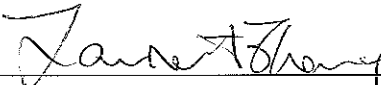
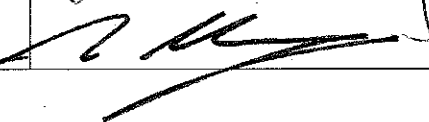


MTR Corporation Limited

Shatin to Central Link -
Consultancy Agreement No. NEX/2213

**Environmental Impact Assessment
(EIA) of Cross Harbour Section
(Phase I – Mong Kok East to Hung Hom)**

Contamination Assessment Plan
Sep 2009

| | Name | Signature |
|----------------------|----------------|---|
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| | | | |
|---|---|-------|-------------|
| Version: | C | Date: | 14 Sep 2009 |
| <p>The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and AECOM Environment accepts no responsibility for its use by others.</p> <p>This report is copyright and may not be reproduced in whole or in part without prior written permission.</p> | | | |

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1. INTRODUCTION

Project Background

- 1.1 The Shatin to Central Link (SCL) is one of the ten large-scale infrastructure projects announced by the Chief Executive in his 2007-2008 Policy Address, targeting commencement of construction by 2010. The Executive Council has endorsed on 11 March 2008 the SCL scheme jointly developed by the Corporation to proceed with further planning and design for this line. The SCL scheme as endorsed by the Executive Council has incorporated convenient interchange arrangements as a result of the merger between the MTR Corporation Limited and the Kowloon-Canton Railway Corporation.
- 1.2 There are two phases for the Cross Harbour Section (CHS). Phase I is the modification of existing East Rail Line (EAL) tracks from Mong Kok East Station (MKK) to the new Hung Hom Station. Phase II is a 6-km extension of East Rail Line from a new Hung Hom Station across the harbour to new stations at Exhibition (EXH) and Admiralty (ADM). The construction of Phase I is scheduled to be completed in 2015 with Phase II in 2019. Phase II, however, will have significant program and works interfaces with Wanchai Development Phase II (WDII) and Central Wanchai Bypass (CWB) projects.
- 1.3 The layout plan of the latest design of CHS alignment based on the latest information provided by MTR in June 2009 is shown in **Figure no. NEX2213/C/361/ENS/M50/001**. The demarcation line of Phase I and Phase II CHS alignment is located at the north of the North Flood Gate Building.
- 1.4 Regarding Phase I works, the tunnels at the Hung Hom area will generally be built by cut-and-cover (C & C) methods. The adjoining section of the Phase II cross-harbour tunnels will be constructed using immersed tube (IMT). Various alternative alignments are being investigated in order to align the vertical and horizontal profiles between Phases I and II.
- 1.5 The implementation of the Project requires an environmental permit under the EIAO. Environmental Impact Assessment Study Briefs (ESB) ESB-192/2008 under Section 5(1) of the EIAO was issued by the Environmental Protection Department (EPD).
- 1.6 The ESB requires a land contamination assessment to be carried out, including the submission of a Contamination Assessment Plan (CAP), Contamination Assessment Report (CAR) and, if land contamination is confirmed, a Remediation Action Plan (RAP) to the Director of Environmental Protection (DEP) for endorsement.
- 1.7 This CAP is prepared for Phase I works following the requirements in the ESB.

Objectives

- 1.8 The objectives of this CAP are to:
 - i. present the findings of the desk study and site appraisal on past and present land use activities that may lead to land contamination,
 - ii. identify potential hotspots of land contamination for intrusive site investigation,
 - iii. propose a sampling and testing strategy for the site investigation if necessary; and
 - iv. obtain EPD endorsement of CAP as required by the ESB.
- 1.9 A Contamination Assessment Report (CAR) will be prepared based on site investigation results after the completion of site investigation works. Should significant contamination be identified within the

works areas, a Remediation Action Plan (RAP) will be submitted as required in *Clause 3.4.5.5 of the ESB-192/2008*, for formulation of necessary remedial measures.

