

Your Ref : (8) in EP2/N7/A/52 Ax(1) Pt.12
Our Ref : (CV/2012/09)/M45/200/(D01502)

8 August 2014

By Hand

Environmental Impact Assessment Ordinance Register Office
Environmental Protection Department
27/F, Southorn Centre,
130 Hennessy Road,
Wanchai, Hong Kong

Attn.: Mr. Charles Pang

Dear Sir,

Contract No. CV/2012/09
Liantang / Heung Yuen Wai Boundary Control Point
Site Formation and Infrastructures – Contract 3

Environmental Permit No. EP-404/2011/A
Condition 3.4 – Revised Contamination Assessment Plan (CAP)
– Fanling (Rev.3)

I refer to your above referenced letter dated 13 June 2014 and email to our Mr. Perry Yam dated 11 July 2014 enclosing comments on our revised CAP – Fanling (Rev. 2) submitted on 20 May 2014.

On behalf of the Permit Holder, Civil Engineering and Development Department (CEDD), I would like to submit under Condition 3.4 of the Environmental Permit (EP) No. EP- 404/2011/A, three hard copies of the revised CAP – Fanling (Rev.3) certified by the ET Leader and verified by the IEC for your approval. Please be advised that your comments have been addressed in the revised submission.

Should you have any queries, please contact the undersigned or our Mr. Perry Yam at 2171 3350.

Yours faithfully,



Alan Lee
Senior Resident Engineer
AECOM Asia Co. Ltd.

Encl.

c.c. CEDD/BCP	- Attn: Mr. Chris Wong/ Mr. Desmond Lam	- 1 hard copy
AECOM	- Attn: Mr. Francis Leong	- 1 CD copy
SMEC(IEC)	- Attn: Mr. Anthony Wong	- 1 CD copy
AUES(ET)	- Attn: Mr. T. W. Tam	- w/o

CTW/AL/GW/PY/LOR/tps



JOB No.: TCS00670/13

**AGREEMENT NO. CE 45/2008 (CE)
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT AND ASSOCIATED WORKS**

**REVISED CONTAMINATION ASSESSMENT PLAN (CAP) –
FANLING**

**PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT (CEDD)**

Quality Index

Date	Reference No.	Prepared By	Certified By
30 July 2014	TCS00670/13/600/R00163	 Ben Tam (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Rev.	Date	Description
1	14 April 2014	First submission
2	19 May 2014	Amended against IEC comment on 23 April 2014
3	30 July 2014	Amended against EPD comment on 13 June 2014 and 11 July 2014

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6 August 2014

Our ref: 7076192/L16551/Ry/AB/AW/WM/rw
Your ref:

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

By Email & Post

Attention: Mr Alan LEE

Dear Sir

Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Contract No. CV/2012/09
Revised Contamination Assessment Plan – Car and Furniture Workshops in Fanling (Rev. 3)

With reference to the Revised Contamination Assessment Plan – Car and Furniture Workshops in Fanling (Revision 3) certified by the ET Leader provided to us on 5 August 2014, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 3.4 of the Environmental Permit No. EP-404/2011/A.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Ms Winnie MA on tel. 3995 8138 or by email to winnie.ma@smec.com.

Yours faithfully
For and on behalf of
SMEC Asia Limited



Antony WONG
Independent Environmental Checker

cc	CEDD/BCP	-	Mr Desmond LAM / Mr Pui Sang LI	by fax: 2714 0103
	AECOM	-	Mr Francis LEONG / Mr Perry YAM	by email
	AUES	-	Mr TW TAM	by email

Item	EPD’s comment	Response to comment
i)	Section 1.5:- AUES has been appointed as the Specialist to <u>carry out</u> land contamination assessment including site supervision, <u>chemical analysis</u> and the related report submission. Please clarify how to carry out the chemical analysis.	The land contamination specialist will appoint a HOKLAS-accredited laboratory, ALS, for carrying out the chemical analysis. Please refer to Section 1.5.
ii)	Section 1.7:- According to Section 1.7, this CAP has incorporated the detailed information e.g. site background and geology and hydrogeology, etc., however, information on geology and hydrogeology are missing.	Sections 2.10 to 2.14 have been added to provide information on geology and hydrogeology.
iii)	Section 3:- The proposed sampling points provided in the approved EIA report (e.g. Table 4.1) should be presented in this revised CAP.	Noted and Table 3-1 provided.
iv)	Section 3.6:- Please provide the full name for “ER”.	The full name of “ER”, the Engineer’s Representative, has been provided.
v)	Section 3.7:- please clarify why sampling points in the working area of spraying furniture are not required. In addition, the location of the proposed sampling point (FW-01) should be marked on the respective photographs in Appendix D (e.g. Photo 3 – Chemicals materials storage location).	Section 3.7 (now Section 3.4) has been updated as “ <i>According to the site observation on 3 April 2014, ground surface of the workshop was paved with concrete and no surface crack on the concrete surface was observed. Moreover, only a few chemicals for painting including spray paint and solvent were stored for minor furniture maintenance, and no other kinds of chemicals were used in the working area in the past as advised by the operator. Considering the risk of contaminating the land of the furniture workshop should be very low, therefore, one sampling point is proposed at the chemical storage area of the furniture workshop (see Photo 3 of Appendix D)</i> ”.
vi)	Section 3.8:- please provide further information on each of the proposed sampling locations (e.g. oil stain) and confirm that the proposed sampling locations covering the potential land contamination hot spots of Photos no. 10 to 16 in Appendix D. In addition, the location of the proposed sampling points (CW-1, CW-2 and CW-3) should be marked on the respective photographs in Appendix D (e.g. Photo 13 – Oil stain observed at chemical storage location).	Section 3.8 (now Section 3.5) has been updated as “ <i>Based on site visit observation on 3 April 2014, vehicle repair and maintenance work areas occupy about 1/3 area (about 110m²) of whole car workshop. Repair and maintenance operation location is in the East part of the car workshop and paved with concrete (see Photos 16 and 17 of Appendix D). No surface crack observed on the concrete surface. Within the repair and maintenance operation area, several lube empty bottles observed was temporary stored (see Photo 15 of Appendix D). Moreover, obvious oil stains was observed at the car workshop boundary near entrance (see Photos 13 and 14 of Appendix D). In addition, chemicals waste i.e. lube oil empty bottles and general wastes were found disposed in front of the entrance (see Photos 10 and 11 of Appendix D). Hence, five hot spot locations; one at repair and maintenance operation area; one at temporary empty lube bottle storage location; two at the assessment site entrance; and one at the obvious oil stain area, are proposed at the car repair workshop for soil sampling to carry out the land contamination assessment.</i> ” Appendix E – the proposed sampling location is also updated.

Item	EPD’s comment	Response to comment
vii)	Table 3-3:- Same as (v) and (vi) above, further information (e.g. oil stain) of the sampling points should be provided.	Table 3-3 (now Table 3-2) has been updated.
viii)	Section 3.14:- According to Item 10 of Observations of the “Site Walkover Checklist for Land Contamination Assessment” (Appendix G) of the Car Repair Workshop, the site may have equipment which might contain polychlorinated biphenyls (PCBs). Please clarify why PCBs in not included.	“Section 3.14” is updated as “Section 3.11”. Polychlorinated biphenyls (PCBs) has incorporated for chemicals analysis.
ix)	Section 3.15:- According to Section 1.5, AUES has been appointed as the Specialist to carry out land contamination assessment including site supervision. However, as mentioned in Section 3.15, pit excavation will be supervised by Resident Engineer to ensure that no cross contamination or any other forms of interference. Please clarify.	Section 3.15, now Section 3.12, has been amended as “ <i>Soil sampling by pit excavation is recommended. During investigation, pit excavation will be supervised by a land contamination specialist and Resident Engineer to ensure that no cross contamination or any other forms of interferences. Moreover, a land contamination specialist would be also responsible to monitor and supervise all the soil and water sampling.</i> ”
x)	Tables 3-4 and 3-5:- The names of chemicals/parameters used should be consistent with our guidelines throughout the report, e.g. “Total Petroleum Hydrocarbons (TPH)” should read as “Petroleum Carbon Ranges”. The proposed testing parameter, Acetone is missing. The figures of reporting limits of “Petroleum Carbon Ranges” should be in µg/L for groundwater. Please also check and proofread the reporting limits shown in Table 3-4.	Tables 3-4 and 3-5 (now Tables 3-3 and 3-4) has been checked and amended. Table 3-6 (now Table no. 3-5) has also been revised.
xi)	Section 4.2 & 4.3:- “BETX” should read as “BTEX” and individual chemical names should be provided.	Noted and amended. Chemical name of BTEX including Benzene, Toluene, Ethylbenzene and Xylenes (total), has been incorporated.
xii)	Section 4:- To avoid any confusion, please state the number of all samples to be collected for laboratory testing, including QA/QC samples, duplicate samples, blank samples, etc.	The number of trip blank depends on groundwater delivery event. The number of field blank sample collection depends on the number of days of groundwater sampling. Two duplicate soil samples and one duplicate groundwater sample are predicted for each area. Moreover, two equipment blank samples are predicted for each area. The statement has been incorporated in relevant sections. Table 4-1 is added to summarise the QA/QC sample collection.
xiii)	Appendix D:- Figure: Photograph Record Location:- A detailed layout plan indicating the extent of the premises, structures and facilities for the activities should be provided.	Extra four photographs (Photo 19 to 22) related to the extent of the premises has been added in Appendix D . The Figure: Photograph Record Location has also been updated.

Response to further comments given by EPD via email on 11 July 2014

Item	EPD' Further Comment	Reponses to Further Comment
i	Section 1.5:- "HOLAS" should read as "HOKLAS"	Noted and amended.
ii	Section 2.14:- Please clarify the figure and provide the references for the statement "the average year rainfall recorded between 1986 and 2013 at Fanling is about 1,841.7 mm."	The average year rainfall recording is extracted from Hong Kong Observatory Ta Kwu Ling Station. Section 2.14 has been revised to clarify that the information is extracted from Ta Kwu Ling station.
iii	Section 3.9 and Table 3-2:- Please clarify whether the "obvious stain area" is the same location as "Chemical Storage Location" listed in Table 3-2. If affirmative, please use the same names in Section 3.9 and the "Location of Sampling Point" listed in Table 3-2 to avoid confusion.	"Chemical Storage Location" listed in Table 3-2 is the same location as "obvious oil stains area" described in Section 3.9. The description of sampling point CW-3 has been amended as " <i>Observed Obvious oil stains location</i> " to avoid confusion.
iv	Section 3.15:- The consultants should include the justification why PCBs was also chosen as one of the potential contaminants in this section (e.g. the site may have equipment which might contain PCBs).	A new sentence " <i>Furthermore, the site may be contaminated with PCBs as coming from equipment</i> " has been added in Section 3.15 (now Section 3.11) to explain why PCBs analysis is required.
v	Table 3-3:- Please provide the remaining part of the table to show the method used and proposed reporting limits for PCBs.	Noted and amended.
vi	Table 3-4:- The consultants should clarify the "Report Limit" for C6-C8 of PCRs.	The testing laboratory confirmed that the "Report Limit" for C6-C8 of Petroleum Carbon Ranges is 5mg/kg for soil and 20µg/L for water. Table 3-3 and Table 3-4 have been amended. The full set "Report Limit" provided by ALS is enclosed.
vii	Table 4-1:- In addition to the QA/QC samples, the consultants should also list out the proposed numbers of soil/groundwater samples to be collected and analyzed. The chemical testing to be conducted should also be indicated for each of the samples.	Table 4-1 has been amended to include the proposed numbers of soil/water samples to be collected from both assessment sites.
viii	Appendix D:- The consultants did not address our previous comment (xiii) dated 13 June 2014. The areas of the following land uses should be clearly indicated on the "Figure: Photograph Record Location", e.g. repair and maintenance operation location, chemical storage area, temporary storage location, etc..	Appendix D " <i>Figure: Photograph Record Location</i> " has updated.



Analytical Charges

RBRG: Land Contamination

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limit			Unit Cost (HK\$)
			Soil (mg/kg)	Ground Water (µg/L)	Blanks (µg/L)	
Metals						
Lead	EG020*	USEPA6020	1	NR [@]	1	
Antimony			1	NR [@]	1	
Arsenic			1	NR [@]	10	
Barium			1	NR [@]	1	
Cadmium			0.2	NR [@]	0.2	
Cobalt			1	NR [@]	1	
Copper			1	NR [@]	1	
Manganese			1	NR [@]	1	
Molybdenum			1	NR [@]	1	
Nickel			1	NR [@]	1	
Tin			1	NR [@]	1	
Zinc			1	NR [@]	10	
Mercury			EG036*	APHA3112B	0.2	
Chromium III [^]	EG049*	By Calculation	1	NR [@]	20	
Chromium VI	EG3060* in soil EG050* in water	USEPA3060 APHA 3500 Cr: D	1	NR [@]	20	
Volatile Organic Compounds						
Acetone	EP074SR*	USEPA 8260	50	500	500	
Benzene			0.2	5	5	
Bromodichloromethane			0.1	5	5	
2-Butanone			5	50	50	
Chloroform			0.04	5	5	
Ethylbenzene			0.5	5	5	
Methyl tert-Butyl Ether			0.5	5	5	
Methylene Chloride			0.5	50	50	
Styrene			0.5	5	5	
Tetrachloroethene			0.04	5	5	
Toluene			0.5	5	5	
Trichloroethene			0.1	5	5	
Xylenes (sum of meta & para, ortho)			2	20	20	
Petroleum Carbon Ranges (PCR)						
C6 - C8	EP071HK_SR*	USEPA 8015/8260	5	20	20	
C9 – C16			200	500	500	
C17 – C35			500	500	500	

*The laboratory is HOKLAS accredited for the in-house method as quoted. The relevant method references are as listed.

[^] Chromium III = Total Chromium – Chromium VI

[@] NR = Not required

** QC groundwater sample shall be conducted Hg testing.



2) RBRG: Land Contamination

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limit			Unit Cost (HK\$)
			Soil (mg/kg)	Ground Water (µg/L)	Blanks (µg/L)	
Semivolatile Organic Compounds						
Acenaphthene	EP076HK*	USEPA 8270	0.5	2	2	
Acenaphthylene			0.5	2	2	
Anthracene			0.5	2	2	
Benzo(a)anthracene			0.5	NR [®]	2	
Benzo(a)pyrene			0.5	NR [®]	2	
Benzo(b)fluoranthene			0.5	1	1	
Benzo(k)fluoranthene			0.5	NR [®]	2	
Benzo(g,h,i)perylene			0.5	NR [®]	2	
Bis(2-Ethylhexyl)phthalate			5	NR [®]	2	
Chrysene			0.5	1	1	
Dibenzo(a,h)anthracene			0.5	NR [®]	2	
Fluoranthene			0.5	2	2	
Fluorene			0.5	2	2	
Hexachlorobenzene			0.2	4	4	
Indeno(1,2,3-cd)pyrene			0.5	NR [®]	2	
Naphthalene			0.5	2	2	
Phenanthrene			0.5	2	2	
Phenol			0.5	NR [®]	2	
Pyrene	0.5	2	2			
Total PCBs	EP066*	USEPA8270	0.1	1	1	
Free Cyanide	EK025MD	APHA 4500CN:B,C, E & I	1	NR [®]	0.01 mg/L	

*The laboratory is HOKLAS accredited for the in-house method as quoted. The relevant method references are as listed.

[^] Chromium III = Total Chromium – Chromium VI

[®] NR = Not required

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1 INTRODUCTION

- 1.1 **Liantang/Heung Yuen Wai Boundary Control Point and Associated Works** (hereinafter called “The Project”) is a Designated Projects (DPs) under the Environmental Impact Assessment (EIA) Ordinance. In accordance with the EIA Ordinance (EIAO), an EIA report for the Project was approved and an Environmental Permit (EP) EP-414/2011 was issued by the Director of Environmental Protection (DEP) before construction and operation of the Project. The Project Layout Plan is enclosed in *Appendix A*.

