JOB NO.: TCS01264/22

CEDD Contract No. SD/2022/01 –
Site Formation and Infrastructure Works for Public Housing Development at Ex-Mount Davis Cottage Area in Kennedy Town

Further Review Report for Land Contamination Assessment on Working Area under the Contract within New World First Bus Former Depot Area

PREPARED FOR

China Road and Bridge Corporation (Hong Kong)

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1. INTRODUCTION

1.1 BACKGROUND

1.1.1 Civil Engineering and Development Department (hereafter referred as "CEDD") Contract No. SD/2022/01 - Site Formation and Infrastructure Works for Public Housing Development at Ex-Mount Davis Cottage Area in Kennedy Town (hereinafter referred as "the Works Contract") is a Non-Designated Project. The works to be executed within the Site under the Works Contract include the following construction works:

(a) Site formation of a platform at +28 mPD at the eastern portion of the site and a platform at +29.5 mPD at the western portion with formation of associated slopes and retaining structures;
(b) Natural terrain hazard mitigation works of the natural hillside overlooking the Site from the south;
(c) A vehicular access connecting the development to Victoria Road and a footbridge over Victoria Road for the development; and
(d) Ancillary works including drainage, diversion of existing streamcourses, sewerage, watermains, landscaping, environmental protection and mitigation works; and
(e) Other ancillary works in association with the above proposed works i.e. contaminated soil treatment of land remediation.

1.1.2 In October 2022, CEDD awarded the Works Contract to China Road and Bridge Corporation (Hong Kong) (hereinafter named "CRBC"). Layout plan of the Works Contract is shown in ***Appendix A***.

1.1.3 Pursuant to Particular Specification (PS) Section 25.47(1)(v) of the Works Contract, *CRBC* shall employ Environmental Specialist (ES) before commencement any works within ***New World First Bus Former Depot*** area to perform further land contamination assessment work to confirm:

a. the validity of publicly available information, i.e., approved CAP and CAR/RAP in the Updated EIA Report (Register No. AEIAR-188/2015) regarding the extend and quantity of the contaminated areas;
b. whether there is any potential contamination due to the continual operation of the Bus Depot;
c. whether further site investigation is required; and
d. prepare ***Contamination Assessment Review Report*** (hereinafter called "*Further Review Report*") for any working areas as located within the former Bus Depot.

1.1.4 Based on the requirement, CRBC employed Action-United Environmental Services & Consulting (AUES) as an ES to prepare a Further Review Report and undertake further land contamination assessment in accordance with *Section 25.47of PS* stipulation.

1.1.5 Further Review Report shall be included the further land contamination assessment findings, conclusions and recommendations.

2. PREVIOUS LAND CONTAMINATION ASSESSMENT FINDINGS

2.1 GENERAL

2.1.1 In mid-2014, Mott MacDonald Hong Kong Limited (MMHK) has been commissioned by CEDD to undertake the detailed design of the demolition and ground decontamination works at the Proposed Kennedy Town Comprehensive Development Area Site (KTCDA)" (hereinafter called the Decommissioning Project). The major works involved in the Decommissioning Project are divided into the following phases, as presented in ***Table 2-1***.

Table 2-1 Different Phases of the Major Works for the Decommissioning Project

Phase	Description
Phase 1 Part 1	Demolition and clearance of all existing chimneys, buildings and ancillary structures above the existing concrete ground slab in the Phase 1 Site area where the former Kennedy Town Incinerator Plant (KTIP) and the Kennedy Town Abattoir (KTA) are located. The Phase 1 Part 1 also includes the removal of asbestos containing materials and dioxin/furan contaminated wastes within the Phase 1 Site.
Phase 1 Part 2	Temporary use of the Phase 1 Site as site office and for the storage of common construction materials for the construction of the West Island Line (WIL) and Highways Department maintenance depot.
Phase 2	Demolition of remaining structures and ground decontamination works within the Decommissioning Project site

2.2 PREVIOUS LAND CONTAMINATION ASSESSMENT

2.2.1 In 2002, Site Investigation (SI) and laboratory testing works were carried out under the Contamination Assessment Plan (the "CAP submitted in Original EIA Report") as part of an Environmental Impact Assessment (EIA) study under Agreement No. CE 15/99 (the "Original EIA study") - the Proposed Kennedy Town Comprehensive Development Area Site (KTCDA)" (hereinafter called the Decommissioning Project). The results and recommended decontamination methods were reported respectively in a Contamination Assessment Report (the "CAR submitted in Original EIA Report") and Remediation Action Plan (the "RAP submitted in Original EIA Report"), and incorporated into both the Original EIA Report (EIA Register No. AEIAR-058/2002, approved on 16 April 2002) and EP.

2.2.2 In January 2003, a Contamination Confirmatory Investigation Proposal (CCI Proposal) was submitted recommending further SI (including soil sampling and laboratory analysis) to ascertain the extent of land contamination and volume of contaminated soil. Further SI was subsequently conducted and the Final SI Report was submitted to EPD in May 2004. At the time of approval of the Original EIA Report and the CCI Proposal, Hong Kong was using the Dutch List "B" levels of the Netherlands ("Dutch B") as referenced under the Practice Note (PN) for Professional Persons Environmental Consultative Committee ProPECC PN3/94 "Contaminated Land Assessment and Remediation" (ProPECC PN3/94) issued by EPD in 1994 to interpret the levels of land contamination.

2.2.3 According to the CCI Proposal indicated that the amount of soil requiring decontamination would be significantly larger than the quantity as predicted in the Original EIA Report. As such, the recommended land decontamination methods and related mitigation measures in the Original EIA Report are no longer applicable. Hence, alternative ground decontamination works have to be proposed by MMHK in an Updated EIA and its scope is provided in EIA Study Brief No. ESB-252/2012 (the

Updated EIA Study Brief) issued by EPD on 28 August 2012. In accordance with Appendix D2 of the Updated EIA Study Brief, a Contamination Assessment Plan, CAR and RAP shall be submitted to EPD for approval as part of the Updated EIA Report. The laboratory results of the additional SI in the *The former New World First Bus Depot* are also incorporated into the CAR and RAP submitted in Updated EIA Report.