2. ENVIRONMENTAL LEGISLATION, POLICIES, PLANS AND STANDARDS

- 2.1 Land Contamination assessment shall be conducted in accordance with Section 3.4.5 of ESB No. ESB-192/2008 and Sections 3.1 and 3.2 (Potential Contaminated Land Issues) of Annex 19 “*Guidelines for Assessment of Impact on Sites of Cultural Heritage and Other Impacts*” of the *Technical Memorandum on the Environmental Impact Assessment Process of the Environmental Impact Assessment Ordinance (EIAO-TM)*”).
- 2.2 Based on the EIAO-TM, the following land uses may have the potential to cause or have caused land contamination:
- 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
 - Dumping ground and landfill.
- 2.3 If the above land uses are identified, land contamination assessment shall be conducted with reference to the “*Guidance Note for Contaminated Land Assessment Remediation*” (Guidance Note) and “*Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair /Dismantling Workshop*” (Guidance Note 2) issued by Environmental Protection Department (EPD). In addition, the Risk-based Remediation Goals (RBRGs) stipulated in the “*Guidance Manual for Use of Risk-based Remediation Goals for Contamination Management*” (Guidance Manual) issued by EPD shall be adopted as the criteria for assessing soil and groundwater contamination.

3. ASSESSMENT AREA

- 3.1 According to the information provided by MTR, all the works sites and areas at Hung Hom, except for the Kowloon Freight Building (KFB) and MTR Freight Head Office (MFHO), are a part of Phase I, while the demarcation line between the Phase I and Phase II CHS alignment is located at the north of the North Flood Gate Building (**Figure no. NEX2213/C/361/ENS/M57/001**). Phase II covers the alignment section from the demarcation line through the Victoria Harbour and the works areas on Hong Kong Island.
- 3.2 According to Section 3.4.5.2 of the ESB-192/2008, the “Assessment Area” for the land contamination assessment shall include any potential land contamination site(s) within the Project Area. The Project Areas of the Phase I CHS are based on the latest Land Requirement Plan provided by MTR in September 2009 and are shown in **Figure no. NEX2213/C/361/ENS/M57/001**. The land contamination Assessment Area therefore covers the part of the Project area where intrusive works will be carried out. In addition, the geotechnical profiles along the alignment of Phase I CHS are shown in **Appendix A**.
- 3.3 The Assessment Area for the purposes of the land contamination impact assessment has been broken up into four areas. These areas are shown in **Figure no. NEX2213/C/361/ENS/M57/001** and are detailed below:
- Area 1: the works area north of the covered section of Hung Hom Freight Terminal (HFT);

- Area 2: the works area within the covered section of HFT;
- Area 3: the works area south of the covered section of HFT; and
- Area 4: all associated works areas east of HUH (Hung Hum Station) (4 separate areas).

3.4 Based on the engineering design at this stage, the specific sites for this contaminated land assessment can be described as follows:

i. **Area 1: Works Area North of the Covered Section of HFT**

3.5 This area covers the related section of railway alignment and the associated works areas.

3.6 The railway alignment covered in this area starts from the end of the tunnel near Oi Sen Path and west of Oi Man Estate, extending southeast and ends at the covered portion of HFT (excluding the Locomotive Running Shed or the underground storage tanks (USTs) northeast of the Locomotive Running Shed, which were classified in Area 2).

3.7 The East West Line (EWL) is an interfacing project to this Project. Areas included within the EWL project boundary but not SCL project boundary are not included within the scope of this CAP.

3.8 Works areas in Area 1 are listed in **Table 3.1** below.

Table 3.1 Works Areas in Area 1

| Land Ref. No.# | Location | Brief Description | Figure Reference |
|----------------|---|--|---------------------------|
| W1 | Areas located to the west of the proposed Chatham Rd. ventilation building and northwest of the existing tunnel section near Hau Man St.. | <ul style="list-style-type: none"> Tentative works site for railway reprovisioning works | NEX2213/C/361/ENS/M57/002 |
| H1 | An area interfacing W1 from Oi Man Estate extending southeasterly to the covered section of HFT | <ul style="list-style-type: none"> Tentative works site for C&C tunnel construction | NEX2213/C/361/ENS/M57/002 |
| WS. 101 | An area near the Hung Hom Interchange, southeast of the proposed Chatham Rd. ventilation building | <ul style="list-style-type: none"> Tentative works site for C&C tunnel construction | NEX2213/C/361/ENS/M57/002 |
| WS. 102 | A area near Princess Margaret Rd. | <ul style="list-style-type: none"> Tentative works site for stormwater drain diversion, track works and road diversion works | NEX2213/C/361/ENS/M57/002 |
| WS. 103 | An area near Princess Margaret Rd. between Chatham Rd. South and WS. 102 | <ul style="list-style-type: none"> Tentative works site for railway refurbishment works | NEX2213/C/361/ENS/M57/002 |
| WS. 105 | Area covering Hung Hom Interchange near Chatham Rd. North | <ul style="list-style-type: none"> Tentative works site for permanent stormwater drain diversion and temporary road bridge construction | NEX2213/C/361/ENS/M57/002 |
| WS. 106 | An area east of the HFT railway tracks and southeast of Hung Hom Interchange, interfacing the C&C area of the Project | <ul style="list-style-type: none"> Tentative works site for Cheong Wan Rd. diversion, culvert diversion and site access | NEX2213/C/361/ENS/M57/003 |

