike (LC	tion CC Lot: 30 cction action QC Lot: 30 tion S) and La	04350)			2	mg/kg	<5	V	:5	0.0
EP-071HK_SR: Total Petroleum Hy HK1321360-001 Anonymous HK1321360-001 Anonymous HK1321360-001 Anonymous Method Blank (MB), Laboratory Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Fluorene	rdrocarbons (TPH) (C9 - C16 Fre C17 - C35 Fre C17 - C35 Fre C6 - C8 Fre C6 - C8 Fre C7 Control Spike (LC CAS Number CAS N	2C Lot: 30 ction action action CC Lot: 30 ttion S) and La	04350)								
HK1321360-001 EP-071HK_SR: Total Petroleum Hy HK1321360-001 Method Blank (MB), Laboratory Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Fluorene	C9 - C16 Fra C17 - C35 Fi ydrocarbons (TPH) (C6 - C8 Frac r Control Spike (LC	action action QC Lot: 30 tion S) and La LOR 2C Lot: 29	AND PROPERTY OF STREET, STREET								
EP-071HK_SR: Total Petroleum Hy HK1321360-001 Anonymous Method Blank (MB), Laboratory Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Fluorene	rdrocarbons (TPH) (Control Spike (LCC	action QC Lot: 30 tion S) and La			1	200	mg/kg	<200	♡	<200	0.0
EP-071HK_SR: Total Petroleum Hy HK1321360-001 Anonymous Method Blank (MB), Laboratory Matix: SOIL Method: Compound EP-076A: Polycyclic Aromatic Hydi Naphthalene Acenaphthylene Acenaphthene Fluorene	rdrocarbons (TPH) (Control Spike (LC	2C Lot: 300 tion S) and La LOR 2C Lot: 291 25			The state of the second st	200	mg/kg	<200	3)	<500	0.0
HK1321360-001 Anonymous Method Blank (MB), Laboratory Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Acenaphthene Fluorene	Control Spike (LC	S) and La S) and La LOR C Lot: 29	04354)								
Method Blank (MB), Laboratory Matrix: SOIL Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Acenaphthene Fluorene	Control Spike (LC	S) and La LOR 2C Lot: 29				5	mg/kg	<5	>	<5	0.0
Metrix: SOIL Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Acenaphthene Fluorene	CAS Number	LOR 2C Lot: 291	boratory Co	introl Spike	Duplicate (1	DCS) Repor	4				
Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Acenaphthene		2C Lot: 29	Method Blank (MB) Report	Report		Laboratory	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	1 Laboratory Control	I Spike Duplicate	e (DCS) Report	
Method: Compound EP-076A: Polycyclic Aromatic Hydl Naphthalene Acenaphthylene Acenaphthene Fluorene		25 LOR			Spike		Spike Recovery (%)	Recovery	Recovery Limits (%)		RPD (%)
EP-076A: Polycyclic Aromatic Hydr Naphthalene Acenaphthylene Acenaphthene Fluorene	TO SECURE A SECURE OF THE PROPERTY OF THE PROP	2C Lot: 29(Unit	Result	Concentration	ion LCS	DCS	Low	High	Value	Control Limit
Naphthalene Acenaphthylene Acenaphthene Fluorene		25	36697)								
Acenaphthylene Acenaphthene Fluorene			µg/kg		25 µg/kg	102	1	63	117	1	-
Acenaphthylene Acenaphthene Fluorene				<50	1		-	-	1		-
Acenaphthene	208-96-8	25	µg/kg	-	25 µg/kg	91.0	-	54	119		
Acenaphthene				<20			-	1	1		
Fluorene	83-32-9	25	µg/kg	1	25 µg/kg	95.1		29	122	-	1
Fluorene				<50	-	-		-	1	1	
	86-73-7	20	µg/kg	<20				1 :	5	1	-
					25 µg/kg			09	126	-	
Phenanthrene	82-01-8	25	hg/kg	-	25 µg/kg	97.7	-	09	127		-
				<50	-	-	1	1	1		
Anthracene	120-12-7	20	hg/kg	<20	-				;		
					25 µg/kg	91.4		26	124		
Fluoranthene	206-44-0	20	µg/kg	<20			1	;	5		
					25 µg/kg	99.1	-	61	132		
Pyrene	129-00-0	20	µg/kg	<50	-			;	1 5	-	-
					25 µg/kg		-	61	133		
Benz(a)anthracene	26-55-3	25	hg/kg		25 µg/kg		1	22	124		-
				<20	1					-	
Chrysene	218-01-9	25	hg/kg		25 µg/kg	97.8		09	128	-	
				<20	1			-	-	-	
Benzo(b)fluoranthene	202-99-2	25	µg/kg	-	25 µg/kg	101	-	48	135		-
				<20	-		-	-	-		
Benzo(k)fluoranthene	207-08-9	20	hg/kg	<50	1		-		-	-	1
				-	25 µg/kg		-	28	133		-
Benzo(a)byrene	50-32-8	25	ug/kg		25 µg/kg	94.8		20	124	-	
				<20			-				
Indeno(1.2.3.cd)pyrene	193-39-5	25	ug/kg		25 µg/kg	99.3		48	134	-	
				<20	1	1	1				-
Dibenz(a.h)anthracene	53-70-3	20	µg/kg	<50	1		-		-	-	
					25 µg/kg	97.6	-	20	137	-	
Benzo(g.h.i)perylene	191-24-2	20	hg/kg	<20	1			-	-	-	
				-	25 µg/kg	868	-	22	140		

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Polycyclic Aromatic Hydrocarbons (PAHs) QCL cut; 31/3444) Activation Activa	Matrix:			Method Blank (MB) Report	Report (Laboratory Contra	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicat	e (DCS) Report	
LOR Unit Result Concentration LCS DoS Low GC Lot: 3013444) 25 25 µg/kg 102 — 63 50 µg/kg 25 µg/kg 101 — 64 50 µg/kg 25 µg/kg 103 — 64 50 µg/kg 25 µg/kg 103 — 64 50 µg/kg 25 µg/kg 103 — 66 50 µg/kg 25 µg/kg 101 — 66						Spike	Spike Re	covery (%)	Recovery	Limits (%)		RPD (%)
GQC Lot: 3013444) CQC Lot: 301350) CQC Lot: 301350) CQC Lot: 3013444) CQC Lot: 3014354) CQC Lot: 3014454 CQC Lot: 30	Method: Compound	CAS Number	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Control Limit
50 μg/kg <50 μg/kg <50 25 μg/kg -50 25 μg/kg 101 -6 -6 50 μg/kg -50 25 μg/kg 103 -6 -6 50 μg/kg -50 25 μg/kg 101 -6 -6 50 μg/kg -50 25 μg/kg 101 -6 -6 50 μg/kg -50 25 μg/kg 101 -6 -6 50 μg/kg -50 25 μg/kg 99.3 -6 -6 50 μg/kg -50 25 μg/kg 99.3 -6 -6 50 μg/kg -50 25 μg/kg 99.3 -6 -6 50 </td <td>EP-076A: Polycyclic Aromatic Hydrocar</td> <td>rbons (PAHs)</td> <td>QC Lot: 3</td> <td>013444)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	EP-076A: Polycyclic Aromatic Hydrocar	rbons (PAHs)	QC Lot: 3	013444)								
	Nanhthalana	91-20-3	50	ua/ka	<50			1	-	-		-
)	1	25 µg/kg	102	-	63	117	-	-
<50 — — — — <50	Acenaphthylene	208-96-8	25	ug/kg		25 µg/kg	101	-	54	119	-	-
\$\circ \circ				<20	-	-	1				1	
	Acenaphthene	83-32-9	50	ua/ka	<50	-				-	-	1
1)	1	25 µg/kg	100	-	69	122	-	1
<50	Fliorene	86-73-7	25	ua/ka		25 ug/kg	103	1	09	126		-
<50)	0.00	<50		-		1		1	1
	10	85.01.8	20	בא/סוו	<50			-	1	-		
	Pnenantnrene	0-10-00	9	SV/SH	8	25,10/69	102		09	127	1	1
<50		1	L			2000	100		9 4	107		
Color	Anthracene	1-21-021	22	рд/кд	1 2	ga/gd cz	4.00		3	7		1
<50					005	-						
	Fluoranthene	206-44-0	20	µg/kg	06×	-	3		2	6	-	
<50					-	gy/grd cz	10.5	-	0 0	707		
Color Colo	Pyrene	129-00-0	25	µg/kg		gy/gd cz	101	1	0	22		
Color					<20					1 3		
\$\circ \circ 3enz(a)anthracene	56-55-3	25	µg/kg		25 µg/kg	97.3	1	25	124	-	-	
\$\circ \circ				<20			1	1	-			
	hrysene	218-01-9	20	µg/kg	<50	-	-			!	1	1
1 —— 25 µg/kg 99.3 —— 48 650 —— —— —— —— 650 —— —— —— —— 650 —— —— —— —— 650 —— —— —— —— 650 —— —— —— —— 650 —— —— —— —— 7 —— —— —— —— 8 —— —— —— —— 9 —— —— —— —— 1 —— —— —— —— 25 µg/kg 92.9 —— —— —— 65 —— —— —— —— 65 —— —— —— —— 7 —— —— —— —— 8 — —— —— —— 9 —— —— —— —— 43 — — 43 9 — — 43 9 — — — — 43 — — — — 43 — — — <td></td> <td></td> <td></td> <td></td> <td></td> <td>25 µg/kg</td> <td>99.5</td> <td>1</td> <td>09</td> <td>128</td> <td></td> <td></td>						25 µg/kg	99.5	1	09	128		
<50	Senzo(b)fluoranthene	202-99-2	25	µg/kg	1	25 µg/kg	99.3		48	135	1	1
25 µg/kg 100 58					<20	-			-	1	1	1
<50	3enzo(k)fluoranthene	207-08-9	25	µg/kg	-	25 µg/kg	100	-	28	133	-	1
25 µg/kg					<20		-	1	1	1		
<50	Benzo(a)pyrene	50-32-8	25	µg/kg	1	25 µg/kg	101	-	20	124		-
<50					<50	1					-	1
25 µg/kg 92.2 48	ndeno(1.2.3.cd)pvrene	193-39-5	20	µg/kg	<50		-	1	1	1	-	-
)	1	25 µg/kg	92.2		48	134	-	
<50	Dibenz(a.h)anthracene	53-70-3	25	ug/kg	1	25 µg/kg	92.9	-	20	137	1	1
55 25 µg/kg 96.5 53 90 mg/kg 89.0 43 43 43 69 69 69 69 69 69 69 69 69 43)	<20	-				1	1	
25 µg/kg 96.2 55	Benzo(a.h.i)bervlene	191-24-2	20	ug/kg	<50	1		-	1	1	1	-
4200 32 mg/kg 96.5 53 500 90 mg/kg 89.0 43 43 43 5 4.5 mg/kg 89.9 69 5 200 32 mg/kg 93.2 53 6 500 90 mg/kg 67.7 43					-	25 µg/kg	96.2		55	140		-
g <2000	P-071HK SR: Total Petroleum Hydroca	arbons (TPH)	(QC Lot: 2	(002996								
Section Solution Section Sec	C9 - C16 Fraction		200	mg/kg	<200	32 mg/kg	96.5		53	104	1	1
3 <5	C17 - C35 Fraction	1	200	mg/kg	<200	90 mg/kg	89.0	1	43	66	-	-
3 <5 4.5 mg/kg 89.9 69 3 <200 32 mg/kg 93.2 53 3 <500 90 mg/kg 67.7 43	-P-071HK SR: Total Petroleum Hydroca	arbons (TPH)	(OC Lot: 2	966727)								
3 <200 32 mg/kg 93.2 53	C6 - C8 Fraction		5	mg/kg	<5	4.5 mg/kg	89.9		69	139	-	
9 <200 32 mg/kg 93.2 53 9 <500 90 mg/kg 67.7 43	=P-074HK SR: Total Petroleum Hvdroca	arbons (TPH)	(QC Lot: 3	(004350)								
g <500 90 mg/kg 67.7 43	C9 - C16 Fraction		200	ma/ka	<200	32 mg/kg	93.2	-	53	104		-
	217 - C35 Fraction		200	mg/kg	<500	90 mg/kg	67.7	-	43	66		1
	EP-071HK SR: Total Petroleum Hydroca	arbons (TPH)	(OC Lot: 3	(004354)								
45 A 5 marka 85.5 69		/·· ·· · · · · · · · · · · · · · · · ·	2	ma/ka	٨,	4 5 ma/kg	85.5		69	139	-	



∴ 6 of 6 ∴ CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1318896, Amendment 1



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

				Matrix Spike	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report	ix Spike Dupi	IICATE (INSD)	Report	
			Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)	RPL	RPD (%)
Laboratory Client sample ID sample ID	Method: Compound	CAS	CAS Concentration	MS	MSD	Гом	High	Value	Control Limit
EP-071HK SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966700)	arbons (TPH) (QC Lot: 2966700)								
HK1318887-004 Anonymous	C9 - C16 Fraction		32 mg/kg	73.7	1	20	130		
	C17 - C35 Fraction		90 mg/kg	74.2		20	130		
EP-071HK SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966727)	arbons (TPH) (QC Lot: 2966727)								
HK1318887-004 Anonymous	C6 - C8 Fraction	1	4.5 mg/kg	91.1		20	130		
EP-071HK SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3004350)	arbons (TPH) (QC Lot: 3004350)								
HK1321360-002 Anonymous	C9 - C16 Fraction		32 mg/kg	69.7		20	130		
	C17 - C35 Fraction		90 mg/kg	71.0		20	130		
EP-071HK SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3004354)	arbons (TPH) (QC Lot: 3004354)								
HK1321360-002 Anonymous	C6 - C8 Fraction		4.5 mg/kg	80.8		20	130		-

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	carbons (PAHs) Surrogates	•	
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	rogate		
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Technichem (HK) Pty Ltd ALS

ALS Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES







CERTIFICATE OF ANALYSIS

Client	CIVIL ENGINEERING AND DEVELOPMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 7
Contact	: MR SUN NG	Contact	: Fung Lim Chee, Richard	Work Order	HK1320318
Address	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	Amendment	-
E-mail Telephone	: sunng@cedd.gov.hk	E-mail Telephone	: Richard.Fung@alsglobal.com : +852 2610 1044		
Facsimile		Facsimile	: +852 2610 2021		
Project	: RELOCATION OF SHA TIN SEWERAGE TREATMENT WORKS TO CAVERNS	Quote number		Date Samples Received	: 29-JUL-2013
	: GE/2012/24.11			Issue Date	: 15-AUG-2013
-C number	: H025609			No. of samples received	4
Site				No. of samples analysed	4:

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Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories

Authorised results for Senior Chemist - Organics

Chemist - Inorganics

Inorganics

ALS Laboratory Group
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1/1F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
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A Campbell Brothers Limited Company

Page Number Client Work Order

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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. The completion date of analysis is: 02-AUG-2013

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. HK1320318

Project Name: Agreement No. CE 43/2011 (DS) Relocation of Sha Tin Sewerage Treatment Works to Caverns - Feasibility Study. Sample(s) were received in a chilled condition.

Water sample(s) analysed and reported on an as received basis. Result(s) reported on a dry weight basis.

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

Page Number Client Work Order

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			Client sample ID	BH-ENV4A	BH-FNV4A	BH-FNV4A	
					1.0M	1.8M	
		Client san	Client sampling date / time	[29-JUL-2013]	[29-JUL-2013]	[29-JUL-2013]	
Compound	CAS Number	LOR	Unit	HK1320318-001	HK1320318-002	HK1320318-003	
EA/ED: Physical and Aggregate Properties	s						
EA055: Moisture Content (dried @ 103°C)		0.1	%	16.1	15.9	10.0	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	ons (PAHs)						
Naphthalene	9120-3	0.500	mg/kg	<0.500	<0.500	<0.500	
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	
Chrysene	218-019	0.500	mg/kg	<0.500	<0.500	<0.500	
Benzo(b)fluoranthene	202-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	
Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	
Benzo(g.h.i)perylene	19124-2	0.500	mg/kg	<0.500	<0.500	<0.500	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	oons (TPH)						
C6 - C8 Fraction	-	2	mg/kg	~	<5	<5	
C9 - C16 Fraction	1	200	mg/kg	<200	<200	<200	
C17 - C35 Fraction	-	200	mg/kg	<500	<200	<200	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	ons (PAHs) Su	rrogates					Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	93.6	99.9	100	
4-Terphenyl-d14	1718-51-0	0.1	%	89.3	91.2	89.6	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	te						Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	97.1	97.2	98.6	
Toluene-D8	2037-26-5	0.1	%	102	101	102	
4-Bromofluorobenzene	460-00-4	0.1	%	91.3	92.5	91.4	

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Sub-Matrix: WATER			Client sample ID	BH-ENV4A	
		Client sam	Client sampling date / time	1.85M (G.W) [29-JUL-2013]	
Compound	CAS Number	LOR	Unit	HK1320318-004	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)	rbons (PAHs)				
Naphthalene	9120-3	2.0	hg/L	<2.0	
Acenaphthylene	208-96-8	2.0	hg/L	<2.0	
Acenaphthene	83-32-9	2.0	hg/L	<2.0	
Fluorene	86-73-7	2.0	hg/L	<2.0	
Phenanthrene	85-01-8	2.0	µg/L	<2.0	
Anthracene	120-12-7	2.0	hg/L	<2.0	
Fluoranthene	206-44-0	2.0	hg/L	<2.0	
Pyrene	129-00-0	2.0	hg/L	<2.0	
Chrysene	218-019	1.0	hg/L	<1.0	
Benzo(b)fluoranthene	205-99-2	1.0	hg/L	<1.0	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	arbons (TPH)				
C6 - C8 Fraction		20	µg/L	<20	
C9 - C16 Fraction	1	200	hg/L	<500	
C17 - C35 Fraction	1	200	hg/L	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	arbons (PAHs) Sur	rogates			Surrogate control limits listed at end of this report
2-Fluorobiphenyl	32160-8	0.1	%	77.4	
4-Terphenyl-d14	1718-51-0	0.1	%	87.0	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate				Surrogate control limits listed at end of this report
Dibromofluoromethane	1868-53-7	0.1	%	102	
Toluene-D8	2037-26-5	0.1	%	102	
4-Bromofluorobenzene	460-00-4	0.1	%	94.0	

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Matrix: SOIL	Alatrix: SOIL		Transact.			Poned (0110) etection (vinterede l	touch	
					1	aboratory Duplicate (DUP)	кероп	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
A/ED: Physical	te Properties	(QC Lot: 2989534)						
HK1320290-001		EA055: Moisture Content (dried @ 103°C)		0.1	%	10.7	10.2	4.8
HK1320290-002	Anonymous	EA055: Moisture Content (dried @ 103°C)		0.1	%	10.4	10.8	3.8
P-076A: Polycyc	lic Aromatic Hydrocarbon	EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2987270)						
HK1320132-001	Anonymous	Naphthalene	91-20-3	200	ug/kg	<500	<500	0.0
		Acenaphthylene	208-96-8	200	hg/kg	<500	<500	0.0
	7	Acenaphthene	83-32-9	200	hg/kg	<500	<500	0.0
		Fluorene	86-73-7	200	hg/kg	<500	<500	0.0
		Phenanthrene	82-01-8	200	hg/kg	<500	<500	0.0
		Anthracene	120-12-7	200	hg/kg	<500	<500	0.0
		Fluoranthene	206-44-0	200	hg/kg	<500	<200	0.0
		Pyrene	129-00-0	200	hg/kg	<500	<500	0.0
		Benz(a)anthracene	56-55-3	200	µg/kg	<500	<500	0.0
		Chrysene	218-01-9	200	µg/kg	<500	<500	0.0
		Benzo(b)fluoranthene	205-99-2	200	µg/kg	<500	<500	0.0
	3	Benzo(k)fluoranthene	207-08-9	200	µg/kg	<200	<200	0.0
		Benzo(a)pyrene	50-32-8	200	µg/kg	<200	<200	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	200	µg/kg	<500	<500	0.0
		Dibenz(a.h)anthracene	53-70-3	200	µg/kg	<500	<500	0.0
		Benzo(g.h.i)perylene	191-24-2	200	ng/kg	<200	<500	0.0
P-071HK_SR: To	tal Petroleum Hydrocarbo	EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2979725)						
HK1319666-001	Anonymous	C9 - C16 Fraction		200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	-	200	mg/kg	<200	<200	0.0
P-071HK_SR: To	tal Petroleum Hydrocarboi	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2979732))			
HK1319666-001	Anonymous	C6 - C8 Fraction	-	2	mg/kg	<5	< 2	0.0
Matrix: WATER			American and the second and the seco			Laboratory Duplicate (DUP) Report	Peport	National Comments of the Comme
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	TOR	Unit	Original Result	Duplicate Result	RPD (%)
P-071HK SR: To	tal Petroleum Hydrocarboi	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2979735)						
HK1319666-003	Anonymous	C6 - C8 Fraction		0.02	mg/L	<0.02	<0.02	0.0

Matrix: 30L			Method Blank (MB) Report	Report		Laboratory Contro	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicate ((DCS) Report	
					Spike	Spike Red	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound	CAS Number LOR	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Value Control Limit
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2987270)	Hydrocarbons (PAHs)	QC Lot: 2	2987270)								
Naphthalene	91-20-3	25	µg/kg	1	25 µg/kg	99.4		63	117		1
				<20	-			1	1		-
Acenaphthylene	208-96-8	25	µg/kg	1	25 µg/kg	100		54	119	1	1
				<20	1	-		1		-	-
Acenaphthene	83-32-9	25	µg/kg	1	25 µg/kg	93.0		29	122	1	1
				<20	-	-	-	1	1		
Fluorene	86-73-7	20	µg/kg	<50	1	-	1	1	1	1	