2.2.4 In 2007, EPD promulgated the Risk-Based Remediation Goals (RBRGs) to replace Dutch B levels as the new land contamination assessment standards for Hong Kong. A Contamination Assessment Plan adopting RBRG approach (the "CAP submitted in Updated EIA Report") was endorsed by EPD on 27 March 2013. Subsequent to the endorsement of CAP submitted in Updated EIA Report, a Contamination Assessment Report (CAR submitted in Updated EIA Report) and Remediation Action Plan (RAP submitted in Updated EIA Report) are jointly prepared based on future land use assumptions. The CAR and RAP submitted in Updated EIA Report were prepared and submitted to seek agreement in principle with EPD in accordance with Section 8(iv) and (v) of the "Guidance Note for Contaminated Land Assessment and Remediation" (Guidance Note).

2.2.5 The previous SI report or CCI proposal for the Decommissioning Project site concerned have been taken in consideration in the CAR submitted in Updated EIA Report and it is recommended that most of the previous SI data (including original EIA study SI data) is still valid for the land contamination assessment and remediation either based on Dutch B levels or RBRGs.

2.3 GENERAL SITE CONTEXT AND PREVIOUS SITE INVESTIGATION

2.3.1 A review of the historical information for the Decommissioning Project site was conducted. The whole Decommissioning Project site is divided into a total of 41 grids as shown in **Appendix A,** comprising:

- 32 square-shaped grids, each grid with dimensions of 31m x 31m (i.e. grid area of 961m2);
- 2 irregular-shaped grids (B and C) with grid areas of about 575m2 and 363m2 respectively;
- 6 irregular-shaped grids (3, 4, 7, 8, 33 and A, amended as 3R, 4R, 7R, 8R, 33R, AR respectively) with grid areas of about 585m2 , 681m2 , 697m2 , 643m2 , 467m2 and 187m2; and
- 1 new grid (D) with grid area of about 772m2.

2.3.2 Based on the Works Contract site layout plan shown in ***Appendix A*** that the proposed Lift Tower and DN1050mm diversion drainage pipe as part of the Works Contract are located within Former New World First Bus Depot on grid 3R and 4R and the covered area is approximated *250m^2*. In addition, installation of temporary water-main with 40m length and 300mm diameter, and two septic tanks with 4m length and 2m width for site office are scheduled on grids 8R and D within the former bus depot. No excavation is required for the site offices setup and the site offices will be operated until the end of the Works Contract. In addition, the temporary water main and two septic tanks will be in place after the completion of decontamination works (if required), and will be operated until the end of the Works Contract.

2.3.3 According to previous SI report or CCI proposal for Former New World First Bus Depot, soil sampling was carried out at the 25 sampling boreholes selected on grids 3R, 4R, 8R and D and chemical analysis for the soil samples were performed accordingly. The samples collected depth and chemicals analyzed from individual boreholes is listed in ***Table 2-2***, and the location of the individual boreholes is shown in **Appendix B**.

Table 2-2 Relevant Boreholes and Parameters Analytical on Grids 3R, 4R, 8R and D within Bus Depot Area during Previous Site Investigation

Grid	Borehole ID	Depth of Samples Tested (m)							Parameters Analyzed				Previous SI of Assessment Phase
		0.5	1.5	3.0	4.5	6.0	7.5	9.0	PCRs	VOC BTEX only	SVOC PAH only	Heavy Metals	
3R	BH8	Y	Y	Y	Y	-	Y	-	√	√	√	√	BCT
	BH96	-	Y	Y	Y	-	-	-	-	-	-	Pb only	Tiers 1/2
4R	TB23	Y	Y	Y	-	-	-	-	√	√	√	√	EIA
	BH1	Y	Y	Y	-	-	Y	-	-	-	-	Pb only	Tiers 1/2
	BH3	Y	Y	Y	-	Δ	-	-	-	-	-	Cu & Pb	Tiers 1/2
	BH5	Y	Y	Y	-	Y	-	-	-	-	-	Pb only	Tiers 1/2
	BH7	Y	Y	Y	Y	-	-	-	-	-	-	Cu & Pb	Tiers 1/2
	BH9	Y	Y	Y	Y	Δ	-	-	-	-	√	Cu & Pb	Tiers 1/2
	BH10a	Y	Y	Y	Y	Y	-	-	√	√	√	√	#BCT
	BD1	Y	Y	Y	Y	Y	Y	Y	√	√	√	Cd, Cr, Cu, Pb, Hg & Zn	Additional
8R	TB27	Y	Y	Y	-	-	-	-	√	√	√	√	EIA
	BH10	Y	Y	Y	Δ	-	-	-	-	-	√	Cu & Pb	Tiers 1/2
	BH11	Y	Y	Y	Y	Δ	-	-	√	-	√	Cu & Pb	Tiers 1/2
	BH15	Y	Y	Y	Y	-	-	-	-	-	√	Cu & Pb	Tiers 1/2
	BH16	Y	Y	Δ	Δ	-	-	-	√	√	√	Cu, Pb & Hg	Tiers 1/2
	BH30	Y	Y	-	-	-	-	-	-	-	-	Pb only	Tiers 1/2
	BD2	Y	Y	Y	-	Y	Y	Y	√	√	√	Cd, Cr, Cu, Pb, Hg & Zn	Additional
D	TB1	Y	Y	Y	-	-	-	-	√	√	√	√	EIA
	TB21	Y	Y	Y	Y	-	-	-	√	√	√	√	EIA
	TB22	Y	Y	Y	-	-	-	-	√	√	√	√	EIA
	TB26	Y	Y	Y	Y	-	-	-	√	√	√	√	EIA
	BH22	Y	Y	Y	Δ	Δ	-	-	√	√	-	Cu, Pb, Zn & Hg	Tiers 1/2
	BH24	Y	Y	-	Y	Y	-	-	√	-	-	√	Tiers 1/2
	BH25	-	-	-	Δ	Δ	Δ	-	√	-	√	Cd, Cu, Pb, Hg & Zn	Tiers 1/2
	BH27	Y	Y	Y	Y	Δ	-	Δ	√	-	√	Cu, Pb, Zn & Hg	Tiers 1/2
	BH27a	Y	Y	Y	Y	Y	Y	-	√	√	√	√	#BCT
	BH34	Y	Y	Y	Y	-	Y	-	√	-	-	Cd, Cu, Pb, Hg & Zn	Tiers 1/2
	BD3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Cd, Cr, Cu, Pb, Hg & Zn	Additional
	BD4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Cd, Cr, Cu, Pb, Hg & Zn	Additional