#: As provided by MTR, except for W1 and H1. The Land Ref. No. shall be revised as per any amendments of the scheme.

ii. Area 2: Works Area within the Covered Section of HFT

3.9 HFT is currently used as a freight terminal, an intermediate station on East Rail Line, the terminus of Intercity Through Train to major cities of the mainland and a terminal providing parking, fuelling and maintenance services to trains.

- 3.10 Works will be carried out at part of HFT to accommodate Hung Hom Station for this Project. The type of works conducted will include modification, reprovisioning, (re)construction, and demolition. The proposed C&C works area in Area 2 is mainly along the proposed alignment. Existing facilities in this area such as the Locomotive Running Shed and the nearby underground storage tanks will be demolished. A traction power feeder station will be built near the existing Locomotive Running Shed; reprovisioning of facilities for the freight office is proposed in the eastern portion of the HFT, as indicated in **Figure no. NEX2213/C/361/ENS/M57/004**.
- 3.11 Works areas in Area 2 are presented in **Table 3.2** below.

Table 3.2 Works Areas in Area 2

| Land Ref. No.# | Location | Brief Description | Figure Reference |
|----------------|---|--|---------------------------|
| W2 | The entire covered section of HFT and an area around the existing Locomotive Running Shed, interfacing Area 1 | <ul style="list-style-type: none"> Tentative works areas including the C&C works area along the proposed alignment, areas for demolition and (re)construction of facilities and buildings, and area for non-soil excavation/disturbance works during construction (e.g. traffic) An traction power feeder station is proposed to be constructed in the northeast corner of this area | NEX2213/C/361/ENS/M57/004 |

#:The Land Ref. No. shall be revised as per any amendments of the scheme.

iii. Area 3: Works Area South of the Covered Section of HFT

- 3.12 This area covers the related section of railway alignment and the associated works areas.
- 3.13 The railway alignment covered in this area starts from the southern end of the covered section of HFT, extending southerly to the Hung Hom waterfront, including the protruding pier of Hung Hom Freight Yard (HFY). KFB and MFHO are proposed to be demolished in Phase II, and are therefore discussed in the CAP of Phase II of the Project.
- 3.14 This area interfaces the works areas of EWL. Overlapping works areas are discussed within this CAP. Works areas within EWL only are not in the scope of this CAP.
- 3.15 Works areas in Area 3 are listed in **Table 3.3**:

Table 3.3 Works Areas in Area 3

| Land Ref. No.# | Location | Brief Description | Figure Reference |
|----------------|---|---|---------------------------|
| WS. 110 | Access road into the International Mail Centre (IMC) south of Area 2 | <ul style="list-style-type: none"> Tentative works site for demolition of access ramp and construction of East-West Link (EWL) at ground level | NEX2213/C/361/ENS/M57/005 |
| WS. 115 | An area around IMC | <ul style="list-style-type: none"> Tentative works site for building demolition, railway ramp structure and road works construction of EWL | NEX2213/C/361/ENS/M57/005 |
| W3 | An area covering the HFT and the protruding pier at Hung Hom waterfront | <ul style="list-style-type: none"> Tentative barging point and the associated haul road | NEX2213/C/361/ENS/M57/006 |

#: As provided by MTR, except for W3. The Land Ref. No. shall be revised as per any amendments of the scheme.

iv. Area 4: Supporting Works Areas

3.16 Supporting works areas are scattered near the HFT and are classified in the **Table 3.4** below.

Table 3.4 Works Areas in Area 4

| Land Ref. No.# | Location | Brief Description | Figure Reference |
|----------------|---|--|---------------------------|
| WS. 112 | An area located northeast of HFT interfacing Area 2 | <ul style="list-style-type: none"> Tentative works site for construction of stormwater | NEX2213/C/361/ENS/M57/007 |
| WA. 102 | An area located east of HFT next to WS. 112 | <ul style="list-style-type: none"> Tentative works area for contractor's site office/ stockpiling | NEX2213/C/361/ENS/M57/007 |
| WA. 103 | An area east of HFT near Hung Hom waterfront | <ul style="list-style-type: none"> Tentative works area for MTR engineer's site office | NEX2213/C/361/ENS/M57/007 |
| NSL-034 | An area northeast of WA. 103, near Hung Luen Road | <ul style="list-style-type: none"> Tentative works area for contractor's site office/stockpiling | NEX2213/C/361/ENS/M57/007 |

#: As provided by MTR. The Land Ref. No. shall be revised as per any amendments of the scheme.