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EP-076A: Compound CAS Number LOR Unid EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2987270) Eng/k Pluorene 86-73-7 25 µg/k Anthracene 120-12-7 25 µg/k Pyrene 129-00-0 50 µg/k Benz(a)anthracene 56-55-3 50 µg/k Benzo(b)filuoranthene 207-08-9 50 µg/k Benzo(a)pyrene 50-32-8 25 µg/k Benzo(a)pyrene 50-714K_SR. Total Petroleum Hydrocarbons (TPH) QC Lot: 2979725) C3-C16 Fraction	23333	(QC Lot: 2987270) 25 µg/kg 25 µg/kg 25 µg/kg	<i>Unit</i> (7270) - Contir	Result	Spike Concentration	Spike Rec LCS	Spike Recovery (%) CS DCS	Recovery	Recovery Limits (%) Low High	Value	RPD (%) Control Limit
Method: Compound CAS Num EP-076A: Polycyclic Aromatic Hydrocarbons (PAIFluorene Phenanthrene Re-7 Anthracene Renz(a)anthracene Renz(b)fluoranthene Renz(b)fluoranthene Renz(c)fluoranthene 23000	Lot: 298 25 25 25 26		2	Concentration	SO7	SOG	TOW	High	Value	Control Limit	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAF Fluorene 86-7 Phenanthrene 85-7 Anthracene 120-1 Fluoranthene 206-4 Pyrene 120-0 Benz(a)anthracene 56-5 Chrysene 218-0 Benzo(b)fluoranthene 207-0 Benzo(b)fluoranthene 207-0 Benzo(c)fluoranthene 207-0 Benzo(c)fluoranthene 207-0 Benzo(c)fluoranthene 207-0 Benzo(c)fluoranthene 207-0 Benzo(c)fluoranthene 207-0 Benzo(c)fluoranthene 50-3 Dibenz(a.h)anthracene 53-7 Benzo(c)fluoranthene 53-7 Benzo(c)fluoranthene 50-3 Indeno(1.2.3.cd)pyrene 53-7 Benzo(c)fluoranthracene 53-7 Benzo(c)fluoranthracene 53-7 Benzo(c)fluoranthracene 50-3 Indeno(1.2.3.cd)pyrene 191-2 Benzo(c)fluoranthracene 53-7 Benzo(c)fluoranthracene 53-7 Benzo(c)fluoranthracene 50-3 Benzo(c)fluoranthracene 50-3 Indeno(1.2.3.cd)pyrene 191-2 Benzo(c)fluoranthracene 50-3 Benzo(c)fluoranthrace	230000	25 25 25 25 26		inied			CLASS CONTRACTOR AND STREET OF THE STREET OF	Season State Control of the Control			
Fluorene Phenanthrene Benzolanthracene Fluoranthene Pyrene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene Benzo(g.h.i)perylene C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction		25 25 25 50	CONTRACTOR AND AND AND AND AND AND AND AND AND AND	202							
Phenanthrene Anthracene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(a)pyrene Dibenz(a.h)anthracene EP-071HK_SR: Total Petroleum Hydrocarbons (TPC) C1 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C16 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction		25 25 50	ng/kg		25 µg/kg	102		60	126	-	
Anthracene Pyrene Pyrene Benz(a)anthracene Benz(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(c)fluoranthene Benzo(c)fluoranthene Benzo(c)fluoranthene Benzo(c)fluoranthene Benzo(c)fluoranthene Benzo(c)fluoranthene Benzo(c)fluoranthene Benzo(c)fluoranthene CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C16 Fraction CO-C17 - C35 Fraction CO-C18 Fraction CO-C18 Fraction CO-C18 Fraction CO-C18 Fraction CO-C18 Fraction CO-C18 Fraction		25	µg/kg		25 µg/kg	95.8		09	127	1	
Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(x)fluoranthene Benzo(x)fluoranthene Benzo(x)fluoranthene Benzo(x)fluoranthene Benzo(x)fluoranthene Benzo(x)fluoranthene 193-3 Dibenz(a.h)anthracene Benzo(y.h.i)perylene C1 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction		25 50		<20			1			-	
Fluoranthene Pyrene Pyrene Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene Benzo(a)hyrene Dibenz(a.h)anthracene Benzo(g.h.i)perylene C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C6 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction		20	hg/kg		25 µg/kg	90.1		56	124	-	
Pyrene Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenz(a.h)anthracene EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) C3 - C46 Fraction C17 - C35 Fraction C17 - C35 Fraction C16 - C8 Fraction C6 - C8 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) C6 - C8 Fraction		20		<50	1	-		-	-		-
Pyrene Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene Benzo(g.h.i)perylene C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction C6 - C8 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) C6 - C8 Fraction C6 - C8 Fraction			µg/kg	<50			1	1	-		
Pyrene Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenz(a.h)anthracene EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) C1 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C16 - C8 Fraction C6 - C8 Fraction C6 - C8 Fraction				1	25 µg/kg	99.2	-	61	132		-
Benz(a)anthracene 56-5 Chrysene 218-0 Benzo(b)fluoranthene 207-0 Benzo(a)pyrene 50-3 Indeno(1.2.3.cd)pyrene 53-7 Dibenz(a.h)anthracene 53-7 Benzo(g.h.i)perylene 191-2 EP-074HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction C17 - C35 Fraction C17 - C35 Fraction		20	hg/kg	<50	-	1	1			-	-
Benz(a)anthracene 56-5 Chrysene 218-0 Benzo(b)fluoranthene 205-9 Benzo(k)fluoranthene 207-0 Benzo(a)pyrene 50-3 Indeno(1.2.3.cd)pyrene 53-7 Dibenz(a.h)anthracene 53-7 Benzo(g.h.i)perylene 191-2 EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction C17 - C35 Fraction C16 - C8 Fraction C6 - C8 Fraction				-	25 µg/kg	101	-	61	133		1
Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene Benzo(g.h.i)perylene C17 - C35 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) - C35 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) - C35 Fraction		20	ng/kg	<50	2					-	
Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene Dibenz(a.h)anthracene Benzo(g.h.i)perylene C17 - C35 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) - C16 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TPC) - C35 Fraction				-	25 ua/ka	93.7	-	57	124		
Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene Dibenz(a.h)anthracene Benzo(g.h.i)perylene C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction) EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction)		25	ua/ka	1	25 ua/ka	8 66		5 6	128		
Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene Dibenz(a.h)anthracene Benzo(g.h.i)perylene EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-071HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction)			0	<50				3	220		
Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene 50-3 Dibenz(a.h)anthracene 53-7 Benzo(g.h.i)perylene C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction C6 - C8 Fraction Marix: WATER		20	ua/ka	<50							-
Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1.2.3.cd)pyrene 50-3 Dibenz(a.h)anthracene 53-7 Benzo(g.h.i)perylene 53-7 EP-074HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction			0		25 ua/kg	2 96		48	135		
Benzo(a)pyrene 50-3 Indeno(1.2.3.cd)pyrene 193-3 Dibenz(a.h)anthracene 53-7 Benzo(g.h.i)perylene 191-2 EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-077HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction		20	no/ka	VEO.	0	1		2	22		
Benzo(a)pyrene 50-3 Indeno(1.2.3.cd)pyrene 193-3 Dibenz(a.h)anthracene 53-7 Benzo(g.h.i)perylene 191-2 EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction C17 - C35 Fraction C6 - C8 Fraction		3	54/61	00/		1 6		(-
Dibenz(a.h)anthracene Benzo(g.h.i)perylene CP - C16 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction					gy/gu cz	96.1	-	28	133		-
Indeno(1.2.3.cd)pyrene Dibenz(a.h)anthracene Benzo(g.h.i)perylene EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-071HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction		52	hg/kg		25 µg/kg	2.96		20	124	-	
Indeno(1.2.3.cd)pyrene Dibenz(a.h)anthracene Benzo(g.h.i)perylene EP-074HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction				<20			!	!	-		-
Dibenz(a.h)anthracene Benzo(g.h.i)perylene EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-071HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction		25	µg/kg		25 µg/kg	85.9	-	48	134		
Dibenz(a.h)anthracene Benzo(g.h.i)perylene EP-074HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction				<20			1		-		-
Benzo(g.h.i)perylene EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-071HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction		20	µg/kg	<20	1	-		-		1	-
Benzo(g.h.i)perylene EP-071HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-071HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction					25 µg/kg	94.2	-	20	137	-	-
EP-074HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction		25	hg/kg		25 µg/kg	94.8		55	140		-
EP-074HK_SR: Total Petroleum Hydrocarbons (TP C9 - C16 Fraction C17 - C35 Fraction EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction				<50		-	-	-	-	-	-
C9 - C16 Fraction C17 - C35 Fraction EP-071HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction	PH) (QC	Lot: 297	9725)								
C17 - C35 Fraction EP-071HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction	2	200	mg/kg	<200	32 ma/ka	63.1		53	104		
EP-074HK_SR: Total Petroleum Hydrocarbons (TP C6 - C8 Fraction Matrix: WATER	2	200	mg/kg	<500	90 mg/kg	53.9		43	5 6		
C6 - C8 Fraction		(QC Lot: 2979732)	9732)								
Matrix: WATER		5	mg/kg	<5	4.5 mg/kg	89.1		69	139		-
		Me	Method Blank (MB) Report	port	THE PARTY OF THE P	Laboratory Control 5	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control S	pike Duplicate	(DCS) Report	WORKSHIP STATES OF STATES OF STATES OF THE S
					Spike	Spike Recovery (%)	overy (%)	Recovery Limits (%)	Limits (%)	RP	RPD (%)
Method: Compound CAS Number		LOR	Unit	Result	Concentration	SO7	DCS	Том	High	Value	Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2989863)	Hs) (QC	Lot: 2989	863)								
Naphthalene 91-20-3	20-3 0	0.2	hg/L	<0.2	0.5 µa/L	96.1		25	110		
Acenaphthylene 208-96-8		0.2	ng/L	<0.2	0.5 ua/L	97.3		42	103		
Acenaphthene 83-32-9		0.2	hg/L	<0.2	0.5 µg/L	89.6	-	25.	102		
Fluorene 86-73-7		0.2	hg/L	<0.2	0.5 µg/L	97.3	1	200	105		
ne		0.2	hg/L	<0.2	0.5 µg/L	96.8		23	106		
Anthracene 120-12-7		0.2	hg/L	<0.2	0.5 µg/L	93.2	-	52	107		
Fluoranthene 206-44-0		0.2	hg/L	<0.2	0.5 µg/L	99.1	1	63	118		
Pyrene 129-00-0		0.2	na/L	<0.2	0.5 ua/l	101		67	120		

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Matrix: WATER		Method Blank (MB) Report) Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicate	(DCS) Report	
				Spike	Spike Red	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound LOR	LOR	Unit	Result	Concentration	SO7	DCS	Low	High	Value	Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2989863) - Contin	(QC Lot:	2989863) - Col	ntinued							
Chrysene 218-01-9	218-01-9 0.2	hg/L	<0.2	0.5 µg/L	95.7		61	123		
Benzo(b)fluoranthene 205-99-2	0.2	hg/L	<0.2	0.5 µg/L	92.6	-	55	112		
EP-074HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2979735)	(QC Lot:	2979735)								
C6 - C8 Fraction	0.02	mg/L	<0.02	0.03 mg/L	79.1	-	76	1134		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2989864)	(QC Lot:	2989864)								
C9 - C16 Fraction	0.5	mg/L	<0.5	0.21 mg/L	46.3		12	112		
C17 - C35 Fraction	0.5	mg/L	<0.5	0.60 mg/L	40.3		4	130		-
				TO AND AND AND AND AND AND AND AND AND AND	ACCHIEGOSTATION CONTENSOR PRODUCTIVA DE SENSOR PRODUCTIVA DE SENSOR PORTUGADA DE SENSO	Combinator property representative and advantage and assessment of the contrac			STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STREET, STATES OF STATES OF STREET, STATES OF STATES OF STREET, STATES OF STREET, STATES OF STAT	

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

Matrix: SOIL					Matrix Spike	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report	x Spike Dupl	licate (MSD)	Report	
				Spike	Spike Re	Spike Recovery (%)	Recovery	Recovery Limits (%)		RPD (%)
Laboratory Client s sample ID	Client sample ID	Method: Compound	CAS	CAS Concentration Number	MS	MSD	Гом	High	Value	Value Control
EP-074HK_SR: Total	Il Petroleum Hydrocarbor	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2979725)								
HK1319666-002 Anonymous	mons	C9 - C16 Fraction		32 mg/kg	62.9		20	130	-	-
		C17 - C35 Fraction	1	90 mg/kg	0.09		20	130	-	l
EP-071HK_SR: Total	Il Petroleum Hydrocarbor	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2979732)								
HK1319666-002 Anonymous	mous	C6 - C8 Fraction		4.5 ma/kg	94.0		20	130		1

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	irbons (PAHs) Surrogates		
2-Fluorobiphenyl	321-60-8	20	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate		
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
Sub-Matrix: WATER	American	Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	irbons (PAHs) Surrogates		
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	gate		
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115



Technichem (HK) Pty Ltd

ALS Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES





CERTIFICATE OF ANALYSIS

: 1 of 3	: HK1319351				: 17-JUL-2013	: 15-AUG-2013		·
Page	Work Order	Amendment			Date Samples Received	Issue Date	No. of samples received	No. of samples analysed
: ALS Technichem HK Pty Ltd	: Fung Lim Chee, Richard	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	: Richard.Fung@alsglobal.com : +852 2610 1044	: +852 2610 2021				
Laboratory	Contact	Address	E-mail Telephone	Facsimile	Quote number			
: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	: MR SUN NG	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	: sunng@cedd.gov.hk :		: RELOCATION OF SHA TIN SEWERAGE TREATMENT WORKS TO CAVERNS	: GE/2012/24.11	: H025608	:
Client	Contact	Address	E-mail Telephone	Facsimile	Project	Order number	C-O-C number	Site

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. The completion date of analysis is: 18-JUL-2013
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: HK1319351

Project Name: Agreement No. CE 43/2011 (DS) Relocation of Sha Tin Sewerage Treatment Works to Caverns - Feasibility Study. Sample(s) were received in a chilled condition. Water sample(s) analysed and reported on an as received basis.

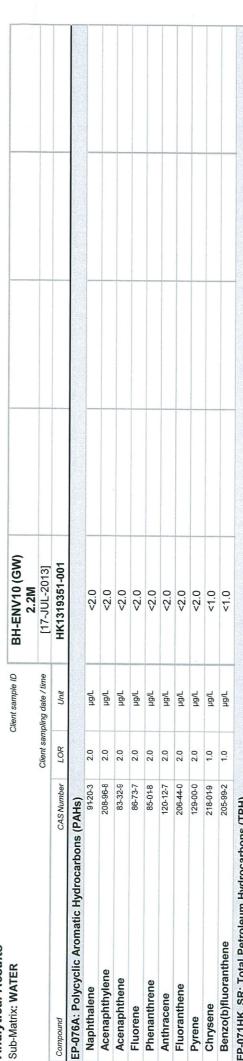
This report may not be reproduced except with prior written approval from the testing laboratory.

Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6. sed results for Senior Chemist - Organics Signatories
Anh Ngoc Huynh

Page Number

: 2 of 3 : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1319351, Amendment 1 Analytical Results Sub-Matrix: WATER Work Order



Acenaphthylene Acenaphthene

Anthracene Fluoranthene Phenanthrene

Pyrene



				0:7	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)	(TPH)				
C6 - C8 Fraction	I	20	hg/L	<20	
C9 - C16 Fraction	1	200	hg/L	<500	
C17 - C35 Fraction	1	200	µg/L	<500	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	(PAHs) Sur	rogates			Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	50.5	
4-Terphenyl-d14	1718-510	0.1	%	96.2	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate					Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	102	
Toluene-D8	2037-26-5	0.1	%	101	
4-Bromofluorobenzene	460-00-4	0.1	%	97.8	



3 of 3 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT HK1319351, Amendment 1

EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2968462)
HK1318887-001 Anonymous C6 - C8 Fraction Laboratory Duplicate (DUP) Report
Matrix: WATER
Laboratory sample ID Client sample ID

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

Matrix: WATER		Method Blank (MB)	3) Report		Laboratory Control	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report	oratory Control	Spike Duplicate	(DCS) Report	
				Spike	Spike Rec	Spike Recovery (%)	Recovery	Recovery Limits (%)	R	RPD (%)
Method: Compound CAS Numb	CAS Number LOR	Unit	Result	Concentration	SO7	DCS	Том	High	Value	Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 2972735)	s) (QC Lot:	2972735)								
Naphthalene 91-20-3	0.2	hg/L	<0.2	0.5 µg/L	81.6		34	106		
Acenaphthylene 208-96-8	3-8 0.2	hg/L	<0.2	0.5 µg/L	85.9	-	38	92	-	-
Acenaphthene 83-32-9	2-9 0.2	hg/L	<0.2	0.5 µg/L	74.0	1	34	100	1	1
Fluorene 86-73-7	3-7 0.2	hg/L	<0.2	0.5 µg/L	81.6	1	31	66		
Phenanthrene 85-01-8	-8 0.2	hg/L	<0.2	0.5 µg/L	84.6	-	34	86	1	1
Anthracene 120-12-7	2-7 0.2	hg/L	<0.2	0.5 µg/L	83.5	1	42	102	1	1
Fluoranthene 206-44-0	1-0 0.2	hg/L	<0.2	0.5 µg/L	102	1	22	105	1	-
Pyrene 129-00-0	0.0	hg/L	<0.2	0.5 µg/L	102	1	55	107	1	-
Chrysene 218-01-9	-9 0.2	hg/L	<0.2	0.5 µg/L	83.3	-	65	121	-	
Benzo(b)fluoranthene 205-99-2	0.5	hg/L	<0.2	0.5 µg/L	80.0		52	102	-	1
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2966725)	4) (QC Lot:	2966725)								
C9 - C16 Fraction	0.5	mg/L	<0.5	0.21 mg/L	49.4	-	12	112	-	
C17 - C35 Fraction	0.5	mg/L	<0.5	0.60 mg/L	50.9		4	130	-	1
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2968462)	4) (QC Lot:	2968462)								
C6 - C8 Fraction	0.02	mg/L	<0.02	0.03 mg/L	85.9		92	1134	1	
ACCIDITION OF A DECISION OF A				The state of the s	The second secon					

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

■ No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.

Surrogate Control Limits

Sub-Matrix: WATER		Recovery	Recovery Limits (%)
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates	carbons (PAHs) Surrogates		
2-Fluorobiphenyl	321-60-8	20	130
4-Terphenyl-d14	1718-51-0	20	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate	ogate		
Dibromofluoromethane	1868-53-7	98	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

Section 3

Summary of Sample Receipt Condition, Analysis Date and Method Reference

Summary of Sample Receipt Condition, Analysis Date and Method Reference



23/08/2013 Date of Issue: Client: Service Order No.:

Civil Engineering and Development Department GE/2012/24.11

Project:

Agreement No. CE43/2011 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns - Feasibility Study Provision of Chemical and Biological Testing Service

!		Sampling	Sampling	Re	Receipt Details		Storage		Testing Date	
ALS Lab ID	Client Sample ID		Time	Date	Time	Condition	Condition*	TPHs	VOCs	PAHs
HK1317305002	BH-ENV05/ 0.5M	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	:	4/07/2013
HK1317305003	BH-ENV06/ 0.5M	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	1	4/07/2013
HK1317305004	BH-ENV07/ 0.5M	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	:	4/07/2013
HK1317305005	BH-ENV09/ 0.5M	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	:	4/07/2013
HK1317305006	BH-ENV10/ 0.5M	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	ı	4/07/2013
HK1317305008	BH-ENV05/ 1.0M	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	1	4/07/2013
HK1317305009	BH-ENV07/ 1.0M	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	1	4/07/2013
HK1317305011	TRIP BLANK	27/06/2013	0:00	27/06/2013	18:00	Ambient	4°C	2/07/2013	2/07/2013	2/07/2013
HK1317464001	BH-ENV10/ 1.0M	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317464002	BH-ENV02/ 0.5M	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317464003	BH-ENV02/ 1.0M	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317464004	BH-ENV09/ 0.9M	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317464005	BH-ENV07/ 1.5M	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317464006	BH-ENV07/ 1.5M(A)	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317464007	BH-ENV07/ 1.5M(B)	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317464008	EQUIPMENT BLANK	28/06/2013	0:00	28/06/2013	16:15	Ambient	4°C	5/07/2013	1	5/07/2013
HK1317593001	BH-ENV12/ 0.5M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317593002	BH-ENV11/ 0.5M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317593003	BH-ENV13/ 0.5M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317593004	BH-ENV01/ 0.5M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317593005	BH-ENV12/ 1.0M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317593006	BH-ENV11/ 1.0M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317593007	BH-ENV13/ 1.0M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	8/07/2013
HK1317593008	BH-ENV07 (G.W) 1.6M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	ı	5/07/2013
HK1317593009	BH-ENV09 (G.W) 1.0M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	1	5/07/2013
HK1317593010	BH-ENV02 (G.W) 1.15M	2/07/2013	0:00	2/07/2013	16:45	Ambient	4°C	5/07/2013	-	5/07/2013

*Container for sample storage: 250mL Glass Jar with Teflon Lined Lid (for Chemical Testing) & High Density Polyethylene Bags (for Biological Testing)

Prepared by ALS Technichem Page 1 of 2

Summary of Sample Receipt Condition, Analysis Date and Method Reference

Civil Engineering and Development Department GE/2012/24.11 23/08/2013 Service Order No.: Date of Issue: Client:

Project:

Agreement No. CE43/2011 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns - Feasibility Study Provision of Chemical and Biological Testing Service

17/07/2013 2/08/2013 1/08/2013 8/07/2013 5/07/2013 16/07/2013 17/07/2013 16/07/2013 17/07/2013 17/07/2013 17/07/2013 17/07/2013 18/07/2013 2/08/2013 16/08/2013 8/07/2013 5/07/2013 8/07/2013 PAHS Testing Date VOCs 30/07/2013 16/07/2013 16/07/2013 16/07/2013 16/07/2013 16/07/2013 16/07/2013 30/07/2013 16/07/2013 15/08/2013 16/07/2013 18/07/2013 30/07/2013 5/07/2013 5/07/2013 5/07/2013 5/07/2013 5/07/2013 TPHs Storage Condition* 0°4 4°C 0°4 4°C 4°C 4°C 4°C 4°C 4°C 4°C 4°C 4°C Condition Ambient Ambient Ambient Ambient Ambient Ambient Ambient Ambient Ambient Ambient Ambient Ambient Ambient Ambient eipt Details 16:30 16:30 16:00 16:00 16:00 15:15 15:15 15:15 16:00 16:00 16:00 15:15 16:30 16:30 16:00 29/07/2013 12/07/2013 12/07/2013 12/07/2013 3/07/2013 12/07/2013 12/07/2013 12/07/2013 12/07/2013 12/07/2013 17/07/2013 29/07/2013 29/07/2013 12/07/2013 3/07/2013 3/07/2013 3/07/2013 3/07/2013 3/07/2013 Date Sampling Time 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 0:00 11/07/2013 11/07/2013 29/07/2013 Sampling Date 12/07/2013 12/07/2013 12/07/2013 11/07/2013 11/07/2013 12/07/2013 29/07/2013 29/07/2013 3/07/2013 3/07/2013 3/07/2013 3/07/2013 3/07/2013 BH-ENV4A 1.85M (G.W) Client Sample ID BH-ENV8A (GW) 0.9M BH-ENV8A 0.85M BH-ENV5 (G.W) 2.73M BH-ENV3A (GW) 0.85M BH-ENVO6 0.73M BH-ENVO1 0.83M BH-ENV5/ 2.5M BH-ENV2/ 1.1M BH-ENV3A 0.80M BH-ENV11/ 3.0M BH-ENV12 (G.W) 2.3M BH-ENV12/ 2.2M BH-ENV10 3.0M BH-ENV3A 0.5M BH-ENV8A 0.5M BH-ENV10 (GW) 2.2M BH-ENV4A 0.5M BH-ENV4A 1.0M BH-ENV4A 1.8M HK1318887003 HK1318887004 HK1317598006 HK1318887001 HK1317598001 HK1317598003 HK1317598005 HK1318887002 HK1318896001 HK1318896002 HK1318896003 HK1318896004 HK1318896005 HK1319351001 HK1320318001 HK1320318002 HK1320318004 HK1317598002 HK1317598004 HK1320318003 ALS Lab ID

*Container for sample storage: 250mL Glass Jar with Teflon Lined Lid (for Chemical Testing) & High Density Polyethylene Bags (for Biological Testing)

Section 4 Chain of Custody (COC) Form

CHAIN OF CUSTODY DOCUMENTATION	DOC	UMEN	TAT	NO					工	H 025602	32	Revsed
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FOR LABORATORY USE ONLY	COMM	ENTS / SPE	CIAL HAN	COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:	R DIPOSAL:		VIO.					Notes: e.g. Highly contaminated samples
COOLER SEAL (circle appropriate)							P					e.g. "High PAHs expected"
Intact: Yes No N/A						_	My.	×				Extra volume for QC or trace LORs etc.
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CHILLED: Yes No	- Coil W	Matori		NOONTAINER INFORMATION	NOITAMAC	15	7-9	B				
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3		(ALS)	ALS Laboratory Group	А		d to attract suite prices)	Notes: e.g. Highly contaminated samples	e.g. "High PAHs expected"	Extra volume for QC or trace LORs etc.															() / / C METHOD OF SHIPMENT	O Con' Note No:	, 5	Transport Co:	
H 025603	ER:	ňi	(EMAIL REPORT TO: Real; & diritech. Com. AK	EMAIL INVOICE TO: (if different to report)	ANALYSIS REQUIRED including SUITES(note - suite codes must be listed to attract suite prices)			2		0	1												/ RECEIVED BY	(Date:)	Time:	Date:	Time:
ION	SAMPLER:	MOBILE	PHONE	7C EMAIL		44	COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:			000		CONTAINER INFORMATION	Type / Code Total bottles	250ml 1 /	\	1- 1-	/ /		/ / /	\	7 1				28 (06/2013	Time: Of:	Date: Name:	Time:
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CLIENT: CE DD GE 2013/24,11		SAMPLER:	
		MOBILE:	(ALS)
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PROJECTIO: S 24.11 Relandion of STSTWIT	JTC	EMAIL REPORT TO: KENISO CHILLAGE LOW AK	
SITE: She Tin Servinge Treatment Plant Pro. No.	0.:	EMAIL INVOICE TO: (if different to report)	
	E NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)	
FOR LABORATORY USE ONLY COMMENTS / SPECIAL HA	COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:	Notes: e.g. High	Notes: e.g. Highly contaminated samples
COOLER SEAL (circle appropriate)		e.g. "High PAHs expected"	Hs expected"
Intact: Yes No NA		Extra volume for	Extra volume for QC or trace LORs etc.
M N		7.	
Office Contraction (1977)	CONTRACTOR OF STREET	200	
ALS ID SAMPLE ID MATRIX DATE Time	Type / Code Total bottles	1	
84-FNV 12/05m < 2/7	2.502		
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(1.6mBH-EN) 07(6W) Water -1	1 7 7		
	-		
(1.15h R.H-FW 02(6W) -1 -1	-		
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Name: Chew Silk Ming	Date: 2-7- 2013	Date: 7):
of:	Time:	Of: CALS Time: 16-40	
Name:	Date:	Name: Date: Transport Co:	
Of:	Time:	Of: Time:	
Water Container Codes: P = Unpreserved Plastic: N = Nitric Preserved	ad Plastic: OBC = Nitric Preserved OB	Water Container Codes: D = Honcesoned Diseit. N = Mitric Deceased Diseit. ODC = Mitric Deceased ODC: SH = Sedium Hadrovide Deceased Diseit. AC = Amber Glass Harassoned	-