Remarks:
1. BCT – Comprehensive Testing
2. √ = parameters analysis carried out for the sampling borehole; Y = analysis carried out for all selected parameters; Δ = analysis carried out only for Petroleum Carbon Ranges, PAH, BTEX and / or Heavy Metals.
3. BTEX include Benzene, Ethylbenzene, Toulene and Xylenes.
4. Heavy metals include Arsenic (As), Cadmium (Cd), Chromium III & VI (Cr III & VI), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn) and Mercury (Hg).
5. Please refer to ***Appendix B*** for grid and borehole locations respectively.
6. The sampling borehole details are shown in ***Appendix B***.

2.4 PREVIOUS SITE INVESTIGATION SOIL RESULTS EXCEEDANCE REMEDIATION CRITERIA

Remediation Criteria of Previous Site Investigation

2.4.1 Since the Project Design Plan was yet to be developed in 2014, MMHK recommended that all chemicals testing results of soil samples should be compared with lower limits of Urban / Rural residential of the RBRGs to assess whether the soil below existing ground level is contaminated or not. Urban / Rural residential of RBRGs criteria are listed ***Table 2-3***.

Table 2-3 Residential of Urban and Rural Risk-based Remediation Goals Criteria of Soil

Parameter		Risk-Based Remediation Goals Limits		
		Urban Residential (mg/kg)	Rural Residential (mg/kg)	Saturation Limit C_{sat} (mg/kg)
Metals	Antimony	2.95E+01	2.91E+01	NA
	Arsenic	2.21E+01	2.18E+01	NA
	Barium	1.00E+04*	1.00E+04*	NA
	Cadmium	7.38E+01	7.28E+01	NA
	Chromium III	1.00E+04*	1.00E+04*	NA
	Chromium VI	2.21E+02	2.18E+02	NA
	Cobalt	1.48E+03	1.46E+03	NA
	Copper	2.95E+03	2.91E+03	NA
	Lead	2.58E+02	2.55E+02	NA
	Manganese	1.00E+04*	1.00E+04*	NA
	Mercury	1.10E+01	6.52E+00	NA
	Molybdenum	3.69E+02	3.64E+02	NA
	Nickel	1.48E+03	1.46E+03	NA
	Tin	1.00E+04*	1.00E+04*	NA
	Zinc	1.00E+04*	1.00E+04*	NA
Petroleum Carbon Ranges	Fractions C6 – C8	1.41E+03	5.45E+02	1.00E+03
	Fractions C9 – C16	2.24E+03	1.33E+03	3.00E+03
	Fractions C17 – C35	1.00E+04*	1.00E+04*	5.00E+03
Volatile Organic Chemicals (VOCs)	Acetone	9.59E+03	4.26E+03	***
	Benzene	7.04E-01	2.79E-01	3.36E+02
	Bromodichloromethane	3.17E-01	1.29E-01	1.03E+03
	2-Butanone	1.00E+04*	1.00E+04*	***
	Chloroform	1.32E-01	5.29E-02	1.10E+03
	Ethylbenzene	7.09E+02	2.98E+02	1.38E+02
	Methyl tert-Butyl Ether	6.88E+00	2.80E+00	2.38E+03
	Methylene Chloride	1.30E+00	5.29E-01	9.21E+02
	Styrene	3.22E+03	1.54E+03	4.97E+02
	Tetrachloroethene	1.01E-01	4.44E-02	9.71E+01
	Toluene	1.44E+03	7.05E+02	2.35E+02
	Trichloroethene	5.23E-01	2.11E-01	4.88E+02
	Xylenes (total)	9.50E+01	3.68E+01	1.50E+02
Semi-Volatile Organic Chemicals (SVOCs)	Acenaphthene	3.51+03	3.28E+03	6.02E+01
	Acenaphthylene	2.34+03	1.51E+03	1.98E+01
	Anthracene	1.00E+04*	1.00E+04*	2.56E+00
	Benzo(a)anthracene	1.20E+01	1.14E+01	NA

Parameter	Risk-Based Remediation Goals Limits		
	Urban Residential (mg/kg)	Rural Residential (mg/kg)	Saturation Limit C_{sat} (mg/kg)
Benzo(a)pyrene	1.20E+00	1.14E+00	NA
Benzo(b)fluoranthene	9.88E+00	1.01E+01	NA
Benzo(g,h,i)perylene	1.80E+03	1.71E+03	NA
Benzo(k)fluoranthene	1.20E+02	1.14E+02	NA
bis-(2-Ethylhexyl)phthalate	3.00E+01	2.80E+01	NA
Chrysene	8.71E+02	9.19E+02	NA
Dibenzo(a,h)anthracene	1.20E+00	1.14E+00	NA
Fluoranthene	2.40E+03	2.27E+03	NA
Fluorene	2.38E+03	2.25E+03	5.47E+01
Hexachlorobenzene	2.43E-01	2.20E-01	NA
Indeno(1,2,3-cd)pyrene	1.20E+01	1.14E+01	NA
Naphthalene	1.82E+02	8.56E+01	1.25E+02
Phenanthrene	1.00E+04*	1.00E+04*	2.80E+01
Phenol	1.00E+04*	1.00E+04*	7.26E+03
Pyrene	1.80E+03	1.71E+03	NA

Remark:
(*) *indicates a 'ceiling limit' concentration.*
(***) *indicates that the C_{sat} and solubility limits exceed the 'ceiling limit' therefore the RBRG applies*

2.4.2 MMHK compared the soil samples with the respective RBRGs with a point-by-point method. The samples with contaminant concentrations exceeding the respective RBRGs were considered contaminated and thus require decontamination. The extent of the land contamination was quantified by the volume of soil requiring decontamination and the depth of such soil.