LAND CONTAMINATION DURING EIA STUDY

- 1.2 In order to fulfill the requirement set out in Clause 3.4.8.1(iv) of the EIA Study Brief, an initial Contamination Assessment Plan (CAP) based on the initial connecting road alignment was submitted on 31 August 2009 and accepted by the Environmental Protection Department (EPD) on 2 October 2009. A revised CAP was submitted on 31 May 2010 due to the refinement of the alignment and scope of works during the design stage and was accepted by EPD on 22 June 2010. Due to the further refining of the alignment section at Sha Tau Kok Road, the CAP was updated and submitted on 14 July 2010 and accepted by EPD on 12 October 2010.
- 1.3 The land contamination assessment had been conducted by reviewing the historical/current land uses and carrying out desktop review as well as site inspection. Other relevant information was also collected from the related Government Departments. Based on the findings of the site appraisal on the existing and historical land uses in the Study Area, adverse land contamination impacts associated with the construction and operation of the proposed Liantang/Heung Yuen Wai Boundary Crossing Point (LT/HYW BCP), connecting roads and ventilation buildings are not expected, except the open area at Sha Tau Kok Road near Loi Tung, works sites of ventilation building in Po Kat Tsai and workshops in Fanling.
- 1.4 Site visit could not be performed at the three potential contamination areas when carrying out the EIA study. Therefore, site investigation to assess the existing ground situation of these three areas was recommended in the EIA Report upon site access granted or land acquisition. Moreover, in according with EP-404/2011/A Condition 3.4, after resumption of private lands, site inspection shall be carried out to ascertain contaminative sources and hotspots of contamination. The revised CAP with sampling and testing schedule shall certified by Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC) and submitted to EPD for approval.
- 1.5 Action-United Environmental Services & Consulting (hereinafter referred to “AUES”) has been appointed as the Land Contamination Specialist to carry out land contamination assessment including site supervision and relevant report submission. Sampling will be carried out by the Contractor under supervision by AUES and Resident Engineer. A Hong Kong Laboratory Accreditation Scheme (HOKLAS)-accredited laboratory will be appointed to carry out HOKLAS-accredited chemical analysis.
- 1.6 On 24 January 2014, site visit was conducted at the open areas at Sha Tau Kok Road near Loi Tung and the ventilation building works sites at Po Kat Tsai. Revised CAP for the two potential contamination sites has been submitted to EPD for approval. The potential contamination site at Fanling was not accessible until April 2014. Site visit was conducted by AUES on 3 April 2014.
- 1.7 This CAP is prepared and submitted only for the potential contamination site at Fanling with detailed information on site background, site geology and hydrogeology, proposed sampling and testing methodology, the locations of soil sampling points and groundwater monitoring wells, Quality Assurance/Quality Control (QA/QC) procedures and an implementation schedule for site investigation in accordance with the EPD requirements.
- 1.8 The tentative schedule of site investigation (SI) would be undertaken for about one week. A Contamination Assessment Report (CAR) or/with Remediation Action Plan (RAP) (if remedial is required) will be submitted to EPD within one month after completion of site investigation work.

REPORT STRUCTURE REPORT STRUCTURE

<i>Section 1</i>	Introduction
<i>Section 2</i>	General Information of the Designated Assessment Sites
<i>Section 3</i>	Sampling Locations and Methodology
<i>Section 4</i>	Quality Auditing (QA) and Quality Checking (QC) Procedure
<i>Section 5</i>	Health and Safety
<i>Section 6</i>	Reporting

2 GENERAL INFORMATION OF THE DESIGNATED ASSESSMENT SITES

ASSESSMENT SITE - CAR WORKSHOP AND FURNITURE WORKSHOP AT FANLING

- 2.1 According to *Section 3.2.4, Table 3.5 and Table 3.6 of Appendix 8.1 of the approved EIA Report*, historical land use of the proposed BCP connecting road of the Project should be agricultural land, plantation, village and bare ground. When EIA study, the area was used as construction sites, drainage channel, village houses and workshops. The designated potential contamination site i.e. car workshop and furniture workshop, are located at Tai Wo Service Road East in Fanling within the Project Works area. The location of designated potential contamination areas are showed in *Appendix B*.
- 2.2 During the Environmental Impact Assessment Stage, land contamination investigation could not be performed at the car workshop and the furniture workshop. However, site visit observed that the land surfaces of both workshops were concrete-paved. The EIA Report described that the furniture workshop was actually used to store furniture. It was anticipated that potential land contamination is insignificant for furniture storage. Nevertheless, certain degree of land contamination indication due to car maintenance service was observed at the car workshop.
- 2.3 Since land contamination assessment cannot be conducted during the EIA stage, site investigation after land acquisition was recommended.
- 2.4 The workshops were not accessible until April 2014. Site visit was conducted by AUES on 3 April 2014. Based on site observation, the car workshop and the furniture workshop should have no significant changes compare to the EIA findings.

Observation During Site Visit at Furniture Workshop

- 2.5 Furniture storage is observed. According to the occupier, only a small amount of chemical materials e.g. one to two cans of spray paint and thinner were stored to use for the products maintenance and no other chemical was used in the past. Surface of the existing ground was kept as concrete paved and no surface crack was found. Moreover, no sign of land contamination was found on the concrete surface.

Observation During Site Visit at Car Workshop

- 2.6 Surface of existing ground of the car workshop was kept as concrete paved and no surface crack was found. The work area of vehicle repair and maintenance occupied about 1/3 of whole car workshop area. The remaining area was for domestic use. Obvious oil stains were observed at the car workshop boundary near its entrance. In addition, some lube oil empty bottles were found in front of the entrance. Chemical wastes including machine oil, lube oil, paints, batteries, solvent were observed disposed at the existing ground. No designated location or proper facilities for chemical wastes storage.
- 2.7 Representative Historical Aerial Photographs of Fanling Works Area extracted from the EIA Report are enclosed in *Appendix C*.

WASTE MANAGEMENT OF THE ASSESSMENT SITE

- 2.8 The occupier claimed that all chemical wastes generated from the workshop were properly disposed by licenced waste collector. However, no disposal record was provided by the occupier. Photographs taken on 3 April 2014 during site visit is shown in *Appendix D*. A Site Walkover Checklist is shown in *Appendix G*.

ACCIDENT OF SPILLAGE/LEAKAGE OF THE CHEMICAL WASTE AND DG RECORD

- 2.9 According to the information extracted from *Appendix 8.1 of the EIA Report*, as shown in *Appendix H*, there were neither records of any accident that involved spillage/leakage of chemical waste nor Dangerous Goods (DG) storage and incidents of spillage/leakage of DG according to the records of EPD and the Fire Services Department (FSD).

SITE GEOLOGY AND HYDROGEOLOGY

Geology

- 2.10 The assessment site is situated in Kau Lung Hang of Fanling, New Territories.
- 2.11 Fanling formation occurs almost exclusively in onshore areas of Hong Kong where its main areas of development are in the northern New Territories on the Fanling and Yuen Long plains. The Formation is a mixed alluvial and colluvial formation of Holocene age. Alluvial components of the formation mainly occur in low-lying areas whereas colluvium is largely distributed on more steeply sloping ground. However, the alluvium and colluvium merge laterally and interdigitate, especially at the bases of slopes adjacent to floodplains.
- 2.12 Alluvial deposits of the formation typically consist of well-sorted to semi-sorted clay, silt, sand and gravel. Consistency is generally soft to firm, with many coarser deposits being loose and unstable in vertical sections. The colour usually ranges from light grey in areas of higher water table, indicating mild reducing conditions, to yellowish brown, indicating oxidising conditions above the permanent water table.
- 2.13 The Holocene colluvial deposits are generally poorly sorted and commonly comprise a light yellowish brown, slightly clayey sandy silt to gravelly silty sand matrix containing subangular to angular slightly decomposed boulders with thin weathering rinds a few millimetres thick. The grain size typically varies with the topography, parent rock type and distance transported from source.

Hydrogeology

- 2.14 Nearby, Ma Wat River is located at the potential contamination assessment sites East side. Ma Wat River is a major network of drainage lines toward Sham Chun River as collected surface runoff from North New Territories. According to Hong Kong Observatory Ta Kwu Ling Station (http://www.hko.gov.hk/cis/region_climat/TKL/TKL_mean_e.htm), average year rainfall recorded between 1986 and 2013 at Fanling is about 1,841.7mm. Moreover, GEO Ground Investigation Report No.00735 (Site Investigation Report of Fanling & Shek Wu Hui Development) shown that the groundwater level is about 1.75m below ground level.

3 SAMPLING LOCATIONS AND METHODOLOGY

3.1 According to *Table 4.1 of Appendix 8.1 of the EIA Report*, the approved CAP should be updated and resubmitted to EPD for approval upon land acquisition and granting site access. The land contamination assessment will be undertaken based on the following documents:

- “*Guidance Note for Contaminated Land Assessment and Remediation*” issued by EPD on 15 August 2007; and
- “*Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management*” issued by EPD in December 2007; and
- “*Practice Guide for Investigation and Remediation of Contaminated Land*” issued by EPD in August 2011; and
- *Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works of the Environmental Impact Assessment (EIA) Report Appendix 8.1.*

PROPOSED SAMPLING LOCATION

3.2 As recommended in Appendix 8.1 of the approved EIA Report, the proposed sampling points for the assessment site for carrying out land contamination assessment are listed in Table 3-1.

Table 3-1 EIA Report Recommended Sampling Number for Workshops in Fanling

Location	Recommended Sampling Points
Works sites to the East and Southwest of Fanling Highway	0-4 trial pits of a regular grid pattern are proposed.

3.3 As measured from the sketch provided by the Engineering Representative (ER), the covered area of the furniture workshop and car workshop is about 680m² and 330m² respectively. Therefore, the selected sampling location for both workshops would be based on site visit findings.

Furniture Workshop in Fanling

3.4 According to the site observation on 3 April 2014, ground surface of the workshop was paved with concrete and no surface crack on the concrete surface was observed. Moreover, only a few chemicals for painting including spray paint and solvent were stored for minor furniture maintenance, and no other kinds of chemicals were used in the working area in the past as advised by the operator. Considering the risk of contaminating the land of the furniture workshop should be very low, therefore, one sampling point is proposed at the chemical storage area of the furniture workshop (see Photo 3 of *Appendix D*).

Car Workshop in Fanling

3.5 Based on site visit observation on 3 April 2014, vehicle repair and maintenance work areas occupy about 1/3 area (about 110m²) of whole car workshop. Repair and maintenance operation location is in the East part of the car workshop and paved with concrete (see Photos 16 and 17 of *Appendix D*). No surface crack observed on the concrete surface. Within the repair and maintenance operation area, several lube empty bottles observed was temporary stored (see Photo 15 of *Appendix D*). Moreover, obvious oil stains was observed at the car workshop boundary near entrance (see Photos 13 and 14 of *Appendix D*). In addition, chemicals waste i.e. lube oil empty bottles and general wastes were found disposed in front of the entrance (see Photos 10 and 11 of *Appendix D*). Hence, five hot spot locations; one at repair and maintenance operation area; one at temporary empty lube bottle storage location; two at the assessment site entrance; and one at the obvious oil stain area, are proposed at the car repair workshop for soil sampling to carry out the land contamination assessment.

3.6 The coordinates of the proposed sampling points at the two workshops are listed in *Table 3-2* and is shown in *Appendix E*.

Table 3-2 Summarize of the Proposed Sampling Points Coordinates at the Two Potential Contamination Workshops

Potential Contamination Area	Sampling Point ID	Co-ordinates		Location of Sampling Point	Photo No. in Appendix D
		Easting	Northing		
Furniture Workshop (the area is about 680m ²)	FW-01	833 921	837 981	Chemical Storage Area	Photo 3
Car Workshop (the area is about 330m ²)	CW-1	833 903	837 992	South side of the entrance	Photo 11
	CW-2	833 901	837 994	North side of the entrance	Photo 10
	CW-3	833 908	837 994	Observed Obvious oil stains location	Photo 12, 13 & 14
	CW-4	833 912	837 994	Lube oil empty bottles temporary storage location	Photo 15
	CW5	833 919	837 988	Vehicle repair and maintenance work area	Photo 16 and 17

- 3.7 Pit excavation with hand tools would be used at the proposed sampling locations to conduct soil sampling. During pit excavation, undisturbed soil samples would be collected using stainless steel hand-held trowel at the proposed depths. At each sampling location, soil samples will be collected at 0.5m, 1.5m and 3.0m below ground level. If groundwater is encountered at sampling pits, groundwater samples will be collected for the assessment.
- 3.8 If contaminant is revealed during site investigation, additional samples would be collected to estimate the extension of soil contamination.

POTENTIAL CONTAMINANTS

- 3.9 Chemical analysis for land contamination assessment would be carried out in accordance with Table 2-2 of Section 2 of the "Practice Guide for Investigation and Remediation of Contaminated Land".

Furniture Workshop

- 3.10 According to the site history, only spray paints and thinner were used for furniture maintenance and no other chemicals was used in the past. The chemical analysis is therefore proposed for the furniture workshop as follows:
- Metals – Cadmium, Chromium III & VI, Lead and Zinc; and
 - Volatile Organic Compounds (VOCs) – Acetone, Benzene, Bromodichloromethane, 2-Butanone, Chloroform, Ethylbenzene, Methyl tert-Butyl Ether, Methylene Chloride, Styrene, Tetrachloroethene, Toluene, Trichloroethene, Xylenes (Total).

Car Repair Workshop

- 3.11 According to the site history, there was vehicle repair and maintenance service. Moreover, obvious oil stain was observed at the car workshop boundary near the entrance. In addition, some lube oil empty bottles were disposed in front of the entrance. Furthermore, the site may be contaminated with PCBs as coming from equipment. According to the findings, the chemical analysis is therefore proposed for the car workshop as follows:
- Metals – Chromium III & VI, Copper, Lead, Manganese, Nickel and Zinc; and
 - Petroleum Carbon Ranges – Fractions C6-C8, Fractions C9-C16 and Fractions C17-C35; and
 - Volatile Organic Compounds (VOCs) – Acetone, Benzene, Toluene, Ethylbenzene, Xylenes (Total), Methyl tert-Butyl Ether, and Trichloroethene;
 - Semi-volatile Organic Compounds (SVOCs)– 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 and Pyrene.

- Polychlorinated Biphenyls (PCBs)

SOIL SAMPLING METHODOLOGY

- 3.12 Soil sampling by pit excavation is recommended. During investigation, pit excavation will be supervised by a land contamination specialist and Resident Engineer to ensure that no cross contamination or any other forms of interferences. Moreover, a land contamination specialist would be also responsible to monitor and supervise all the soil and water sampling.
- 3.13 Excavator or hand digging would be used for pit excavation. Sampling pit excavation would be from existing ground surface to the proposed final depth. All soil samples will be collected using a stainless steel hand-held trowel. Representative soil sample, at least three numbers will be collected from each sampling pit.
- 3.14 Visual and olfactory signs will be carried out during soil samples selection. Moreover, a photo-ionizing detector (PID) will be used to test the soil samples for initial screening. The measurements will be recorded for reporting. If high readings of VOC occur at the deepest targeted sample depth, a decision will be made on site by the land contamination specialist to extend the final sampling depth with an additional 1m in depth and an additional sample will be collected. This process will continue until either organic vapour readings are below 100ppm or accepted by the land contamination specialist.
- 3.15 Furthermore, extra samples will be collected at sampling depth where changes in soil strata or notable changes in soil properties are observed. Simple soil texture classification will be logged by the contamination assessment team or a competent person. Soil description prepared in accordance with relevant guidelines such as GEO's Geoguide will be logged by the contamination assessment team or a competent person. Summary of sampling activities and procedures is presented as follows:
- a) Identify the sampling locations;
 - b) For safety reason, underground utilities checking will be performed before pit excavate;
 - c) Samples will be collected and stored in an appropriately prepared and labeled sampling container or plastic bags provided by the laboratory for field screening and laboratory analysis;
 - d) All samples will be field-screened to determine the maximum contaminant concentrations and the vertical extent of contamination where possible, by:
 - Photo-ionizing detector (PID) reading; and
 - Supported by subjective assessment of headsapce vapor concentrations.
 - e) At least three (3) soil samples will be collected from each sampling pit for laboratory analysis;
 - f) Each sub-sample collected will be put into a sample container or high-density polyethylene bag provided by the HOKLAS laboratory. All samples will be stored in a cool box maintained at a temperature of 4°C without being frozen.
- 3.16 A Chain-Of-Custody (COC) protocol will be followed as part of QA/QC procedures and the completed COC forms will be delivered to the laboratory together with the samples for testing. Samples will be analyzed within 2 days of delivery or within the holding time as advised by the laboratory. Duplicate sample will also be taken at a frequency of 1 per every 20 samples.
- 3.17 Every sample container will carry a unique label containing the following information:
- Project title;
 - Unique label number;
 - Sampling date;
 - Sampling interval length;
 - Location number;
 - Sampling depth; and
 - Sample description.

- 3.18 All excavation pits will be logged. Information will include the following:
- Sampling point identification;
 - Site sketch showing sample locations and measured distances;
 - Actual depth of samples collected;
 - Depth of the water table measured during sampling if groundwater present;
 - Date and time of sample collection;
 - Sample identification number;
 - Description of sample condition such as soil type, colour, odour and staining, if present;
 - Presence of free products in underground water if any; and
 - Description of soil strata.