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S / OFFICE:		MOBILE:	(ALS)
ROJECT MANAGER (PM): The State NA		PHONE	ALS Laboratory Group
+. [Re	71/7	EMAIL REPORT TO: 1/2/1 PC/1. COMMIC	
Jugo Treatmen	40.:	EMAIL INVOICE TO: (if different to report)	
RED (Date):	QUOTE NO.:	ANALYSIS REQUIRED including SUITES(note - suite codes must be listed to attract suite prices)	act suite prices)
27.12	COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:		Notes: e.g. Highly contaminated samples
OOLER SEAL (circle appropriate) NIA Nact: Yes No NIA			e.g. "High PAHs expected" Extra volume for QC or trace LORs etc.
AMPLE TEMPERATURE No No		YOUR	
SAMPLE INFORMATION (note: S = Soil, W=Water)	CONTAINER INFORMATION	<u>d</u>	
ALS ID MATRIX DATE TIME			
[BH-EAVIL 13.0m S 3/7	250ml 1	\ \ \	
12.7			
3 RIJ-ENUS/25m ~	- :		
11.1			
5 Bit - ENV 12/2.3m (GW) Water -1	7	3	
(1811-ENV5/2.73, (Gw) -1	- ' -		
RELINQUISHED BY:		KECEIVED BY	/ METHOD OF SHIPMENT
Jame: Grow Silk Ming	Date: 3-7-2013	Name: NEW North Date: 5.1.	/ 24 S Con' Note No:
	Time:	Of: A(§ Time: (6	
vame:	Date:	Name: Date:	Transport Co:
Of:	Time:	Of: Time:	
Vater Container Codes: P = Unpreserved Plastic; N = Nitric Preserve	ved Plastic; ORC = Nitric Preserved ORC	Vater 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;	AG = Amber Glass Unpreserved;

ALS Laboratory Group

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COC Page

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CLIENT:	(FOD GF 2013 /24.1)	13/24	11.4				SAMPLER:						
ADDRESS / OFFICE:							MOBILE:						(ALS)
PROJECT MANAGER (PM):	Mr.	Sun Na					PHONE						ALS Laboratory Group
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Sha Tin Cavern Sewage Treatment Works

CAP Appendix 2.02

Selected Aerial Photos Reviewed

AECOM August 2016

Sha Tin Cavern Sewage Treatment Works

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AECOM August 2016

RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS -INVESTIGATION, DESIGN AND CONSTRUCTION

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RELOCATION OF SHA TIN
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CAVERNS AND SEWAGE
TREATMENT WORKS INVESTIGATION, DESIGN
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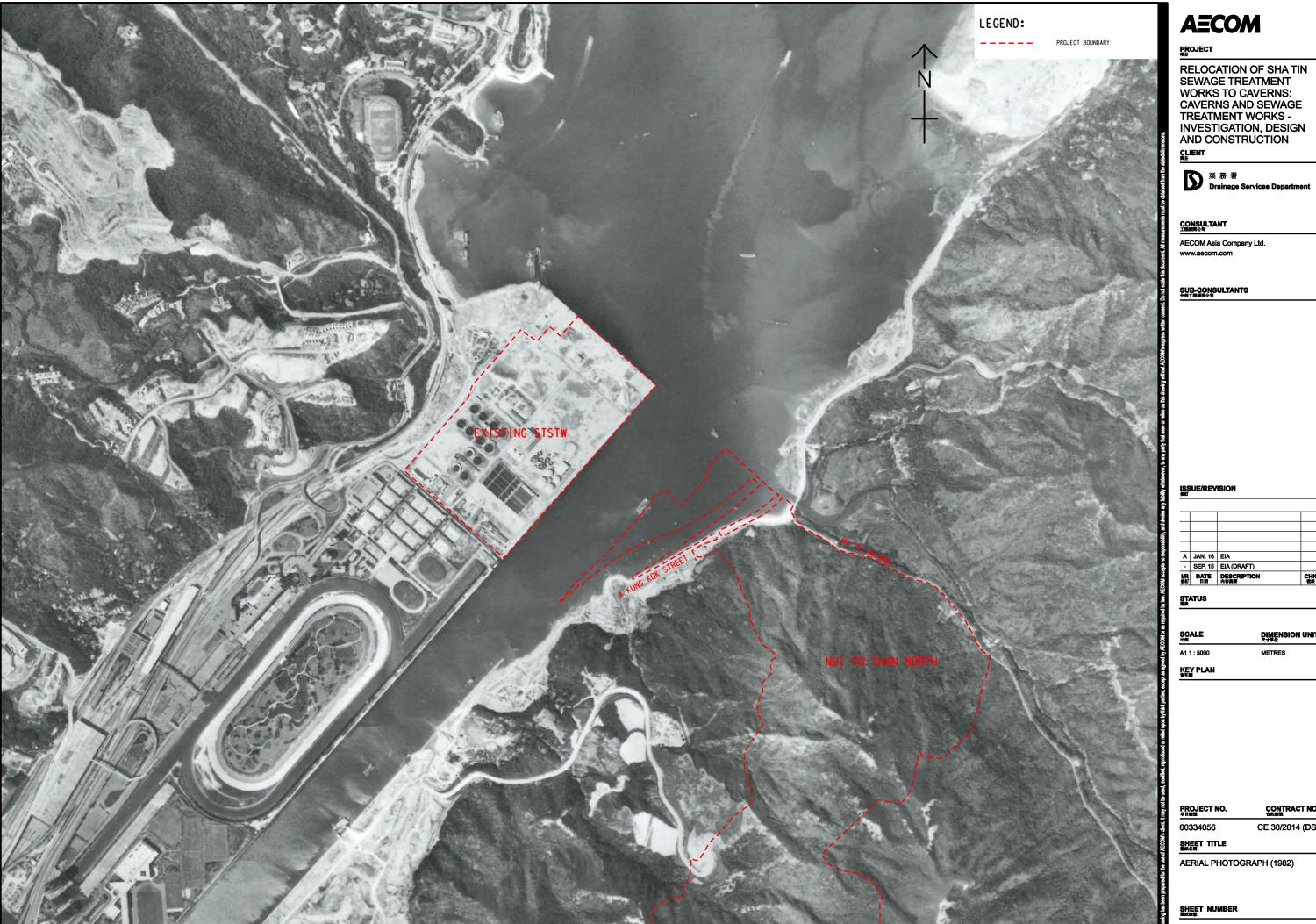
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RELOCATION OF SHA TIN
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TREATMENT WORKS INVESTIGATION, DESIGN
AND CONSTRUCTION

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RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS -INVESTIGATION, DESIGN AND CONSTRUCTION

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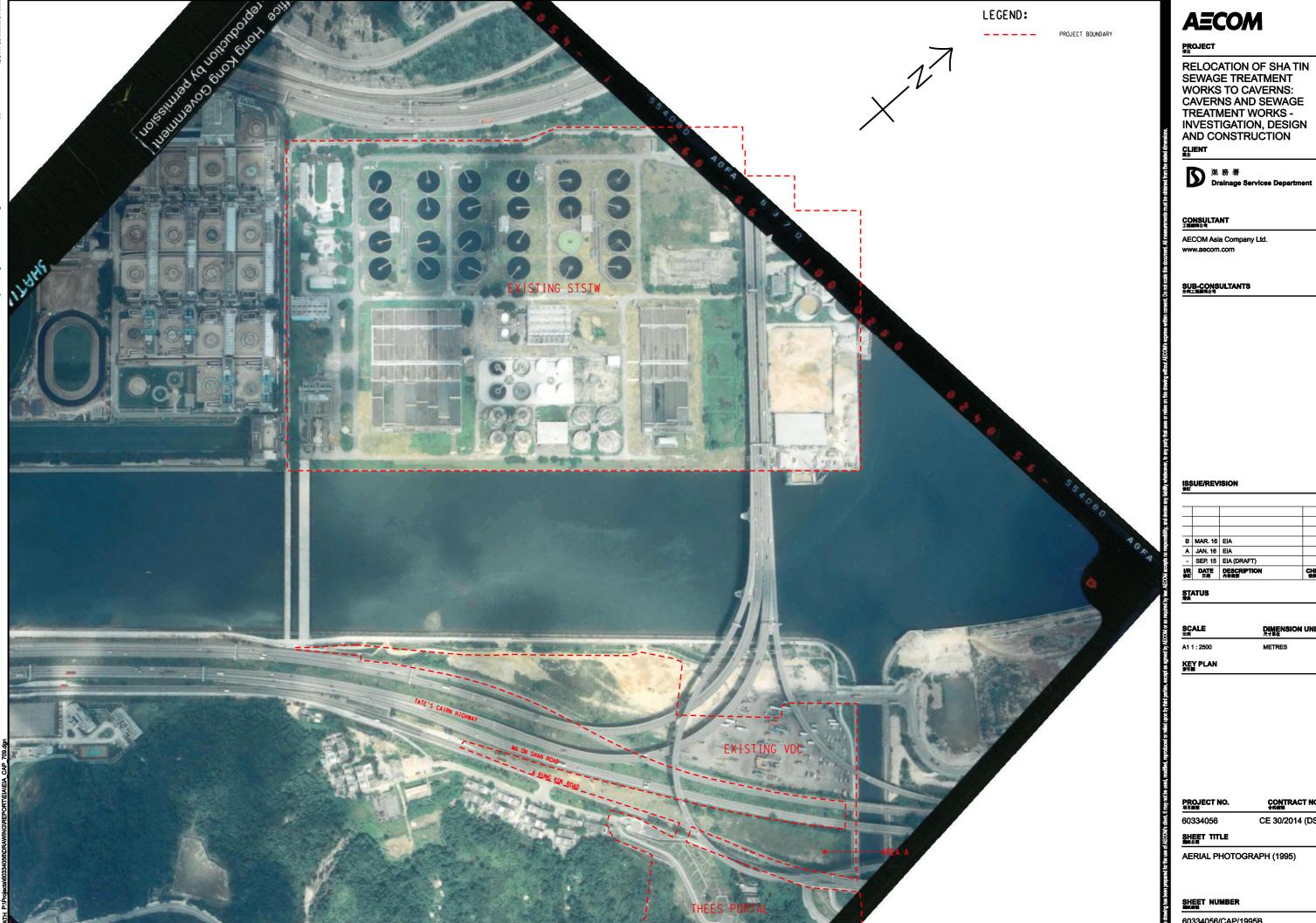
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RELOCATION OF SHA TIN
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WORKS TO CAVERNS:
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TREATMENT WORKS INVESTIGATION, DESIGN
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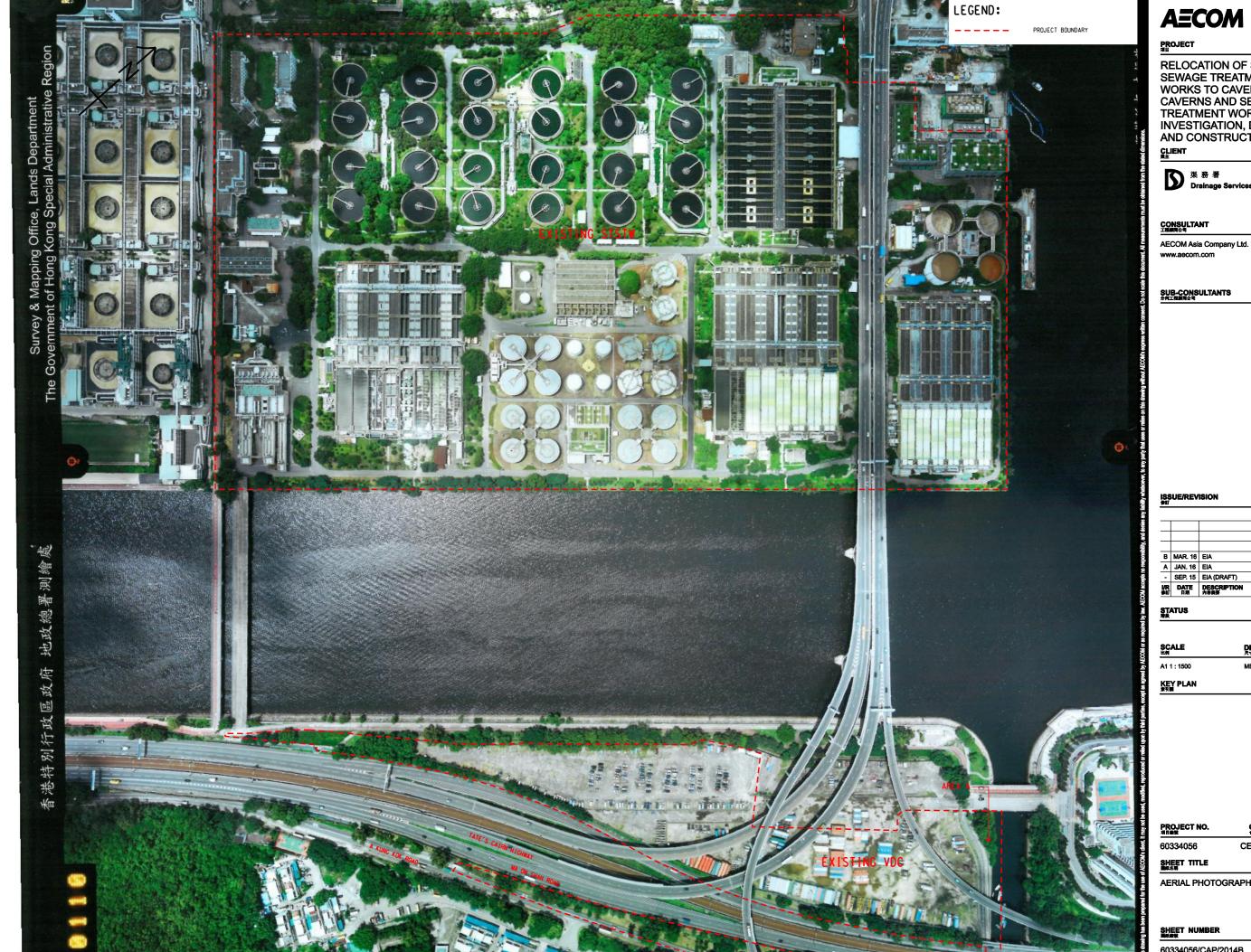
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RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS -INVESTIGATION, DESIGN AND CONSTRUCTION CLIENT

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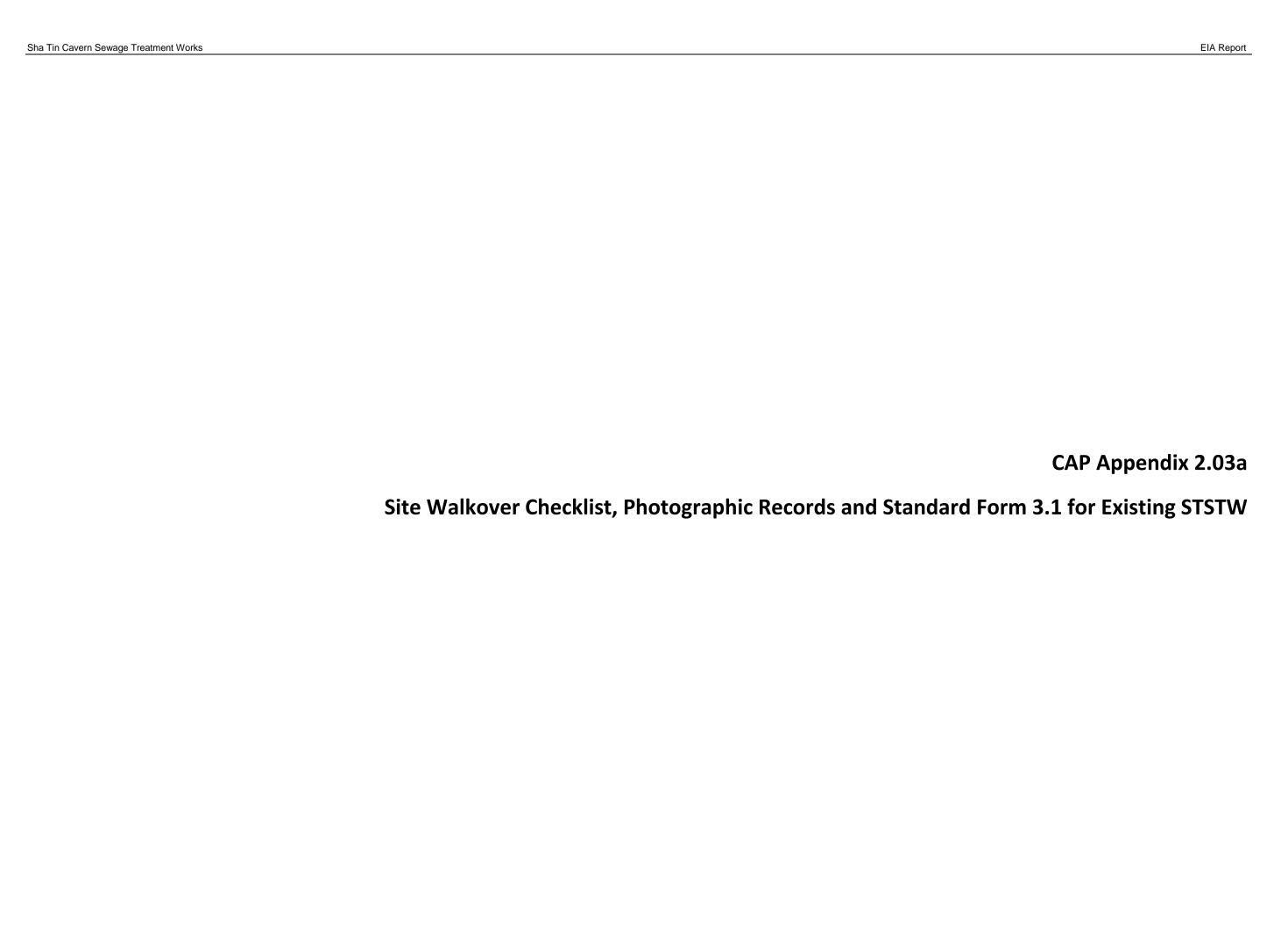
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WORKS TO CAVERNS:
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AECOM August 2016

Sha Tin Cavern Sewage Treatment Works

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AECOM August 2016

Appendix 2.03a - Photographic Records of STSTW

No.: Date taken: 07/11/14

Location:

Chemical Waste Store

(Area: ~26m²)

Description:

Room A: Spent Sulfuric Acid, Nitric Acid in liquid form

Room B: Spent Alkali

The chemical wastes in the store are protected from weather. The floor of the store is concreted paved and ventilation in the store is good.



No.:

Date taken: 07/11/14

Location:

Dangerous Goods Store

(Area: ~14m²)

Description:

Room A: The bagged sodium hypochlorite (in powder form) is stored in the DG store and is protected from weather. The floor of the DG store is concreted paved and was observed in good condition.



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Appendix 2.03a - Photographic Records of STSTW

No.: **A3** Date taken: 07/11/14

Location:

Dangerous Goods Store

(Area: ~14m²)

Description:

Room B: Paint and paint thinner are stored in the room.

The paint and thinner are protected from weather. The floor of the DG store is concreted paved and was observed in good condition.



No.: A4 Date taken: 07/11/14

Location:

Chemical Waste Area

(Area: ~42m²)

Description:

Empty lubrication oil containers, grease containers, bleach drums and waste batteries

The chemical waste area has a metal roof and the floor of the area is concreted paved with bundings and was observed in good condition.



Appendix 2.03a - Photographic Records of STSTW

No.: **A5** Date taken: 07/11/14

Location:

Scrap Iron Storage Area

(Area: ~21m²)

Description:

Metal scrap generated within STSTW were temporary stored in this concrete paved storage area with fences surrounding the locked area.



No.: **A6** Date taken: 07/11/14

Location:

Chemical Waste Collecting Tank

(Area: ~34m²)

Description:

The chemical waste collecting tank is situated on top of a concrete paved area with concrete bunding to prevent spilling and leakage.



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Appendix 2.03a – Photographic Records of STSTW

No.: **A7** Date taken: 07/11/14

Location:

Mechanic Workshop

 $(Area: ~1090m^2)$

Description:

The workshop is concrete paved. Repair and maintenance of valve bodies, spindles pumps and other light machine take place in it. No oil stain was observed.



No.: **A8** Date taken: 28/01/15

Location:

Administration and Laboratory Buildings

(Area: 1470m²)

Description:

Laboratory is on the first floor of the building.

Ground floor is used only as exhibition center and storeroom. No chemicals were found stored on the ground floor.



Appendix 2.03a – Photographic Records of STSTW

No.: Date taken: 03/11/14

Location:

CLP Transformer No.1 for Staff Accommodation Block

(Area: ~29m²)

Description:

CLP Transformer
No. 1 is operated by
CLP and located
within the substation.
Ground are concrete
paved and without
stains.



No.: **A10** Date taken: 03/11/14

Location:

Transformer No.19 & 20

Description:

Transformer No. 19 and No. 20 are housed within the transformer rooms. The transformer rooms are elevated on an approximately 0.5m concrete platform.



AECOM

Appendix 2.03a - Photographic Records of STSTW

No.: **A11** Date taken: 07/11/14

Location:

Chemical Store

(Area: ~166m²)

Description:

The store is used for storage of chemicals (mainly lubrication oil).

The chemical store has a metal roof and the floor of the store is concreted paved with good ventilation. No sign of spillage or stain was observed.



No.: A12 Date taken: 07/11/14

Location:

Fuel Oil Tanks

Description:

Two ~1000L aboveground diesel oil tanks used by STSTW power house's generator.



Appendix 2.03a - Photographic Records of STSTW

No.: **A13** Date taken: 17/07/15

Location:

Diesel Filling Point

Description:

A diesel filling point was observed near the diesel storage tank.



No.: **A14** Date taken: 07/11/14

Location:

Transformer No.21 & 22

Description:

Two transformers (labeled as 'Transformer No. 21' and '22') were located at the western side of the Power House.



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Appendix 2.03a – Photographic Records of STSTW

No.: A15 Date taken: 7/11/14 & 28/01/15

Location:

Power House

(Area: ~2470m²)

Description:

Six set of power generators and five set of air blowers supply energy for the treatment plant. Fuel and lubrication oil were being used in daily operation.

A temporary chemical waste collecting point for lubrication oil bottles and oil drums was observed at entrance of the building.



No.: A16 Date taken: 28/01/15

Location:

Boiler House

(Area: ~231m²)

Description:

Four set of hot water boiler located within the building, no fuel or lubricant is needed for the boiler to operate.

No oil stain was observed inside the building.



Date

taken:

Appendix 2.03a - Photographic Records of STSTW

No.: **A17**

A17 17/07/15

Location:

Transformer No.11 and 12

Description:

There are 2 transformers (labeled as Transformer No. 11 to 12) near the Power House for the operation of the Boiler House. The transformers are housed within the transformer rooms. The transformer rooms are elevated on an approximately 1.0m concrete platform. No stains were observed on the floor.



No.: A18 Date taken: 17/07/15

Location:

Transformer No.13 to 18

Description:

There are 6 transformers (labeled as Transformer No. 13 to 18) near the Power House for the operation of the Power House. The transformers are housed within the transformer rooms. The transformer rooms are elevated on an approximately 1.0m concrete platform. No stains were observed on the floor.



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Appendix 2.03a - Photographic Records of STSTW

No.: A19 Date taken: 28/01/15

Location:

Waste Gas Burners

(Area: ~36m²)

Description:

Two set of waste gas burners are located within the treatment plant, to remove methane gas produced from digestion/sludge holding tanks.



No.: **A20** Date taken: 28/01/15

Location:

Sludge Thickening House

 $(Area: ~890m^2)$

Description:

Sludge thickening receiving tanks and cold water receiving tanks were observed in the building.

Concrete paved ground is in good condition and no sign of spillage or stain was observed.



Appendix 2.03a - Photographic Records of STSTW

No.: **A21**

Date taken: 17/07/15

Location:

Transformer No.5, 6 and A

Description:

Transformers No.5 and 6 are located in front of the sludge thickening house, functioning for the SAS thickening house. Transformer A is located behind the sludge thickening house. They are situated on an elevated concrete paved floor with secured gate.



No.: **A22** Date taken: 28/01/15

Location:

Air Blower House

(Area: 1307m²)

Description:

Six air blowers located at the Air Blower House, situated on concrete paved floor with a metal shield surrounded.

Numbers of oil drum are temporary stored on either plastic shelve or metal trolley.

No oil stain or spillage was observed.



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Appendix 2.03a - Photographic Records of STSTW

No.: **A23**

3 _{17/07/15}

Date

taken:

Location:

Transformer No.1 to 4

Description:

There are 4 transformers (labeled as Transformer No. 1 to No. 4). The room is paved with concrete and no stains were observed.



No.: **A24** Date taken: 28/01/15

Location:

Switchgear House and Transformer No. 7 to 10

(Area: ~288m²)

Description:

Use as switch room with control panels. 4 transformers are situated at the back of the building

No stain inside the building or stress of vegetation in the surrounding area is observed.