2.4.3 Once the nature, location and depth of soil contamination have been identified by comparing with the RBRGs, the soil volume requiring excavation and decontamination was then worked out. The methodology used for calculating soil volume requiring excavation and/or decontamination was inherited from the "Final Site Investigation Report for Kennedy Town Comprehensive Development Area" dated March 2004.

Previous Site Investigation Soil Sample Exceed Remediation Limit Criteria

2.4.4 The proposed Lift Tower with DN1050mm diversion drainage pipe, temporary water-main and two septic tanks for site office are located within Former New World First Bus Depot on grids 3R, 4R, 8R and D. Hence, all soil samples collected from these grids was compared Urban and Rural Residential Risk-based Remediation Goals as shown above ***Table 2-3***. Detailed soil samples exceedance is listed in ***Table 2-4***.

Table 2-4 Chemicals as Detected from Soil Sample Exceed Urban and/or Rural Residential of the RBRGs Criteria

Borehole ID	Exceedance Soil Sample Collected Depth (m bgl)	Contamination Parameter with Exceedances
Grid 4R		
BH7	3.0	Lead
BH9	4.5	Lead and Benzo(a)pyrene

Borehole ID	Exceedance Soil Sample Collected Depth (m bgl)	Contamination Parameter with Exceedances
BH10a	0.5	Benzo(a)pyrene and PCR (C6-C8, C9-C16 & C17-C35)
	3.0	Benzo(a)pyrene
BD1	0.5	Lead
Grid 8R		
TB27	3.4	Lead and Benzo(a)pyrene
BH10	3.0	Lead and Benzo(a)pyrene
BH11	3.0	PCR (C6-C8 & C9-C16)
	4.5	Lead, Benzo(a)pyrene and PCR (C6-C8 & C9-C16)
BH15	1.5	Lead
BH16	0.5 and 1.5	Mercury
BH30	0.5	Lead
BD2	0.5 and 1.5	Lead
	3.0	Lead, Mercury and Benzo(a)pyrene
Grid D		
TB1	0.3	Copper, Lead, Zinc
	1.3 and 2.5	Lead and PCR (C6-C8)
TB21	0.5	Lead
	3.5	PCR (C6-C8 & C9-C16)
TB26	0.8	PCR (C6-C8 & C9-C16)
	1.8	PCR (C6-C8)
	2.7	Lead & PCR (C6-C8 & C9-C16)
BH22	1.5, 3.0 and 4.5	Lead
BH24	4.5	Lead
BH25	4.5	Lead
BH27	0.5	Lead
	3.0	PCR (C6-C8 & C9-C16)
	6.0	Lead
BH27a	6.0	Lead
BH34	0.5	Copper, Lead, Zinc
	1.5	Lead and PCR (C6-C8)
	3.0	PCR (C6-C8)
BD3	1.5 and 4.5	Lead
BD4	0.5 and 1.5	Lead and PCR (C9-C16)
	3.0	Mercury, Lead and PCR (C9-C16)

2.4.5 Based on findings, soil exceeding certain RBRGs preliminary identified. Hence, treatment of contaminated soil by cement solidification and/or biopiling, followed by on-site backfilling, was recommended depending on the types of contaminants found in the soil in each designated grid by MMHK.

3. FURTHER LAND CONTAMINATION ASSESSMENT AND UPDATING REMEDIATION PLAN UNDER THE WORKS CONTRACT

3.1 THE WORKS CONTRACT REQUIREMENTS

3.1.1 The proposed lift tower, diversion drainage pipe, temporary watermain and two septic tanks construction of the Works Contract SD/2022/01 are located on Grids 3R, 4R, 8R and D of the designated contamination areas of New World First Bus Former Depot. As it is considered that the excavation area may be subjected to further contamination, further assessment is required to confirm that:

a. the validity of publicly available information, i.e., approved CAP and CAR/RAP in the Updated EIA Report (Register No. AEIAR-188/2015) regarding the extend and quantity of the contaminated areas;

b. whether there is any potential contamination due to the continual operation of the former Bus Depot; and

c. whether further site investigation is required

3.2 AVAILABLE INFORMATION REGARDING THE EXTEND AND QUANTITY OF THE CONTAMINATED AREAS

3.2.1 Viewing aerial photos taken between 2014 and 2022 and the Review Report for the former New World First Bus Depot, the bus depot operation was ceased in 2016. After that the depot area was vacated and no occupation from other party. Therefore, it was considered that no further potential contamination sources after 2016 and the contamination zone as designated within the Former Bus Depot is not expected to be increased or extended. The aerial photos taken between 2014 and 2022 are shown in **Appendix C**.

3.3 SITE VISIT AT THE FORMER NEW WORLD FIRST BUS DEPOT

3.3.1 Site visit was conducted in November 2022 by AUES. The site was an idling government site and the floor of the site was paved with concrete with minor surface scratches. No potential source of contamination was spotted during the site visit. The site photos and the walkover checklist are provided in **Appendix D.**

3.4 FURTHER SITE INVESTIGATION OF LAND CONTAMINATION ASSESSMENT

3.4.1 Base on the desktop review of the relevant information and the approved Review Report for the former New World First Bus Depot, it is concluded that no further potential contamination sources during or after the former Bus Depot operation. However, the concentration of the determined soil exceedance parameters for past several years may be changed over time. So, it is recommended to conduct soil sampling at the work area under the Works Contract to assess the current situation of contaminated soil quantity and the remediation zone.