4. SITE APPRAISAL

Regional Geological Setting

- 4.1 A review of the Hong Kong Geological Topography (Series: HGM20) – Sheet No. 11, 1: 20,000 Scale (1996) indicated that the generalized regional geological conditions for the southern half of Area 1 (south of Chatham Road North) and Areas 2, 3 and 4 is likely to comprise of the following stratigraphical sequences from youngest to oldest:
- i. **Reclaimed Hang Hau Formation** (Holocene aged), consisting of marine sand, part silty (reclaimed between 1904 and present day).
 - ii. **Hang Hau Formation** (Holocene Aged), consisting of undivided, mainly dark grey marine mud.
 - iii. **Hang Hau Formation** (Holocene aged), consisting of marine sand, part silty (thin layer potentially present at southern end of Assessment Area).
 - iv. **Chek Lap Kok Formation** (Holocene Aged), consisting of undivided; red, yellow and grey clay, silt, sand and gravel.
 - v. **Jurassic-Cretaceous Aged Granite** (bedrock), consisting of medium-grained granite, 2 – 6 mm.
- 4.2 The regional geological conditions in the northern half of Area 1 (north of Chatham Road North) is likely to consist predominantly of outcropping fine to medium grained granite bedrock (Jurassic-Cretaceous aged), with coverage of Quaternary aged Alluvium (clay/silt, sand and gravel; well sorted to semi-sorted) present over a small area immediately north of Chatham Road North.
- 4.3 Reviews of previous ground investigation (GI) reports were conducted at the Civil Engineering and Development Department's (CEDD's) Geotechnical Information Library to obtain information regarding the geological conditions at or in the vicinity of the Assessment Area. The GI reports reviewed are listed below:
- *The Freightyard Superstructure Contract for Goodsyards Building Site Investigation Works Final Field Works Report conducted by Gammon Construction Limited (1998) (CEDD's Geotechnical Information Unit Report No. 41946);*
 - *Hunghom Bypass and Princess Margaret Road Link Site Investigation Final Field Works Report conducted by Enpack (Hong Kong) Limited (1994) Volumes 1 & 2 (CEDD's Geotechnical Information Unit Report No. 19087 & 19088);*
 - *11NW-D/F82, Chatham Road, Ground Investigation Factual Fieldwork Report conducted by Bachy Soletanche Group Limited (2002) (CEDD's Geotechnical Information Unit Report No. 34432);*
 - *10-year Extended LPM Project Phase 4, Package H-Ground Investigation Works for Slopes in Sham Shui Po, Yau Tsim Mong and Kowloon City conducted by Gold Ram Engineering and Development Limited (2005) (CEDD's Geotechnical Information Unit Report No. 43301).*
- 4.4 Review of these reports identified evidence of the importation of reclaimed marine sands (Hang Hau Formation), together with other fill materials across the Assessment Area. A summary of the presence of fill material identified within the reviewed reports across the Assessment Area is presented below:

- i. The majority of Area 1 is covered by a layer of fill material composed either of silty sand or silty clay approximately 8.5 m thick. Highly weathered granite underlies the fill material. No reclamation history is related to this area.
- ii. The majority of Area 2 is covered by a layer of fill material composed of either sandy silt or silty sand approximately 6.5 m thick. The eastern half of Area 2 was a reclaimed area
- iii. The majority of Area 3 is covered by a layer of fill material composed of sand and gravel with cobbles approximately 10 m thick. Part of this area (e.g. the protruding pier at Hung Hom waterfront) was a reclaimed area.
- iv. The majority of Area 4 is covered by a layer of fill material composed of silt, sand and gravel with cobbles and boulders approximately 18 m thick. The majority of Area 4 was a reclaimed area.
- v. Surficial fill material consisting of semi-sorted clay/silt, sand and gravel is found around the Hung Hom Interchange.
- vi. From Princess Margaret Road to Hung Hom Interchange medium-grained granite of Jurassic-Cretaceous age is the principal geological unit.