Appendix 2.03a - Photographic Records of STSTW

No.: **A25** Date taken: 28/01/15

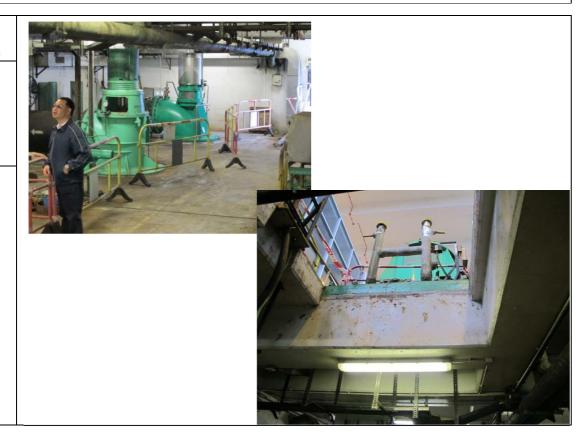
Location:

Effluent Pumping Station

(Area: 619m²)

Description:

Four set of effluent pumps are located within the building. Turbine of the pump that required use of lubricant is located on the first floor.



No.: **A26** Date taken: 17/07/15

Location:

Transformer No.25 and 26

Description:

There are 2 transformers (labeled as Transformer No. 25 to No. 26) near the Effluent Pumping Station. The transformers are on an elevated concrete platform of approximately 0.5m thick. No stains were observed on the floor.



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Appendix 2.03a - Photographic Records of STSTW

No.: **A27** Date taken: 28/01/15

Location:

Sludge Dewatering House

(Area: 1340m²)

Description:

Eight centrifuges are located on the first floor of the building and their control panels are based on the ground floor.



No.: **A28** Date taken: 28/01/15

Location:

Water Reclamation House

(Area: 312m²)

Description:

Major part of the building is used as information center for visitor.

The remaining portions are used for water reclamation (e.g. ultrafiltration and reverse osmosis system).



Appendix 2.03a – Photographic Records of STSTW

No.: **A29** Date taken: 07/11/14 & 17/07/15

Location:

Transformer No.23 and 24

Description:

There are 2 transformers (labeled as Transformer No. 23 and 24) for the Water Reclamation House. The transformers are on an elevated concrete platform of approximately 0.5m thick. No stains were observed on the floor.





No.: **A30** Date taken: 28/01/15

Location:

Sludge Transfer Pumping Station

(Area: 475m²)

Description:

Sludge pumps are located on the first floor of the building and for the ground floor, only transfer pipes were observed, no lubricant is needed for pipe line.



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Appendix 2.03a - Photographic Records of STSTW

No.: **A31** Date taken: 28/01/15

Location:

RAS Pumping Stations

(Area: ~168m² per Station)

Description:

A total of 5 RAS pumping stations situated in different area of the treatment plant and all building are fully concrete paved

Pumps are located on the first floor and control panel and pipe lines are located on ground floor.



Standard Form 3.1 Summary of On-Site Land Use

Shatin Sewage Treatment Works (STSTW) Property Name:

Current Use

Type of facility/	On-site property	•	Description of		Approximate cire of	Off-site property
lype of facility/	Sire property	Date began ¹	business process/	Owner or Occupier	Applications of	affected?
business	land use		primary products		on-site property	YesNo
Sewage Treatment	Industrial	1982	Sewage Treatment	Drainage Services	280,000m²	No
Works				Department		

No If Yes, complete this section. Yes Past Use Are past uses different from current uses? l or pre-industrial time if vacant. Start with the Con this mos

most recent use and II	d list in chronologica	ist in chronological order backwards through time.	rougn time.	40 11 11 11 11 11		
Type of facility/	On-site property	Date began ²	Date ended ³	Date ended business process/	Owner or	Approximate si of on-site
business	land use			primary products	Occupier	property

Off-site property affected?

Future Use

ete this section.	Approximate size of on-site property	280,000m²
No If Yes, complete this section.	Owner or Occupier	N/A
nt uses? _ < Yes_	Description of business process/primary products	Residential development
Will future uses be different from current uses? 💉 Yes	On-site property land use ⁴	Urban residential Residential developme
Will future uses be	Type of facility/ business	Housing

Annex C1 Site Walkover Checklist

GENERAL SITE DETAILS

SITE OWNER/CLIENT	Hong Kong Drainage Services Dep	partment		
PROPERTY ADDRESS	Shatin Sewage Treatment Works, Ma Liu Shui, Shatin, N.T	1 Shui Chong Street,		
PERSON CONDUCTING	THE QUESTIONNAIRE			
NAMEMatthe	w Lee (AECOM)			
POSITIONEnviron	nmental Consultant			
AUTHORIZED OWNER/O	CLIENT REPRESENTATIVE (IF APPLI	CABLE)		
NAME Mr. Ng	Kwok-keung (Drainage Services De	partment)		
POSITION Senior Mechanical Inspector				
TELEPHONE <u>2684 1</u>	063			
SITE ACTIVITIES				
Briefly describe activities Obtain a flow schema		of products/chemicals/materials handled.		
Number of employees:	Full-time:	89 (as on 7/11/14)		
	Part-time:	n/a (as on 7/11/14)		
	Temporary/Seasonal:	n/a (as on 7/11/14)		
Maximum no. of people	on site at any time:	Uncountable		
Typical hours of operation	on:	24 hrs		
Number of shifts:		3		
Days per week:		7 Days		
Weeks per year:		All days throughout the year		
Scheduled plant shut-do	own:	n/a		

Specify the approximate year in which the current use of the on-site property began.
Specify the approximate year in which the past use of the on-site property began.
Specify the approximate year in which the past use of the on-site property ended.
Specify all applicable land use including urban residential, rural residential, industrial or public parks.

Detail the main sources of energy at the site:
Gas Yes/ No
Electricity Yes/ No
Coal Yes /No
Oil Yes/ No
Other Yes /No
SITE DESCRIPTION
This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.
What is the total site area: <u>28 hectares</u>
What area of the site is covered by buildings (%): $\sim 40\%$
Please list all current and previous owners/occupiers if possible.
Drainage Services Department
Is a site plan available? If yes, please attach. Yes/ No
Are there any other parties on site as tenants or sub-tenants? Yes/No
If yes, identify those parties: Not Applicable
Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.
North: <u>Urban residential</u> , hotel and university
South: Racecourse
Fast: Shing Mun River

Industrial (MTR and Highway)

West:

Annex C1 Site Walkover Checklist

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).

Reclaimed land and surrounded by large body of water (Sha Tin Hoi and Shing Mun River) to the East and Northeast

State the size and location of the nearest residential communities.

Residential area along Kau To Shan Road, ~approx. 200m to 350m to the west of the Study Area

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

No			

Questionnaire with Existing/Previous Site Owner or Occupier

		Yes/No	Notes
1.	What are the main activities/operations at the above address?		Sewage treatment works
2.	How long have you been occupying the site?		Since 1982
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	Yes	
4.	Prior to your occupancy, who occupied the site?		Not applicable
5.	What were the main activities/operations during their occupancy?		Not applicable
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	No	Stage III Extension commenced in 2001
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	No	
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	No	
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	No	
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	Lubricating oil and fuels for pumps and power generation, NaOH, NaOCl, Fe(III)Cl for sewage treatment
	• Where do you store these chemicals?		Dangerous goods room, chemical storage room, aboveground tank and cylinder
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	Yes	Representative unavailable to provide the list
13.	Has the facility produced a separate hazardous substance inventory?	Yes	Representative unavailable to provide the list
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	No	

		Yes/No	Notes
15.	How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?		By truck and lorry and stored in above-ground tanks and cylinders
16.	Do you have any underground storage tanks? (If yes, please provide details.)	No	
	 How many underground storage tanks do you have on site? 		Not applicable
	What are the tanks constructed of?		Not applicable
	What are the contents of these tanks?		Not applicable
	Are the pipelines above or below ground?		Not applicable
	 If the pipelines are below ground, has any leak and integrity testing been performed? 		Not applicable
	 Have there been any spills associated with these tanks? 		Not applicable
17.	Are there any disused underground storage tanks?	No	
18.	Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	Yes	Monitoring system for tanks and cylinders
19.	How are the wastes disposed of?		Temporarily stored in chemical waste store, chemical waste collecting tank and chemical waste area. Licensed chemical waste collector will collect the waste for proper disposal.
20.	Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	Yes	Public complaint on odour
21.	Have any spills occurred on site? (If yes, please provide details.)	No	
	When did the spill occur?		Not applicable
	What were the substances spilled?		Not applicable
	What was the quantity of material spilled?		Not applicable
	• Did you notify the relevant departments of the spill?		Not applicable
	What were the actions taken to clean up the spill?		Not applicable
	What were the areas affected?		Not applicable
22.	Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	No	
23.	Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	
24.	Are there any known contaminations on site? (If yes, please provide details.)	No	
25.	Has the site ever been remediated? (If yes, please provide details.)	No	

Annex C1 Site Walkover Checklist

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	Yes	Floors of chemical waste store, chemical store and dangerous goods store are concrete paved, chemicals are place on shelves. Chemical tank and cylinder has bund wall
2.	What are the conditions of the bund walls and floors?		Both are in good condition
3.	Are any surface water drains located near to drum storage and unloading areas?	No	
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	Yes	Spent lube oil, waste battery, grease, scrap
5.	Is there a storage site for the wastes?	Yes	Chemical waste and refuse collection point
6.	Is there an on-site landfill?	No	
7.	Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	
8.	Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	
9.	Are there any potential off-site sources of contamination?	No	
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	Yes	Transformers
11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	Yes	Tanks are used for sewage treatment
12.	Any noticeable odours during site walkover?	Yes	Odour from sewage
13.	Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	Yes	Fuels, lubricating oil, sodium hydroxide.

Sha Tin Cavern Sewage Treatment Works

CAP Appendix 2.03b

Site Walkover Checklist, Photographic Records and Standard Form 3.1 for

Vehicle Detention Centre and its Surrounding Area

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Sha Tin Cavern Sewage Treatment Works

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Appendix 2.03b - Photographic Records of Area A

No.: Date taken: **B7** 17/07/15

Location:

Cycling track and footpath outside the vehicle detention centre (VDC) of the Northeastern part of Area A

Description:

The area is consisted of concrete paved bicycle track, foot path and fenced vacant area.



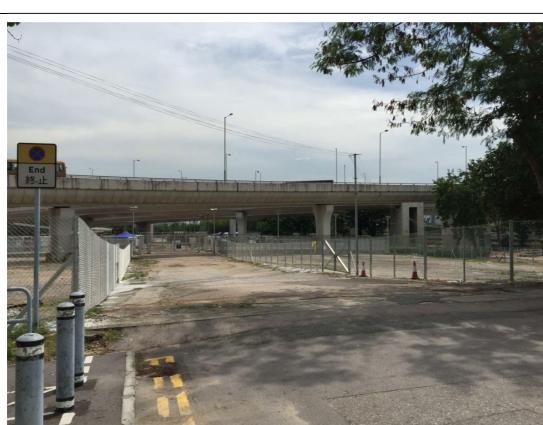
No.: Date taken: **B8** 17/07/15

Location:

End of Hang Tai Road at the main entrance of VDC in Area A

Description:

Photo showing the concreted paved road and fenced VDC area.



Standard Form 3.1 Summary of On-Site Land Use

Sha Tin Vehicle Detention Centre

Current Use

Property Name:

Type of facility/ business	On-site property land use	Date began ¹	Description of business process/ primary products	Owner or Occupier	Approximate size of on-site property	Off-site property affected? YesNo
Vehicle Detention	Industrial	2004	Vehicle Detention	Hong Kong Customs 48,000m ²	48,000m²	No
Centre				and Excise		
				Department		

No If Yes, complete this section. Are past uses different from current uses?

Complete this table with each different operation, use , or status of the on-site property. Include all operations back to pre-commercial or pre-industrial time if this information is necessary to characterize the site. Specify the status of the property at each stage, including times it may have been vacant. Start with the most recent use and list in chronological order backwards through time.

Type of facility/ business	On-site property land use	Date began ²	Date ended³	business process/	Owner or Occupier	Approximate size of on-site	OTT-SITE affe
				primary products		property	
Construction site Industrial	Industrial	2002	2003	Construction	Unknown	48,000m²	No
Car Park	Industrial	1995	2002	Car Park	Unknown	48,000m ²	No
Construction site Industrial	Industrial	1993	1995	Construction	Unknown	48,000m²	No
Vacant	N/A	1985	1993	N/A	N/A	48,000m²	No

No If Yes, complete this section

:y/ On-site property land use4 of Industrial	Approximate size of on-site property	48,000m²	
:y/ On-site property De land use sof Industrial An rel	Owner or Occupier	Drainage Services Department	
.v/	Description of business process/ primary products	Ancillary facilities of relocated STSTW	
Type of facility/business aciliary facilities of located STSTW	On-site property land use ⁴	Industrial	
z P	Type of facility/ business	Ancillary facilities of relocated STSTW	

Specify the approximate year in which the current use of the on-site property began.
Specify the approximate year in which the past use of the on-site property began.
Specify the approximate year in which the past use of the on-site property ended.
Specify all applicable land use including urban residential, rural residential, industrial or public parks.

Annex C1 Site Walkover Checklist

GENERAL SITE DETAILS

SITE OWNER/CLIENT	Hong Kong Customs and Excise D	epartment						
	<u> </u>							
PROPERTY ADDRESS	_ Sha Tin Vehicle Detention Centre, 39 Hang Tai Road,							
	Tai Shui Hang, Shatin							
PERSON CONDUCTING	THE OUESTIONNAIRE							
POSITION <u>Assista</u>	nt Environmental Consultant							
AUTHORIZED OWNER/C	LIENT REPRESENTATIVE (IF APPLI	CABLE)						
NAME Mr. Lar	m (Customs and Excise Department)						
POSITION <u>Storeho</u>	ouse staff							
TELEPHONE <u>2647 1</u>	895							
SITE ACTIVITIES								
Briefly describe activities Obtain a flow schema		of products/chemicals/materials handled.						
Number of employees:	Full-time:	26 (as on 14/11/14)						
	Part-time:	0 (as on 14/11/14)						
	Temporary/Seasonal:	0 (as on 14/11/14)						
Maximum no. of people	on site at any time:	n/a (based on operational needs)						
Typical hours of operation	on:	24 hrs						
Number of shifts:		3						
Days per week:		7 Days						
Weeks per year:		52 Weeks						
Scheduled plant shut-do	wn:	n/a						

Detail the main sources of	of energy at the site:
----------------------------	------------------------

Gas Yes/No

Electricity Yes/No

Coal Yes/No

Oil Yes/No

Other Yes/No

SITE DESCRIPTION

This section is intended to gather informa	ation on site setting	and environmental	receptors on,	adjacent c
close to the site.				

What is the total site area:	45,828 m ² (as of 14/11/2014) 37,994 (after 08/07/2015)
What area of the site is covered by buildings (%):	~1 %
Please list all current and previous owners/occupiers if possible.	
Current occupier: Hong Kong Customs and Excise Department; Previous owner: Lands Department	
Is a site plan available? If yes, please attach. Yes/No	
Are there any other parties on site as tenants or sub-tenants? Yes/N	o
If yes, identify those parties: Not Applicable	
Describe surrounding land use (residential, industrial, rural, etc.) and ider and types of industry.	ntify neighbouring facilities
North: Sha Tin Hoi and urban residential (Kam Tai Court)	
South: Low density residential (Ah Kung Kok Fishermen Village) and Veg	getation
East: Vegetation	
West: Shing Mun River	

Annex C1

Site Walkover Checklist

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).

Reclaimed/flat land and surrounded by a large body of water (Shing Mun River / Sha Tin Hoi) to the West and Northwest

State the size and location of the nearest residential communities.

Kam Tai Court (~120m Northeast, ~44500m²), Chevalier Garden (~250m East, ~60000m²) and Ah Kong Kok Fisherman Village (~150m South, ~11000m²)

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

No

Questionnaire with Existing/Previous Site Owner or Occupier

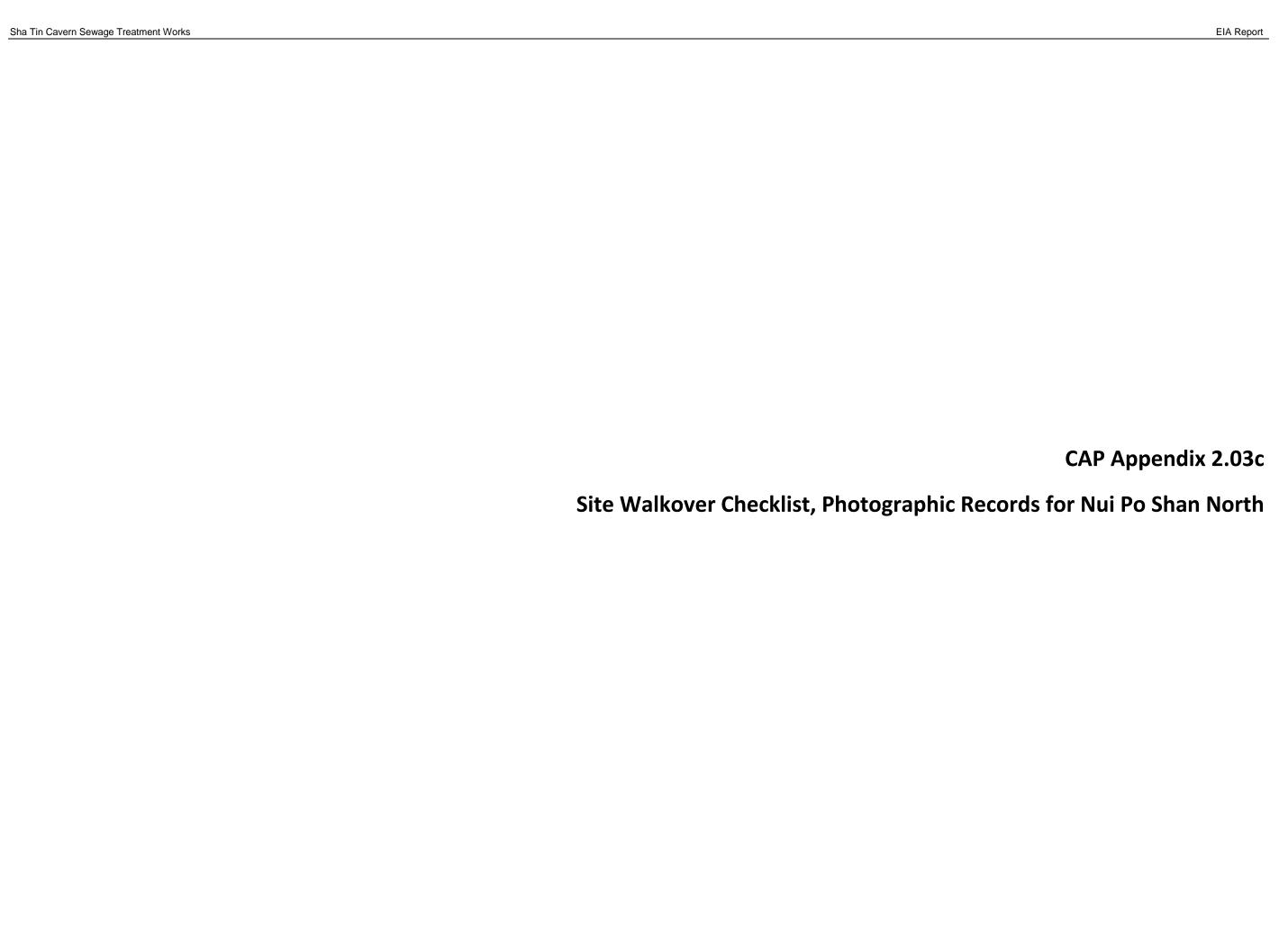
		Yes/No	Notes
1.	What are the main activities/operations at the above address?		Vehicle detention centre
2.	How long have you been occupying the site?		Since July, 2003 - Phase I (24,900 m²) operated in July 2005 - Phase II (20,928 m²) operated in April 2008
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	No	
4.	Prior to your occupancy, who occupied the site?		Lands Department
5.	What were the main activities/operations during their occupancy?		Not applicable
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	No	
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	No	
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	No	
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	No	
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	Pest control Exercise as quarterly basis
•	Where do you store these chemicals?		
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)		Not applicable
13.	Has the facility produced a separate hazardous substance inventory?	No	
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	No	

		Yes/No	Notes
15.	How are materials received (e.g. rail, truck, etc.) and		
	stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?		Not applicable
16.	Do you have any underground storage tanks? (If yes, please provide details.)	No	
	 How many underground storage tanks do you have on site? 		Not applicable
	What are the tanks constructed of?		Not applicable
	What are the contents of these tanks?		Not applicable
	Are the pipelines above or below ground?		Not applicable
	 If the pipelines are below ground, has any leak and integrity testing been performed? 		Not applicable
	 Have there been any spills associated with these tanks? 		Not applicable
17.	Are there any disused underground storage tanks?	No	
18.	Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)		Not applicable
19.	How are the wastes disposed of?		Not applicable
20.	Have you ever received any notices of violation of		Letter from Mr. CHIU, Shatin DC
	environmental regulations or received public complaints?	Yes	member on VDC's hygiene issue
	(If yes, please provide details.)		on 24/07/2013
21.	Have any spills occurred on site? (If yes, please provide details.)	No	
	When did the spill occur?		Not applicable
	What were the substances spilled?		Not applicable
	 What was the quantity of material spilled? 		Not applicable
	 Did you notify the relevant departments of the spill? 		Not applicable
	 What were the actions taken to clean up the spill? 		Not applicable
	What were the areas affected?		Not applicable
22.	Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	No	
23.	Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?		Not applicable
24.	Are there any known contaminations on site? (If yes, please provide details.)	No	
25.	Has the site ever been remediated? (If yes, please provide details.)	No	

Annex C1 Site Walkover Checklist

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary		Not applicable
	containment (i.e. bund walls and floors)?		
2.	What are the conditions of the bund walls and floors?		Not applicable
3.	Are any surface water drains located near to drum	No	
	storage and unloading areas?		
4.	Are any solid or liquid waste (other than wastewater)	No	
	generated at the site? (If yes, please provide		
	details.)		
5	Is there a storage site for the wastes?	No	
6.	Is there an on-site landfill?	No	
7.	Were any stressed vegetation noted on site during	No	
	the site reconnaissance? (If yes, please indicate		
	location and approximate size.)		
8.	Were any stained surfaces noted on-site during the	No	
	site reconnaissance? (If yes, please provide details.)		
9.	Are there any potential off-site sources of	No	
	contamination?		
10.	Does the site have any equipment which might	No	
	contain polychlorinated biphenyls (PCBs)?		
11.	Are there any sumps, effluent pits, interceptors or	No	
	lagoons on site?		
12.	Any noticeable odours during site walkover?	No	
13.	Are any of the following chemicals used on site:	No	
	fuels, lubricating oils, hydraulic fluids, cleaning		
	solvents, used chemical solutions, acids, anti-		
	corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and		
	polyurethane foam?		
	polyurethane roann:		



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Sha Tin Cavern Sewage Treatment Works

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Appendix 2.03c – Photographic Records of Nui Po Shan North

No.: C1 Date taken: 17/07/15

Location:

Evangelical Lutheran Church of Hong Kong, David Camp, 59A A Kung Kok Street.

Description:

Religious camp site consisting of 2 single storey structures, footpaths and vegetation.



No.: C2 Date taken: 17/07/15

Location:

Mui Tsz Lam Road, near the intersection of Mui Tsz Lam Road and A Kung Kok Street

Description:

General view of the area with vegetated land and paved road.



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Appendix 2.03c – Photographic Records of Nui Po Shan North

No.:

Date taken: 24/07/15

Location:

THEES Portal

Description:

Entrance / access road and overall view of the site. Above ground features, including the valve chamber, concrete inlet chamber and switch room, are located at the top of the site. The area is mainly paved with concrete and surrounded by vegetation without stains.



Appendix 2.03c – Photographic Records of Nui Po Shan North

No.: C4

Date taken: 17/07/15

Location:

Roundabout at the end of A Kung Kok Shan Road.

Description:

Near 'The Neighbourhood Adviceaction Council Harmony Manor'. The proposed project boundary covers the vegetated land to the right and Nui Po Shan at the back.



No.: **C5**

Date taken: 17/07/15

Location:

A Kung Kok Shan Road, near the roundabout at the end of A Kung Kok Shan Road

Description:

Proposed area for the Ah Kung Kok Shan Road Surface Magazine Site. The area mainly covered by vegetation.



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Appendix 2.03c - Photographic Records of Nui Po Shan North

No.: taken: 17/07/15 C6

Location:

Mui Tsz Lam Road, west of the Contractor's Works Area

Date

Description:

The area of the project boundary (to the left of Mui Tsz Lam Road) is undeveloped and mainly covered by vegetation.



Appendix 2.03c – Photographic Records of Nui Po Shan North

No.: C7 Date taken: 24/07/15

Location:

Contractor's Works Area

Description:

Engineer's site office, car parking area and construction materials storage area (e.g. fences etc). The area was mainly paved with intact concrete with no stains observed.



No.: C8 Date taken: 24/07/15

Location:

Contractor's Works Area

Description:

Contractor's site office, car parking area and construction materials storage area (e.g. metal reinforcement bars/sheets etc). The area was mainly paved with intact concrete with no stains observed.