3.4.2 Since the Project Design Plan was yet to be developed in 2014, all chemical testing results of soil samples were compared with the lower limits of Urban / Rural residential of the RBRGs to assess whether the soil below ground level are contaminated in the Review Report for the former New World First Bus Depot prepared by MMHK. In the view of the current Works Contract's design plan, the proposed lift tower, diversion drainage pipe, temporary watermain construction and two septic tanks will be located within grids 3R, 4R, 8R and D of the Former Bus Depot. It is suggested that the land use for grids 3R, 4R, 8R and D shall be classified as "Roads including pedestrian walkway" and/or "Public Utilities" in accordance with ***Section 3*** of "***Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management***". Hence, lower limits of "***Industrial***" and "***Public Park***" criteria of Risk-based

Remediation Goals which as listed in ***Table 3-1***, is recommended to be used for assessing all soil samples collected from Grids 3R, 4R, 8R and D.

3.4.3 If groundwater encountered at any sampling point during soil sampling, groundwater monitoring well shall be set up for groundwater sampling and groundwater monitor wells location will be as same as soil sampling location.

Table 3-1 Industrial and Public Park of Risk-based Remediation Goals limits of Soil

Parameter		Risk-Based Remediation Goals Limits (mg/kg)		Lower Limits of Industrial or Public Park (mg/kg)	Saturation Limit C_{sat} (mg/kg)
		Industrial	Public Park		
Heavy Metals	Antimony	2.61E+02	9.79E+01	9.79E+01	NA
	Arsenic	1.96E+02	7.35E+01	7.35E+01	NA
	Barium	1.00E+04*	1.00E+04*	1.00E+04*	NA
	Cadmium	6.53E+02	2.45E+02	2.45E+02	NA
	Chromium III	1.00E+04*	1.00E+04*	1.00E+04*	NA
	Chromium VI	1.96E+03	7.35E+02	7.35E+02	NA
	Cobalt	1.00E+04*	4.90E+03	4.90E+03	NA
	Copper	1.00E+04*	9.79E+03	9.79E+03	NA
	Lead	2.29E+03	8.57E+02	8.57E+02	NA
	Manganese	1.00E+04*	1.00E+04*	1.00E+04*	NA
	Mercury	3.84E+01	4.56E+01	3.84E+01	NA
	Molybdenum	3.26E+03	1.22E+03	1.22E+03	NA
	Nickel	1.00E+04*	4.90E+03	4.90E+03	NA
	Tin	1.00E+04*	1.00E+04*	1.00E+04*	NA
	Zinc	1.00E+04*	1.00E+04*	1.00E+04*	NA
Petroleum Carbon Ranges	Fractions C6 – C8	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+03
	Fractions C9 – C16	1.00E+04*	1.00E+04*	1.00E+04*	3.00E+03
	Fractions C17 – C35	1.00E+04*	1.00E+04*	1.00E+04*	5.00E+03
Volatile Organic Chemicals (VOCs)	Acetone	1.00E+04*	1.00E+04*	1.00E+04*	***
	Benzene	9.21E+00	4.22E+01	9.21E+00	3.36E+02
	Bromodichloromethane	2.85E+00	1.34E+01	2.85E+00	1.03E+03
	2-Butanone	1.00E+04*	1.00E+04*	1.00E+04*	***
	Chloroform	1.54E+00	2.53E+02	1.54E+00	1.10E+03
	Ethylbenzene	8.24E+03	1.00E+04*	8.24E+03	1.38E+02
	Methyl tert-Butyl Ether	7.01E+01	5.05E+02	7.01E+01	2.38E+03
	Methylene Chloride	1.39E+01	1.28E+02	1.39E+01	9.21E+02
	Styrene	1.00E+04*	1.00E+04*	1.00E+04*	4.97E+02
	Tetrachloroethene	7.77E-01	1.84E+00	7.77E-01	9.71E+01
	Toluene	1.00E+04*	1.00E+04*	1.00E+04*	2.35E+02
	Trichloroethene	5.68E+00	6.94E+01	5.68E+00	4.88E+02
	Xylenes (total)	1.23E+03	1.00E+04*	1.23E+03	1.50E+02
Semi-Volatile Organic Chemicals (SVOCs)	Acenaphthene	1.00E+04*	1.00E+04*	1.00E+04*	6.02E+01
	Acenaphthylene	1.00E+04*	1.00E+04*	1.00E+04*	1.98E+01
	Anthracene	1.00E+04*	1.00E+04*	1.00E+04*	2.56E+00
	Benzo(a)anthracene	9.18E+01	3.83E+01	3.83E+01	NA
	Benzo(a)pyrene	9.18E+00	3.83E+00	3.83E+00	NA
	Benzo(b)fluoranthene	1.78E+01	2.04E+01	1.78E+01	NA
	Benzo(g,h,i)perylene	1.00E+04*	5.74E+03	5.74E+03	NA
	Benzo(k)fluoranthene	9.18E+02	3.83E+02	3.83E+02	NA
	bis-(2-Ethylhexyl)phthalate	9.18E+01	9.42E+01	9.18E+01	NA
	Chrysene	1.14E+03	1.54E+03	1.14E+03	NA

Parameter		Risk-Based Remediation Goals Limits (mg/kg)		Lower Limits of Industrial or Public Park (mg/kg)	Saturation Limit C_{sat} (mg/kg)
		Industrial	Public Park		
	Dibenzo(a,h)anthracene	9.18E+00	3.83E+00	3.83E+00	NA
	Fluoranthene	1.00E+04*	7.62E+03	7.62E+03	NA
	Fluorene	1.00E+04*	7.45E+03	7.45E+03	5.47E+01
	Hexachlorobenzene	5.82E-01	7.13E-01	5.82E-01	NA
	Indeno(1,2,3-cd)pyrene	9.18E+01	3.83E+01	3.83E+01	NA
	Naphthalene	4.53E+02	9.14E+02	4.53E+02	1.25E+02
	Phenanthrene	1.00E+04*	1.00E+04*	1.00E+04*	2.80E+01
	Phenol	1.00E+04*	1.00E+04*	1.00E+04*	7.26E+03
	Pyrene	1.00E+04*	5.72E+03	5.72E+03	NA

Remark:
(*) *indicates a 'ceiling limit' concentration.*
(***) *indicates that the C_{sat} and solubility limits exceed the 'ceiling limit' therefore the RBRG applies*

3.5 PROCEDURES OF FURTHER LAND CONTAMINATION ASSESSMENT

3.5.1 The procedures of Further Land Contamination Assessment for the work area under the Works Contract in grids 3R, 4R, 8R and D shall be compliance with the "*Practice Guide for Investigation and Remediation of Contaminated Land*" (hereinafter named "*PG*") requirements. Detailed procedures are as below:-

Supplementary Contamination Assessment Plan

3.5.2 The Supplementary Contamination Assessment Plan (SCAP) should be prepared to include information such as the design and location of site investigation to determine the presence and extent of contamination at the work area under the Works Contract in grids 3R, 4R, 8R and D. The SCAP shall be submitted to EPD for approval before commencement of site investigation.