4.5 The overall reclamation history of the Assessment Area is illustrated in **Appendix B**.

Site Inspection and Appraisal

Sources of Historical Information

- 4.6 The assessment was conducted firstly by screening of all works areas by a review of the current and historic land use along with the construction profile. Relevant site history was reviewed based on historical maps of Hong Kong and aerial photography as shown in **Appendix C**. Sites along the alignment considered as having potential land contamination concerns were identified; site inspections were conducted in November and December 2008.
- 4.7 A review of aerial photographs obtained from the Survey and Mapping Office, Lands Department has been undertaken. The aim of the review was to identify land within the project area which may have been contaminated through a previous land use. A list of aerial photographs which have been reviewed is provided in **Table 4.1**. Copies of representative aerial photographs are given in **Appendix C**.

Table 4.1 Review of Aerial Photographs

| Year | Height (Feet) | Photograph Reference Number |
|------|---------------|-----------------------------|
| 1967 | 4000 | 5415* |
| 1973 | 5000 | 5283* |
| 1989 | 4000 | A17997* |
| 1999 | 4000 | CN25189* |
| 2006 | 4000 | CW71959* |

Source: Survey and Mapping Office, Lands Department

*Copies of aerial photographs are given in **Appendix C**.

- 4.8 Based on the aerial photographs detailed above the development history of the Assessment Area is summarised below.

4.9 The existing land uses of the inspected areas include freight terminal, open storage, railway tracks, car parks, vacant lands, oil storages, electrical substation, pump room, office building and petrol filling station (PFS).

i. **Area 1: Works Area North of the Covered Section of HFT**

Review of Historic and Current Land Uses

Area around Hung Hom Interchange near Chatham Road North

4.10 This area was mainly occupied by open storage area, traffic roads and temporary structures in 1967. It was noted as the Hung Hom Interchange from 1973 to 2006. Planted areas and some temporary structures were found scattered around the Hung Hom Interchange during 1973 to 2006. The China Light and Power (CLP) customer substation was noted at north of this area in 2006. No major land use changes were noted since then.

Signal Telecom Automatic Revenue Collection (STA) Building, Workshop and Depot

4.11 This area was mainly occupied by an unknown temporary structure in 1967. The STA Building, a workshop and a depot were noted in this area in 1973. No major land use changes were noted since then.

Area around Gillies Avenue South

4.12 This area was mainly used as an open car park from 1967 to 1973. It was noted as the Gillies Avenue South in 1989. No major land use changes were noted since then.

Site Inspection

4.13 Site inspection for Area 1 was conducted in November and December 2008. Most of the areas are vacant, green areas, highway structures, streets and pavements, or recreational park. Land uses with potential contamination concerns, including the emergency generator room and the associated fuel tank room, and previous D.G. storage, and all located at or near the Signal Telecom Automatic Revenue Collection (STA) Building, as indicated in **Table 4.2**. For easy reference, sites with potential contamination concerns have been assigned a letter as a unique Site ID, e.g. 1-01, 1-02, 1-03, etc. in Area 1.