Annex C1 Site Walkover Checklist

GENERAL SITE DETAILS

SITE OWNER/CLIENT	Welcome Construction Co., Ltd.		
,	·		
PROPERTY ADDRESS	30 Mui Tsz Lam Road		
	Tai Shui Hang, Sha Tin, N.T.		
	, , , , , , , , , , , , , , , , , , ,		
PERSON CONDUCTING	THE QUESTIONNAIRE		
NAME <u>Kelvin</u>	Chiang (AECOM)		
POSITIONEnviror	nmental Consultant		
AUTHORIZED OWNER/C	CLIENT REPRESENTATIVE (IF APPLICATION OF APPLICATIO	ABLE)	
NAMEMr. Tsu	ui Kam Chuen (Welcome Construction	Co., Ltd.)	
POSITION Site Ag	ent		
TELEPHONE <u>6345 2</u>	454		
SITE ACTIVITIES			
Briefly describe activities Obtain a flow schema	s carried out on site, including types on the control of the contr	of products/chemicals/mater	ials handled.
Number of employees:	Full-time:	20	_
	Part-time:	N/A	_
	Temporary/Seasonal:	N/A	-
Maximum no. of people	on site at any time:	20	_
Typical hours of operation	on:	10 hrs	_
Number of shifts:		1	_
Days per week:		6 Days	_
Weeks per year:		52 Weeks	_
Scheduled plant shut-do	wn:	N/A	

Detail	the	main	sources	of	energy	at	the	site:
--------	-----	------	---------	----	--------	----	-----	-------

Gas Yes/No

Electricity Yes/No

Coal Yes/No

Oil Yes/No

Other Yes/No

SITE DESCRIPTION

West: Vegetation (Niu Po Shan)

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area:	~2500m ²
What area of the site is covered by buildings (%):	~10%
Please list all current and previous owners/occupiers if possible.	
Current occupier: Welcome Construction Company Ltd.; Previous occupier	: Unknown
Is a site plan available? If yes, please attach. Yes/No	
Are there any other parties on site as tenants or sub-tenants? Yes/N	0
If yes, identify those parties: Not Applicable	
Describe surrounding land use (residential, industrial, rural, etc.) and iden and types of industry.	tify neighbouring facilities
North: Mui Tsz Lam Road	
South: Vegetation (Niu Po Shan)	
East: Mui Tsz Lam Road	

Annex C1

Site Walkover Checklist

Describe the topography	of the area	(flat terrain,	rolling hills,	mountains,	by a large	body of	water,
vegetation, etc.).							

Vegetation to the south and west, rolling hills	
State the size and location of the nearest residential communities.	
Chevalier Garden (~67m North East, ~60000m²)	

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

No

Questionnaire with Existing/Previous Site Owner or Occupier

		Yes/No	Notes
1.	What are the main activities/operations at the above address?		Site office
2.	How long have you been occupying the site?		Since February 2009
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	No	
4.	Prior to your occupancy, who occupied the site?		Not known
5.	What were the main activities/operations during their occupancy?		Not applicable
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	No	
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	No	
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	No	
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	Yes	Boreholes in the surrounding are
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	No	
•	Where do you store these chemicals?		
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	No	
13.	Has the facility produced a separate hazardous substance inventory?	No	
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	No	

		Yes/No	Notes	
15.	How are materials received (e.g. rail, truck, etc.) and		Construction materials only;	
	stored on site (e.g. drums, tanks, carboys, bags, silos,		received by trucks	
	cisterns, vaults and cylinders)?			
16.	Do you have any underground storage tanks? (If yes,	Yes	Sewage tank	
	please provide details.)		-	
	 How many underground storage tanks do you have on site? 		Two sewage tanks on site	
	What are the tanks constructed of?		Concrete	
	What are the contents of these tanks?		Sewage	
	 Are the pipelines above or below ground? 		Below ground	
	 If the pipelines are below ground, has any leak and integrity testing been performed? 	No		
	Have there been any spills associated with these tanks?	No		
17.	Are there any disused underground storage tanks?	No		
18.	Do you have regular check for any spillage and monitoring			
	of chemicals handled? (If yes, please provide details.)		No chemicals being handled.	
19.	How are the wastes disposed of?		Waste (general refuse) collected by trucks	
20.	Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	,	
21.	Have any spills occurred on site? (If yes, please provide details.)	No		
	When did the spill occur?			
	What were the substances spilled?			
	 What was the quantity of material spilled? 			
	 Did you notify the relevant departments of the spill? 			
	What were the actions taken to clean up the spill?			
	What were the areas affected?			
22.	Do you have any records of major renovation of your site			
	or re-arrangement of underground utilities, pipe	No		
	work/underground tanks (If yes, please provide details.)			
23.	Have disused underground tanks been removed or		No disused underground tanks.	
	otherwise secured (e.g. concrete, sand, etc.)?		The disased anderground anno.	
24.	Are there any known contaminations on site? (If yes, please provide details,)	No		
25.	Has the site ever been remediated? (If yes, please provide	Na		
	details.)	No		

Annex C1 Site Walkover Checklist

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?		No chemicals observed on-site.
2.	What are the conditions of the bund walls and floors?		Not applicable
3.	Are any surface water drains located near to drum storage and unloading areas?		Not applicable
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	Yes	General refuse only; collected by waste collector.
5.	Is there a storage site for the wastes?	Yes	General refuse at designed areas.
6.	Is there an on-site landfill?	No	
7.	Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	
8.	Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	
9.	Are there any potential off-site sources of contamination?	No	
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	
11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	No	
12.	Any noticeable odours during site walkover?	No	
13.	Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	No	

Annex C1 Site Walkover Checklist

GENERAL SITE DETAILS

SITE OWNER/CLIENT	Drainage Services Department			
PROPERTY ADDRESS	THEES Portal; A Kung Kok Street			
PERSON CONDUCTING	THE QUESTIONNAIRE			
NAME <u>Kelvin</u>	Chiang (AECOM)			
POSITIONEnviror	nmental Consultant			
AUTHORIZED OWNER/O	CLIENT REPRESENTATIVE (IF APPLIC	CABLE)		
		partment)		
_		•		
POSITION Senior	Mechanical Inspector			
TELEPHONE <u>2684 1</u>	063			
SITE ACTIVITIES				
Briefly describe activities carried out on site, including types of products/chemicals/materials handled. Obtain a flow schematic if possible.				
Number of employees:	Full-time:	None		
	Part-time:	None		
	Temporary/Seasonal:	None		
Maximum no. of people	on site at any time:	N/A		
Typical hours of operation	on:	N/A		
Number of shifts:		N/A		
Days per week:		N/A		
Weeks per year:		N/A		
Scheduled plant shut-do	own:	N/A		

Gas Yes/No

Electricity Yes/No

Coal Yes/No

Oil Yes/No

Other Yes/No

SITE DESCRIPTION

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area:	~2070 m ²		
What area of the site is covered by buildings (%):	~1 %		
Please list all current and previous owners/occupiers if possible.			
Current occupier: Drainage Services Department			
Is a site plan available? If yes, please attach. Yes/No			
Are there any other parties on site as tenants or sub-tenants? Yes/No)		
If yes, identify those parties: Not Applicable			
Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.			
North: A Kung Kok Street			
South: Vegetation (Niu Po Shan)			
East: Vegetation (Niu Po Shan)			
West: Ah Kung Kok Fishermen Village			

Annex C1

Site Walkover Checklist

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).

Vegetation to the east and south, rolling hills

State the size and location of the nearest residential communities.

Ah Kong Kok Fisherman Village (~14m Southwest, ~11000m²) and Evangelical Lutheran Church of Hong Kong David Camp (~17m North, ~1200m²)

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

No

Questionnaire with Existing/Previous Site Owner or Occupier

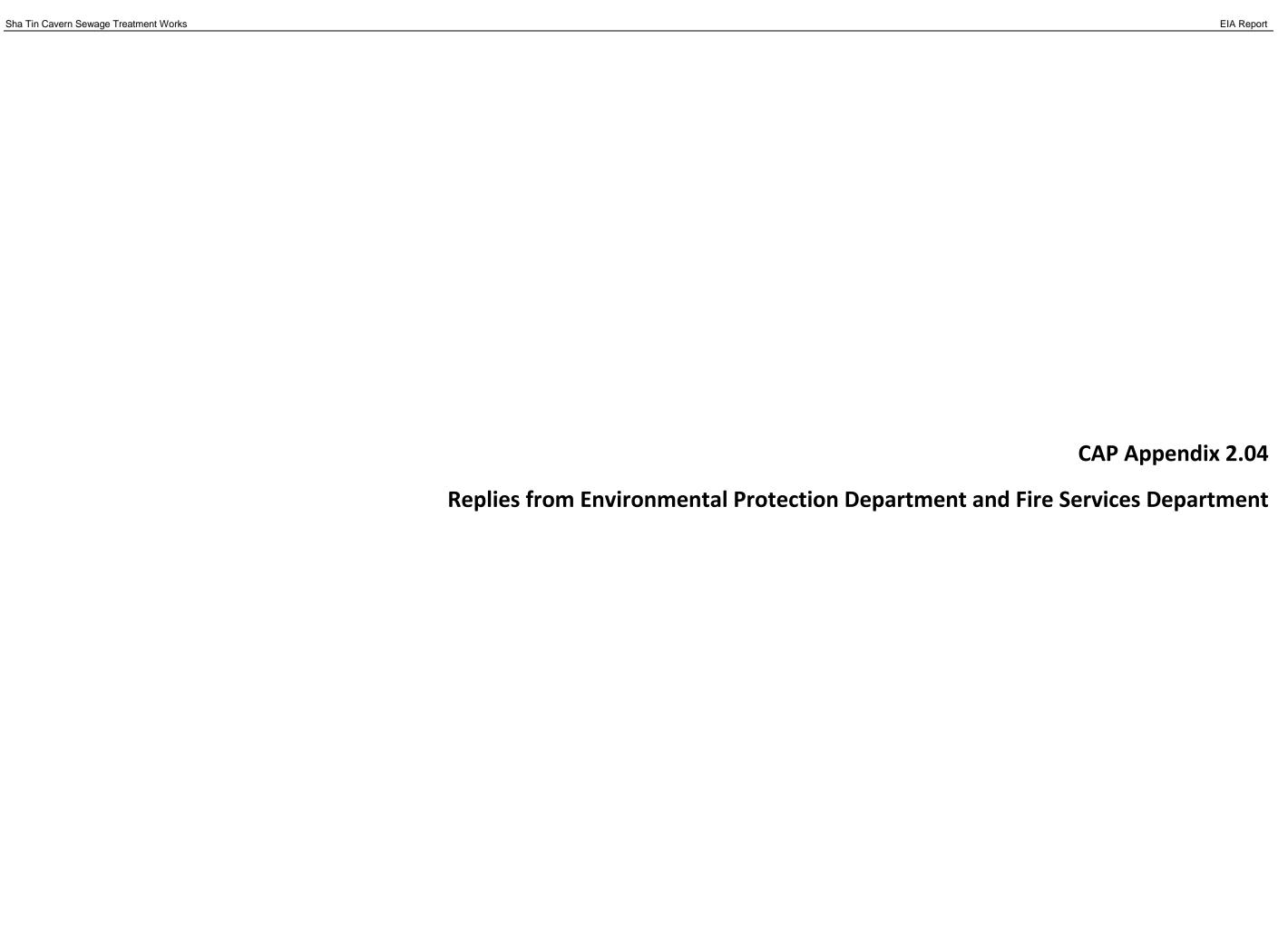
		Yes/No	Notes
1.	What are the main activities/operations at the above address?		Inlet of THEES effluent
2.	How long have you been occupying the site?		Since 1994
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)		Unknown
4.	Prior to your occupancy, who occupied the site?		Unknown
5.	What were the main activities/operations during their occupancy?		Unknown
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	No	
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	No	
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	No	
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	Yes	Boreholes in the surrounding area
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	No	
•	Where do you store these chemicals?		
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)		Not applicable
13.	Has the facility produced a separate hazardous substance inventory?	No	
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	No	

		Yes/No	Notes
15.	How are materials received (e.g. rail, truck, etc.) and		
	stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?		Not applicable
16.	Do you have any underground storage tanks? (If yes, please provide details.)	No	
	 How many underground storage tanks do you have on site? 		Not applicable
	What are the tanks constructed of?		Not applicable
	What are the contents of these tanks?		Not applicable
	 Are the pipelines above or below ground? 		Not applicable
	 If the pipelines are below ground, has any leak and integrity testing been performed? 		Not applicable
	Have there been any spills associated with these tanks?		Not applicable
17.	Are there any disused underground storage tanks?	No	
18.	Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)		No chemicals handled.
19.	How are the wastes disposed of?		No wastes disposed of.
20.	Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	
21.	Have any spills occurred on site? (If yes, please provide details.)	No	
	When did the spill occur?		Not applicable
	 What were the substances spilled? 		Not applicable
	What was the quantity of material spilled?		Not applicable
	 Did you notify the relevant departments of the spill? 		Not applicable
	 What were the actions taken to clean up the spill? 		Not applicable
	What were the areas affected?		Not applicable
22.	Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	No	
23.	Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?		No disused underground tanks.
24.	Are there any known contaminations on site? (If yes, please provide details.)	No	
25.	Has the site ever been remediated? (If yes, please provide details.)	No	

Annex C1 Site Walkover Checklist

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary		No chemicals observed on-site.
	containment (i.e. bund walls and floors)?		
2.	What are the conditions of the bund walls and floors?		Not applicable
3.	Are any surface water drains located near to drum		Not applicable
	storage and unloading areas?		
4.	Are any solid or liquid waste (other than wastewater)	No	
	generated at the site? (If yes, please provide		
	details.)		
5	Is there a storage site for the wastes?	No	
6.	Is there an on-site landfill?	No	
7.	Were any stressed vegetation noted on site during	No	
	the site reconnaissance? (If yes, please indicate		
	location and approximate size.)		
8.	Were any stained surfaces noted on-site during the	No	
	site reconnaissance? (If yes, please provide details.)		
9.	Are there any potential off-site sources of	No	
	contamination?		
10.	Does the site have any equipment which might	No	
	contain polychlorinated biphenyls (PCBs)?		
11.	Are there any sumps, effluent pits, interceptors or	No	
	lagoons on site?		
12.	Any noticeable odours during site walkover?	No	
13.	Are any of the following chemicals used on site:	No	
	fuels, lubricating oils, hydraulic fluids, cleaning		
	solvents, used chemical solutions, acids, anti-		
	corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and		
	polyurethane foam?		
	polyureurane roant:		



AECOM August 2016

Sha Tin Cavern Sewage Treatment Works

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AECOM August 2016



AECOM +852 3922 9000 tel 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road

Shatin, Hong Kong 香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓

www.aecom.com

Our ref : CYKY:KWGH:ccm:60334056/2.1-2014013312W

30 October 2014

By Fax (2685 1133) and Post

Environmental Protection Department Regional Office (North) 10/F, Sha Tin Government Offices, No.1 Sheung Wo Che Road, Sha Tin, New Territories, Hong Kong

Dear Sir / Madam,

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works – Investigation, Design and Construction Request for Information of Chemical Waste Producer and Chemical Spillage Accident

We are the consultant appointed by Drainage Services Department (DSD) for the captioned Agreement. A copy of a self-explanatory memo dated 8 Oct 2014 issued by DSD is enclosed for your reference.

The areas of concern (the Concerned Areas) for the land contamination assessment include the existing Sha Tin Sewage Treatment Works and the Customs and Excise Department's Sha Tin Vehicle Detention Centre. The Concerned Areas are shown in Figure A attached.

As part of the land contamination assessment and following the Practice Guide for Investigation and Remediation of Contaminated Land issued by Environmental Protection Department (EPD), we have to collect historical information regarding the past and present activities of the Concerned Areas. In this regard, we would be much appreciated if you could furnish us with the following information of the Concerned Areas for our assessment:

- Current and past (early as the records are available) registered Chemical Waste Producer(s) within the Concerned Areas (preferably with the registration date, status (moved out or active), nature and quantity of the major chemical waste); and
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas.

Your assistance in this matter will be greatly appreciated. Should you have any queries, please feel free to contact the undersigned at 3922 9345 or our Mr. Matthew Lee at 3922 9439.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau

Associate Director

Water & Urban Development, Hong Kong

Encl.

CC

MEMO Chief Engineer/Sewerage Projects, DSD To Distribution From () in SP/8/4399DS/CE3014(DS) Ref. Attn.: Tel. No. 2594 7460 Email 2827 8700 Your Ref. Fax. No. khchan06@dsd.gov.hk Dated Fax. No. Email Date 8 October 2014 **Total Pages** 3 + Encl.Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: **Caverns and Sewage Treatment Works**

Urgent by Fax

		 Investigation, Design and Construction
	appointe Septemb	We wish to inform you that AECOM Asia Company Ltd. (AECOM) has been d to undertake the captioned Assignment. The Assignment commenced on 29 er 2014.
	2.	The scope of the Assignment mainly comprises:
	(a)	preliminary and detailed design of cavern sewage treatment system (CSTS) for the relocated Sha Tin Sewage Treatment Works (STSTW);
	(b)	preliminary design of upstream sewerage and pumping station (USPS), including diversion of sewage to the relocated STSTW and diversion of effluent from the Tai Po Sewage Treatment Works (TPSTW) to the existing Tolo Harbour Effluent Export Scheme (THEES) tunnel in relation to the relocation of the STSTW to caverns;
	(c)	detailed impact assessments on environment, traffic, geotechnical, sewerage, drainage, waterworks, utilities, blasting vibration and other relevant aspects;
	(d)	public engagement and consultation exercises with relevant stakeholders;
	(e)	tendering and supervision for the associated site investigation works; and
	(f)	tendering and supervision for the future construction works for the relocation project, except USPS, which are "phases subject to incorporation".
_		The layout plan showing the preliminary location of the relocated STSTW is enclosed for your ease of reference.

-1-

- 3. During the course of the Assignment, AECOM may approach your Department/Office direct to search for information, to seek your comments/approvals where appropriate, or to seek other assistance relating to the Assignment. We should be grateful if you would render the necessary assistance to them.
- 4. Should you have any further enquiry, please feel free to contact our Engineers, Ms. Agnes P. F. YIU (Tel: 2594 7459), Mr. William H. M. WONG (Tel: 2594 7457) or the undersigned.
- 5. Thank you for your assistance in advance.

(Benjamin K. H. CHAN) for Chief Engineer/Sewerage Projects Drainage Services Department

Encl.



Date: OCT. 2014

Project No.: 60334056 Scale: 1 : 6000 (A3)

Hong Kong.

OUR REF: 來函檔案 YOUR REF:

TEL. NO .:

國文似文

FAX NO .:

址

EPCW/D2226/753-10

Environmental Protection Department Environmental Compliance Division

CYKY:KWGH:ccm:60334056/2.1-2014013Regional Office (North)

2158 5841 2685 1155 10/F., Shatin Government Offices, 1 Sheung Wo Che Road, Sha Tin, New Territories,



環境保護署 環保法規管理科 香港新界沙田 上禾瓷路一號 沙田政府合署 10 棲

HOMEPAGE: http://www.epd.gov.hk/

10 November 2014

By fax only: 3922 9797

To: AECOM

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road

Shatin, N.T. (Attn: Cherry Yau)

Dear Ms Yau,

Agreement No. CE 30/2014(DS) Relocation of Sha Tin SewageTreatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction Request for Information of Chemical Waste Producer and Chemical Spillage Accident

I refer to your letter dated 30 October 2014 on the captioned.

Regarding your enquiries in the above letter, this Regional Office has no record of reported accidents of spillage / leakage of chemicals at the concerned site. You may need to check with other parties / departments for such information as appropriate.

A registry of chemical waste producers is available in the Territory Control Office of this department. Please contact Mr. Dennis Leung, Senior Environmental Protection Inspector at 2835 1027 for making an appointment to view the records.

Should you have any enquiry, you may contact the undersigned.

Yours sincerely.

(CHENG Hing Wai, Henry) for Director of Environmental Protection

No.: R225 L1 P.001/001 A=COM

AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong

香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓 www.aecom.com

Your Ref.: EPCW/D2226/753-10

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013188W

13 October 2015

+852 3922 9000 tel

By Fax (2685 1133) and Post

Environmental Protection Department Regional Office (North) 10/F, Sha Tin Government Offices, 1 Sheung Wo Che Road, Sha Tin, New Territories, Hong Kong

Attn.: Mr. Henry H W Cheng

Dear Sir.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Chemical Waste Producer and Chemical Spillage Accident

We refer to your letter of the above reference dated 10 November 2014 regarding the captioned subject. The letter is attached herewith for your ease of reference.

To facilitate our land contamination assessment under this Agreement, we would be much appreciated if you could furnish us of any reported accidents of spillage/leakage of chemicals within the following Concerned Areas. The Concerned Areas cover the areas as listed in the table and are shown in the Figure A.

Concerned Area	Address	
Area A	Area adjacent to C&ED's Sha Tin Vehicle Detention Centre covering vacant land, footpaths, cycling tracks, sitting-out area and sections of A Kung Kok Street / Ma On Shan Road / Tate's Cairn Highway (please refer to Figure A for details)	
Area B	Footpath, cycling track and vacant land near Kam Tai Court/Hang Tai Road and Chevalier Garden (please refer to Figure A for details)	
David Camp	59A A Kung Kok Street, Ma On Shan, Sha Tin	
THEES Portal	Located at A Kung Kok Street, near Ah Kung Kok Fishermen Village	
Contractor's Work Area (Construction Site Office)	30 Mui Tsz Lam Road, Tai Shui Hang, Sha Tin, N.T.	
Nui Po Shan North	Part of the undeveloped Nui Po Shan within the project boundary, located between Mui Tsz Lam Road and A Kung Kok Shan Road	

-2-

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013188W

As per your letter, we will contact the Territory Control Office of your department separately for registry of chemical waste producers within the Concerned Areas.

We would be grateful to have your reply on or before 27 October 2015. Should you need further information, please kindly contact the undersigned at 3922 8345 or our Mr. Kelvin Chiang at 3922 9507.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau **Technical Director**

Water & Urban Development

Encl.

10-NOV-2014 10:30 FROM RO(N) EPD STGO

EPCW/D2226/753-10

TO 39229797

P.01

環境保護署 環保法規管理科 香港新界沙田 上禾瓷路一號 沙田政府合署 10 楼

CYKY:KWGH:ccm:60334056/2.1-2014013Begitahal Office (North) 電 新 TEL. NO.: 2158 5841

國文例其 FAX NO.: 2685 1155

OUR REF:

YOUR REF:

來函檔室

HOMEPAGE: http://www.epd.gov.hk/

10 November 2014

By fax only: 3922 9797

To: AECOM

8/F Grand Central Plaza. Tower 2, 138 Shatin Rural Committee Road

Shatin, N.T. (Attn: Cherry Yau)

Dear Ms Yau.

Agreement No. CE 30/2014(DS) Relocation of Sha Tin SewageTreatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction Request for Information of Chemical Waste Producer and Chemical Spillage Accident

Environmental Protection Department

Environmental Compliance Division

10/F., Shatin Government Offices,

1 Sheung Wo Che Road,

Sha Tin, New Territories,

Hong Kong.

I refer to your letter dated 30 October 2014 on the captioned.

Regarding your enquiries in the above letter, this Regional Office has no record of reported accidents of spillage / leakage of chemicals at the concerned site. You may need to check with other parties / departments for such information as appropriate.

A registry of chemical waste producers is available in the Territory Control Office of this department. Please contact Mr. Dennis Leung, Senior Environmental Protection Inspector at 2835 1027 for making an appointment to view the records.

Should you have any enquiry, you may contact the undersigned.