Prevent Cross Contamination

- 3.19 In order to prevent cross contamination, no excavation work would be undertaken during raining. Work bund will be erected before commencing excavation at each sampling pit to prevent surface runoff flowing into the pit.
- 3.20 Furthermore, all soil excavated from the sampling pits will be stored nearby using impervious sheets to prevent cross contamination. Soil will be backfilled into the sampling pit immediately after sampling completed.

SOIL SAMPLE ANALYSIS

- 3.21 All samples and duplicate samples will be delivered to the HOKLAS-accredited laboratory for the chemical testing. As per the “*Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management*” requirements, all chemical analysis methods used for soil assessment should be accredited under HOKLAS. The chemicals analysis method and the reporting limits are shown in **Table 3-3**.

Table 3-3 Testing Method and Reporting Limit of the Chemical Analysis- Soil Sample

Parameter	Methods	Reporting Limit (mg/kg)
a) Metals	USEPA 6020	
• Chromium III & VI		1
• Copper		1
• Lead		1
• Manganese		1
• Nickel		1
• Zinc		1
b) Petroleum Carbon Ranges	USEPA 8015	
• C6 – C8		5
• C9 – C16		200
• C17 – C35		500
c) Volatile Organic Compounds (VOCs)	USEPA 8260	
• Acetone		50
• Benzene		0.2
• Toluene		0.5
• Ethylbenzene		0.5
• Xylenes (total)		2
• Methyl tert-Butyl Ether		0.5
• Trichloroethene	0.1	
d) Semi-volatile Organic Compounds (SVOCs)	USEPA 8270	
• Acenaphthene		0.5
• Acenaphthylene		0.5
• Anthracene		0.5
• Benzo(a)anthracene		0.5
• Benzo(a)pyrene		0.5

Parameter	Methods	Reporting Limit (mg/kg)
<ul style="list-style-type: none"> • 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 		0.5
e) Polychlorinated Biphenyls (PCBs)	USEPA8270	0.1

3.22 Extra soil samples will be stored and tested for Toxicity Characteristics Leaching Procedure (TCLP) of full suite of parameters if excavation and landfill disposal is indicated as last resort of remediation method. As advised by the Testing Laboratory (ALS), samples for TCLP analysis shall be undertaken within three months, if necessary.

GROUNDWATER SAMPLING METHODOLOGY

3.23 In according with *Section 4.2 of Appendix 8.1 of the EIA Report*, if groundwater observed at any sampling pit, water sampling would be undertaken. Water sample will be directly collected from the base of sampling pit.

Groundwater Sampling

3.24 Groundwater sample will be collected directly from the base of the pit after soil sampling completion. Field measurement including the temperature, electrical conductivity and pH value will be conducted with at least three consecutive stable readings to be obtained. A stainless steel hand-held bucket or a mechanical pump will be used to perform groundwater sampling.

3.25 Between sampling events, all sampling tools or equipment used will be thoroughly decontaminated with laboratory-grade detergent followed by demonized water. All groundwater samples collected will be treated and preserved in same as for soil samples. All laboratory QA/QC and chain of custody procedures will be followed. Duplicate sample will also be taken at a frequency of 1 per every 20 samples.

3.26 Every sample container will carry a unique label containing the following information:

- Project title;
- Unique label number;
- Sampling date; and
- Location number.

GROUNDWATER SAMPLE ANALYSIS

3.27 Groundwater samples will be delivered to laboratory within 24 hours and analyzed within 2 days of delivery or within the holding time as advised by the laboratory. As per the “*Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management*” requirements, all chemical analysis methods used for groundwater assessment should be accredited under HOKLAS. The chemicals analysis method and the reporting limits are shown in *Table 3-4*.

Table 3-4 Testing Method and Reporting Limit of the Chemical Analysis – Groundwater Sample

Parameter	Methods	Reporting Limit (µg/L)
a) Petroleum Carbon Ranges	USEPA 8015	
<ul style="list-style-type: none"> • C6 – C8 • C9 – C16 		20 500

Parameter	Methods	Reporting Limit (µg/L)
• C17 – C35		500
b) Volatile Organic Compounds (VOCs)	USEPA 8260	
• Acetone		500
• Benzene		5
• Toluene		5
• Ethylbenzene		5
• Xylenes (total)		20
• Methyl tert-Butyl Ether		5
• Trichloroethene		5
c) Semi-volatile Organic Compounds (SVOCs)	USEPA 8270	
• Acenaphthene		2
• Acenaphthylene		2
• Anthracene		2
• Benzo(b)fluoranthene		1
• Chrysene		1
• Fluoranthene		2
• Fluorene		2
• Naphthalene		2
• Phenanthrene		2
• Pyrene		2
d) Polychlorinated Biphenyls (PCBs)	USEPA8270	1

ASSESSMENT GUIDELINES

- 3.28 According to the EIA Study, the potential land contamination sites involve storage of construction materials, vehicle maintenance and storage of furniture. Therefore “industrial” scenario under RBRG standard is recommended as the detection limit. The concentration of detection limit has adopted by EPD as local remediation new requirements with effective from 15 August 2007.
- 3.29 Based on EIA Study recommendation, the soil and groundwater will be evaluated the industrial of Risk-based Remediation Goals limits and is listed in *Table 3-5*.

Table 3-5 Industrial of Risk-based Remediation Goals limits for Soil and Groundwater

Parameter	Soil		Groundwater		
	Industrial (mg/kg)	Soil Saturation Limit C_{sat} (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)	
Metals	Chromium III	1.00E+04*	NA	NA	NA
	Chromium VI	1.96E+03	NA	NA	NA
	Copper (Cu)	1.00E+04	NA	NA	NA
	Lead (Pb)	2.29E+03	NA	NA	NA
	Manganese (Mn)	1.00E+04*	NA	NA	NA
	Nickel (Ni)	1.00E+04*	NA	NA	NA
	Zinc (Zn)	1.00E+04*	NA	NA	NA
Petroleum Carbon Ranges	C6 – C8	1.00E+04*	1.00E+03	1.15E+03	5.23E+00
	C9 – C16	1.00E+04*	3.00E+03	9.98E+03	2.80E+00
	C17 – C35	1.00E+04*	5.00E+03	1.78E+02	2.80E+00
Volatile Organic Chemicals (VOCs)	Acetone	1.00E+04*	***	1.00E+04*	***
	Benzene	9.21E+00	3.36E+02	5.40E+01	1.75E+03
	Toluene	1.00E+04*	2.35E+02	1.00E+04*	5.26E+02
	Ethylbenzene	8.24E+03	1.38E+02	1.00E+04*	1.69E+02
	Xylenes (total)	1.23E+03	1.50E+02	1.57E+03	1.75E+02
	Methyl tert-Butyl Ether	7.01E+01	2.38E+03	1.81E+03	***
Trichloroethene	5.68E+00	4.88E+02	1.42E+01	1.10E+03	

Parameter		Soil		Groundwater	
		Industrial (mg/kg)	Soil Saturation Limit C_{sat} (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
Semi-Volatile Organic Chemicals (SVOCs)	Acenaphthene	1.00E+04*	6.02E+01	1.00E+04*	4.24E+00
	Acenaphthylene	1.00E+04*	1.98E+01	1.00E+04*	3.93E+00
	Anthracene	1.00E+04*	2.56E+00	1.00E+04*	4.34E-02
	Benzo(a)anthracene	9.18E+01	NA	NA	NA
	Benzo(a)pyrene	9.18E+00	NA	NA	NA
	Benzo(b)fluoranthene	1.78E+01	NA	7.53E+00	1.50E-03
	Benzo(g,h,i)perylene	1.00E+04*	NA	NA	NA
	Benzo(k)fluoranthene	9.18E+02	NA	NA	NA
	Chrysene	1.14E+03	NA	8.12E+02	1.60E-03
	Dibenzo(a,h)anthracene	9.18E+00	NA	NA	NA
	Fluoranthene	1.00E+04*	NA	1.00E+04*	2.06E-01
	Fluorene	1.00E+04*	5.47E+01	1.00E+04*	1.98E+00
	Indeno(1,2,3-cd)pyrene	9.18E+01	NA	NA	NA
	Naphthalene	4.53E+02	1.25E+02	8.62E+02	3.10E+01
	Phenanthrene	1.00E+04*	2.80E+01	1.00E+04*	1.00E+00
Pyrene	1.00E+04*	NA	1.00E+04*	1.35E-01	
Polychlorinated Biphenyls (PCBs)		7.48E-01	NA	5.11E+00	3.10E-02

Remark:

(*) indicates a 'ceiling limit' concentration.

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

RECOMMENDATION

- 3.30 Due to all proposed sampling points located at structures within workshops, structure dismantling first is recommended to provide spacing for pit excavation.

4 QA/QC PROCEDURES

- 4.1 The quality control samples will be collected in the course of soil and groundwater sampling. Duplicate soil samples will be taken. For the groundwater sample, one trip/travel blank, one field blank and duplicate sample will be taken.

Trip/Travel Blank

- 4.2 The trip blank will be prepared in the laboratory using organic-free water. The trip blank will remain unopened and accompanied from the start of sampling to delivery of samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total). The trip blank would be collect and analysis for each groundwater samples delivery event. Number of trip blank depends on number of groundwater delivery trips.

Field Blank

- 4.3 The field blank will be prepared in field using organic-free water by passing the water from a full bottle to an empty bottle at the most contaminated location on site. The field blank accompanied the project samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total). The field blank would be collect for each groundwater sampling date. Number of field blank sample collection depends on the number of days of groundwater sampling.

Duplicate Sample

- 4.4 The duplicate sample(s) will be collected as a split sample from soil and groundwater sample. Chemical analysis is equivalent to the original sample(s). These samples will be delivered to the laboratory as two individual samples without any indication to the laboratory that they have been duplicated. One duplicate sample will be collected for every twenty soil or groundwater samples. According to the estimated numbers of soil and groundwater samples to be collected from these two areas, two duplicate soil samples and one duplicate groundwater sample are predicted for each area.

PROCEDURE FOR DECONTAMINATING EQUIPMENT AND SAMPLING TOOLS

- 4.5 Tap water, phosphate-free detergent (Decon[®] 90) and distilled water will be used for cleaning the digging and sampling tools/equipment. The decontamination is required to be conducted as follows:
- All sampling tools/equipment decontamination will be perform before each sampling pit excavation to ensure no cross contamination;
 - All sampling tools/equipment will be decontaminated before next sampling to prevent cross-contamination of samples; and
 - All sampling tools/equipment will be decontaminated before leaving the potential contaminated areas to prevent potentially contaminated soil or water being transported off-site.
- 4.6 The land contamination specialist or his delegates will supervise all the decontamination work.
- 4.7 Furthermore, equipment blank will be collected to determine potential cross contamination between samples and potential influences from the sampling tools used. It will be collected from assessment site by the sampling tools/equipment rinse to verify the decontamination procedures and background or ambient airborne contaminants on the site. The equipment blank collection will be one per every twenty soil samples or groundwater samples. According to the estimated numbers of soil and groundwater samples to be collected from these two areas, two equipment blank samples are predicted for each area.
- 4.8 According to above procedures, Table 4-1 summarised the QA/QC sample(s) collection.

Table 4-1 QA/QC Sample(s) Collection

QA/QC Sample(s) to be collected from the site	Matrix	Chemical Testing	Fanling (Proposed Numbers of Sample: 18 soil and 6 water samples)
Trip Blank	Soil	NA	NA
	Water	BTEX	Depends on the delivery event
Field Blank	Soil	NA	NA
	Water	BTEX	Depends on the number of days of water sample collection
Duplicate Sample	Soil	Same with original sample	1
	Water		1
Equipment Blank	Water	Full chemical analysis	1

5 HEALTH AND SAFETY

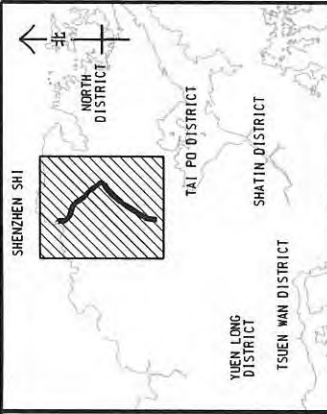
- 5.1 In general, all personnel who are involved in carrying out site investigation works shall comply with the in-house health and safety precautions listed below:
- All site personnel will possess an approved Construction Industry Safety Training Certificate (Green Card);
 - Safety helmets, safety boots, gloves and protective clothing will be provided to all personnel working on site;
 - Eye and ear protector will be provided for concrete layer breaking;
 - Briefing on health and safety requirements will be provided to the site personnel for daily before the SI works;
 - No food, drink, alcohol or drugs will be consumed whilst conducting the SI works on site;
 - Direct skin contact with the contaminated materials will be avoided;
 - Hand-wash basins will be provided and made accessible to all personnel working for the captioned site SI works;
 - The land contaminated specialist will be responsible for project implementation. The specialist will also supervise SI work on site.
- 5.2 The details of Health and Safety Plan (HASP) are shown in **Appendix F**.

6 REPORTING

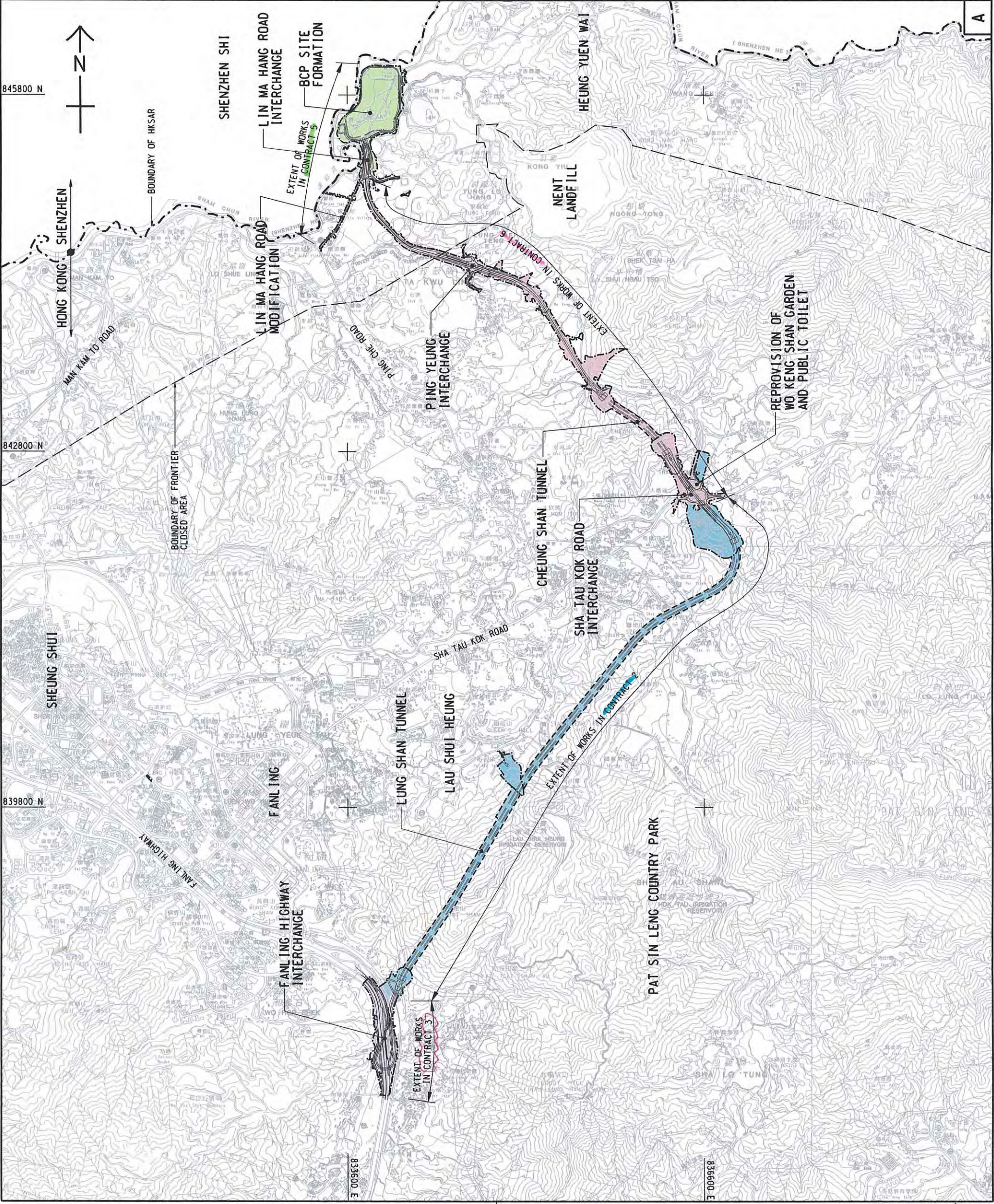
- 6.1 Upon completion of the site investigation (SI) works, a Contamination Assessment Report (CAR) will be prepared base on the findings of the SI. The chemical analysis results of the sampled soil and groundwater will be assessed in compliance with the requirements set out in the “*Guidance Note for Contaminated Land Assessment and Remediation*” and the “*Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management*”, issued by EPD.
- 6.2 If any assessment area is identified with soil/groundwater contamination, remediation should be proposed to clean up the contaminated area. A Remediation Action Plan (RAP), if necessary, combined with CAR would be submitted to EPD for approval. After the remediation work, a Remediation Report (RR) would be prepared and submitted to EPD.
- 6.3 Meanwhile, no construction works shall be started at the contaminated area before the completion of the remediation works and the approval of the corresponding Remediation Report.