Table 4.2 Summary of Site Appraisal Results for Area 1

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---|---|---|---|--|---|
| WS. 101 | 1-01 | Open storage, traffic roads, temporary structures and green areas | Highway structures, streets, green areas | Highway structures, streets, green areas | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/002 & NEX2213/C/361/ENS /M57/008 |
| WS. 102 | 1-02 | | Highway structures, vacant area, and green area | Vacant area with no specific use and green area | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/002 & NEX2213/C/361/ENS /M57/008 |
| WS. 103 | 1-03 | | Vacant area and green area | Vacant area adjacent to Princess Margaret Road and green area | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/002 & NEX2213/C/361/ENS /M57/008 |
| WS. 105 | 1-04 | | Highway structures | Highway/ road structures | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/002 & NEX2213/C/361/ENS /M57/008 |
| W1 | 1-06 | | Vacant area, and green area, railway tracks | Vacant area, and green area, railway tracks observed in this area | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/002 & NEX2213/C/361/ENS /M57/008 |
| W1 | 1-07 | | Vacant area, and green area, railway tracks | Railway tracks were observed in this area. The northern end of this area is the entrance of a tunnel | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/002 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-08 | Open storage, traffic roads, temporary structures and green areas | MTR open storage under the highway near Oi Sen Path | <ul style="list-style-type: none"> • A site office was observed onsite • Open area of this site was observed to be used for storage of construction materials, such as road-blocks, metal frames, tires, structural steels, piles of gravels • A long vehicle, a wheel barrow, and several drums filled with gravels or metals were also observed onsite • No chemical storage was observed onsite • The ground of this site is concrete-paved with no observable oil stains | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/002 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-09 | Open storage, | CLP Substation "Ho Man Tin | <ul style="list-style-type: none"> • Located near Oi Sen Path, north to the Hung Hom Interchange | No | No adverse contaminated land impacts are identified based on | NEX2213/C/361/ENS /M57/002 & |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---|-------------------------------|---|---|--|------------------------------|
| | | traffic roads, temporary structures and green areas | KCR Substation (No. 32934-6)" | <ul style="list-style-type: none"> • Has been operating for 5-10 years and was in operation during the site inspection • There was no UST, D.G. or chemical waste storage in this substation, according to the site representative • Two non-PCB transformers (both 132/25 KV) were situated above ground in the centre of this site. • Stacks of batteries were stored on a shelf in the Battery/ Charger Room on the south eastern portion of this substation; the floor of this room was entirely paved with a layer of tiles. According to the site personnel, no waste batteries were stored onsite • One silicone oil transformer was found in the L.V. Transformer Room located on the south western portion of the substation. • A fire pump powered by electricity was observed in the Fire Pump Room (Electric) located on the south western portion of this substation • An above ground diesel fire pump containing a day tank (on the higher level of a metal shelf) and associated batteries (on the lower level of the shelf) were observed in the south western part of the Fire Pump Room (Diesel) on the south western corner of this site. According to the site personnel, the diesel-powered fire pump serves as the standby fire pump for the one powered by electricity. No diesel refuelling was and would be done for the diesel fire pump • The entire substation is neatly paved by concrete; no oil stain was observed during the site inspection | | site appraisal. | NEX2213/C/361/ENS /M57/008 |
| WS. 106 | 1-05 | Open car park | Streets, pavements and | <ul style="list-style-type: none"> • Street, pavements and green areas | No | No adverse contaminated land impacts are identified based on | NEX2213/C/361/ENS /M57/003 & |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---|---|--|---|--|---|
| | | | green areas | | | site appraisal. | NEX2213/C/361/ENS /M57/008 |
| H1 | 1-01 | - | - | <ul style="list-style-type: none"> This area overlaps with WS. 101; details please refer to WS. 101 in this table | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-11 | S&C PEMs (for signal and communication) | S&C PEMs (for signal and communication) | <ul style="list-style-type: none"> Observed at both north and south of the STA Building Container-shaped structure which is lifted above the ground According to the site personnel, only electronic devices are kept inside these modules; no chemical or waste has been stored According to the site personnel, entrance into these modules was strictly prohibited from non-professionals to avoid disturbance of the operations of the electronic apparatus inside | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-12 | Temporary structure | Mechanical workshop | <ul style="list-style-type: none"> Located on the ground floor of the STA Building Used for storage of electrical equipment, mechanical parts, hand tools (e.g. hammers, screw drivers), gear wheels and several plastic buckets Covers an area of about 8 m² No waste or large storage of chemicals was present onsite; except four containers of grease (about 1 L each) and several bottles of detergents held above ground on a shelf The floor of this site was paved and covered by a protective layer with no observable oil stains | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-13 | Temporary structure | Relay Room | <ul style="list-style-type: none"> Located on the ground floor of the STA Building Storage of cabinets of electrical equipment, | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|--|--|--|---|---|---|
| | | | | control panels, plastic/ metal parts, hand tools, cardboard boxes and crates <ul style="list-style-type: none"> No chemical or waste was stored The entire floor of this site is paved and covered by a clean protective layer; no oil stain was observed during the site inspection | | | /M57/008 |