Yours sincerely,

(CHENG Hing Wai, Henry) for Director of Environmental Protection

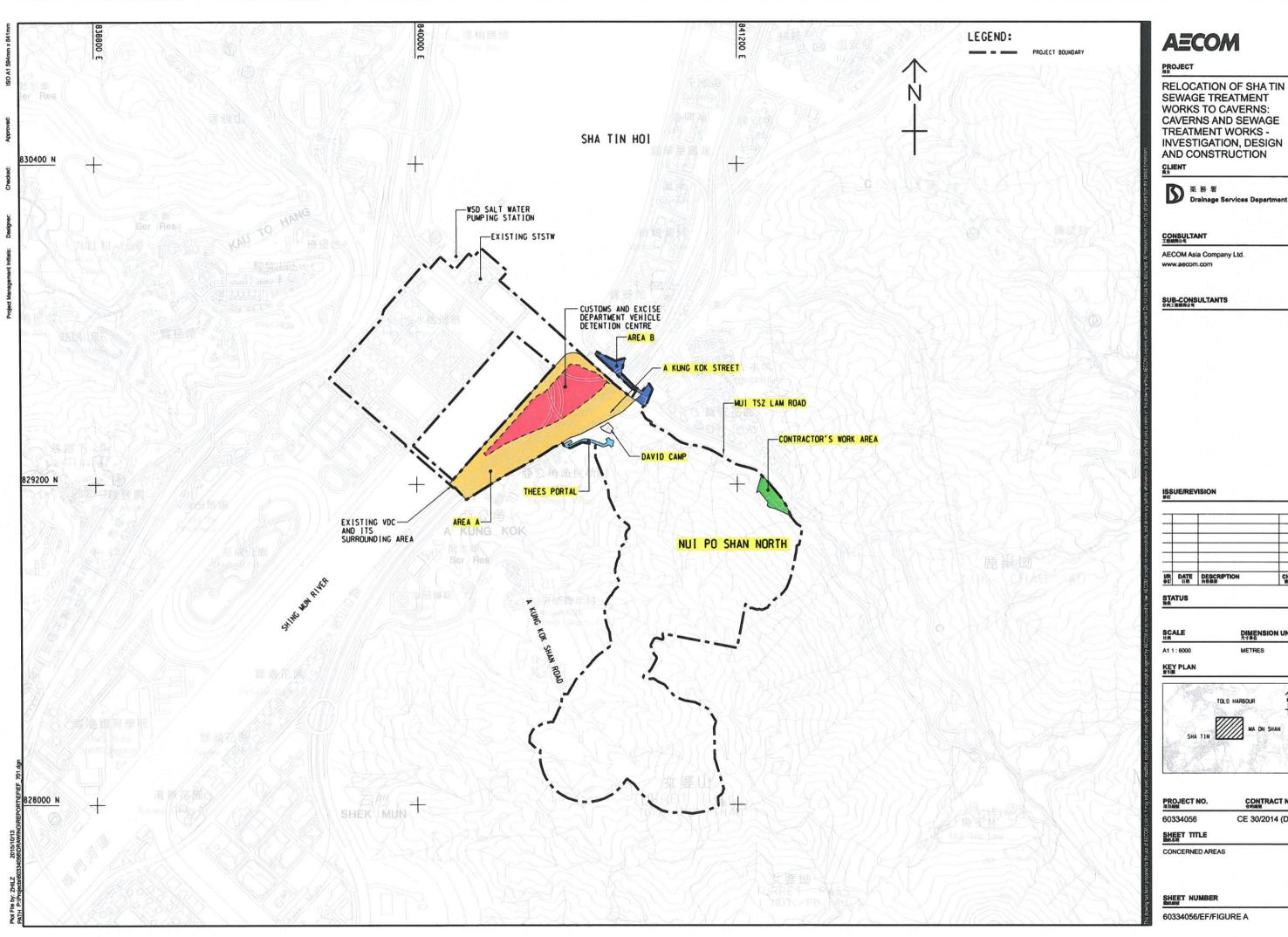
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10/11/2014 10:30

No.: R225 L1

P.001/001



RELOCATION OF SHATIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS -INVESTIGATION, DESIGN AND CONSTRUCTION



VR 90	DATE 日期	DESCRIPTION 内容描版	СН
7			
\dashv			_

DIMENSION UNIT

TOLO HARBOUR

CONTRACT NO. CE 30/2014 (DS)



AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong

+852 3922 9000 tel

香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓

www.aecom.com

Your Ref.: (175) in FSD GR 6-5/4 R Pt. 7

Our Ref.: CYKY:TXT;cfwl:60334056/5.1-2015002057W

9 February 2015

By Fax (2367 3631) & Post

Fire Services Department Licensing and Certification Command 5/F, South Wing, Fire Services Headquarters Building, 1 Hong Chong Road, Kowloon, Hong Kong

Dear Sirs,

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Dangerous Goods, Chemical Spillage Accident and Fire Record

We write further previous letter via ref. CYKY:KWGH:ccm:60334056/2.1-2014013313W dated 30 October 2014 and your kind advice under above mentioned reference dated 14 November 2014 regarding captioned subject.

To facilitate our land contamination assessment within the existing Sha Tin Sewage Treatment Works (the Concerned Areas) as shown in enclosed Figure A, we would be much appreciated if you could furnish us with the following information of the Concerned Areas:

- Current and past registered Dangerous Goods storage within the Concerned Areas (with type of dangerous goods, storage method, quantity, and licence no. / date of issue);
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas; and
- Fire records within the Concerned Areas.

Should you need further information, please kindly contact the undersigned at 3922 9345 or our Mr. Leo Luk at 3922 9401.

Yours faithfully, For and on behalf of AECOM Asia Co. Ltd.

Cherry Yau

Technical Director

Water & Urban Development

Encl.

CE/SP, DSD - Attn: Mr. K. H. Chan (w/e)

EA/EPD

- Attn: Mr. Laurence Chung (w/e)

60334056/CAP/FIGURE A



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (173) in FSD GR 6-5/4 R Pt. 8

來函檔號 YOUR REF.: CYKY:TXT:cfwl:60334056/5.1-2015002057W

電子郵件 E-mail

: hkfsdenq@hkfsd.gov.hk

圖文傳真 FAX NO.

: 2739 5879

話 TEL NO.

: 2733 7741

24 February 2015

AECOM Asia Co. Ltd.

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road,

Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Land Contamination Assessment within the existing Sha Tin Sewage Treatment Works Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 9.2.2015 regarding the captioned request and reply below in response to your questions seriatim:-

- 1. Dangerous goods approval has been granted in respect of the captioned address. Please refer to Appendix A for details.
- No record of incidents of spillage / leakage of dangerous 2. goods was found at the aforesaid location with your given conditions.

If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(WONG Ronald) for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時請引述編號及日期

Appendix A

Land Contamination Assessment within the existing **Sha Tin Sewage Treatment Works** Request for Information of Dangerous Goods & Incident Records

<u>Item</u>	<u>Types</u>	Quantity	Storage Method
1.	Sodium Hydroxide Solution	9,200 Litres	Above ground tank
2.	i) Sodium Hydroxide Solution	2,950 Litres	Above ground tank
	ii) Sodium Hypochlorite Solution	1,130 Litres	Above ground tank
3.	Sodium Hydroxide Solution	9,200 Litres	Above ground tank
4.	Sodium Hydroxide Solution	3,620 Litres	Above ground tank
5.	Sodium Hypochlorite.Solution	2 nos of 12m ³	Above ground tank
6.	Sodium Hypochlorite Solution	2 nos of 12m ³	Above ground tank
7.	Sodium Hypochlorite Solution	2 nos of 12m ³	Above ground tank
8.	Sodium Hypochlorite Solution	2 nos of 12m ³	Above ground tank
9.	Sodium Hypochlorite Solution	2 nos of 12m ³	Above ground tank
10.	Sodium Hydroxide Solution	10,000 Litres	Above ground tank
11.	Sodium Hypochlorite Solution	2 nos of 7.85m ³	Above ground tank
12.	Diesel	1,000 Litres	Above ground tank
13.	i) Acetylene	2 nos of 11.2m ³ cylinders	Approved gas cylinder
	ii) Hydrogen	2 nos of 6.2m ³ cylinders	Approved gas cylinder
14.	i) Compressed Air	2 nos of 6.8m ³ cylinders	Approved gas cylinder
	ii) Argon	6 nos of 6.8m ³ cylinders	Approved gas cylinder

	iii) Helium	2 nos of 6.2m ³ cylinders	Approved gas cylinder
	iv) Nitrogen	2 nos of 6.2m ³ cylinders	Approved gas cylinder
	v) Oxygen	2 nos of 6.8m ³ cylinders	Approved gas cylinder
	vi) Carbon Dioxide	2 nos of 22.7kg cylinders	Approved gas cylinder
	vii) Nitrous Oxide	2 nos of 27kg cylinders	Approved gas cylinder
15.	i) Hydrochloric Acid	30 Litres	Inside a 2.5-litre container
	ii) Sulphuric Acid	20 Litres	Inside a 2.5-litre container
16.	i) Phosphoric Acid	1,000 Litres	Inside a 2.5-litre container
	ii) Nitric Acid	20 Litres	Inside a 2.5-litre container
17.	i) Sodium Hydroxide Soultion	100 Litres	Inside a 2.5-litre container
	ii) Sodium Hydroxide	100 kg	Inside a 1-kg container

AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong 香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓

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+852 3922 9000 tel

Your Ref.: (175) in FSD GR 6-5/4 R Pt. 7

Our Ref.: CYKY:TXT:cfwl:60334056/5.1-2015002056W

9 February 2015

By Fax (2367 3631) & Post

Fire Services Department Licensing and Certification Command 5/F, South Wing, Fire Services Headquarters Building, 1 Hong Chong Road, Kowloon, Hong Kong

Dear Sirs,

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Dangerous Goods, Chemical Spillage Accident and Fire Record

We write further to our previous letter via ref. CYKY:KWGH:ccm:60334056/2.1-2014013313W dated 30 October 2014 and your kind advice under above mentioned reference dated 14 November 2014 regarding captioned subject.

To facilitate our land contamination assessment within the Custom and Excise Department's Sha Tin Vehicle Detention Centre (VDC) including its adjoining area as highlighted in green as shown in enclosed Figure B, we would be much appreciated if you could furnish us with the following information related to the Concerned Areas:

- Current and past registered Dangerous Goods storage within the Concerned Areas (with type of dangerous goods, storage method, quantity, and licence no. / date of issue);
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas; and
- Fire records within the Concerned Areas.

Should you need further information, please kindly contact the undersigned at 3922 9345 or our Mr. Leo Luk at 3922 9401.

Yours faithfully, For and on behalf of AECOM Asia Co. Ltd.

Cherry Yau **Technical Director**

Water & Urban Development

Encl.

CE/SP, DSD - Attn: Mr. K. H. Chan (w/e) EA/EPD Attn: Mr. Laurence Chung (w/e)

60334056/CAP/FIGURE B



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (172) in FSD GR 6-5/4 R Pt. 8

來函檔號 YOUR REF. : CYKY:TXT:cfwl:60334056/5.1-2015002056W

電子郵件 E-mail

hkfsdeng@hkfsd.gov.hk

圖文傳真 FAX NO.

: 2739 5879

話 TEL NO.

: 2733 7741

24 February 2015

AECOM Asia Co. Ltd.

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road,

Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU.

Land Contamination Assessment with the Custom and Excise Department's Sha Tin Vehicle Detention Centre (VDC) Request for Information of Dangerous Goods & Incident Records

I refer to your letter regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(WONG Ronald)

for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時請引述編號及日期

AECOM 8/F Grand Central Plaza, Tower 2 138 Shatin Rural Committee Road Shatin, Hong Kong 香港新界沙田鄉事會路138號

+852 3922 9000 tel +852 3922 9797 fax

新城市中央廣場第2座8樓 www.aecom.com

Your Ref.: (172) in FSD GR 6-5/4 R Pt. 8

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013189W

13 October 2015

1 5 OCT 2015

By Fax (2367 3631) and Post



Fire Services Department Licensing and Certification Command 5/F, South Wing, Fire Services Headquarters Building, 1 Hong Chong Road. Kowloon, Hong Kong

Dear Sir / Madam.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Dangerous Goods, Chemical Spillage Accident and Fire Record

We refer to your letter of the above reference dated 24 February 2015 regarding the captioned subject (the copy of letter is enclosed for your ease of reference).

To facilitate our land contamination assessment under this Agreement, we would be much appreciated if you could furnish us with the following information of the Concerned Areas for our assessment. The Concerned Areas (Area A and B) cover the following areas and area shown in the Figure A:

- 1) Area A The area adjacent to C&ED's Sha Tin Vehicle Detention Centre covering vacant land, footpaths, cycling tracks, sitting-out area and sections of A Kung Kok Street/ Ma On Shan Road/ Tate's Cairn Highway; and
- Area B Footpath, cycling track and vacant land near Kam Tai Court/ Hang Tai Road and Chevalier Garden
- Current and past registered Dangerous Goods storage within the Concerned Areas (with type of dangerous goods, storage method, quantity, and license no. / date of issue);
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas; and
- Fire records within the Concerned Areas.

We would be grateful to have your reply on or before 27 October 2015. Should you need further information, please kindly contact the undersigned at 3922 8345 or our Mr. Kelvin Chiang at 3922 9507.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau

Technical Director

Water & Urban Development

Encl.



FIRE SERVICES HEADQUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (172) in FSD GR 6-5/4 R Pt. 8

來函檔號 YOUR REF.: CYKY:TXT:cfwl:60334056/5.1-2015002056W

電子郵件 E-mail

: hkfsdeng@hkfsd.gov.hk

圖文傳真 FAX NO.

: 2739 5879

話 TEL NO.

: 2733 7741

24 February 2015

AECOM Asia Co. Ltd.

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road,

Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Land Contamination Assessment with the Custom and Excise Department's Sha Tin Vehicle Detention Centre (VDC) Request for Information of Dangerous Goods & Incident Records

I refer to your letter regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

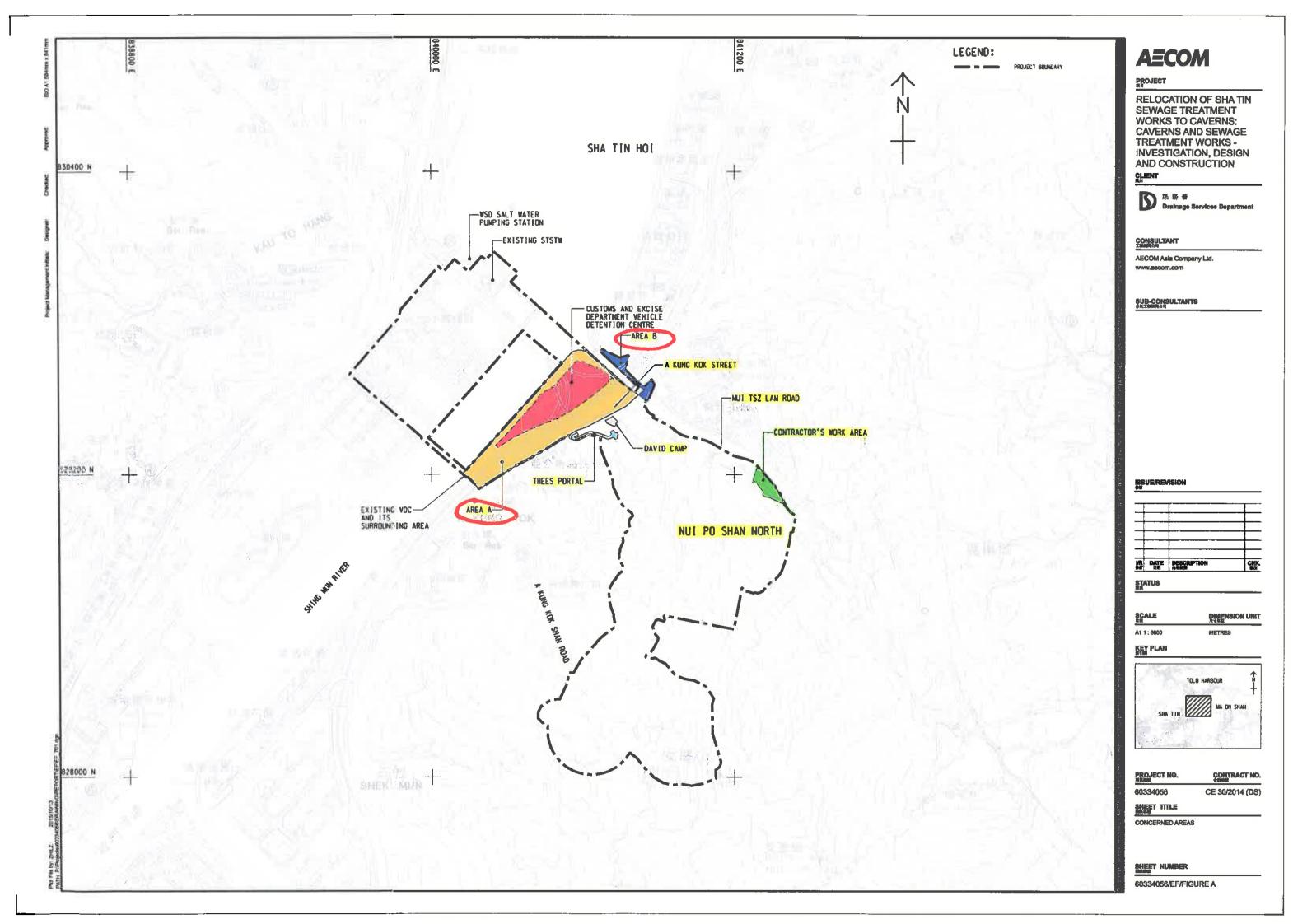
If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(WONG Ronald)

for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時調引述編號及日期



香港九龍尖沙咀東部康莊道1號 消防總部大廈



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS

BUILDING, No.1 Hong Chong Road,

Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (190) in FSD GR 6-5/4 R Pt. 10

來函檔號 YOUR REF. : CYKY:TXT:kchy:60334056/5.1-2015013189W

電子郵件 E-mail : hkfsdeng@hkfsd.gov.hk

圖文傳真 FAX NO. : 2739 5879 : 2733 7741 話 TEL NO.

13 November 2015

AECOM Asia Co. Ltd 8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction Area A: C & ED's Sha Tin Vehicle Detention Centre and Sections of A Kung Kok Street/ Ma On Shan Road/ Tate's Cairn Highway Area B: Near Kam Tai Court/ Hang Tai Road and Chevalier Garden Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 13.10.2015 regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

Should you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(LEE Kui-hung) for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時誘引述編號及日期

 $\Delta \equiv COM$

AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong 香港新界沙田鄉事會路138號

+852 3922 9000 tel

1 5 OCT 2015

新城市中央廣場第2座8樓 www.aecom.com

Your Ref.: (172) in FSD GR 6-5/4 R Pt. 8

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013193W

13 October 2015

By Fax (2367 3631) and Post

Fire Services Department Licensing and Certification Command 5/F, South Wing, Fire Services Headquarters Building. 1 Hong Chong Road, Kowloon, Hong Kong

Dear Sir / Madam.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Dangerous Goods, Chemical Spillage Accident and Fire Record

We refer to your letter of the above reference dated 24 February 2015 regarding the captioned subject (the copy of letter is enclosed for your ease of reference).

To facilitate our land contamination assessment under this Agreement, we would be much appreciated if you could furnish us with the following information of the Concerned Areas for our assessment. The Concerned Area (Contractor's Work Area) is located at 30 Mui Tsz Lam Road. Tai Shui Hang, Sha Tin, N.T. and is shown in enclosed Figure A.

- Current and past registered Dangerous Goods storage within the Concerned Areas (with type of dangerous goods, storage method, quantity, and licence no. / date of issue):
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas; and
- Fire records within the Concerned Areas.

We would be grateful to have your reply on or before 27 October 2015. Should you need further information, please kindly contact the undersigned at 3922 8345 or our Mr. Kelvin Chiang at 3922 9507.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau **Technical Director**

Water & Urban Development

Encl.



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (172) in FSD GR 6-5/4 R Pt. 8

來函檔號 YOUR REF. : CYKY:TXT:cfwl:60334056/5.1-2015002056W

電子郵件 E-mail

: hkfsdenq@hkfsd.gov.hk

圖文傳真 FAX NO.

: 2739 5879

: 2733 7741

話 TEL NO.

24 February 2015

AECOM Asia Co. Ltd.

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road,

Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Land Contamination Assessment with the Custom and Excise Department's Sha Tin Vehicle Detention Centre (VDC) Request for Information of Dangerous Goods & Incident Records

I refer to your letter regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

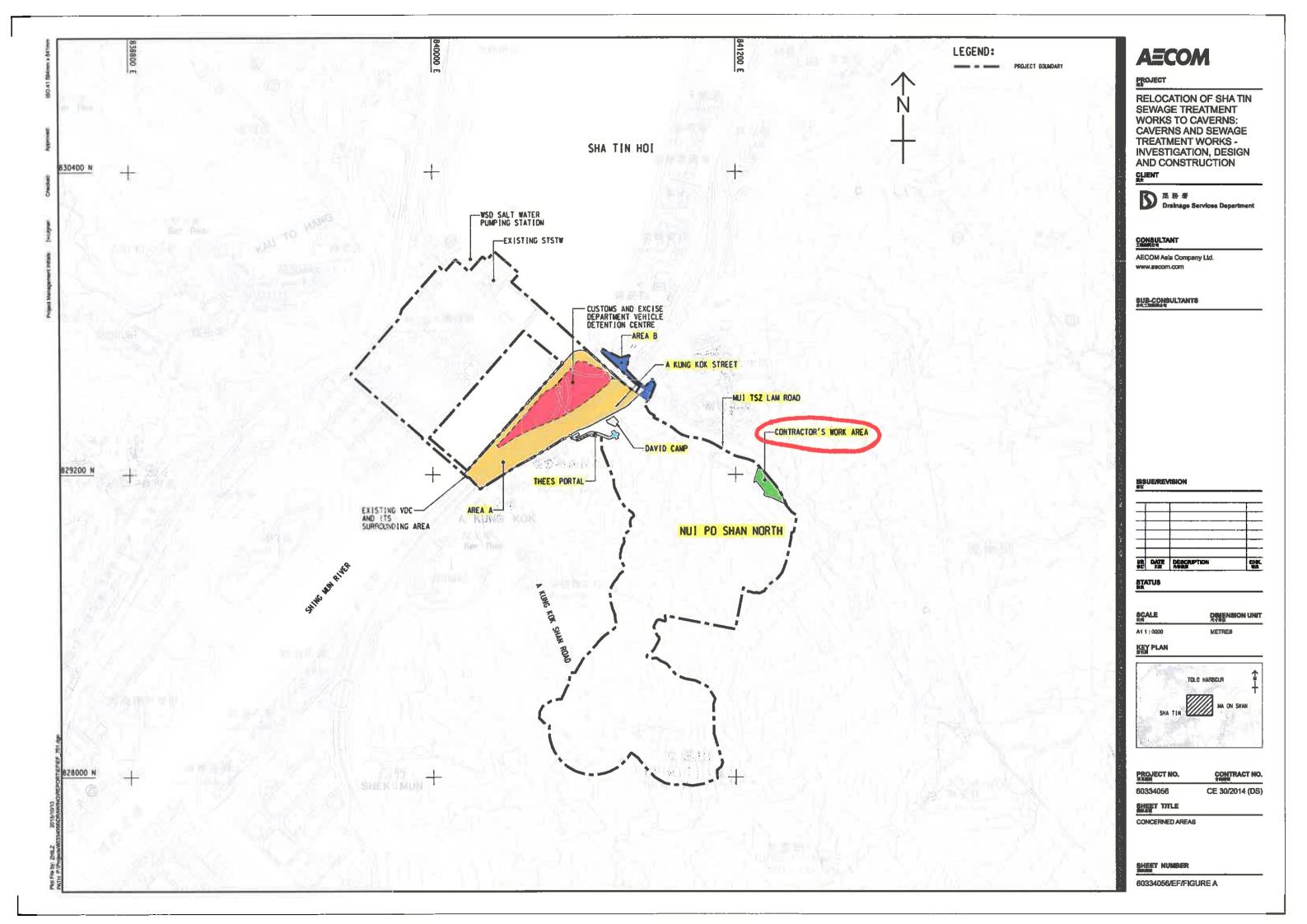
If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(WONG Ronald)

for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時請引逃編號及日期



消防處 香港九龍尖沙咀東部康莊道1號 消防總部大廈



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (188) in FSD GR 6-5/4 R Pt. 10

來函檔號 YOUR REF. : CYKY:TXT:kchy:60334056/5.1-2015013193W

電子郵件 E-mail : hkfsdeng@hkfsd.gov.hk

圖文傳真 FAX NO. : 2739 5879 電 話 TEL NO. : 2733 7741

13 November 2015

AECOM Asia Co. Ltd 8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Relocation of Sha Tin Sewage Treatment Works to Caverns:

Caverns and Sewage Treatment Works - Investigation, Design and Construction

(Contractor's Work Area, located at 30 Mui Tsz Lam Road, Tai Shui Hang, Sha Tin, NT)

Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 13.10.2015 regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

Should you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(LEE Kui-hung)
for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡 提 及 本 信 時 調 引 並 編 號 及 日 期 **AECOM**

AECOM 8/F Grand Central Plaza, Tower 2 138 Shatin Rural Committee Road Shatin, Hong Kong

www.aecom.com

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1 5 OCT 2015

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+852 3922 9797 fax

FAXED

Your Ref.: (172) in FSD GR 6-5/4 R Pt. 8
Our Ref: CVKV:TXT:kchy:60334056/5.1

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013190W

13 October 2015

By Fax (2367 3631) and Post

Fire Services Department Licensing and Certification Command 5/F, South Wing, Fire Services Headquarters Building, 1 Hong Chong Road, Kowloon, Hong Kong

Dear Sir / Madam,

Agreement No. CE 30/2014 (DS)
Relocation of Sha Tin Sewage Treatment Works to Caverns:
Caverns and Sewage Treatment Works – Investigation, Design and Construction

Request for Information of Dangerous Goods, Chemical Spillage Accident and Fire Record

We refer to your letter of the above reference dated 24 February 2015 regarding the captioned subject (the copy of letter is enclosed for your ease of reference).

To facilitate our land contamination assessment under this Agreement, we would be much appreciated if you could furnish us with the following information of the Concerned Areas for our assessment. The Concerned Area (David Camp) is located at 59A A Kung Kok Street, Ma On Shan, Sha Tin and is shown in enclosed **Figure A**.