Supplementary Contamination Assessment Report

3.5.3 Upon completed site investigation (SI) works, a Supplementary Contamination Assessment Report (SCAR) shall prepare as based on the findings. The chemical analysis results of the soil and/or groundwater samples should be compared with the requirements set out in the relevant the "*Guidance Note for Contaminated Land Assessment and Remediation"* with the "*Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management'*, as issued by EPD.

Remediation Action Plan (RAP)

3.5.4 If there is any contamination confirmation found on the work area under the Works Contract in grids 3R, 4R, 8R and D, remediation works should be undertaken to clean up as follow the currently Risk-Based Remediation Goals. Remediation Action Plan (RAP) which included the proposed treatment methodology and target together with SCAR shall be prepared and submitted to EPD for approval.

Remediation Report (RR)

3.5.5 After completion of the treatment work, a Remediation Report (RR) shall be developed and submitted to EPD for approval. Furthermore, construction works at the working areas in grids 3R, 4R, 8R and D should only be commenced after the RR was approved by EPD.

Appendix A

Layout Plan of the Works Contract

830800 E
830900 E
831000 E
816100 N
816000 N
815900 N

PROPOSED LIFT TOWER

HKSKH ST. LUKE'S CHURCH

VICTORIA ROAD

KA WAI MAN ROAD

J:\316047\REPORTEN\CAR\130228\FIG 2-2.dgn DATE:25/03/2013 TIME:09:17:48 USER:ylm42160

Notes

Key to symbols

- Project Boundary for KTCDA Site
- PREVIOUS GRID
- PROPOSED REVISED GRID
- TB20 — PREVIOUS SAMPLING BOREHOLES FOR EIA
- BH16 BH6 — PREVIOUS SAMPLING BOREHOLES FOR TIER 1 / TIER 2
- BH155 BH154 — PREVIOUS SAMPLING GRID BOREHOLES
- BH8 — PREVIOUS SAMPLING BOREHOLES FOR COMPREHENSIVE TESTING (BCT)
- Project Boundary for CEDD Contract No. SD/2022/01
- Proposed Lift Tower and DN1050mm diversion drainage pipe
- Proposed DN300mm watermain
- Proposed Septic Tanks
- Site Office

0 5 10 15 20 25m
1 : 500 SCALE BAR

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	MAR 13	MING	FIRST ISSUE	BW	AFK

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20/F Tins Landmark East
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Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

ALTERNATIVE GROUND DECONTAMINATION WORKS AT THE PROPOSED KENNEDY TOWN COMPREHENSIVE DEVELOPMENT AREA SITE

Title

GRID SYSTEM FOR THE KTCDA SITE AND BOREHOLE LOCATIONS

Designed	AM		Eng check	SMF	
Drawn	MING		Coordination	SMF	
Dwg check	AM		Approved	AFK	
Scale at A1	1:500	Status	PRE	Rev	P1