| H1 | 1-14 | S&C E&M Workshop for signal, communication, electrical and mechanical works for the railway, and a Switch Room | Vacant and abandoned office | <ul style="list-style-type: none"> Room was evacuated and suspended from operation; the room is vacant with furniture only during the site inspection According to the site personnel, only railway mechanical works were conducted in this site A previous office area was observed onsite; a Switch Room was found next to the office Two metal buckets (about 5 L each) for solid waste of oil bottles (油罐) and used cloth for oil (油污布) and three bottles (about 3 L each) for waste paint, waste transformer oil and waste thinner were observed on a shelf kept above ground in the workshop in good condition The concrete-paved floor is intact with no cracks; no oil stains observed onsite | No | No adverse contaminated land impacts have been identified based on site appraisal. However, as this site is within the hoarding area where demolition is expected to expose soil beneath the structure, it would be beneficial to have a land contamination expert on site during excavation in order to detect any abnormal staining or odors that may indicate further investigation is required. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-15 | | Telecom Room for storage of discarded monitors | <ul style="list-style-type: none"> Used for storage of discarded monitors were observed onsite during the site inspection No chemical or waste was stored The floor of the entire room was paved and no oil stains were observed. | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-16 | | EAL & MOL – SMB BM Sub-Depot – office and storage of tools | <ul style="list-style-type: none"> Half of this site is used as an office, the other half is used as a store room for tools (e.g. hand tools, ladders), materials (e.g. metal ingots, wires, cardboards), equipment (e.g. vacuum machine, cables, | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---------------------|---|--|---|---|---|
| | | | | <p>trolley)</p> <ul style="list-style-type: none"> Several cans (about 250 mL each) of glue and/ or paint/ thinner were kept inside a metal cabinet above ground The floor of the entire room was paved and covered by an anti-slippery layer; the floor is in a clean and tidy condition and no oil stains were observed. | | | |
| H1 | 1-17 | | Warehouse for storage of solid goods | <ul style="list-style-type: none"> Located on the ground floor of the STA Building. According to the site personnel, no chemical or waste has been stored in this site; no potentially contaminating activities (e.g. fuel handling, maintenance) were performed in this site. | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-18 | Temporary structure | Emergency generator room and an associated fuel tank room | <ul style="list-style-type: none"> Located on the G/F near its north façade of the Signal Telecom Automatic Revenue Collection (STA) Building An above ground diesel tank (450 L) was observed shelved, with a drip beneath, on a metal frame in the room. The fuel tank is connected by above ground pipelines through the wall to the emergency generator in the adjacent room The fuel tank was refilled once per annum by direct connection to the oil filling truck The emergency generator has been operating for more than 10 years; no past spillage or leakage of battery fluids recorded The ground of both rooms were concrete-paved; suspected oil stains were observed | Yes | <ul style="list-style-type: none"> <u>Emergency generator room and fuel tank room</u>: possible spillage/leakage of fuel during handling The total area occupied for potentially contaminating land use is about 30 m² | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-19 | Temporary structure | Cable yard | <ul style="list-style-type: none"> Located north of the CLP substation The yard was wired during the site visit Several container-shaped mobile site office structures and more than 10 drums of | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|--|--|---|---|--|---|
| | | | | <p>cables were observed onsite from the outside</p> <ul style="list-style-type: none"> The ground of this site is entirely concrete-paved and in a tidy condition; there was no observable oil stain | | | |
| H1 | 1-20 | Temporary structure | China Light Power (CLP) customer substation (Hung Hom Complex "A" Substation, No. 04579-9) | <ul style="list-style-type: none"> One battery charge, one large switch supported by the battery charge and one silicone oil transformer were found onsite No chemical or waste was stored and no PCB has been used, even though it has been in operation for more than 10 years, according to the representative The entire substation was concrete-paved and tidy with no observable oil stain. | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| - | 1-10 | Temporary structures and D.G. store for paints | Open storage for construction materials | <ul style="list-style-type: none"> This area is located in the Project area with no specific proposed works conducted under Phase II of this Project. It is also under the works area of East West Line (EWL). Considering its close location (< 10 m) to the C&C works area and based on its reported past land use from the previous site inspections, this area is assessed for conservativeness. Previously existed north to the STA Building, but was demolished about 4 years ago as indicated by the site representative The D.G. store had been operated for more than 10 years prior to demolition | Yes | <ul style="list-style-type: none"> <u>Location of the demolished D.G. storage</u>: possible spillage/ leakage of paint in previous operations The area occupied for this potentially contaminating land use is about 100 m² | NEX2213/C/361/ENS /M57/003 & NEX2213/C/361/ENS /M57/008 |
| H1 | 1-21 | Temporary structure | P-ways and Works Workshop – office and store room, and a store area nearby | <ul style="list-style-type: none"> The P-ways and Works Workshop is a single-storey building; it has been in existence for more than 10 years The southern section of the building is used as an office for railway track maintenance worker The floor of the office was concrete-paved and in a tidy condition; no observable oil | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS /M57/004 & NEX2213/C/361/ENS /M57/008 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---------------------|-------------------|--|---|---------------------------------------|------------------|
| | | | | stains observed <ul style="list-style-type: none"> • The northern portion of the building is used as a store room of mechanical tools and materials, (e.g. railway ties, ladders, metal frames) • A metal above ground cabinet of flammable chemicals was the only chemical storage observed in the store room • The floor of the store room was concrete-paved and in a clean and tidy condition, with no oil stains observed • A neighbouring (south) store area (approximately 50 m²) of inert construction materials (e.g. packaged cement, packaged limestone powder, wooden boards, plastic containers, metal valves) occupied by the subcontractor(s) was found. • The ground surface of the store area was observed as entirely concrete-paved with no observable stains | | | |