- Current and past registered Dangerous Goods storage within the Concerned Areas (with type of dangerous goods, storage method, quantity, and licence no. / date of issue);
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas; and
- Fire records within the Concerned Areas.

We would be grateful to have your reply on or before 27 October 2015. Should you need further information, please kindly contact the undersigned at 3922 8345 or our Mr. Kelvin Chiang at 3922 9507.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau
Technical Director

Water & Urban Development

Encl.



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS BUILDING.

No.1 Hong Chong Read, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (172) in FSD GR 6-5/4 R Pt. 8

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電子郵件 E-mail

: hkfsdenq@hkfsd.gov.hk

圖文傳真 FAX NO.

: 2739 5879

話 TEL NO.

: 2733 7741

24 February 2015

AECOM Asia Co. Ltd.

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road,

Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Land Contamination Assessment with the Custom and Excise Department's Sha Tin Vehicle Detention Centre (VDC) Request for Information of Dangerous Goods & Incident Records

I refer to your letter regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

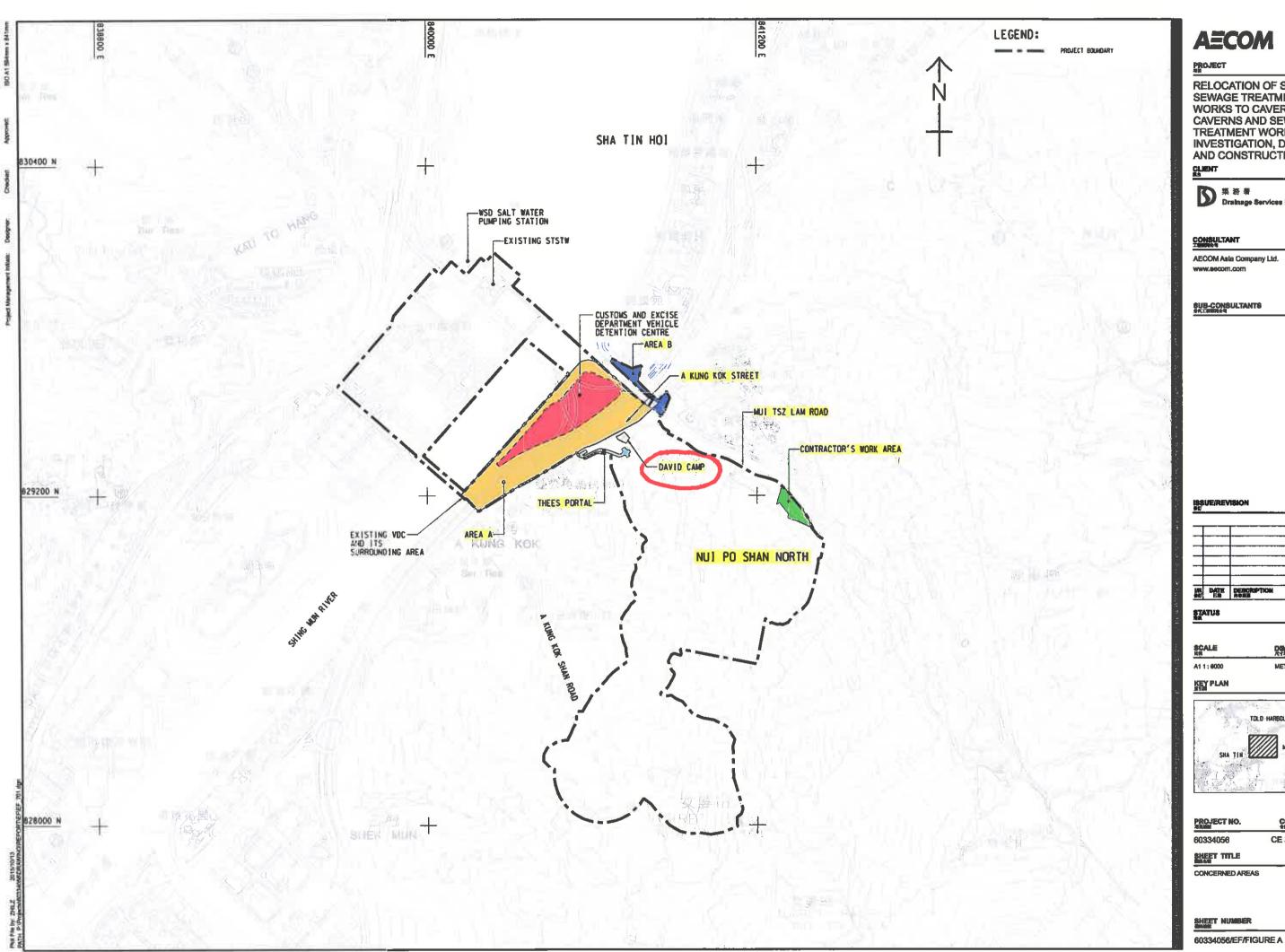
If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(WONG Ronald)

for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本倍時調引述編號及日期



AECOM

PROJECT

RELOCATION OF SHATIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS -INVESTIGATION, DESIGN AND CONSTRUCTION

築 游 看 Drainage Services Departmen

CHK.

TOLD HARBOUR

CONTRACT NO. CE 30/2014 (DS)

香港九龍尖沙咀東部康莊道!號 消防總部大廈



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADOUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (192) in FSD GR 6-5/4 R Pt. 10

來函檔號 YOUR REF. : CYKY:TXT:kchy:60334056/5.1-2015013191W

: hkfsdenq@hkfsd.gov.hk 電子郵件 E-mail

圖文傳真 FAX NO. : 2739 5879 話 TEL NO. : 2733 7741

13 November 2015

AECOM Asia Co. Ltd 8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction (undeveloped area of Nui Po Shan, located between A Kung Kok Shan Road and Mui Tsz Lam Road)

Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 13.10.2015 regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

Should you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(LEE Kui-hung) for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時調引述编號及日期

AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong

香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓 www.aecom.com

Your Ref.: (172) in FSD GR 6-5/4 R Pt. 8

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013192W

13 October 2015

By Fax (2367 3631) and Post



+852 3922 9000 tel

Fire Services Department Licensing and Certification Command 5/F, South Wing, Fire Services Headquarters Building, 1 Hong Chong Road. Kowloon, Hong Kong

Dear Sir / Madam.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Dangerous Goods, Chemical Spillage Accident and Fire Record

We refer to your letter of the above reference dated 24 February 2015 regarding the captioned subject (the copy of letter is enclosed for your ease of reference).

To facilitate our land contamination assessment under this Agreement, we would be much appreciated if you could furnish us with the following information of the Concerned Areas for our assessment. The Concerned Area (THEES Portal) is located at A Kung Kok Street and is shown in enclosed Figure A.

- Current and past registered Dangerous Goods storage within the Concerned Areas (with type of dangerous goods, storage method, quantity, and licence no. / date of issue);
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas: and
- Fire records within the Concerned Areas.

We would be grateful to have your reply on or before 27 October 2015. Should you need further information, please kindly contact the undersigned at 3922 8345 or our Mr. Kelvin Chiang at 3922 9507.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau **Technical Director**

Water & Urban Development

Encl.



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

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來函檔號 YOUR REF.: CYKY:TXT:cfwl:60334056/5.1-2015002056W

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: 2733 7741

24 February 2015

AECOM Asia Co. Ltd.

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road,

Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Land Contamination Assessment with the Custom and Excise Department's Sha Tin Vehicle Detention Centre (VDC) Request for Information of Dangerous Goods & Incident Records

I refer to your letter regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

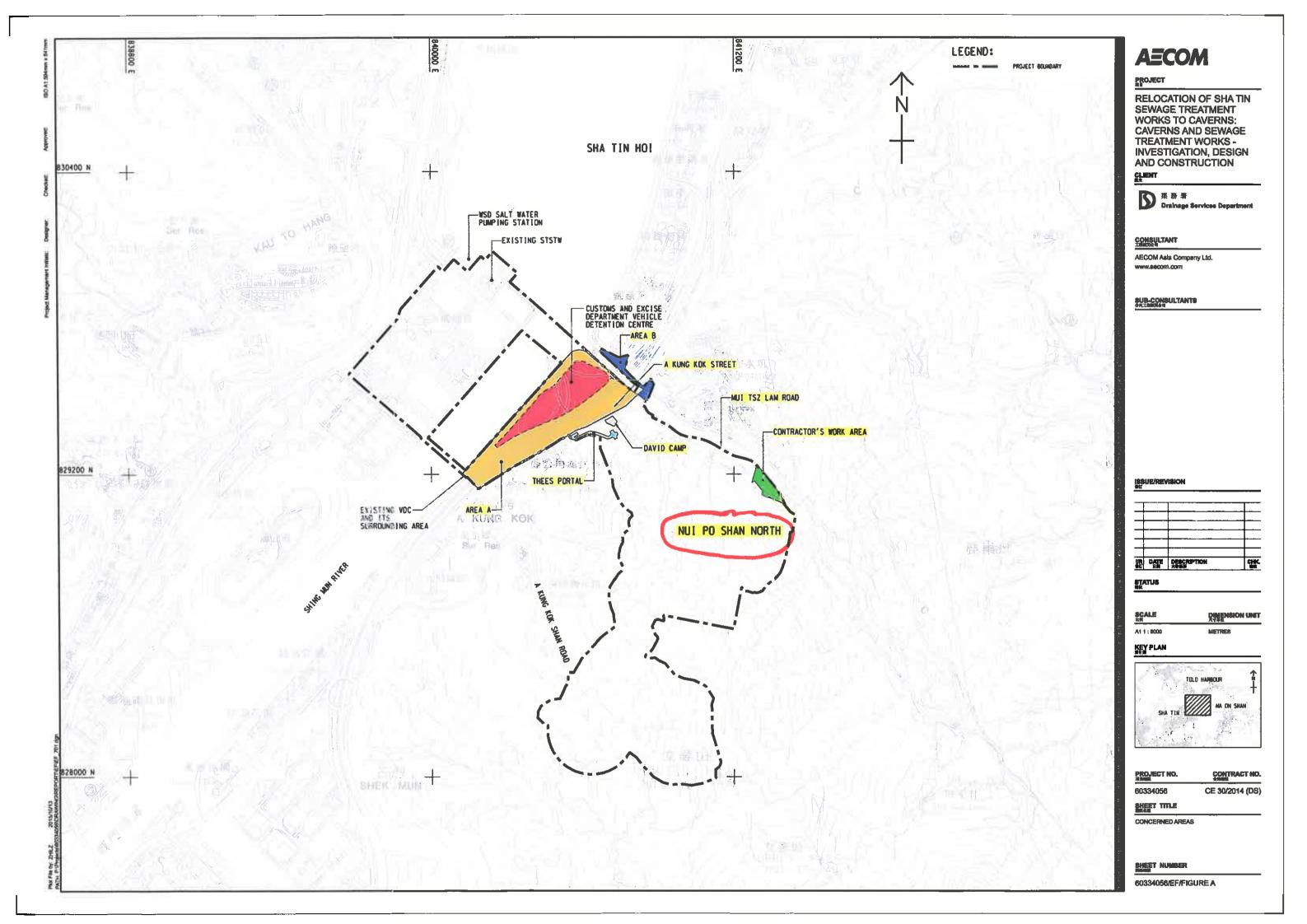
If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(WONG Ronald)

for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時調引述編號及日期



香港九龍尖沙咀東部康莊道!號 消防總部大廈



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADOUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

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: hkfsdenq@hkfsd.gov.hk 電子郵件 E-mail

圖文傳真 FAX NO. : 2739 5879 話 TEL NO. : 2733 7741

13 November 2015

AECOM Asia Co. Ltd 8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction (undeveloped area of Nui Po Shan, located between A Kung Kok Shan Road and Mui Tsz Lam Road)

Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 13.10.2015 regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

Should you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(LEE Kui-hung) for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時調引述编號及日期

AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong

香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓

www.aecom.com

Your Ref.: (172) in FSD GR 6-5/4 R Pt. 8

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013192W

13 October 2015

By Fax (2367 3631) and Post



+852 3922 9000 tel

Fire Services Department Licensing and Certification Command 5/F, South Wing, Fire Services Headquarters Building, 1 Hong Chong Road. Kowloon, Hong Kong

Dear Sir / Madam.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Dangerous Goods, Chemical Spillage Accident and Fire Record

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To facilitate our land contamination assessment under this Agreement, we would be much appreciated if you could furnish us with the following information of the Concerned Areas for our assessment. The Concerned Area (THEES Portal) is located at A Kung Kok Street and is shown in enclosed Figure A.

- Current and past registered Dangerous Goods storage within the Concerned Areas (with type of dangerous goods, storage method, quantity, and licence no. / date of issue);
- Reported accidents of spillage/leakage of chemicals within the Concerned Areas: and
- Fire records within the Concerned Areas.

We would be grateful to have your reply on or before 27 October 2015. Should you need further information, please kindly contact the undersigned at 3922 8345 or our Mr. Kelvin Chiang at 3922 9507.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau **Technical Director**

Water & Urban Development

Encl.



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS BUILDING,

No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (172) in FSD GR 6-5/4 R Pt. 8

來函檔號 YOUR REF.: CYKY:TXT:cfwl:60334056/5.1-2015002056W

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話 TEL NO.

24 February 2015

AECOM Asia Co. Ltd.

8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road,

Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Land Contamination Assessment with the Custom and Excise Department's Sha Tin Vehicle Detention Centre (VDC) Request for Information of Dangerous Goods & Incident Records

I refer to your letter regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

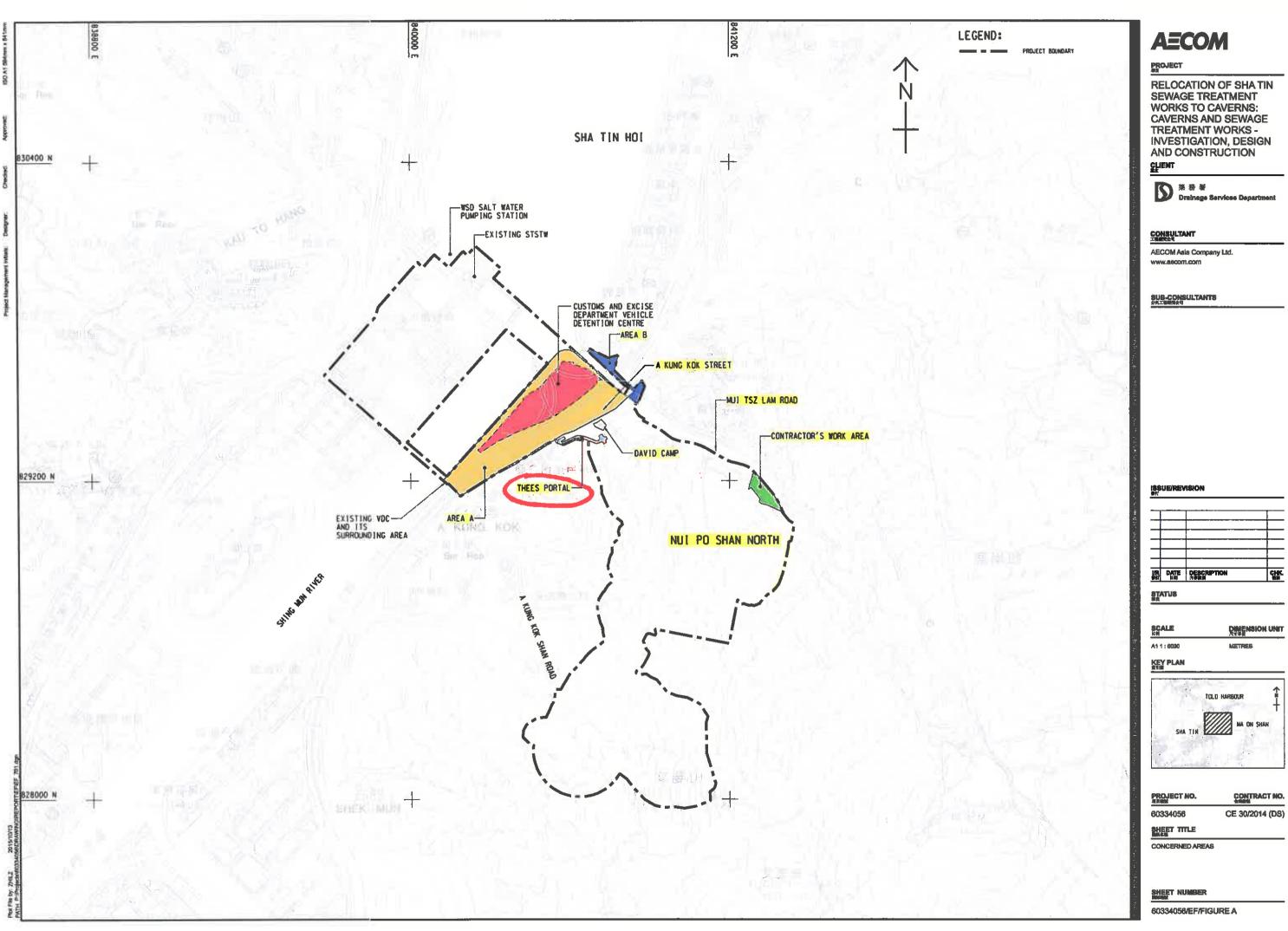
If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(WONG Ronald)

for Director of Fire Services

Ref. number and date should be quoted in reference to this letter 凡提及本信時調引述編號及日期





組	DATE 日初	DESCRIPTION	앫
П			П
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SCALE	DIMENSION UNIT
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香港九龍尖沙咀東部康莊道 1 號 消防總部大廈



FIRE SERVICES DEPARTMENT FIRE SERVICES HEADQUARTERS

BUILDING, No.1 Hong Chong Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

本處檔號 OUR REF. : (191) in FSD GR 6-5/4 R Pt. 10

來函檔號 YOUR REF. : CYKY:TXT:kchy:60334056/5.1-2015013192W

: hkfsdenq@hkfsd.gov.hk 電子郵件 E-mail

2739 5879 圖文傳真 FAX NO. 話 TEL NO. : 2733 7741

13 November 2015

AECOM Asia Co. Ltd 8/F Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong.

(Attn: Ms. Cherry YAU, Technical Director)

Dear Ms. YAU,

Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction (Thees Portal, located at A Kung Kok Street) Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 13.10.2015 regarding the captioned subject.

Please be advised that neither records of dangerous goods license nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

Should you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(LEE Kui-hung) for Director of Fire Services $\Delta = COM$

AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road Shatin, Hong Kong

香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓 www.aecom.com

Your Ref.: EPCW/D2226/753-10

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013188W

13 October 2015

+852 3922 9000 tel

By Fax (2685 1133) and Post

Environmental Protection Department Regional Office (North) 10/F, Sha Tin Government Offices, 1 Sheung Wo Che Road, Sha Tin, New Territories, Hong Kong

Attn.: Mr. Henry H W Cheng

Dear Sir.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Chemical Waste Producer and Chemical Spillage Accident

We refer to your letter of the above reference dated 10 November 2014 regarding the captioned subject. The letter is attached herewith for your ease of reference.

To facilitate our land contamination assessment under this Agreement, we would be much appreciated if you could furnish us of any reported accidents of spillage/leakage of chemicals within the following Concerned Areas. The Concerned Areas cover the areas as listed in the table and are shown in the Figure A.

Concerned Area	Address
Area A	Area adjacent to C&ED's Sha Tin Vehicle Detention Centre covering vacant land, footpaths, cycling tracks, sitting-out area and sections of A Kung Kok Street / Ma On Shan Road / Tate's Cairn Highway (please refer to Figure A for details)
Area B	Footpath, cycling track and vacant land near Kam Tai Court/Hang Tai Road and Chevalier Garden (please refer to Figure A for details)
David Camp	59A A Kung Kok Street, Ma On Shan, Sha Tin
THEES Portal	Located at A Kung Kok Street, near Ah Kung Kok Fishermen Village
Contractor's Work Area (Construction Site Office)	30 Mui Tsz Lam Road, Tai Shui Hang, Sha Tin, N.T.
Nui Po Shan North	Part of the undeveloped Nui Po Shan within the project boundary, located between Mui Tsz Lam Road and A Kung Kok Shan Road

-2-

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013188W

As per your letter, we will contact the Territory Control Office of your department separately for registry of chemical waste producers within the Concerned Areas.

We would be grateful to have your reply on or before 27 October 2015. Should you need further information, please kindly contact the undersigned at 3922 8345 or our Mr. Kelvin Chiang at 3922 9507.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau **Technical Director**

Water & Urban Development

Encl.

10-NOV-2014 10:30 FROM RO(N) EPD STGO

EPCW/D2226/753-10

TO 39229797

P.01

環境保護署 環保法規管理科 香港新界沙田 上禾瓷路一號 沙田政府合署 10 楼

CYKY:KWGH:ccm:60334056/2.1-2014013Begitahal Office (North) 電 新 TEL. NO.: 2158 5841

國文例其 FAX NO.: 2685 1155

OUR REF:

YOUR REF:

來函檔室

HOMEPAGE: http://www.epd.gov.hk/

10 November 2014

By fax only: 3922 9797

To: AECOM

8/F Grand Central Plaza. Tower 2, 138 Shatin Rural Committee Road

Shatin, N.T. (Attn: Cherry Yau)

Dear Ms Yau.

Agreement No. CE 30/2014(DS) Relocation of Sha Tin SewageTreatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction Request for Information of Chemical Waste Producer and Chemical Spillage Accident

Environmental Protection Department

Environmental Compliance Division

10/F., Shatin Government Offices,

1 Sheung Wo Che Road,

Sha Tin, New Territories,

Hong Kong.

I refer to your letter dated 30 October 2014 on the captioned.

Regarding your enquiries in the above letter, this Regional Office has no record of reported accidents of spillage / leakage of chemicals at the concerned site. You may need to check with other parties / departments for such information as appropriate.

A registry of chemical waste producers is available in the Territory Control Office of this department. Please contact Mr. Dennis Leung, Senior Environmental Protection Inspector at 2835 1027 for making an appointment to view the records.

Should you have any enquiry, you may contact the undersigned.

Yours sincerely,

(CHENG Hing Wai, Henry) for Director of Environmental Protection

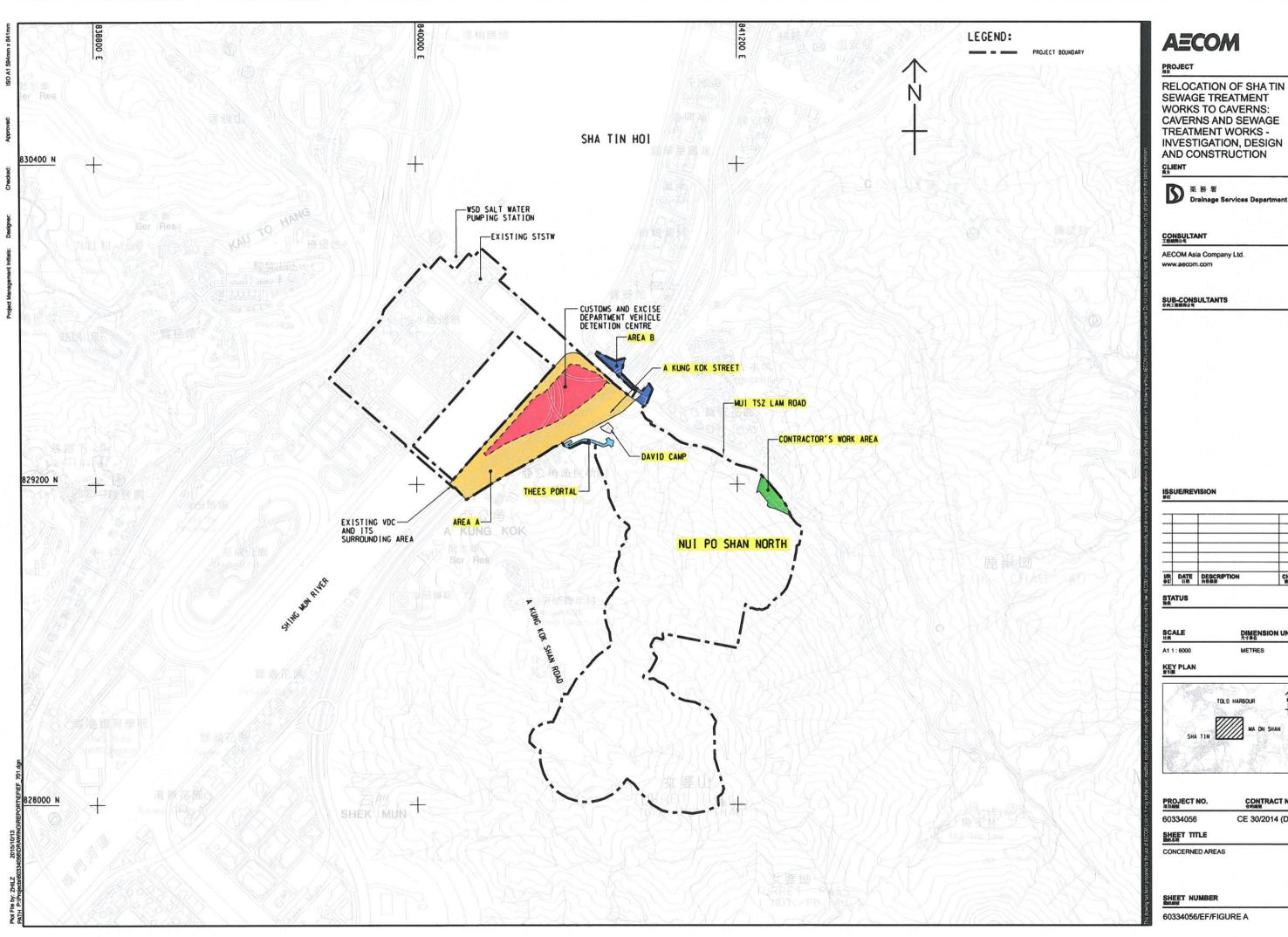
平 维 紅 RECYCLED PAPER

TOTAL P.01

10/11/2014 10:30

No.: R225 L1

P.001/001



RELOCATION OF SHATIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS -INVESTIGATION, DESIGN AND CONSTRUCTION



VR 90	DATE EM	DESCRIPTION 内容描版	СН
7			
\dashv			_

DIMENSION UNIT

TOLO HARBOUR

CONTRACT NO. CE 30/2014 (DS)

Chiang, Tsun Yat Kelvin

From: hcheng@epd.gov.hk

Sent: Wednesday, January 13, 2016 4:59 PM

To: Xie, Ting Tina

Cc: Yau, King Yee Cherry; Chiang, Tsun Yat Kelvin; Lee, King Hei Kenneth;

kiehshengty@dsd.gov.hk; Tso, Shiu Heng Lawrence

Subject: Re: FW: Agreement No. CE 30/2014 (DS) - Request for Information of Chemical Waste

Producer and Chemical Spillage Accident

Attachments: 2015013188W.pdf

Dear Tina,

This Regional Office has no record of reported accidents of spillage / leakage of chemicals at the concerned site. You may need to check with other parties / departments for such information as appropriate.