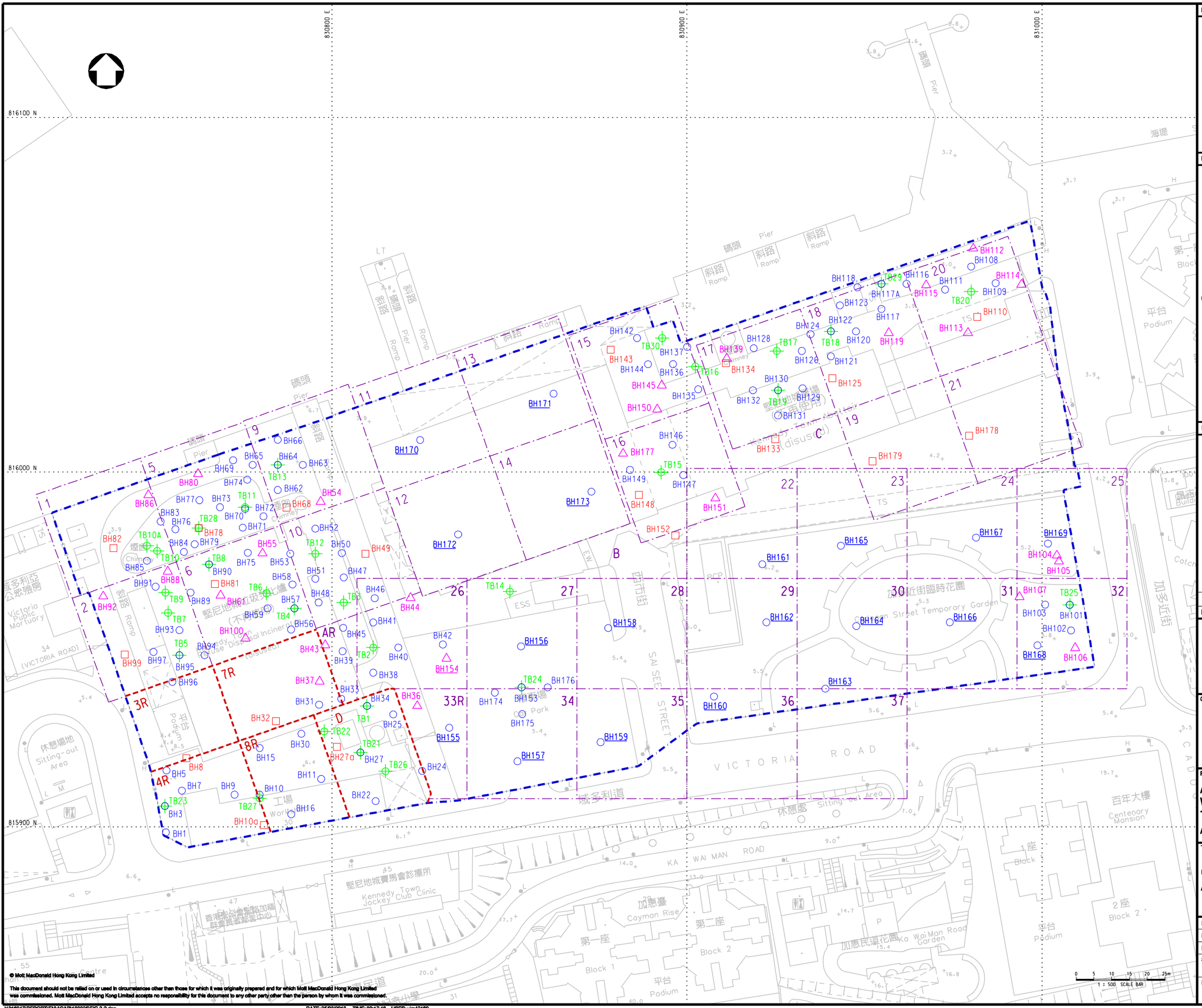
Drawing Number

FIGURE 2.2

Appendix B

Locations of Boreholes for Previous and Additional Site Investigation

(Extracted from the Appendix 7.2 of the Updated EIA Report)



Notes

Key to symbols

- PROJECT SITE BOUNDARY
- PREVIOUS GRID
- PROPOSED REVISED GRID
- TB20 PREVIOUS SAMPLING BOREHOLES FOR EIA
- BH16 BH6 PREVIOUS SAMPLING BOREHOLES FOR TIER 1 / TIER 2
- BH155 BH154 PREVIOUS SAMPLING GRID BOREHOLES
- BH8 PREVIOUS SAMPLING BOREHOLES FOR COMPREHENSIVE TESTING (BCT)

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	MAR 13	MING	FIRST ISSUE	BW	AFK

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CEDD

CIVIL ENGINEERING
AND DEVELOPMENT
DEPARTMENT

Project

ALTERNATIVE GROUND DECONTAMINATION WORKS AT THE PROPOSED KENNEDY TOWN COMPREHENSIVE DEVELOPMENT AREA SITE

Title

GRID SYSTEM FOR THE KTCDA SITE AND BOREHOLE LOCATIONS

Designed	AM	Eng check	SMF
Drawn	MING	Coordination	SMF
Dwg check	AM	Approved	AFK

Scale at A1	Status	Rev
1:500	PRE	P1

Drawing Number

FIGURE 2.2

j:\320320\report\env\cap\121030\FIG 3-1.dgn DATE:31/10/2012 TIME:11:30:11 USER:yim42189

Notes

1. THE GI WORK IS SCHEDULED TO COMMENCE IN MAY 2013.
2. TOTAL NO. OF GI IS 4 AND EACH REQUIRES 4 WORKING DAYS (TOTAL = 16 WORKING DAYS)

Key to symbols

- PROJECT SITE BOUNDARY
- PROPOSED REVISED GRID
- MTRCL WIL WORKS SITE
- HyD MAINTENANCE DEPOT
- EXISTING BUS DEPOT
- EXISTING CAR PARK
- EXISTING CADOGAN STREET TEMPORARY GARDEN
- EXISTING REFUSE COLLECTION POINT
- PROPOSED 4m x 4m WORK AREA FOR GI
- POTENTIAL CONTAMINTAED SOURCES / ACTIVITIES

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 12	MING	PRELIMINARY	AM	AFK

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CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

ALTERNATIVE GROUND DECONTAMINATION WORKS AT THE PROPOSED KENNEDY TOWN COMPREHENSIVE DEVELOPMENT AREA SITE

Title

ADDITIONAL SITE INVESTIGATION SAMPLING LOCATIONS

Designed	AM	Eng check	SMF
Drawn	MING	Coordination	SMF
Dwg check	AM	Approved	AFK

Scale at A1	Status	Rev
1:600	PRE	P1

Drawing Number

FIGURE 2.3

Appendix C

Aerial Photos

Aerial Photo from Lands Department
Photo No: CW107835 (26 Jun 2014)

Photo No: CS62284 (1 Jan 2016)

Photo No: E030112C (14 Sep 2017)

Photo No: E047322C (5 Oct 2018)

Photo No: E071127C (3 Oct 2019)

Photo No: E100182C (13 Jul 2020)

Photo No: E117999C (6 Jan 2021)

Photo No: E145733C (11 Jan 2022)