Appendix A

THE PROJECT LAYOUT PLAN

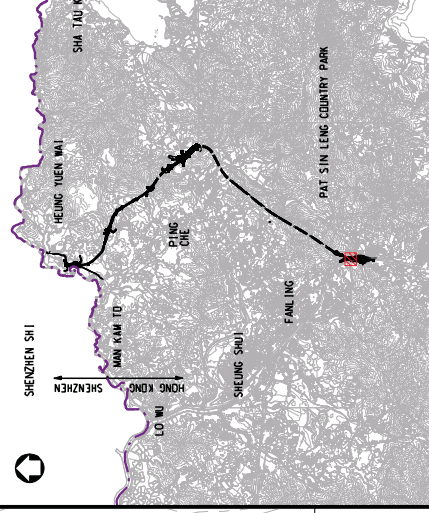


CEDD 土木工程拓展署 Civil Engineering and Development Department		PROJECT LAYOUT PLAN	AECOM
LANTIAN/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURE) (SITE FORMATION AND CONSTRUCTION)			
DRGNO. 60212563/PLP/001 圖紙編號	CONTRACT NO. 60212563/PLP/001 合約編號	DRAWN BY ZJ 繪圖員	CHECKED BY A1 校核員
DATE 11/15/2013 日期	STATUS 01 狀態	SCALE A1 1 : 15000 比例尺	SHEETS 1 OF 1 圖張數
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Appendix B

THE DESIGNATED POTENTIAL CONTAMINATION AREA



KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)

Rev	Date	Drawn	Description	CHK'd	App'd
P2	JUL 10	MING	GENERAL REVISION	FY	HT
P1	MAY 10	MING	FIRST ISSUE	FY	HT

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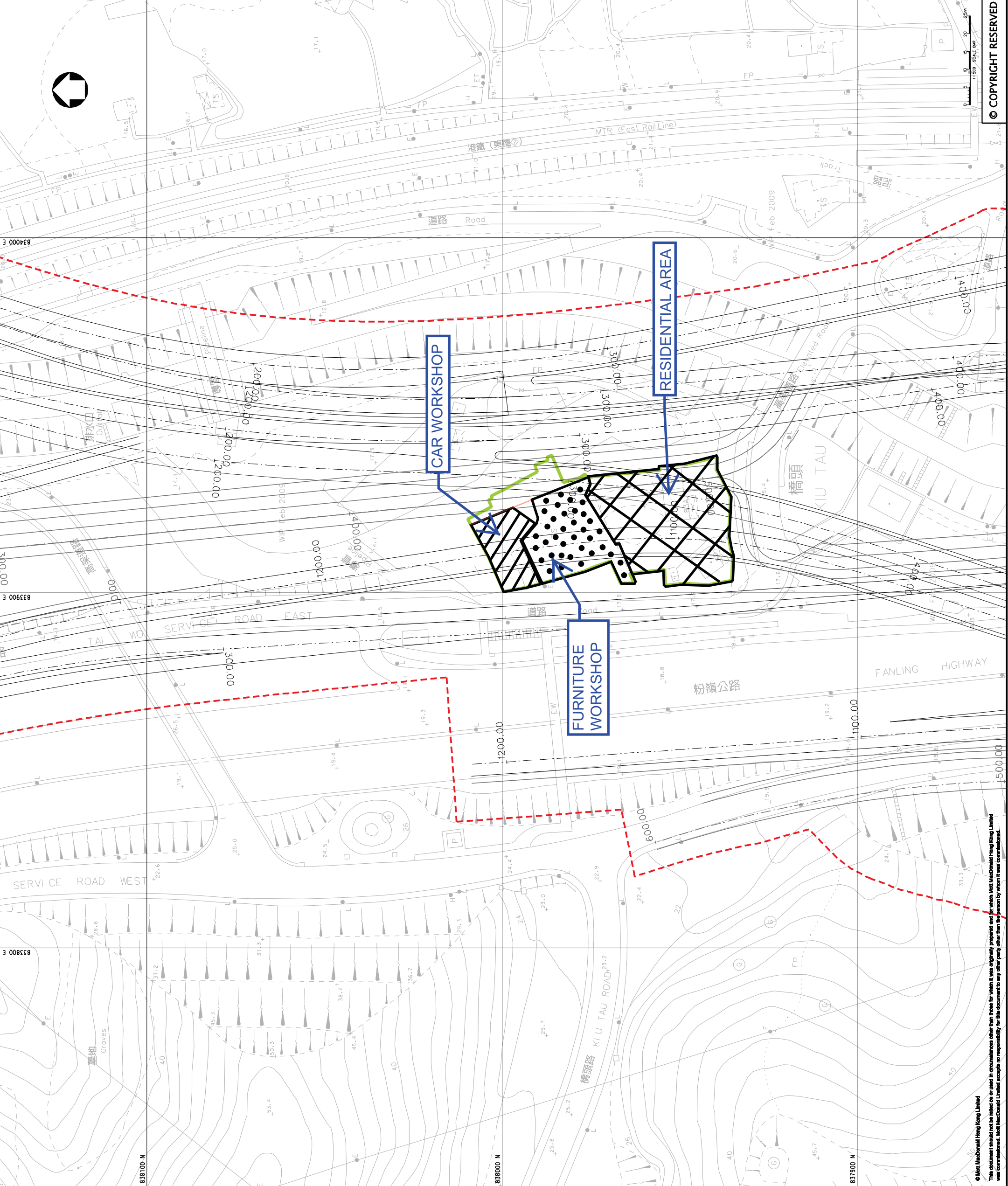
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CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Client

Project
AGREEMENT NO. CE45/2008 (CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Designated	HC	EC	EC
Drawn	MING	Coordination	EC
Dwg. Chk.	HC	Approved	HT
Scale at A1	1:500	Project	255228
Drawing No	CE45/2008/REP/ENV/CA/002/CE.4-2.dgn	Status	PRE
Rev		Figure	P2

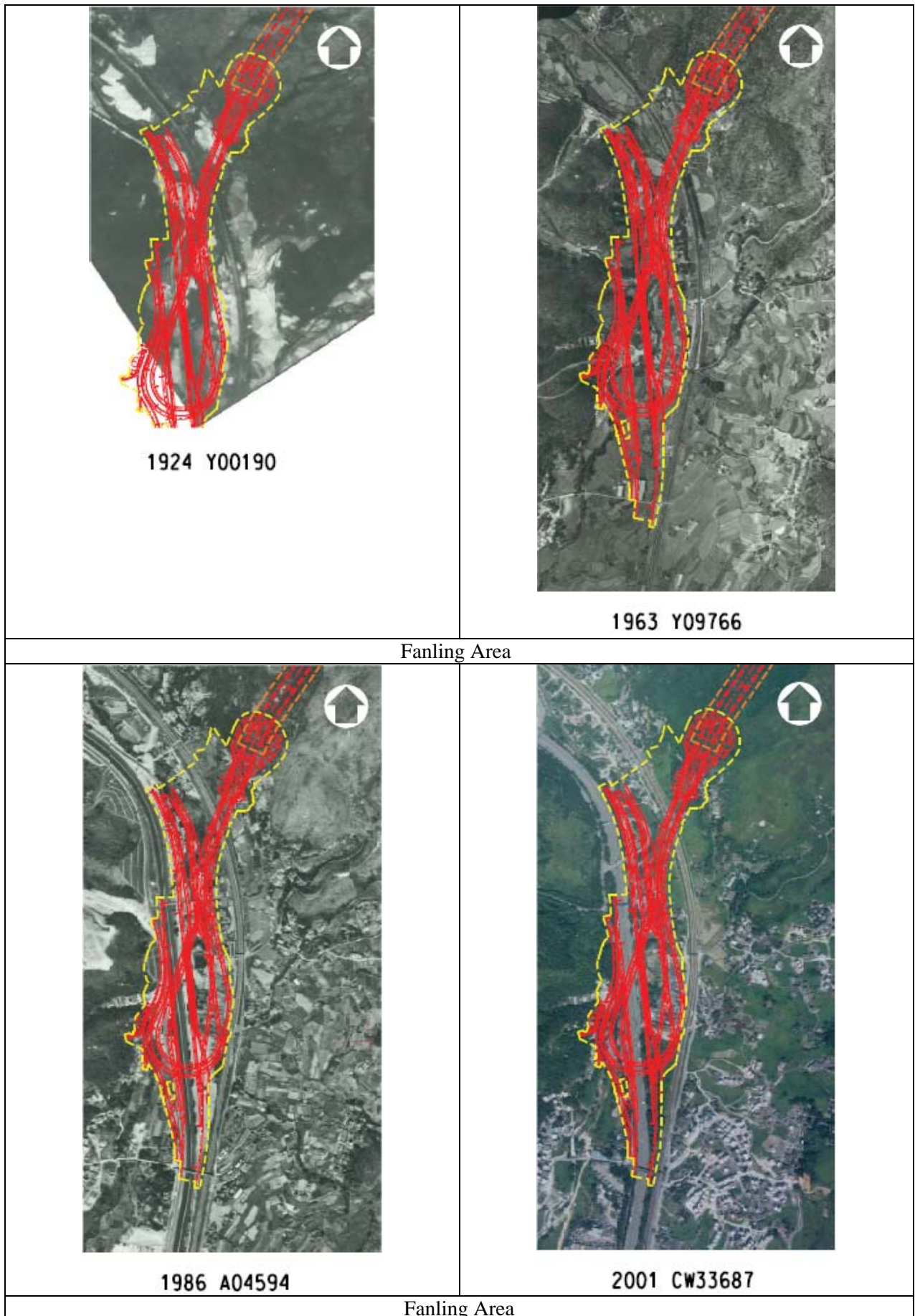


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Appendix C

REPRESENTATIVE HISTORICAL AERIAL PHOTOGRAPHS (Extract From EIA Report)



Appendix D
PHOTOGRAPH RECORD

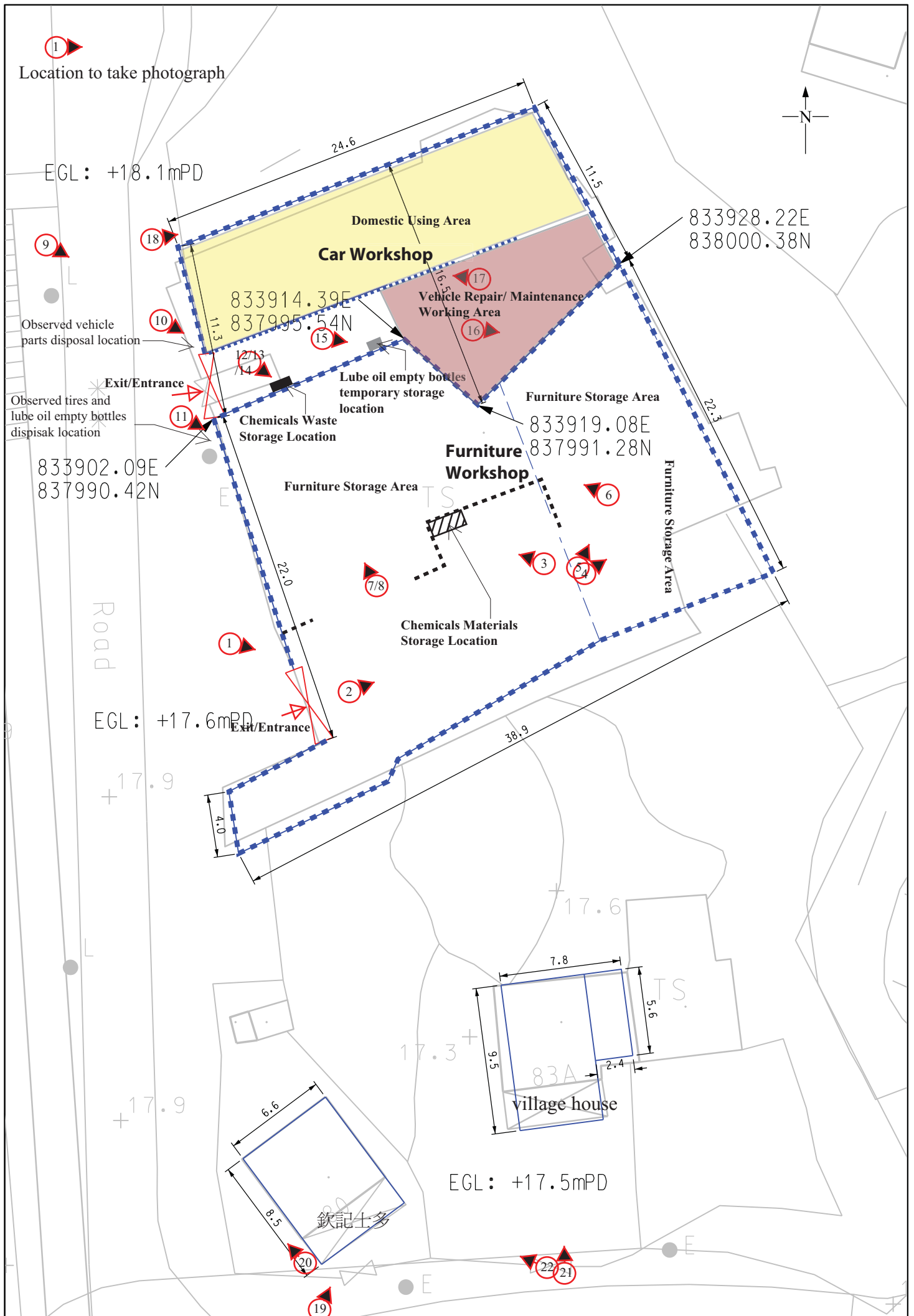




Figure: Photograph Record Location

Furniture Workshop in Fanling

	
<p>Photo 1 – Furniture workshop Exit/Entrance</p>	<p>Photo 2 – Front view of furniture workshop</p>
	
<p>Photo 3 – Chemicals materials storage location</p>	<p>Photo 4 – Products and furniture materials storage location</p>
	
<p>Photo 5 – Products and furniture materials storage location</p>	<p>Photo 6 – Products and furniture materials storage location</p>
	
<p>Photo 7 – Products and furniture materials storage location</p>	<p>Photo 8 – Existing ground surface conditions (concrete-paved)</p>

Car Workshop in Fanling

	
<p>Photo 9 – Car workshop Exit/Entrance</p>	<p>Photo 10 – Vehicle parts observed at car workshop entrance</p>
	
<p>Photo 11 – Tires and lube oil empty bottles observed at car workshop entrance.</p>	<p>Photo 12 – Chemical waste storage location</p>
	
<p>Photo 13 – Oil stain observed at chemical waste storage location</p>	<p>Photo 14 – Oil stain observed at chemical waste storage location</p>
	
<p>Photo 15 – Lube oil empty bottles temporary storage location</p>	<p>Photo 16 – Work area of car repair and maintenance</p>

Car Workshop in Fanling

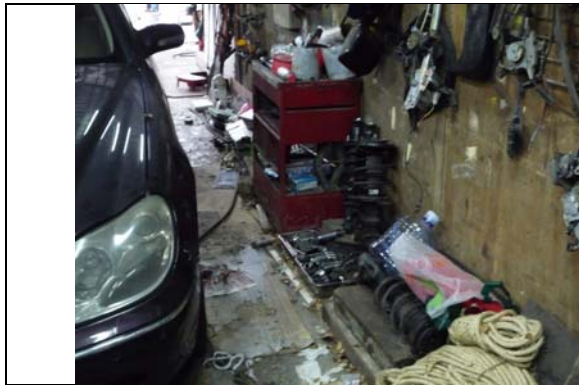


Photo 17 – Work area of car repair and maintenance



Photo 18 – North side at car workshop

Others premises located on the assessment area



Photo 19 – The premises of 欽記士多



Photo 20 – Kitchen of 欽記士多



Photo 21 – the Village House (double-storey)