Henry CHENG EPD

"Xie, Ting Tina" < tina.xie@aecom.com>

13/01/2016 16:44

To "hcheng@epd.gov.hk" <hcheng@epd.gov.hk>

cc "kiehshengty@dsd.gov.hk" <kiehshengty@dsd.gov.hk>, "Yau, King Yee Cherry" <<u>cherry.yau@aecom.com</u>>, "Tso, Shiu Heng Lawrence" <<u>lawrence.tso@aecom.com</u>>, "Chiang, Tsun Yat Kelvin" <<u>Kelvin.Chiang@aecom.com</u>>, "Lee, King Hei Kenneth" <<u>Kenneth.KH.Lee@aecom.com</u>>

Subject FW: Agreement No. CE 30/2014 (DS) - Request for Information of Chemical Waste Producer and Chemical Spillage Accident

Dear Mr. Cheng,

Further to our email below and phone conversation last month, we have already visited the Territory Control Office of your department for the registry of chemical waste producers within the Concerned Areas (Area A, Area B, David Camp, THEES Portal, Contractor's Works Area and Nui Po Shan North as shown in attached Figure A).

As part of the land contamination assessment under this Agreement, we still need the record of reported accidents of spillage/leakage of chemicals within the concerned areas, if any, from your office. We would be much grateful if you could furnish us of any record for our study on or before 19 January 2016. Many thanks.

Regards, Tina

From: Xie, Ting Tina

Sent: Friday, November 27, 2015 3:30 PM

To: 'hcheng@epd.gov.hk'

Cc: kiehshengty@dsd.gov.hk; Yau, King Yee Cherry; Tso, Shiu Heng Lawrence; Chiang, Tsun Yat Kelvin; Lee, King

Hei Kenneth

Subject: Agreement No. CE 30/2014 (DS) - Request for Information of Chemical Waste Producer and Chemical

Spillage Accident

Agreement No. CE 30/2014 (DS)

Relocation of Sha Tin Sewage Treatment Works to Caverns:

Caverns and Sewage Treatment Works - Investigation, Design and Construction

Request for Information of Chemical Waste Producer and Chemical Spillage Accident

Dear Mr. Cheng,

Further to our letter ref. CYKY:TXT:kchy:60334056/5.1-2015013188W dated 13 October 2015 regarding the captioned subject, it is found that we have not received your reply yet. The relevant letter is attached for your easy of reference. We would be grateful to have your replies, if any, at your earliest convenience.

2

Should you have any queries, please feel free to contact me. Thanks.

Regards, Tina Xie ENGINEER, MEng, MICE D +852 3922 8334 tina.xie@aecom.com AECOM

13/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, New Territories, Hong Kong

T: +852 3922 8334 F +852 3922 9797

www.aecom.com

Sha Tin Cavern Sewage Treatment Works

CAP Appendix 2.05

Replies from Customs and Excise Department

Sha Tin Cavern Sewage Treatment Works

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AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road

Shatin, Hong Kong 香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓

www.aecom.com

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013123W

12 October 2015

By Hand & Fax (2854 3987)

Customs and Excise Department Administration and Human Resource Development Branch (AD Branch) 29/F, Customs Headquarters Building, 222 Java Road, North Point, Hong Kong



+852 3922 9000 tel

Attn.: Ms. Fanny Chan

Dear Madam,

Agreement No. CE 30/2014 (DS)

Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Contamination Assessment Plan - Request for Information on Sha Tin Vehicle Detention Centre (STVDC)

We refer to our letter ref. RCYK;CYKY;TXT;KLKH;kchy;60334056/5,1-2015010861W dated 27 August 2015 regarding the submission of captioned Contamination Assessment Plan (CAP).

Following to the above referred letter, we have received comments from Environmental Protection Department (EPD) relating to the potential land contamination concerns within the Sha Tin Vehicle Detention Centre (STVDC). The relevant EPD's comment is extracted below for your reference:

"According to Photo No. B5 in Appendix 2.03b showing the seized goods, it appears that some containers for "chemicals" were stored in open area without proper containment so that any chemicals/residues inside these containers might have the potential for causing land contamination. Please obtain written correspondence from C&ED that (i) "only" emptied containers were stored and (ii) any seized goods of containers with chemicals, fuel, oil, etc. would be "emptied" and completely "cleaned up" off-site to ensure that there are no residues of chemicals/fuel/oil inside these emptied containers before their storage in the Sha Tin Vehicle Detention Centre."

From the above, we would be grateful if you could, if appropriate, provide a written confirmation for the above underlined statement. Photo No. B5 in Appendix 2.03b of the CAP is enclosed herewith for your ease of reference.

Your assistance in this matter will be greatly appreciated. Should you have any queries, please feel free to contact the undersigned at 3922 9345 or email via cherry.yau@aecom.com.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau Technical Director Water & Urban Development

Encl.

Lee, King Hei Kenneth

fanny_lf_chan@customs.gov.hk From:

Sent: Wednesday, October 14, 2015 11:14 AM

Yau, King Yee Cherry To:

hskan@dsd.gov.hk; kiehshengty@dsd.gov.hk; Xie, Ting Tina; Cc:

candy_fk_ng@customs.gov.hk; alan_sl_wong@customs.gov.hk;

ricky kh chow@customs.gov.hk; alice_wf chan@customs.gov.hk

Re: Reminder: CE 30/2014 - Contamination Assessment Plan Subject:

2015010861W.pdf; Chemical Wastes Producers-pdf.zip **Attachments:**

Follow Up Flag: Follow up Flag Status: Flagged

Dear Ms. YAU,

I refer to your letters under reference CYKY:TXT:kchy:60334056/5.1-2015013123W dd. 27 August 2015 and 12 October 2015 in respect of the above subject and would like to provide our comments as below:

i) Re. Letter dd. 27 August 2015

Referring to Para.2.5.1.2 of the report, please note that the VDC of C&ED has the chemical producer records for used empty vehicle batteries. Copy of the record is attached.

ii) Re. Letter dd. 12 October 2015

For the containers as mentioned in the photo no. B5 in Appendix 2.03b of the above mentioned Report, I would like to clarify that only empty containers would be temporarily stored in the VDC.

Please feel free to contact me or Mr. Alan Wong at tel. 3759 3941 if you have any enquiry.

Regards Ms CHAN Lai-fan CSO(C&ED) Tel. 3759 3937

kiehshengty@dsd.gov.hk

alice wf_chan@customs.gov.hk, chlau@pland.gov.hk, fanny lf_chan@customs.gov.hk,

cherry.yau@aecom.com, hskan@dsd.gov.hk, tina.xie@aecom.com Reminder: CE 30/2014 - Contamination Assessment Plan Subject:

Dear All.

This serves as a gentle reminder. I will be appreciated if you could provide your reply letter to AECOM with copy to CE/SP on or before 15 Oct 2015. Thanks!

Raymond Ty (2594 7451)

Attachment

Environmental Protection Department 環境保護署

Waste Disposal Ordinance (Chapter 354)

香港法例第354章廢物處置條例

Waste Disposal (Chemical Waste) (General) Regulation 廢物處置(化學廢物)(一般)規例

Registration of Waste Producer

廢物產生者登記證

To: 致	Waste Producer	Full Name (English) 全 名 (英 文) Commissioner of Customs and Excise
_	廢物產生者	(Chinese) 海關關長 I.D. Card No. (if any)
		Business Reg. Cert. No. (if any) 略 業 登 記 證 號 碼: (如有者)
		Address for Correspondence 通 訳 地 址: <u>Supplies Section, 29/F., Customs Headquarters Building, 222 Java Road, North Point,</u> H.K.
		Fax No. 電話: 3759 3941 國文傳真: 2854 3987
	Producer un	e to your application dated 05 / 10 / 2012 for registration as a Wast ler the Waste Disposal (Chemical Waste) (General) Regulation, the Waste Producer Number, $\frac{1}{2} - \frac{7}{5} = \frac{6}{6} - \frac{13}{6} = \frac{10}{6} = \frac{10}{11}$ is assigned to you in respect of the location or premises
		年 10 月 05 日根據廢物處置(化學廢物)(一般)規例而來信,申請登記爲廢物產生者,茲特配
	Location or Premises where the waste is produced 產生廢物 的地點或	Name of Establishment 機 構 名 稱:Customs and Excise Department Business Reg. Cert. No. (if any) 商 業 登 記 證 號 碼: (如有者)
	樓字 	Address 39 Hang Tai Road, Tai Shui Hang, Shatin, N.T. 地址: Tel. No. 2647 1895 Fax No. 2707 4026 電話: 圖文傳真: (Capacity)
		解 名 人: (全 名) Mr. LAI Mau-yee (職 位) Supplies Supervisor I (CHENG Hing-wai, Henry) for Director of Environmental Protectic 環境保護署署長 (鄭慶偉 代行) Date

Any registered waste producer who fails to inform the Director of Environmental Protection of any change in his registration particulars commits an offence and is liable on conviction to a fine of \$10,000. 任何已登記的廢物產生者,若其登記資料有任何改變而不知會環境保護署署長,即屬違法,被定罪者最高罰款 港幣10,000元。

EPD 130

A=COM

AECOM 8/F Grand Central Plaza, Tower 2 +852 3922 9797 fax 138 Shatin Rural Committee Road

+852 3922 9000 tel

Shatin, Hong Kong 香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓 www.aecom.com

Our Ref.: CYKY:TXT:KLKH:kchy:60334056/5.1-2015013850W

27 October 2015

By Hand & Fax (2854 3987)

Customs and Excise Department Administration and Human Resource Development Branch (AD Branch) 29/F, Customs Headquarters Building, 222 Java Road, North Point, Hong Kong



Attn.: Ms. Fanny Chan

Dear Madam.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works - Investigation, Design and Construction

Contamination Assessment Plan - Request for Information on Sha Tin Vehicle Detention Centre (STVDC)

We write further to our previous letter under ref.CYKY:TXT:kchy:60334056/5.1-2015013123W dated 12 October 2015 for captioned subject and your responses via email dated 14 October 2015 (a copy of relevant correspondences is enclosed for your easy of reference).

As per your responses via email, it was noted that the spent batteries were produced from STVDC. In this connection, we would be grateful if you could furnish us with more information as below:

- 1. The handling process (storage/collection/transportation/disposal) of spent batteries once they were produced within STVDC;
- 2. The existing/pervious/temporary storage area(s) provided for the spent batteries within STVDC,
 - the secondary containment provided for the area(s) (e.g. bund walls and floors), if any.
 - the relevant records describing the condition and location of the storage areas.
- The past record of battery leakage within STVDC, if any;
- 4. The licensed chemical waste collector hired for collection and delivery of the spent batteries from
- 5. Please confirm if the vehicle batteries were emptied before entering STVDC and free from battery

Your assistance in this matter will be greatly appreciated. Should you have any queries, please feel free to contact the undersigned at 3922 9345 or email via cherry.yau@aecom.com.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau **Technical Director**

Water & Urban Development

Encl.

CE/SP, DSD - Attn.: Mr. S. K. Wong

(w/e)

Enclosure: Referent Correspondence

Xie, Ting Tina

From:

fanny_lf_chan@customs.gov.hk

Sent:

Wednesday, October 14, 2015 11:14 AM

To: Cc: Yau, King Yee Cherry hskan@dsd.gov.hk; kiehshengty@dsd.gov.hk; Xie, Ting Tina;

candy_fk_ng@customs.gov.hk; alan_sl_wong@customs.gov.hk;

ricky_kh_chow@customs.gov.hk; alice_wf_chan@customs.gov.hk Re: Reminder: CE 30/2014 - Contamination Assessment Plan

Subject: Attachments:

2015010861W.pdf; Chemical Wastes Producers-pdf.zip

Follow Up Flag:

Follow up

Flag Status:

Completed

Dear Ms. YAU,

I refer to your letters under reference CYKY:TXT:kchy:60334056/5.1-2015013123W dd. 27 August 2015 and 12 October 2015 in respect of the above subject and would like to provide our comments as below:

i) Re. Letter dd. 27 August 2015

Referring to Para.2.5.1.2 of the report, please note that the VDC of C&ED has the chemical producer records for used empty vehicle batteries. Copy of the record is attached.

ii) Re. Letter dd. 12 October 2015

For the containers as mentioned in the photo no. B5 in Appendix 2.03b of the above mentioned Report, I would like to clarify that only empty containers would be temporarily stored in the VDC.

Please feel free to contact me or Mr. Alan Wong at tel. 3759 3941 if you have any enquiry.

Regards Ms CHAN Lai-fan CSO(C&ED) Tel. 3759 3937

From: <u>kiehshengty@dsd.gov.h</u>

o: alice wf chan@customs.gov.hk, chlau@pland.gov.hk, fanny lf chan@customs.gov.hk,

Cc: cherry.yau@aecom.com, hskan@dsd.gov.hk, tina.xie@aecom.com

Date: 12/10/2015 11:04

ubject: Reminder: CE 30/2014 - Contamination Assessment Plan

Dear All,

This serves as a gentle reminder. [will be appreciated if you could provide your reply letter to AECOM with copy to CE/SP on or before 15 Oct 2015. Thanks!

Raymond Ty (2594 7451) SPD, DSD Environmental Protection Department 環境保護署

Waste Disposal Ordinance (Chapter 354)

香港法例第354章廢物處置條例

Waste Disposal (Chemical Waste)(General) Regulation

廢物處置(化學廢物)(一般)規例

Registration of Waste Producer 感動素性多學記錄

-					
o: 政	Waste Producer	Full Name (English) 全 名 (英 文)	Commissioner of Cust	oms and Excise	
	廢物產生者	(Chinese) 海關關長 (中 文)			No. (if any) 碼 :(如有者)
		Business Reg. Cert. No. (if a 爾業登記證號碼: (如	ny) 口有者)		
		Address for Correspondence 通 訳 地 址: Supplies Sec H.K.	e ction, 29/F., Customs H	eadquarters Buildi	ng, 222 Java Road, North Point,
		Tel. No. 電 話: 375	9 3941	Fax No. 圖文傳真:	2854 3987
Producer u WPN 0 (listed below 前於 201		112 7 5 6 C 3 7 6 0 年10 月05 日 根據廢物	emical Waste) (General) — 0 1 is assigned	d to you in respec 現例而來信・申請3	
	Location or Premises where the waste is produced 產生廢物 的地點或 樓字	Name of Establishment	Customs and Excise De	epartment	
		地址:	oad, Tai Shui Hang, Sh		
		Tel. No.		Fax No.	
		電 話:26	347 1895	圖文傳真: ————————————————————————————————————	2707 4026



(CHENG Hing-wai, Henry)
for Director of Environmental Protection 環境保護署署長 (鄭慶偉 代行)

Date 日期	9		10		2012
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WARNING: Any registered waste producer who falls to inform the Director of Environmental Protection of any change in his registration particulars commits an offence and is liable on conviction to a fine of \$10,000. 任何已登記的廢物產生者,若其登記資料有任何改變而不知會環境保護署署長、即屬違法,被定罪者最高罰款 淮幣10.000元。

EPD 130

AECOM

AECOM 8/F Grand Central Plaza, Tower 2 138 Shatin Rural Committee Road

Shatin, Hong Kong 香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓 WWW.88COM.COM

Our Ref.: CYKY:TXT:kchy:60334056/5.1-2015013123W

12 October 2015

By Hand & Fax (2854 3987)

Customs and Excise Department
Administration and Human Resource
Development Branch (AD Branch)
29/F, Customs Headquarters Building,
222 Java Road, North Point, Hong Kong

FAXED

+852 3922 9000 tel

+852 3922 9797 fax

Attn.: Ms. Fanny Chan

Dear Madam.

Agreement No. CE 30/2014 (DS)
Relocation of Sha Tin Sewage Treatment Works to Caverns:
Caverns and Sewage Treatment Works – Investigation, Design and Construction

<u>Contamination Assessment Plan - Request for Information on Sha Tin Vehicle Detention Centre (STVDC)</u>

We refer to our letter ref. RCYK:CYKY:TXT:KLKH:kchy:60334056/5.1-2015010861W dated 27 August 2015 regarding the submission of captioned Contamination Assessment Plan (CAP).

Following to the above referred letter, we have received comments from Environmental Protection Department (EPD) relating to the potential land contamination concerns within the Sha Tin Vehicle Detention Centre (STVDC). The relevant EPD's comment is extracted below for your reference:

"According to Photo No. B5 in Appendix 2.03b showing the seized goods, it appears that some containers for "chemicals" were stored in open area without proper containment so that any chemicals/residues inside these containers might have the potential for causing land contamination. Please obtain written correspondence from C&ED that (i) "only" emptied containers were stored and (ii) any seized goods of containers with chemicals, fuel, oil, etc. would be "emptied" and completely "cleaned up" off-site to ensure that there are no residues of chemicals/fuel/oil inside these emptied containers before their storage in the Sha Tin Vehicle Detention Centre."

From the above, we would be grateful if you could, if appropriate, provide a written confirmation for the above underlined statement. Photo No. B5 in Appendix 2.03b of the CAP is enclosed herewith for your ease of reference.

Your assistance in this matter will be greatly appreciated. Should you have any queries, please feel free to contact the undersigned at 3922 9345 or email via cherry.yau@aecom.com.

Yours faithfully, for and on behalf of AECOM Asia Co. Ltd.

Cherry Yau

Technical Director

Water & Urban Development

Engl.

04-NOV-2015 11:52 FROM C&ED SUPPLIES SECTION

否港海關

香港北角液華道222號

海關總部大樓29字樓

物料供應組

HONG KONG
CUSTOMS & EXCISE DEPARTMENT
SUPPLIES SECTION
29/F, Customs Headquarters Building,
222 Java Road,
North Point, Hong Kong

TO 39229750

Our Ref.

: (32) in OFA SO/S/4S Pt.12

Our Tel. No. Our Fax No. : (852) 3759 3937 : (852) 2854 3987

> <u>By Fax</u> (Fax: 3922 9797) 39229750

P.001

4 November 2015

AECOM Asia Co. Ltd. 8/F Grand Central Plaza, Tower 2 138 Shatin Rural Committee Road Shatin, Hong Kong (Attn: Ms Cherry YAU)

Dear Ms YAU.

Agreement No. CE 30/2014 (DS) Relocation of Sha Tin Sewage Treatment Works to Caverns: Caverns and Sewage Treatment Works – Investigation, Design and Construction

Contamination Assessment Plan Request for Information on Sha Tin Vehicle Detention Centre (STVDC)

I refer to your letter under reference CYKY:TXT:KLKH:kchy:60334056/5,1-2015013850W of 27 October 2015 in respect of the above subject.

One lot of spent batteries was collected at STVDC by EPD's licensed chemical waste collector in Year 2012. No past records of battery leakage occurred within STVDC. For your information, apart from those vehicle batteries installed in the vehicles, STVDC do not keep detached vehicle batteries with battery solution.

..../2

#2266-001

NOV.04.2015 10:28 RECEIVED FROM: +85228543987

04-NOV-2015 11:52 FROM C&ED SUPPLIES SECTION

TO 39229750

P.002

2 -

In case you have any further enquiry, please feel free to contact me or Mr. Alan WONG at 3759 3941.

Yours sincerely,

(Ms CHAN Lai-fan)
for Commissioner of Customs and Excise

c.c. CE/SP, DSD Fax No.: 2827 8700

> TOTAL P.002 #2266-002

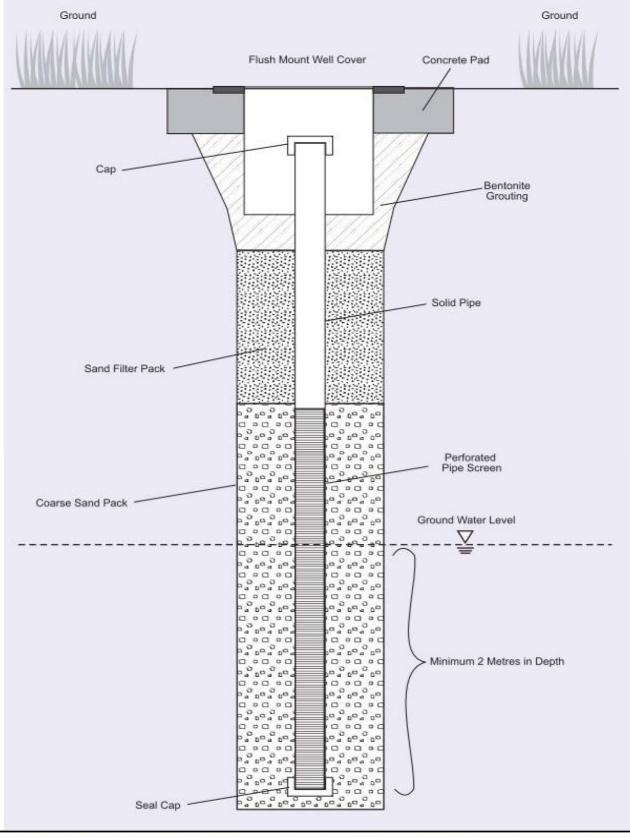
Sha Tin Cavern Sewage Treatment Works

CAP Appendix 3.01

Typical Design of a Groundwater Monitoring Well

Sha Tin Cavern Sewage Treatment Works

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AGREEMENT NO. CE 30/2014 (DS) - RELOCATION OF SHA TIN SEWAGE TREATMENT WORK TO CAVERNS:

CAVERNS AND SEWAGE TREATMENT WORKS - IDC

TYPICAL DESIGN OF GROUNDWATER WELL

SCALE	N.T.S.	DATE	25/11/2014		
CHECK	LUKHYL	DRAWN	LEETH		
JOB NO.		APPEND	IX.	Rev	
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Sha Tin Cavern Sewage Treatment Works

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

Chemical	R		Soil Saturation		
	Urban Residential (mg/kg)	Rural Residential (mg/kg)	Industrial (mg/kg)	Public Parks (mg/kg)	Limit (C _{sat}) (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	0.002.01	0.002 - 01	1,202 - 00	1,002-01	1,002 - 02
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	2.002100
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	
	1.80E+03				
Benzo(g,h,i)perylene		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	4 00= 00	4.00=.00	5.005.00	4.00=.00	
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					
		2.18E+01	1.96E+02	7.35E+01	

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

	Risk-Based F	Solubility Limit			
Chemical	Urban Residential (mg/L)	Rural Residential (mg/L)	Industrial (mg/L)	(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	1,122 - 02	11002 - 01	1,072.00	11702.02	
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	
	1.41E+03 1.00E+04*	1.00E+04*			
Anthracene	1.00=+04"	1.000=+04"	1.00E+04*	4.34E-02	
Benzo(a)anthracene					
Benzo(a)pyrene	E 00E 04	2.005.04	7.505.00	4.505.00	
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	4.00=.01	1045.01	0.705.00		
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	
	1.20LTUI	7.33∟₹00	1.701-02	2.00ET00	
Other Inorganic Compounds					
Cyanide, free					
Organometallics					
TBTO		ı			

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.

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.