Appendix D

Site Photos and Walkover Checklist

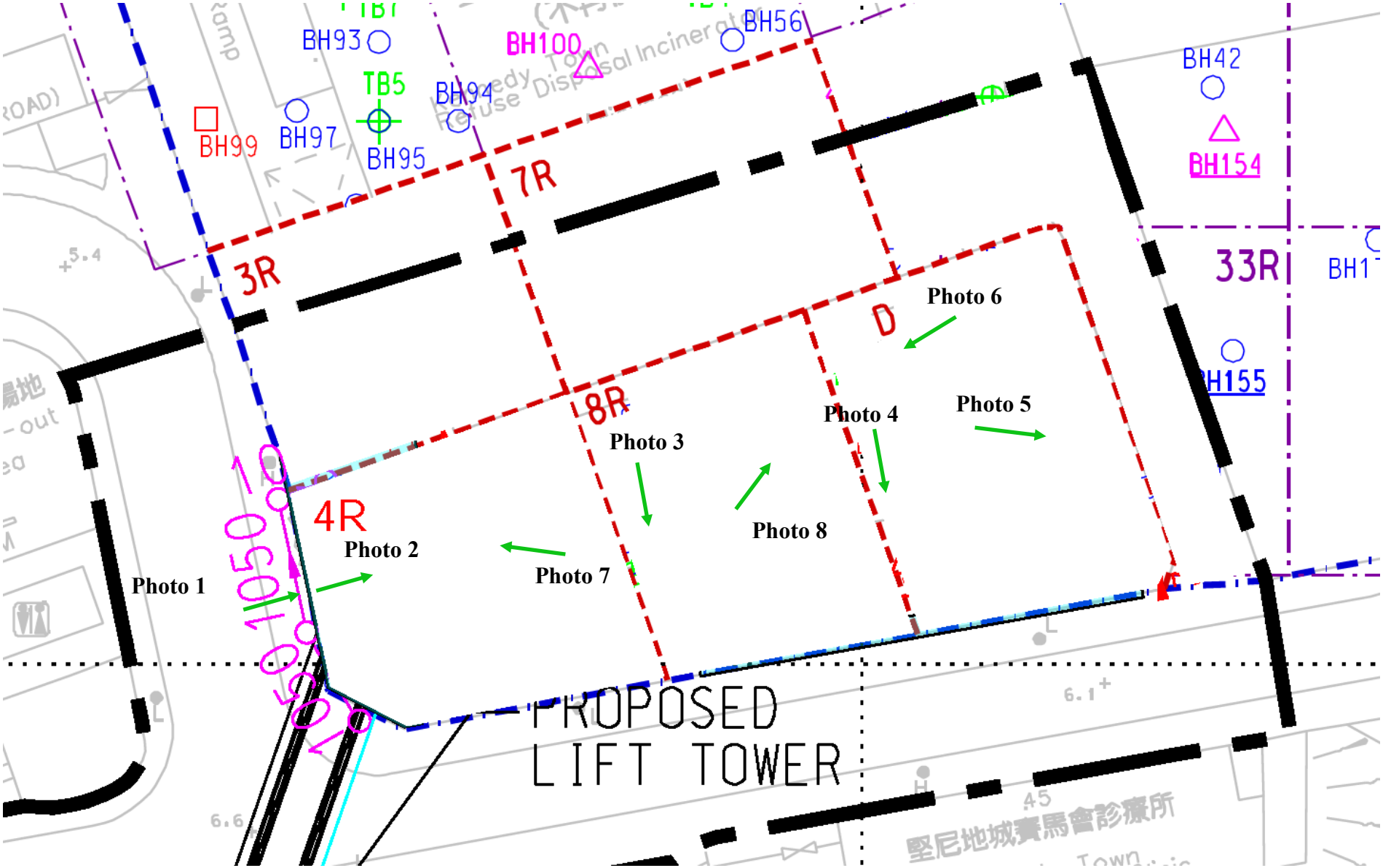
BH93
BH100
BH56
BH42
TB5
BH94
BH99
BH97
BH95
BH154
7R
3R
33R
D
Photo 6
8R
Photo 4
Photo 5
Photo 3
4R
Photo 2
Photo 8
Photo 1
Photo 7
PROPOSED
LIFT TOWER

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

	
Photo 7	**Photo 8**

Location: STT NHS 583, Sai Ning Street, Hong Kong

Date of site visit: 25 November 2022

GENERAL SITE DETAILS

Site Owner / Client:	HKSAR Government
Property Address:	STT NHS 583, Sai Ning Street, Hong Kong
Person conducting the questionnaire:	NA

SITE ACTIVITIES

It is an idle government site with paved ground and no site activity was observed.

SITE DESCRIPTION

What is the total site area:	Approx. 2150m^2
What area of the site is covered by buildings (%):	No building structure was observed.
Please list all current and previous owners/occupiers if possible.	Current owner: HKSAR Government Previous: New World First Bus Service Limited
Is a site plan available? If yes, please attach	NA
Are there any other parties on site as tenants or sub-tenants?	NA
Surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.	North: Victoria Harbour South: Clinic and Elder Centre East: Public Car Park West: Factory buildings
The topography of the area	Flat Terrain
The size and location of the nearest residential communities	Nearest residential communities are Mount Davis 33 and Cayman Rise Block 1 & 2.
Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?	A temporary public park Cadogan Street Temporary Garden is located at the east of the site.

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No	Notes
1. What are the main activities/operations at the above address?	--	NA
2. How long have you been occupying the site?	--	NA
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	--	NA
4. Prior to your occupancy, who occupied the site?	--	NA
5. What were the main activities/operations during their occupancy?	--	NA
6. Have there been any major changes in operations carried out at the site in the last 10 years?	--	NA
7. Have any polluting activities been carried out in the vicinity of the site in the past?	--	NA
8. Has the site ever been used as a petrol filling station/car service garage?	--	NA
9. Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	--	NA
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	--	NA
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	--	NA
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	--	NA
13. Has the facility produced a separate hazardous substance inventory?	--	NA
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.)	--	NA
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)?	--	NA
16. Do you have any underground storage tanks? (If yes, please provide details.) • 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?	--	NA

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No	Notes
• 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?	--	NA
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	--	NA
19. How are the wastes disposed of?	--	NA
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	--	NA
21. Have any spills occurred on site? (If yes, please provide details.) • 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
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.)	--	NA
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	--	NA
24. Are there any known contaminations on site? (If yes, please provide details.)	--	NA
25. Has the site ever been remediated? (If yes, please provide details.)	--	NA

Observations

	Yes/No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	No	
2. What are the conditions of the bund walls and floors?	--	Concrete floor with minor surface scratches
3. Are any surface water drains located near to drum storage and unloading areas?	No	
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	No solid and liquid waste was observed generated at site.
5. Is there a storage site for the wastes?	No	No storage site for waste was observed.
6. Is there an on-site landfill?	No	
7. Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	
8. Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	No stained surface was noted.
9. Are there any potential off-site sources of contamination?	No	No potential off-site sources of contamination noted.
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	
12. Any noticeable odours during site walkover?	No	
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	No	