Photo 22 – Storage area of the Village House

Appendix E

PROPOSED SOIL SAMPLING LOCATION

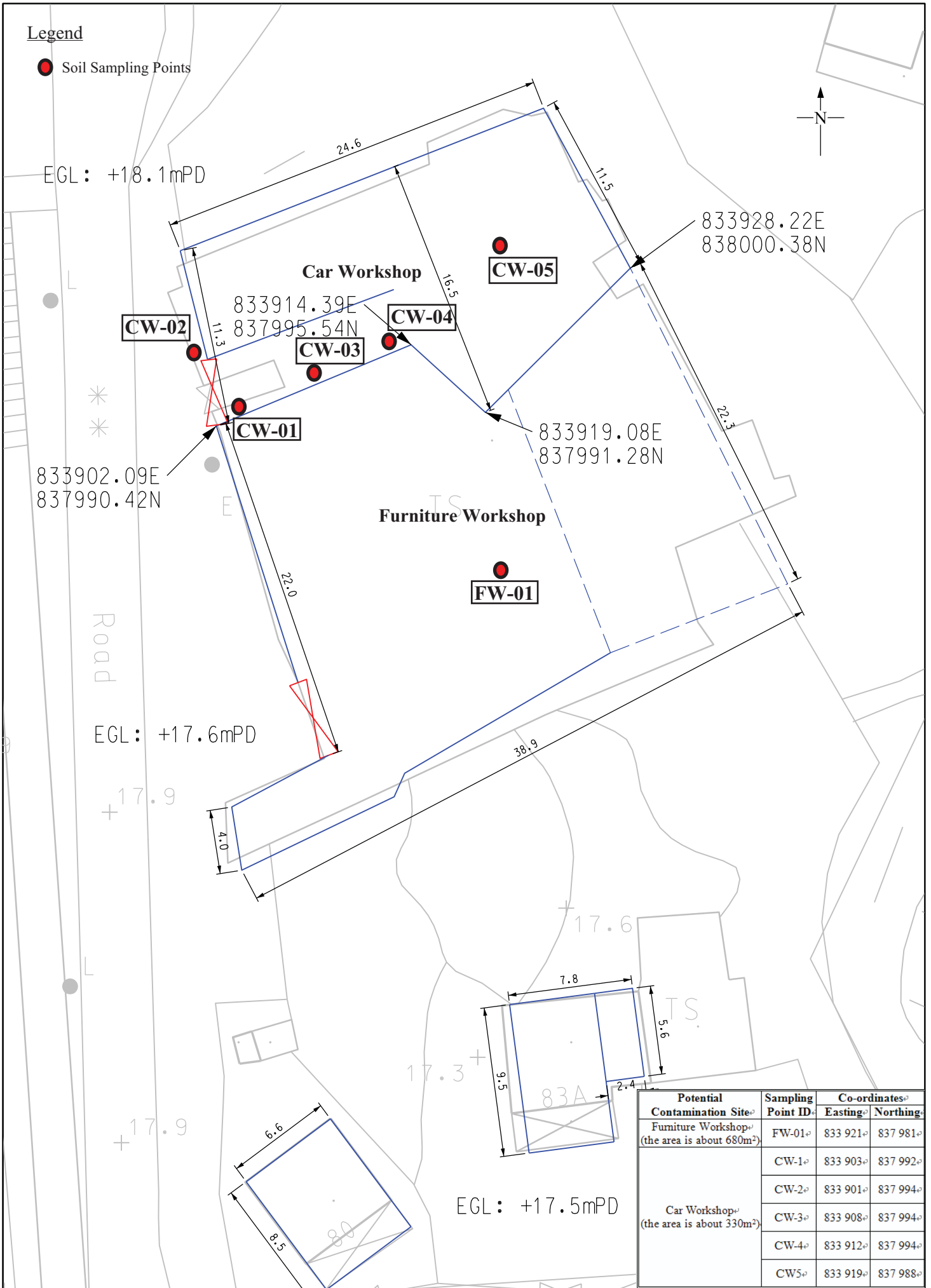


Figure: Proposed Hot Spot Soil Sampling Points Location

Appendix F

HEALTH AND SAFETY PLAN

Health And Safety Plan (HASP) of Land Contamination Assessment Work

- 1 **Project Description:** The assessment is intended to determine whether the sites is contaminated and if so assess the extent of contamination before commencement of any major works on site. The work will involve collection and analysis of representative soil and groundwater samples.
- 2 **Site History:** As refer to relevant sections of the revised CAP incorporated the site histories extracted from the EIA Report.
- 3 **H&S Hazards:**
 - Supervision of SI work: (inhalation of contaminants, eye irritation, noise nuisance, body injury by equipment, muscle fatigue by prolonged standing, mosquito borne diseases, sunstroke due to hot weather)
 - On-Site Assessment: (inhalation of contaminant, poisoning by ingestion, eye irritation, muscle fatigue by prolonged standing, mosquito borne diseases, sunstroke due to hot weather)
 - On-Site Sampling: (inhalation of contaminants, eye irritation, poisoning by ingestion, muscle fatigue by prolonged standing, mental stress by repetitive movement, mosquito borne diseases, sunstroke due to hot weather)
 - In-Situ Measurement: (inhalation of contaminants, poisoning by ingestion, eye irritation, body injury by equipment, muscle fatigue by prolonged standing, mental stress by repetitive movement, mosquito borne diseases, sunstroke due to hot weather)
- 4 **Key Personnel:**
 - T.W. Tam (Land Contamination Specialist)
 - Edwin Au (the Site Agent of Contract 5)
 - Perry Yam (Resident Engineer)
- 5 **Receptor** The worker
- 6 **Level of Protection:** Level 2*
 - Hard hat;
 - Safety shoes;
 - Eye Protector;
 - Ear Protector;
 - Full protective clothing;
 - Respirator; and
 - Rubber glove.

** Depending on actual site conditions, the assessment specialist will determine and see if the protection level can be adjusted.*
- 7 **Decontamination Procedures:** The decontamination procedures will be implemented in accordance with the final approved Contaminated Assessment Plan (CAP).
- 8 **Designation Work Areas** The assessment works will be carried out in accordance with the final approved Contaminated Assessment Plan (CAP).
- 9 **Types & Levels of Expected Contamination:** Potential contamination may relate to products available at the assessment area including BTEX, TPH, PAHs and Heavy metals. Significant of other contaminant is not expected on site.

Health And Safety Plan (HASP) of Land Contamination Assessment Work

- 10 **Monitoring Requirements:** Potential contamination on site is monitored by Photo-Ionizing Detector (PID) as well as visual inspection by qualified assessor.
- 11 **Emergency Phone No:**
- Police: 999 or Sheung Shui Division (Tel: 3661 1672)
 - Fire: Sheung Shui Fire Station (Tel: 2670 7682)
 - Hospital: North District Hospital: (Tel: 2683 8888)
- 12 **Location & Routes to the Nearest Medical Facility:** Fanling Ambulance Depot (Tel: 2669 2250)

Appendix G

SITE WALKOVER CHECKLIST

Site Walkover Checklist for Land Contamination Assessment

Location: The potential contamination workshops of Fanling – Car Repair Workshop

Date of site visit: 3 April 2014

GENERAL SITE DETAILS

Site Owner / Client:	Unknown
Property Address:	Tai Wo Service Road East
Person conducting the questionnaire:	the occupier

SITE ACTIVITIES

The work area of vehicle repair and maintenance is occupied about 1/3 of whole car workshop area. The residual area is used a domestic.

SITE DESCRIPTION

What is the total site area:	The assessment site covered area is about 330m ²
What area of the site is covered by buildings (%):	Full covered the assessment area
Please list all current and previous owners/occupiers if possible.	According to <i>EIA Report Appendix 8.1</i> , the area was used as construction sites, drainage channel and village houses in the past period. Currently is car repair workshop.
Is a site plan available? If yes, please attach	A site plan has provided in Appendix D of this CAP
Are there any other parties on site as tenants or sub-tenants?	No information is provided by the occupier
Surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.	North: Bare ground South: a Furniture Workshop East: Ma Wat Channel West: Tai Wo Service Road East
The topography of the area	The assessment site is located at side Ma Wat Channel
The size and location of the nearest residential communities	Small villages.
Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?	Ma Wat Channel

Site Walkover Checklist for Land Contamination Assessment

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No		Notes
	Yes	No	
1. What are the main activities/operations at the above address?	Yes		Car repair and maintain
2. How long have you been occupying the site?	Yes		About 20 years
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?	No		--
5. What were the main activities/operations during their occupancy?	Yes		Car repair and maintain
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?	Yes		Machine oil, lube oil, paints, batteries and solvent
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.)	No		--
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		--
15. How many are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	No		--
16. Do you have any underground storage tanks? (If yes, please provide details.)	No		--
<ul style="list-style-type: none"> • How many underground storage tanks do you have on site? • What are the tanks constructed of? • What are the contents of these tanks? • Are the pipelines above or below ground? • If the pipelines are below ground, has any leak and integrity testing been performed? • Have there been any spills associated with these tanks? 			
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		--

Site Walkover Checklist for Land Contamination Assessment

Questionnaire with Existing/Previous Site Owner or Occupier

		Yes/No	Notes
19.	How are the wastes disposed of?	No	No information provided by the occupier
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.) <ul style="list-style-type: none"> • 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? 	NA	No information provided by the occupier
22.	Do you have any records of major renovation of your site or rearrangement 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.)	Yes	Machine oil, lube oil, paints, batteries and solvent
25.	Has the site ever been remediated? (If yes, please provide details.)	No	--

Site Walkover Checklist for Land Contamination Assessment

Observations

	Yes/No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	No	Not observed.
2. What are the conditions of the bund walls and floors?	No	Not observed.
3. Are any surface water drains located near to drum storage and unloading areas?	No	Not observed.
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	Yes	Empty bottles, tires, machine oil, lube oil, paints, batteries and solvent.
5. Is there a storage site for the wastes?	No	Not observed.
6. Is there an on-site landfill?	Yes	General refuse was observed to dispose in front of the workshop entrance.
7. Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	Not observed.
8. Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	Yes	Oil stains is observed at the car workshop boundary near entrance.
9. Are there any potential off-site sources of contamination?	No	Not observed.
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	Yes	Machine oil and solvent
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	Not observed.
12. Any noticeable odours during site walkover?	Yes	Slightly.
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 oils, cleaning solvents and thinners.

Site Walkover Checklist for Land Contamination Assessment

Location: The potential contamination workshops of Fanling – Furniture Workshop

Date of site visit: 3 April 2014

GENERAL SITE DETAILS

Site Owner / Client:	Unknown
Property Address:	Tai Wo Service Road East
Person conducting the questionnaire:	the occupier

SITE ACTIVITIES

The Assessment Areas is only used for furniture storage.

SITE DESCRIPTION

What is the total site area:	The assessment site covered area is about 680m ²
What area of the site is covered by buildings (%):	Full covered the assessment area
Please list all current and previous owners/occupiers if possible.	According to <i>EIA Report Appendix 8.1</i> , the area was used as construction sites, drainage channel and village houses in the past period. Currently is used for furniture storage.
Is a site plan available? If yes, please attach	A site plan has provided in Appendix D of this CAP
Are there any other parties on site as tenants or sub-tenants?	No information is provided by the occupier
Surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.	North: car repair workshop South: a domestic East: Ma Wat Channel West: Tai Wo Service Road East
The topography of the area	The assessment site is located at side Ma Wat Channel
The size and location of the nearest residential communities	Small villages.
Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?	Ma Wat Channel

Site Walkover Checklist for Land Contamination Assessment

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No		Notes
	Yes	No	
1. What are the main activities/operations at the above address?	Yes		Furniture storage
2. How long have you been occupying the site?	Yes		More than 20 years
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?	No		--
5. What were the main activities/operations during their occupancy?	Yes		Furniture storage
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		Spray paint and thinner
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		--
15. How many are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	No		--
16. Do you have any underground storage tanks? (If yes, please provide details.)	No		--
<ul style="list-style-type: none"> • How many underground storage tanks do you have on site? • What are the tanks constructed of? • What are the contents of these tanks? • Are the pipelines above or below ground? • If the pipelines are below ground, has any leak and integrity testing been performed? • Have there been any spills associated with these tanks? 			
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		--

Site Walkover Checklist for Land Contamination Assessment

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No		Notes
	Yes	No	
19. How are the wastes disposed of?			All wastes generated from the workshop was disposed at the refuse collection point
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.) <ul style="list-style-type: none"> • 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? 	NA	No information provided by the occupier	
22. Do you have any records of major renovation of your site or rearrangement 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.)	Yes		Paint and solvent
25. Has the site ever been remediated? (If yes, please provide details.)	No		--

Site Walkover Checklist for Land Contamination Assessment

Observations

	Yes/No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	No	Not observed.
2. What are the conditions of the bund walls and floors?	No	Not observed.
3. Are any surface water drains located near to drum storage and unloading areas?	No	Not observed.
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	Not observed.
5. Is there a storage site for the wastes?	No	Rubbish bin is used for waste storage
6. Is there an on-site landfill?	No	All wastes generated from the workshop was disposed at the refuse collection point
7. Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	Not observed.
8. Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	Not observed.
9. Are there any potential off-site sources of contamination?	Yes	The neighboring of car repair workshop.
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	Not observed.
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?	Yes	Paints and thinners.

Appendix H

**RECORDS FROM GOVERNMENT
(EXTRACTED FROM EIA REPORT)**

Chan, Joseph

From: Liu, Benny
Sent: Wednesday, July 29, 2009 17:33
To: Chan, Joseph
Subject: FW: Liantang/Heung Yuen Wai Boundary Control Point & Associated Works
Attachments: ESB(199)(2008).xls

From: wsyuen@epd.gov.hk [mailto:wsyuen@epd.gov.hk]
Sent: 29 July 2009 17:17
To: Cheng, HT
Cc: Liu, Benny; "CI[RN]32"@epd.gov.hk
Subject: Fw: Liantang/Heung Yuen Wai Boundary Control Point & Associated Works

Dear Mr. Cheng,

I refer to your letter (ref:PEJ/HTC/IL/il/T255228/30/L0181) dated 23.07.09 requesting information on chemical waste producers (CWPs) within / in the proximity of your proposed project site.

As requested, please see below attached file showing details of the current (active) / past (inactive) registration of CWPs within / in the proximity of the areas as depicted in sketch 032 - 035.

Please also note that we have no record of any accident involving spillage / leakage of chemical waste within / in the proximity of the above-mentioned areas.

Regards,

William YUEN
Tel. 21585831

27/8/2009

No.	TPU	eIE File Reference No.	Polluter Name	Premises Address	WPN	Nature of Business	Major Chemical Waste
1	634	EP/RN/0000038335	MAN LEE FORK LIFT SERVICE COMPANY	LOT 463, DD85 LAU SHUI HEUNG ROAD FANLING NT	9513-634-M1020-01	VEHICLE MAINTENANCE	SPENT LUBRICATING OIL
2	634	EP/RN/0000038978	GRAND NATION INVESTMENT LIMITED	LOT 4308 BRP & PROTION 4313 BRP IN DD51 KAU LUNG HANG	6202-634-G1019-01	PETROL FILLING STATION	WASTE LUBE OIL, WASTE LUBRICATION OIL BOTTLES
3	634	EP/RN/0000038634	SHUI ON PLANT AND EQUIPMENT SERVICES LTD.	SECT A LOT 609-611 & SECT F 612 DEMARCATON DIST 85 FANLING NT	5213-634-S3011-02	CONSTRUCTION MACHINE	SPENT PUMP OIL, SPENT ENGINE OIL
4	634	EP/RN/0000053038	LEE SUJ HAR	LAU SHUI HEUNG PO KAR CHAI TSUEN DD85, LOT 607R.P., & 606, NORTH DISTRICT, NEW TERRITORIES	6322-634-L1133-01	WASTE METAL, WASTE PLASTIC	
5	634	EP/RN/0000052601	LEE SUJ HAR, JESSICA	LAU SHUI HEUNG PO KAR CHAI TSUEN, DD85, LOT 601, NORTH DISTRICT, NEW TERRITORIES	6322-634-L1133-03	WASTE METAL, WASTE PLASTIC	
6	634	EP/RN/0000038420	HOP KWAN MOTOR SERVICE	LOT 463A IN DD85 TAI WO TSUEN FANLING NT	9513-634-H2484-02	MOTOR REPAIR	WASTE LUBRICATING OIL, BRAKE LINING
7	634	EP/RN/0000044546	KAI FA INTERNATIONAL LTD.	PO KAK TSAI TSUEN NORTH NT	6318-634-K1110-01	COMPUTER WASTE RECYCLE	SPENT GLASS FRAGMENT, IC BOARD
8	634	EP/RN/0000042319	YIU HING AUTO REPAIR	DD 76LOT T378A-SCSS (SITE A) LAU SHUI HEUNG RD FANLING NT	9513-634-Y1055-01	AUTO REPAIRING	SPENT LUBE OIL
9	634	EP/RN/0000035785	TRULY METAL WORKS LTD	LAU SHUI HEUNG RD, DD 85 FANLING NT	3819-634-T2032-01	MFG OF METAL CONTAINERS	OILY SLUDGE, PAINT, KEROSENE
10	634	EP/RN/0000045252	VANNEX INTERNATIONAL LIMITED	LOT 567 SECT D(PARTIAL), LAU SHUI HEUNG RD., FANLING, NORTH DISTRICT, NEW TERRITORIES	6318-634-V2108-01	MATERIAL REPROCESSING	TV & CRT GLASS
11	634	EP/RN/0000052578	LEE SUJ HAR	LAU SHUI HEUNG PO KAR CHAI TSUEN DD85, LOT 531R.P., NORTH DISTRICT, NEW TERRITORIES	6322-634-L1133-02		WASTE METAL, WASTE PLASTIC
12	634	EP/RN/0000052525	HANG CANG MACHINERY ENGINEERING CO. LTD.	25A TAI WO VILLAGE, LAU SHEUNG HEUNG ROAD, FANLING, NORTH DISTRICT, NEW TERRITORIES	9519-634-H1163-01	MACHINERY SELLING OR RENTING	WASTE LUBE OIL, PUMP OIL
13	634	EP/RN/0000039367	CHUN WO HOLDINGS LTD.	LOT 612G IN DD85 PO KAT TSAI FANLING NT	9519-634-C1059-01	MACHINE MAINTENANCE	SPENT LUBE OIL, SPENT GEAR OIL & HYDRAULIC OIL, WASTE BATTERY
14	634	EP/RN/0000085938	P&A ENGINEERING LTD	HEUNG ROAD, FANLING, NORTH DISTRICT, NEW TERRITORIES	5517-634-P2759-03	HYDROLICAL ELECTRICAL	SURPLUS PAINT
15	651	EP/RN/0000044577	MING HING WATERWORKS ENGINEERING CO LTD	WANG SHAN KUK SAN TSUEN FANLING NT	5213-651-M2606-02	CONSTRUCTION	SPENT LUBRICATING OIL
16	652	EP/RN/0000045459	THAI & METAL (HK) LTD.	LOT NOS 758BRP & 767B IN D.D.46, SHA TAU KOK ROAD, FANLING, NORTH DISTRICT, NEW TERRITORIES	6322-652-T2839-02	TRADING	SPENT LUBRICATING OIL

No.	TPU	eIE File Reference No	Polluter Name	Licensee Name (Eng)	Premises Address	WPN	Nature of Business	Major Chemical Waste
1	652	EPRN0000052696	UNIGREEN ENTERPRISE CO. UNIGREEN PROCESSING	UNIGREEN ENTERPRISE CO.	NORTH DISTRICT, NEW TERRITORIES, DD38, 171 RP, 172 & 173	6522-652-111026-02	ELECTRIC APPLIANCE	SPENT CIRCUIT BOARD, SPENT BATTERY CONTAINING MERCURY & ACIDIC ELECTROLYTE & LUBRICATING
2	652	EPRN0000052994	MATERIAL TRADING CO. THAI & METAL TRADING CO.	UNIGREEN ENTERPRISE CO. THAI & METAL TRADING CO.	NORTH DISTRICT, NEW TERRITORIES, DD38, 171 RP LOT NO 75888P & 767 IN DD 46 SHA TAU KOK SHA TAU KOK RD, LOI NT	6522-652-111026-01	ELECTRIC APPLIANCE	BOARD, BATTERY CONTAINING MERCURY, BATTERY CONTAINING ACIDIC ELECTROLYTE & LUBRICATING
3	652	EPRN00000183436	THAI & METAL TRADING CO.	THAI & METAL TRADING CO.		6508-652-12839-01	TRADING	SPENT LUBRICATING OIL

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. : (35) in FSD/GR AI 4/07 III
來函檔號 YOUR REF. : PEJ/HTC/IL/i1/T255228/30/L0179
電訊掛號 Telex : hkfsdenq@hkfsd.gov.hk
圖文傳真 FAX: : 2739 5879
電話 TEL NO. : 2733 7741

6 August 2009

Mott MacDonald.
7th Floor, West Wing Office Building
New World Centre
20 Salisbury Road
Tsim Sha Tsui, Kowloon
Hong Kong.
(Attn: Mr. H.T. CHENG, Project Manager)

Dear Mr.Cheng,

By fax (2827 1823) only

Environmental Impact Assessment
Liantang/Heung Yuen Wai Boundary Control Point & Associated Works
Request for Information of Dangerous Goods

I refer to your letter dated 23 July 2009 regarding the captioned subject.

Please be advised that neither records of dangerous goods licence 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 at 2733 7741.

Yours faithfully,

(TSANG Wing-hung)
for Director of Fire Services

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

Appendix I

Text of Appendix 8.1 of Environmental Impact Assessment Report



Agreement CE45/2008(CE) Liantang/Heung Yuen Wai Boundary Crossing Point and Associated Works

Contamination Assessment Plan (Updated)

July 2010
Civil Engineering and Development Department

Agreement CE45/2008(CE) Liantang/Heung Yuen Wai Boundary Crossing Point and Associated Works

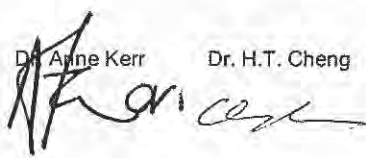
Contamination Assessment Plan (Updated)

July 2010

Civil Engineering and Development Department

3/F Civil Engineering and Development Building, 101 Princess Margaret Road, Homantin, Kowloon

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	Aug 2009	Various	Dr. Anne Kerr	Dr. H. T. Cheng	Draft
B	May 2010	Various	Dr. Anne Kerr	Dr. H.T. Cheng	Revised
C	Jul 2010	Various	 Dr. Anne Kerr	Dr. H.T. Cheng	Updated

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1. Introduction

1.1 Project Background

There are currently four existing boundary crossing points (BCPs) that provide vehicular crossing at the Hong Kong – Shenzhen boundary within the Hong Kong Special Administrative Region (HKSAR). These existing BCPs include Shenzhen Bay and Lok Ma Chau on the western side of the New Territories, as well as Man Kam To and Sha Tau Kok on the eastern side. The existing vehicular crossing points at Man Kam To and Sha Tau Kok have already reached their capacity limits, but scope for desirable expansion to enhance their capacities is limited by site constraints and the capacity of connecting roads on both Hong Kong and Shenzhen sides.

It is anticipated that the volume of cross-boundary traffic will continue to increase with the closer ties of Hong Kong-Shenzhen and the completion of the planned Eastern Corridor in Shenzhen. Therefore, it was identified necessary to establish a new BCP in the eastern part of Hong Kong-Shenzhen boundary to meet the future traffic demand and re-distribute cross-boundary traffic amongst the crossings in the east.

In December 2006, the Hong Kong and Shenzhen Governments jointly commissioned a study entitled “Preliminary Planning Study on Developing Liantang/Heung Yuen Wai Control Point” (hereafter referred to as “the Joint Study”) to examine the need, benefit and function of a new BCP at LT/HYW. The Joint Study confirmed the need for a new BCP at LT/HYW.

In January 2007, the Planning Department commissioned a consultancy study entitled “Planning Study on Liantang/Heung Yuen Wai Cross-boundary Control Point and its Associated Connecting Roads in Hong Kong – Feasibility Study” (hereafter referred to as “the Feasibility Study”) to examine the land, planning, traffic and engineering implications and its associated connecting road within Hong Kong territory for the LT/HYW BCP. With evaluation of a number of alternative options, the Feasibility Study (FS) put forward a preferred layout of the LT/HYW BCP and preferred alignment of the LT/HYW BCP connecting road.

On 18 September 2008, at the second meeting of the Hong Kong-Shenzhen Joint Task Force on Boundary District Development, the two Governments endorsed the major findings of the joint study and jointly announced to implement the LT/HYW BCP after the meeting on the following basis:

- a. the LT/HYW BCP would adopt the separate-location model but design of the BCP should maximize convenience to users including the construction of an integrated passenger hall over the Shenzhen River;
- b. the LT/HYW BCP on Hong Kong side would require resumption and resite of Chuk Yuen Village;
- c. the connecting road with the LT/HYW BCP on Hong Kong side would adopt the alignment leading to Tolo/Fanling Highway in the eastern direction which comprises 3 sections of tunnels with a total length of about 3.5 km; and
- d. the design and construction of the LT/HYW BCP should be packaged with the improvement works of Liantang section of the Shenzhen River

1.2 The Project

1.2.1 Original Scope as Defined in the EIA Study Brief

The Assignment comprises the LT/HYW BCP and its connecting road with associated works. The scope of the Project to be covered in the EIA study, as defined under Section 1.3 of the EIA Study Brief, comprises:

- (i) site formation of about 18.3 hectares of land for the construction of a BCP building in the area of Chuk Yuen Village;
- (ii) re-alignment of Kong Yiu Channel in association with the above site formation and drainage facilities discharging into the Shenzhen River associated with the BCP;
- (iii) cargo processing facilities including processing kiosks for clearance of goods vehicles, vehicle holding areas, customs inspection platforms, cargo examination buildings, X-ray building, weigh stations etc.;
- (iv) passenger related facilities including processing kiosks and examination facilities for private cars and coaches, passenger clearance building and halls, etc.;
- (v) accommodation for and facilities of the Government departments providing services in connection with the BCP;
- (vi) provision of transport related facilities inside the BCP including public transport interchange, and transport drop-off and pick-up areas;
- (vii) other peripheral structures and supporting facilities such as bridges across Shenzhen River, border road and fences, water supply system, utilities, culvert, drainage and sewerage etc.;
- (viii) construction of a dual two-lane trunk road with traffic control and surveillance system connecting the BCP with Fanling Highway adjacent to Wo Hop Shek - which comprises a 6.5km of viaduct, three tunnel sections totaling 3.5km in length, tunnel administration building and tunnel ventilation system;
- (ix) associated diversion/modification works at Lin Ma Hang Road to cope with the BCP development;
- (x) associated environmental mitigation measures, landscaping works, drainage/sewerage, waterworks, utilities and traffic engineering works; and
- (xi) collection, treatment and disposal of sewage generated from the BCP - one of the following two tentative sewage treatment options will be recommended for adoption during the course of the EIA study
 - Option 1 – convey the sewage generated from the BCP to the Shek Wu Hui Sewage Treatment Works through an existing village pumping main;
 - Option 2 – provide an on-site sewage treatment facility to a tertiary level with provision of reedbeds.

1.2.2 Changes to the Original Scope

Following from the preliminary planning and design of the BCP and connecting road and taking into account engineering feasibility, stakeholder consultation and investigation into alternative design and

construction methodologies, a number of changes have been made since the original scope presented in the EIA Study Brief. The major changes to the original scope include:

- (a) EIA Study Brief Section 1.3(ii) - Re-alignment of Kong Yiu Channel is no longer required as further design investigation has revealed that the BCP can be accommodated without the need to modify the channel, and the presence of the BCP is not anticipated to impact the hydrological function of the existing channel;
- (b) EIA Study Brief Section 1.3(viii) - As an outcome from the alignment options selection, the current preferred alignment will consist of two tunnel sections totalling 5.7km in length (instead of three tunnel sections totalling 3.5km in length) and 5.2km of viaduct and/or at grade sections (instead of 6.5km of viaduct), and total length will increase from 10km to 10.9km;
- (c) EIA Study Brief Section 1.3(xi) - Confirmation of provision of on-site sewage treatment facility with proposed Membrane Bioreactor (MBR) treatment and effluent reuse.

1.2.3 Current Scope of the Project

Based on the changes made to the original scope of the Project, the current scope comprises:

- (i) site formation of about 18.3 hectares of land for the construction of a BCP building in the area of Chuk Yuen Village;
- (ii) drainage facilities discharging into the Shenzhen River associated with the BCP;
- (iii) cargo processing facilities including processing kiosks for clearance of goods vehicles, vehicle holding areas, customs inspection platforms, cargo examination buildings, X-ray building, weigh stations etc.;
- (iv) passenger related facilities including processing kiosks and examination facilities for private cars and coaches, passenger clearance building and halls, etc.;
- (v) accommodation for and facilities of the Government departments providing services in connection with the BCP;
- (vi) provision of transport related facilities inside the BCP including public transport interchange, and transport drop-off and pick-up areas;
- (vii) other peripheral structures and supporting facilities such as bridges across Shenzhen River, border road and fences, water supply system, utilities, culvert, drainage and sewerage etc.;
- (viii) construction of a dual two-lane trunk road with traffic control and surveillance system connecting the BCP with Fanling Highway adjacent to Wo Hop Shek - which comprises approximately 5.2km of viaduct and/or at grade sections, and two tunnel sections totalling 5.7km in length, tunnel administration building and tunnel ventilation system;
- (ix) associated diversion / modification works at Lin Ma Hang Road to cope with the BCP development;
- (x) associated environmental mitigation measures, landscaping works, drainage/ sewerage, waterworks, utilities and traffic engineering works; and

- (xi) collection, treatment and disposal of sewage generated from the BCP via provision of an on-site sewage treatment facility to a tertiary level with proposed Membrane Bioreactor (MBR) treatment and effluent reuse.

1.3 Designated Projects under EIA Ordinance

The Project originally comprised the following Designated Projects (DPs) based on items A.1 and I.1 in Part 1 of Schedule 2 to the Environmental Impact Assessment (EIA) Ordinance:

- Re-alignment of Kong Yiu Channel and drainage facilities discharging into the Shenzhen River associated with the BCP (item I.1); and
- A dual two-lane trunk road connecting the BCP with Tolo/Fanling Highway – about 6.5km on viaduct and 3.5km in tunnels (item A.1).

However, following a consideration of design alternatives, re-alignment of Kong Yiu Channel is no longer required, but a new DP based on item F.4 has been added. Hence the current Project, which has undergone notable modification since the EIA Study Brief, now comprises the following DPs:

- A dual two-lane trunk road connecting the BCP with Tolo/Fanling Highway – about 5.3km on viaduct or at grade and 5.7km in tunnels (item A.1); and
- Reuse of treated sewage effluent from a tertiary treatment plant for irrigation at the BCP.

In accordance with the EIA Ordinance (EIAO), an EIA report has to be prepared and approved by Director of Environmental Protection (DEP) before an Environmental Permit (EP) will be issued for construction and operation of the Project.

On 3 November 2008, the Civil Engineering and Development Department (CEDD) submitted a Project Profile (EIAO Register No. PP-372/2008) to apply for an EIA Study Brief under Section 5(1) of the EIA Ordinance. DEP issued on 12 December 2008 an EIA Study Brief (EIAO Register No. ESB-199/2008) to CEDD for undertaking of the EIA Study.

1.4 Structure of the Report

A Contamination Assessment Plan (CAP) was submitted based on initial connecting road alignment on 31 August 2009 and accepted by EPD on 2 October 2009. A revised CAP was submitted on 31 May 2010 due to the refining of alignment and scope of works during the design stage and was accepted by EPD on 22 June 2010. However, due to further refining of the alignment section at Sha Tau Kok Road, this updated CAP is prepared for the submission to DEP for endorsement in accordance with the requirement set out in Clause 3.4.8.1(iv) of the EIA Study Brief.

After this introductory section, Section 2 presents the assessment objectives, criteria and methodology. Section 3 presents findings of the site appraisal, which included a desk-top study and a site reconnaissance survey. Section 4 presents the site investigation plan for the potential contaminated sites. Section 5 presents the assessment conclusion.

2. Assessment Objectives, Criteria and Methodology

2.1 Objectives

The objectives of this CAP are to:

- review the present and historical land uses in relation to possible land contamination within or in the proximity of the Project area;
- identify any potential hot spots of land contamination;
- evaluate the environmental impacts associated with the potential contamination identified from implementation of the Project; and
- propose, where necessary, sampling and laboratory chemical analysis required to determine the nature and extent of any potential land contamination identified

2.2 Relevant Standards, Guidelines and Requirements

The relevant standards and guidelines on land contamination assessment and remediation include the following:

- Section 3 of Annex 19 to the EIAO-TM;
- Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops;
- Guidance Notes for Contaminated Land Assessment and Remediation; and
- Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

In accordance with the requirement specified in Clause 3.4.8.1 of the EIA Study Brief, if any contaminated land uses as stated in Sections 3.1 and 3.2 of Annex 19 in the Technical Memorandum on EIA Process (EIAO-TM) of the EIAO are identified, the carrying out of a land contamination assessment is required and measures shall be proposed to avoid disposal.

The uses that may have the potential to cause land contamination include among others:

- oil installations including oil depots and petrol filling stations;
- gas works;
- power plants;
- shipyards/boatyards;
- chemical manufacturing/processing plants;
- steel mills/metal workshops;
- car repairing and dismantling workshops; and
- scrap yards.

2.3 Assessment Methodology

Desktop appraisal and site reconnaissance were undertaken to identify the presence of any potentially contaminative land within or in the proximity of the Project area.

Relevant information were collected and reviewed as part of the desktop study, including:

- historical aerial photographs along the Project alignment;
- records of active (current) and inactive (past) registered chemical waste producers in the areas of interest from the Environmental Protection Department (EPD);
- records of current and past dangerous good (DG) licences in the areas of interest from the Fire Services Department (FSD);
- records of accidents that involved spillage/leakage of chemical waste or DG from EPD and FSD

Site reconnaissance surveys were undertaken to identify current land uses along the Project alignment and verify the findings of the desktop appraisal.

3. Site Appraisal

3.1 Project Alignment and its Environs

The Project consists of two main components, construction of a Boundary Crossing Point; and construction of a connecting road alignment.

The proposed BCP is located at the boundary with Shenzhen near the existing Chuk Yuen Village. The site is approximately 18.3 ha and will be comprised of a main passenger building with passenger and cargo processing facilities and associated customs, transport and ancillary facilities. Connection to Shenzhen side will be via several bridges over the Shenzhen River.

The connecting road alignment consists of six main sections:

1. Lin Ma Hang to Frontier Closed Area (FCA) Boundary – this section comprises at-grade and viaducts and includes the improvement works at Lin Ma Hang Road;
2. Ping Yeung to Wo Keng Shan – this section stretches from the Frontier Closed Area Boundary to the tunnel portal at Wo Keng Shan and comprises at-grade and viaducts including an interchange at Ping Yeung;
3. North Tunnel – this section comprises the tunnel segment at Wo Keng Shan and includes a ventilation building at the portals on either end of the tunnel;
4. Sha Tau Kok Road – this section stretches from the tunnel portal at Wo Keng Shan to the tunnel portal south of Loi Tung and comprises at-grade and viaducts including an interchange at Sha Tau Kok and an administration building;
5. South Tunnel – this section comprises a tunnel segment that stretches from Loi Tung to Fanling and includes a ventilation building at the portals on either end of the tunnel as well as a ventilation building in the middle of the tunnel near Lau Shui Heung;
6. Fanling – this section comprises the at-grade, viaducts and interchange connection to the existing Fanling Highway.

Figure 3.1 and 3.1a-k shows the Project layout and corresponding works areas.

3.2 Desktop Study

3.2.1 Review of Historical Aerial Photographs and Previous Approved Studies

Relevant historical aerial photographs taken between 1924 and 2005, where available, were collected and reviewed. The aerial photos cover the land requirement limit of the Project, taking into account the refined alignment of the BCP connecting road. Part of the BCP and Lin Ma Hang Road were studied in the CAP of the Regulation of Shenzhen River Regulations Stage IV EIA Study, approved in December 2009 by EPD. The Contamination Assessment Report (CAR) was also submitted to EPD in March 2010. The CAP and CAR were reviewed for this assignment. The historical land uses identified from the review are summarised below for evaluation of potential land contamination.

3.2.1.1 Proposed BCP at Chuk Yuen Village

The proposed LT/HYW BCP will be built in the area of Chuk Yuen Village, which is inside the Closed Area. A review of the aerial photos suggested that the area that will be occupied by the BCP was agricultural land since 1940's until 1970's. Abandoned agricultural land started to appear in 1970's but the area was reduced in 1980's. Woodland can be seen from the aerial photos taken in 1980's and larger area of abandoned agricultural land was found since late 1990's. The land use of the study area has not changed much since then.

Table 3.1 presents a summary of the historical land use identified at the area of Chuk Yuen Village. Representative aerial photos reviewed are presented in **Figure A1** of **Appendix A**.

Table 3.1 Historical land use in the area of Chuk Yuen Village

Date	Ref. no.	Height (ft)	Land Use
6/11/1945	Y00963	20,000	Active agricultural land, village houses
17/11/1954	Y02912	29,200	Active agricultural land, village houses
20/12/1973	7827R	12,500	Active and abandoned agricultural land, village houses
23/11/1976	16345	12,500	Active and abandoned agricultural land, village houses
5/8/1986	A05594	4,000	Active and abandoned agricultural land, village houses, woodland
28/4/1992	A30725R	4,000	Active and abandoned agricultural land, village houses, woodland
9/12/1999	CN25141R	8,000	Active and abandoned agricultural land, village houses, woodland
21/11/2005	CW68388R	8,000	Active and abandoned agricultural land, village houses, woodland

3.2.1.2 Sections of BCP Connecting Road between Lin Ma Hang and Frontier Closed Area and between Ping Yeung and Wo Keng Shan

The proposed BCP connecting road around Ta Kwu Ling partly falls within the Closed Area Boundary, including part of the existing Lin Ma Hang Road. A review of the historical aerial photographs revealed that the Project Area involves land that was primarily agricultural land until the 1970's. Village houses at Ping Yeung and Lin Ma Hang Road were mostly developed in the 1970's. Aside from the progressive abandonment of agricultural land and slight expansion of village areas, the land use in the area has changed very little.

Table 3.2 presents a summary of the historical land use identified in the region. Representative aerial photos reviewed are presented in **Figure A1** and **A2** of **Appendix A**.

Table 3.2 Historical land use along connecting road between Lin Ma Hang and Wo Keng Shan

Date	Ref. no.	Height (ft)	Land Use
6/11/1945	Y00963	20,000	Agricultural land, hillside shrubland
17/11/1954	Y02912	23,200	Agricultural land, hillside shrubland
16/5/1969	Y15864	3,000	Agricultural land, hillside shrubland
23/11/1976	16345	12,500	Agricultural land, hillside shrubland, village houses
3/8/1986	A05560, A05562, A05594	4,000	Agricultural land, hillside shrubland, village houses
7/11/1994	CN8665	4,000	Agricultural land, village houses, hillside grassland and shrubland, bareground
19/11/2004	CW61736, CW63140R	4,000	Active and abandoned agricultural land, village houses, hillside grassland and shrubland

Date	Ref. no.	Height (ft)	Land Use
21/11/2005	CW68388R	8,000	Active and abandoned agricultural land, village houses, hillside shrubland

3.2.2 North Tunnel at Wo Keng Shan and Sha Tau Kok Road Section of the BCP Connecting Road

This portion of the BCP connecting road involves a roundabout at Loi Tung and connecting road emerges at the tunnel portals at Princess Hill and Cheung Shan.

Review of historical aerial photographs suggests that the land use in the area has generally changed very little. Sha Tau Kok Road can be seen in the aerial photo taken in 1954. In the 1950's and 1960's, the land in the region was mainly for agricultural use, except for the hillside areas which were not cultivated. Some of the agricultural land was abandoned in the 1990's. Part of the area within the land requirement limit turned into open area while other parts have been converted to horticulture.

Table 3.3 presents a summary of aerial photographs reviewed and the historical land use identified in the region. Representative aerial photos reviewed are presented in **Figure A3** of **Appendix A**.

Table 3.3 Historical land use along connecting road in Sha Tau Kok Road Section

Date	Ref. no.	Height (ft)	Land Use
17/11/1954	Y02912	29,200	Agricultural land, hillside shrubland
1963	Y10132	-	Agricultural land, hillside shrubland, village houses
20/12/1973	7838	12,500	Agricultural land, hillside shrubland, village houses
3/8/1986	A05508	4,000	Agricultural land, hillside shrubland, village houses
7/11/1994	CN8700	4,000	Active and abandoned agricultural land, hillside shrubland and woodland, village houses, open area
29/3/2001	CW30301	3,500	Active and abandoned agricultural land, horticulture, hillside shrubland and woodland, village houses, open area

3.2.3 South Tunnel at Lau Shui Heung and Proposed Mid-tunnel Ventilation Building at Po Kai Tsai

The proposed South Tunnel at Lau Shui Heung runs through the hillside. Construction of the tunnel mid-ventilation building is proposed at Po Kai Tsai, near Lau Shui Heung, where the South Tunnel locates. The area was used as agricultural land in 1970's, which was later on abandoned and turned into bareground in 1980's. The area has then been used as open storage and warehouse for construction materials until now.

The historical land use identified from a review of relevant aerial photos are summarised in **Table 3.4**. Representative aerial photos at Lau Shui Heung and Po Kai Tsai reviewed are presented in **Figure A4** and **A5** of **Appendix A**.

Table 3.4 Historical land use of the location of proposed ventilation building at Po Kai Tsai

Date	Ref no.	Height (ft)	Land Use
22/2/1963	Y09973	3,900	Agricultural land, access road
23/11/1978	23416	4,000	Agricultural land, access road
13/1/1981	35589	10,000	Abandoned agricultural land, access road
7/3/1986	A04656	4,000	Bare ground, access road
18/10/1990	A23492	4,000	Open storage, access road

Date	Ref no.	Height (ft)	Land Use
20/7/1995	CN10584	3,000	Open storage and warehouse, access road
24/9/2001	CW33835, CW33898	4,000	Open storage and warehouse, access road, agricultural land, hillside shrubland

3.2.4 Fanling Section of BCP Connecting Road

The proposed BCP connecting road will be constructed as a viaduct structure spanning over a new drainage channel at the village of Kiu Tau and the MTR East Rail and bore into Lung Shan near Fanling Highway.

Aerial photo taken in 1924 revealed that the railway already existed and the surrounding area was used as agricultural land. In the early 60's, the area was mostly agricultural land with some scattered houses and low rise buildings. In the 80's, part of the study area became bare ground and more houses and low rise buildings were built in the area. In the late 1990's early 2000's, some of the discrete area next to Fanling Highway was turned into construction sites, and a significant area of the land has been used in carrying works for drainage improvement. The land to the south of Kiu Tau village between Fanling Highway and the railway has been turned into plantation.

Table 3.5 presents a summary of relevant aerial photographs reviewed and the historical land use identified within or in the proximity of the Project alignment in Fanling. Representative aerial photos reviewed are presented in **Figure A6** of **Appendix A**.

Table 3.5 Historical land use along the proposed BCP connecting road in Fanling

Date	Ref. No.	Height (ft)	Land Use
1924	Y00190	12,500	Agricultural land, railway
17/2/1963	Y09766	3,900	Agricultural land, village, low rise buildings
7/3/1986	A04594	4,000	Agricultural land, bare ground, village, low rise buildings
4/6/1995	CN9781	3,000	Agricultural land, plantation, bare ground, village, construction sites, low rise buildings
24/9/2001	CW33687	4,000	Agricultural land, plantation, village, construction sites, low rise buildings

3.2.5 Review of Records from Government Departments

Relevant data, including records of active and inactive registered chemical waste producers, records of current and past DG licences, and records of any accident that involved spillage/leakage of chemical waste or DG in the areas of interest were collected from EPD and FSD. Replies from the two Government departments in response to the Consultants' requests are presented in **Appendix B** for reference.

A review of the records from EPD revealed that while there are a number of registered chemical waste producers in the area, the Project alignment will not encroach onto these existing facilities. There was also no record of any accident that involved spillage/leakage of chemical waste within or in the proximity of the areas of interest.

Reply from FSD also revealed that there were neither records of DG licence nor incidents of spillage/leakage of DG in the areas of interest.

3.3 Site Reconnaissance Survey

Site reconnaissance surveys were carried out in May, July and October 2009 and May 2010 to identify current land uses along the Project alignment and to verify the findings of desktop appraisal.

The proposed LT/HYW BCP will be built over the area of Chuk Yuen Village (see **Photo 1** in **Appendix C**) after its relocation. The reconnaissance site surveys revealed that the area is occupied by village houses and agricultural fields. No potentially contaminative facilities such as car repairing workshops or scrap yards has been observed on site.

At the further north of BCP connecting road, the viaduct will span over a site that is occupied by an abandoned pigsty (see **Photo 2** in **Appendix C**) to the west of Nga Yiu Ha. No sign of land contamination was observed on the paved ground surface at this abandoned site.

Site inspections confirmed that running further northwest the viaduct will pass over areas occupied by agricultural fields, woodlands, River Ganges (Ping Yuen River) and scattered village houses (see **Photo 3** in **Appendix C**). No potentially contaminative land uses were observed within or in the proximity of the Project alignment.

At the north portal of the North Tunnel section, the BCP connecting road emerges at the northern side of Cheung Sha along Wo Keng Shan Road. Site observations confirmed that an existing recycling compound (see **Photo 4** in **Appendix C**) in Ping Che is situated on the opposite side of Ng Chow Road at more than 50m from the proposed viaduct. No sign of land contamination was observed during the site visits along the Project area.

In the valley south of Loi Tung, the bored tunnel through Princess Hill will emerge at a low level portal and climb up to pass over Shan Tau Kok Road and the adjacent River Indus (Ng Tung River). **Photos 5 and 6** in **Appendix C** illustrate the agricultural land, horticultural land and natural hillside observed near Loi Tung. Construction site office at the Wo Keng Shan Road and an open area at the Sha Tau Kok Road were identified within the land requirement limit. Open storage of construction materials and vehicle tyre fixing and replacement services were observed within the open area (**Photo 12 and 13** in **Appendix C**). Although no sign of land contamination was observed on the ground surface, further site visits are suggested to be conducted after land acquisition and access to the area is granted to assess the land contamination potential.

The works area for the proposed ventilation building at Po Kai Tsai is currently used as open storage. It was observed during the site visit that the area is mainly used as storage of construction materials, with the land surface concrete-paved. Provided with no records of possible land contamination due to chemical spillage in the area according to EPD and FSD, it is considered that the possible land contamination within the area is low. Due to the inaccessibility of the area during the course of this assignment, it is considered further site visits are to be arranged after land acquisition to assess land contamination potential.

As observed on site, the areas involved in the construction of the proposed BCP connecting road at the east and southwest sides Fanling Highway are currently occupied by construction sites (see **Photos 7 and 8** in **Appendix C**), drainage channel, and village houses (see **Photo 9** in **Appendix C**). No sign of contamination was identified at these existing land uses.

However, a car workshop and a furniture workshop were identified near the Tai Wo Service Road East. It is observed that the land surfaces of both workshops are concrete-paved. The furniture workshop was

actually found to be used as storage during site investigation (see **Photo 10** in **Appendix C**). It is anticipated that potential of land contamination is insignificant for furniture storage. Car maintenance service was observed in the car workshop indicating certain degree of land contamination (see **Photo 11** in **Appendix C**). Due to the inaccessibility of the area during the course of this assignment, the extent of land contamination is suggested to be further assessed by site visits after land acquisition.

3.4 Prediction and Evaluation of Environmental Impacts

Based on the findings from the desktop study and the site reconnaissance survey, the current land uses, including potentially contaminative uses, within or in the vicinity of the Project area have been identified and are summarised in **Table 3.6**.

Table 3.6: Summary of Site Appraisal Results

Areas	Current Land Use	Historical Land Use	Potential Land Contamination Impact on the Project Area	Need for Further Site Investigation	Photos (in Appendix C)
Area of the proposed BCP at Chuk Yuen Village	Agricultural land, village houses, woodland	Agricultural land, village	No contaminative land uses were identified	No	1
Viaduct section that encroach onto a site occupied by an abandoned pigsty	Abandoned pigsty	Agricultural land	No adverse contaminated land impacts are identified based on site appraisal	No	2
Along viaduct section near Ping Yeung and Nga Yiu Ha	Agricultural fields, woodlands, village houses	Agricultural fields, woodlands, village houses	No contaminative land uses were identified	No	3
Site at opposite side of Ng Chow Road, Ping Che	Recycling compound of metals and plastic with storage of construction equipment	Agricultural land	Proposed viaduct will not encroach onto these existing facilities; no adverse contaminated land impacts are identified based on site appraisal	No	4
Along north tunnel under Cheung Shan	Hillside shrubland and grassland	Hillside shrubland and grassland	No contaminative land uses were identified	No	--
Works areas at Sha Tau Kok Road (near Loi Tung)	Agricultural land, horticulture, village houses, shrubland, open area, construction site office	Agricultural land, village, shrubland	Potential of land contamination at the open storage and vehicle tyre fixing and replacement services were identified	Yes after land acquisition due to current inaccessibility	5, 6, 12, 13
Ventilation building in Po Kai Tsai	Open storage, warehouse, access road	Agricultural land, bare ground	Potential of land contamination at the open storage and warehouse was identified	Yes after land acquisition due to current inaccessibility	--
Along south tunnel under Lung Shan and Lau Shui Heung	Hillside shrubland and grassland	Hillside shrubland and grassland	No contaminative land uses were identified	No	--
Sites to the east and southwest of Fanling Highway	Construction sites, drainage channel, village houses, workshops	Agricultural land, plantation, village, bare ground	Possible contaminative land uses were identified at the car and furniture workshops	Yes after land acquisition due to current inaccessibility	7, 8, 9, 10, 11

4. Site Investigation Plan

4.1 Purpose of Site Investigation

The proposed geo-environmental investigations intend to identify the presence (if any) and the extent of contamination (ground/groundwater) for the works areas of the ventilation building at Po Kai Tsai and sites to the east and southeast of Fanling Highway. A sampling and analytical programme is proposed based on the RBRGs Guidance note and the EPD's Guidance Notes. The site investigation programme will be implemented upon site access is granted and EPD endorsement, prior to the commencement of construction.

The proposed sampling locations will be reviewed when the access of sites or land acquisition is granted. Any additional locations, if needed, will be submitted to EPD for endorsement before the site investigation works begins.

Table 4.1 summarizes the review of potential contaminated sites and the corresponding sampling and analysis proposal.



Table 4.1 Summary of Potential Contaminated Sites

Location I.D.	Review of available information	Initial contamination evaluation of site(s) and possible remediation methods	Confirmation of whether the contamination problem at site(s) would be surmountable	Sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of site(s)	Schedule of submission of revised CAP (if necessary), CAR, RAP and RR upon this/these site(s) is/are accessible
Ventilation building in Po Kai Tsai	Historical land use of the area was found to be agricultural land and bareground. The area is currently used as access road, open storage and warehouse. Access of the site is currently impossible.	<u>Initial Contamination Evaluation</u> Potential concern due to possible industrial activities within the site. <u>Possible Contaminants</u> Petroleum hydrocarbons, metals and organic solvents <u>Possible Remediation</u> Upon the contaminated soil quantity and quality, possible remediation included: <ul style="list-style-type: none"> Stabilization/solidification for heavy metals Bioremediation for organic contaminants 	During site inspection, the area was used as construction materials storage. It is not likely to cause insurmountable impacts, provided there are available and adopted remediation methods for the potential contaminants.	Due to inaccessibility of the site, specific hotspots of contamination cannot be determined during the course of this assignment. 8-10 trial pits based on a regular grid pattern are proposed at this stage.	<u>Revised CAP</u> Upon land acquisition and access is granted, site inspection would be carried out to identify any contaminative sources and hotspot of contamination within the site area. A revised CAP would be prepared and submitted to EPD for endorsement. <u>CAR and Remedial Action Plan (RAP)</u> CAR would be submitted to EPD for endorsement upon the completion of site investigation and laboratory testing. RAP would also be submitted if contamination is identified.
Works sites to the east and southwest of Fanling Highway	Historical land use of the area was found to be agricultural land, plantation, village and bareground. The area is currently used as construction sites, drainage channel, village houses and workshops. Possible contaminative land uses were identified at the car and furniture workshops. Access of the sites is currently impossible.	<u>Initial Contamination Evaluation</u> Potential concern due to vehicle repair/maintenance activities and furniture storage/manufacturing within the sites. <u>Possible Contaminants</u> Petroleum hydrocarbons, metals and organic solvents <u>Possible Remediation</u> Upon the contaminated soil quantity and quality, possible remediation included: <ul style="list-style-type: none"> Stabilization/solidification for heavy metals Bioremediation for organic contaminants 	The sites would have been used for vehicle maintenance and furniture storage/manufacturing only. It is not likely to cause insurmountable impacts, provided there are available and adopted remediation methods for the potential contaminants.	Due to inaccessibility of the site, specific hotspots of contamination cannot be determined during the course of this assignment. 0-4 trial pits based on a regular grid pattern are proposed at this stage.	<u>Remediation Report (RR)</u> A RR would be submitted to demonstrate completion of remediation works prior to the commencement of construction works.

Location I.D.	Review of available information	Initial contamination evaluation of site(s) and possible remediation methods	Confirmation of whether the contamination problem at site(s) would be surmountable	Sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of site(s)	Schedule of submission of revised CAP (if necessary), CAR, RAP and RR upon this/these site(s) is/are accessible
Open area at Sha Tau Kok Road (near Loi Tung)	<p>Historical land use of the area was found to be agricultural land, village and shrubland. The area is currently used as access road, open storage and tyre fixing and replacement services.</p> <p>Access of the site is currently impossible.</p>	<p><u>Initial Contamination Evaluation</u></p> <p>Potential concern due to possible industrial activities within the site.</p> <p><u>Possible Contaminants</u></p> <p>Petroleum hydrocarbons, metals and organic solvents</p> <p><u>Possible Remediation</u></p> <p>Upon the contaminated soil quantity and quality, possible remediation included:</p> <ul style="list-style-type: none"> • Stabilization/solidification for heavy metals • Bioremediation for organic contaminants 	<p>During site inspection, part of the area was used as construction materials storage and tyre fixing and replacement services. It is not likely to cause insurmountable impacts, provided there are available and adopted remediation methods for the potential contaminants.</p>	<p>Due to inaccessibility of the site, specific hotspots of contamination cannot be determined during the course of this assignment. 0-8 trial pits based on a regular grid pattern are proposed at this stage.</p>	

4.2 Scope of Site Investigations

The following sampling locations and depths are recommended based on the best available information acquired and have made reference to the guidelines on sampling and analysis recommended in the Guidance Notes (**Section 2.2**).

The proposed site investigation programme will be undertaken as follows in **Table 4-2**:

Table 4.2 Contaminated Land Site Investigation

Investigation Approach	Trial Pits (Trial pits based on a regular grid pattern are proposed at this stage. Tentative sampling locations are shown in Figure 4.1, 4.2 and 4.3)
Excavation Method	Excavation will be done by preferably hand digging. Trial pits digging will be undertaken by separate hand digging tools to geotechnical investigations. Strict protocols and 'chain-of-custody' procedures will be employed to prevent cross-contamination and deterioration of recovered samples, which will include steam cleaning between each investigation location, sterilisation of sampling equipment between each depth, and the use of cool boxes for storage of recovered samples.
Provisional Depth	3m
Field/In-situ Testing	In-situ testing of Volatile Organic Carbon (VOC) using Photo Ionizing Detector (PID) (where applicable)
Sampling Method	Collect soil samples with a clean knife or spatula and placed within relevant containers or U100 samples and groundwater sample (if encountered) from each trial pit.

Soil samples will be taken to identify the potential contamination vertical profile taking into consideration the proposed excavation levels. Sub-samples will be taken from recovered undisturbed samples at nominally 0.5, 1.5 & 3.0 m below ground level (or below concrete pavement) with depth variations made to suit proposed excavation depths. Groundwater samples will be taken from the base of all trial pits (if encountered).

Field testing will encompass head space tests by use of a Photo Ionizing Detector (PID) (where applicable) to identify the presence of any potential Volatile Organic Chemicals (VOCs), and identification of any significant free-product thickness lying above the groundwater table by use of an interface meter.

4.3 Quality Assurance / Quality Control

4.3.1 Soil Sampling

Soil samples will be labelled uniquely and unambiguously. The nature of soil material sampled will be recorded at different depths. Information such as depth, sampling location and other information such as any non-standard sampling events will be recorded as well. The description of soil samples will include but not limited to:

- Test site where the sample is collected.

- Sample identification number.
- Soil sampling depth (with respect to the lowest level of concert pavement/cover, if any)
- Estimated physical characteristics
- Colour photographs

All samples will be stored in portable cool box with frozen chilled packs at 0-4°C whilst in the field or in transit. Samples will be returned to the laboratory on the same evening as the day of sampling. A chain-of-custody form will be completed for all the samples delivered. Each sample tube will be sealed such that leakage into and out of the tube is minimized.

Strata logging for boreholes will be conducted by a qualified geologist during the drilling and sampling. The logs will include general stratigraphic description, soil sampling depth, sample notation and level of groundwater. The presence of rocks/boulders/cobbles and foreign objects (e.g. wood, metals and plastics) will also be recorded.

All equipment used for sample handling and storage will be decontaminated before and after collection of each sample. Standard procedures for cleaning the drilling rig and sampling equipment is described below:

- Clean with fresh water and lab-grade detergent (use brush if necessary) to remove particulate matter and surface film
- Rinse thoroughly with tap water (for drilling equipment) or distilled water (for sampling equipment);
- After field cleaning, the equipment will be handled by personnel wearing clean gloves to avoid re-contamination. If the equipment is not to be used immediately, it should be covered with clean plastic sheeting or put in a box to avoid re-contamination; and
- The drilling equipment and sampling equipment will be cleaned according to the above procedures between sampling holes.

4.3.2 Groundwater Sampling

If groundwater is encountered during excavation, groundwater samples should also be collected at all trial pits. The trial pit should be pumped to near dry and allowed to stand for 24 hours. Groundwater samples should then be collected using a decontaminated bucket/bailer.

Groundwater samples should be immediately transferred to new, clean, laboratory-supplied “darken” type glass jars for sample storage/transport after collection. Groundwater samples should be placed in the glass jars with zero headspace and promptly sealed with a septum-lined cap. The samples should be placed in ice chests, cooled and maintained at a temperature of about 4°C until delivered to the analytical laboratory immediately after collection.

The floating layer will be removed/recovered and analysed separately from the main aqueous phase of the groundwater (as far as is reasonably practicable). All samples will be uniquely labelled.

Between samples, all equipment used for sample handling and storage will be thoroughly decontaminated with laboratory-grade detergent. Samples will be stored in appropriate pre-washed containers (provided by the laboratory) and immediately put in an insulated cool box. It will be ensured that the sample containers and the box are tightly closed and that sufficient chilling packs or ice are provided to maintain a temperature of 0-4 °C inside the box.

Chilled groundwater samples will be transferred to the custody of the HKOLAS accredited laboratory or one of its Mutual Recognition Arrangement Partners on the same day as sampling. A chain-of-custody system will be operated in triplicate as part of the QA/QC procedure. The accredited laboratory QA/QC procedures will be precisely followed.

4.3.3 Quality Control (QC) Samples

The following QC samples for soil and groundwater will be collected for laboratory analysis during the sampling process:

- ONE equipment blank (i.e. equipment “rinsate”) per 20 samples
- ONE field blank per 20 samples
- ONE set of duplicate sample per 20 samples

4.3.4 Health and Safety Measures

All field personnel should wear appropriate Personal Protective Equipment (PPE) while performing site investigation, such as eye goggles, masks, safety helmet, protective gloves, protective clothing, safety shoes, etc. All personnel should always maintain basic personal hygiene standard and be responsible for maintaining and storing their own PPE in a secure location before leaving the site.

Eating, drinking and smoking are prohibited within the site area. The specific safety measures to be taken depend on the site conditions, the nature and magnitude of contamination, and relevant regulations related to site safety.

4.4 Scope of Laboratory Testing

Laboratory testing will be undertaken as follows:

- The ground investigation contractor transports soil samples (or groundwater samples) in appropriate storage containers on the same day of recovery to the testing laboratory.
- Samples shall be tested at a HOKLAS accredited laboratory or one of its Mutual Recognition Arrangement partners
- All laboratory testing methods must be accredited by the HOKLAS or one of its Mutual Recognition Arrangement partners.
- The Laboratory will take relevant soil subsamples for laboratory testing.
- The Laboratory will carry out the laboratory tests as detailed in **Tables 4.3** and **4.4** below.

- The Laboratory will report laboratory test results from recovered soil/groundwater (where applicable) sampling during the site investigation period. **Table 4.3** sets out the proposed investigation and laboratory testing for the proposed site investigation.
- The accredited laboratory QA/QC procedures will be precisely followed.

Table 4.3 Laboratory Testing Methods for Soil Samples

Chemical Category	Referenced Method	Testing Parameters	“Industrial” scenario Detection Limit (mg/kg)*	Laboratory Limit of Reporting (mg/kg)
Petroleum Carbon Ranges	USEPA 8260/8015	C ₆ -C ₈	1.00E+04	5.0
		C ₉ -C ₁₆	1.00E+04	200
		C ₁₇ - C ₃₅	1.00E+04	500
Volatile Organic Chemicals (VOCs)	USEPA 8260	Benzene	9.21E+00	0.5
		Toluene	1.00E+04	0.5
		Ethylbenzene	8.24E+03	0.5
		Xylene (Total)	1.23E+03	2.0
Semi-Volatile Organic Chemicals (SVOCs)	USEPA 8270	Anthracene	1.00E+04	0.5
		Benzo(a)pyrene	9.18E+00	0.5
		Phenanthrene	1.00E+04	0.5
		Fluoranthene	1.00E+04	0.5
		Napthalene	4.53E+02	0.5
	Pyrene	1.00E+04	0.5	
	USEPA 8270	Phenols	1.00E+04	0.5
Heavy Metals	USEPA 6020	Copper (Cu)	1.00E+04	1.0
		Lead (Pb)	2.29E+03	1.0
		Zinc (Zn)	1.00E+04	1.0
	APHA 3500CR: D (By subtracting Cr ⁶⁺ from total Cr)	Chromium III (Cr ³⁺)	1.00E+04	1.0
	APHA 3500CR: D	Chromium VI (Cr ⁶⁺)	1.96E+03	1.0

* Detection limits under currently HOKLAS accredited scheme may differ from the RBRG criteria detection limits

Table 4.4 Laboratory testing methods for groundwater samples

Parameter	Reference Method	Testing Parameters	“Industrial” Scenario Detection Limit (mg/L)*	Limit of Reporting (mg/L)
Petroleum Carbon Ranges	USEPA 8015 and 8260	C6-C8	1.15E+03	0.2
		C9-C16	9.98E+03	0.5
		C17- C35	1.78E+02	0.5
Volatile Organic Chemicals (VOCs)	USEPA 8260	Benzene	5.40E+01	0.005
		Toluene	1.00E+04	0.005
		Ethylbenzene	1.00E+04	0.005
		Xylene (Total)	1.57E+03	0.2
Semi-Volatile Organic Chemicals (SVOCs)	USEPA 8270	Anthracene	1.00E+04	0.002
		Phenanthrene	1.00E+04	0.002
		Fluoranthene	1.00E+04	0.002
		Napthalene	8.62E+02	0.002
		Pyrene	1.00E+04	0.002

* Detection limits under currently HOKLAS accredited scheme may differ from the RBRG criteria detection limits

4.5 Interpretation of results and reporting

As the potential land contamination sites involve storage of construction materials, vehicle maintenance and storage of furniture, “industrial” scenario under RBRG standard will be applied and the detection limit is included in **Table 4.4**.

Laboratory test results will be mainly assessed against EPD’s RBRGs requirements, which will be adopted for soil and groundwater risk assessment. If any chemicals, which are not listed in the RBRG list, were found, the relevant USEPA risk-based screening level will be adopted for soil and groundwater risk assessment respectively.

The assessments of potential contamination will be presented in a Contamination Assessment Report (CAR) and, if necessary, a Remediation Action Plan (RAP), for approval by EPD.

5. Conclusion

In accordance with the requirement set out in Clause 3.4.8.1(iv) of the EIA Study Brief, this updated Contamination Assessment Plan is prepared due to the further refining of the alignment section at Sha Tau Kok Road for submission to DEP for endorsement.

An investigation into the current and historical land uses in respect to the potential land contamination has been undertaken, including a desktop study and a reconnaissance survey. Based on the findings of the site appraisal on the existing and historical land uses in the Study Area, adverse land contamination impacts associated with the construction and operation of the proposed project are not anticipated except at the open area at Sha Tau Kok Road, work areas of ventilation building in Po Kai Tsai and sites to the east and southwest of Fanling Highway. No site investigations and laboratory chemical analysis can be carried out during the course of this assignment due to inaccessibility of these sites. Further site investigation is therefore proposed upon land acquisition and site access is granted.