*: Current land use is identified based on street maps and site inspection.

ii. **Area 2: Works Area within the Covered Section of HFT**

Review of Historic and Current Land Uses

Locomotive Running Shed

- 4.14 The Locomotive Running Shed was first noted in this area in 1967. An unknown cylinder structure was noted at the east of the shed from 1973 to 1989. Two above ground tanks with unknown usage were noted at the southeast corner of the shed in 1989. These facilities were removed in 1999. No major land use changes were noted since then.

Hung Hom Freight Terminal

- 4.15 This area was previously sea; reclamation was noted in 1964. It was mainly vacant in 1967. It was used as an open storage in 1973. In 1989 this area was noted as Hung Hom Freight Terminal. No major land use changes were noted since then.

The Metropolis

- 4.16 This area was sea from 1967 to 1973. Reclamation of this area was observed to begin in 1989. Reclamation of this area was completed and building construction of this area was noted in 1999. It was noted as The Metropolis in 2006.

Hung Hom Bus Terminal

- 4.17 This area was mainly vacant from 1967 to 1973. It was noted as the bus terminal in 1989. No major land use changes were noted since then.

Hong Kong Coliseum

- 4.18 This area was mainly vacant in 1967. Open storage was noted in this area in 1973. This area was transformed into the Hong Kong Coliseum as noted in 1989's aerial photograph. No major land use changes were noted since then.

Site Inspection

- 4.19 Site inspection for Area 2 was conducted in November and December 2008. The whole area is currently industrial where a number of areas were identified to have land uses with potential contamination concerns, as indicated in **Table 4.3**. For easy reference, these sites have been assigned a letter as a unique Site ID, e.g. 2-01, 2-02, 2-03, etc. in this area.

Table 4.3 Summary of Site appraisal Results for Area 2

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|------------------------------|--|--|---|---|---|
| W2 | 2-01 | Vacant area and open storage | Storage of cargos for the Intercity Through Trains | <ul style="list-style-type: none"> Part of this area is fenced; but according to information provided by the site personnel, this area is used for storage of cargos for the Intercity Through Trains As reported by the site personnel, no D.G. is allowed to be conveyed by freight train or stored at HFT; only low risk chemical goods (mostly solid industrial material, such as salt and plastics) are allowed for transportation in HFT The border of this area overlaps with the railway track G21, which is a concrete-based track. Based on the interview with the site personnel, no recorded chemical spillage/leakage accidents have been recorded in this area. | No (Railway track G21 is a concrete-based track for transporting trains loading/unloading cargos; please refer to Site ID 2-08 in Tables 4.3 and 4.6 for further site investigation details for such tracks.) | <p>Except for the railway track No. G21 which overlaps this area, no adverse contaminated land impacts are identified based on site appraisal.</p> <p>Sampling rationale for railway tracks in HFT is collectively presented in sections on Site ID 2-08 of Tables 4.3 and 4.6.</p> | NEX2213/C/361/ENS/M57/004 & NEX2213/C/361/ENS/M57/009 |
| W2 | 2-02 | Vacant area and open storage | Locomotive traverser | <ul style="list-style-type: none"> Only the east part of the traverse is within the Assessment Area Used for changing the direction of the first car of the locomotive In operation for more than 10 years; in operation during the site inspection The traverse is powered by electricity and lubricating oil has been used for regular maintenance Oil stains were observed scattered on the ballast ground between railway tracks at the locomotive traverse area | Yes | <ul style="list-style-type: none"> <u>Locomotive traverser:</u> Possible contamination during maintenance where lubricating oil is used. Area occupied for this potentially contaminating land use is about 800 m²; approximate area of this site within the cut & cover works area where excavation is expected is < 100 m² | NEX2213/C/361/ENS/M57/004 & NEX2213/C/361/ENS/M57/010 |
| W2 | 2-03 | Vacant area and open storage | North Warehouse | <ul style="list-style-type: none"> Used for storage of solid goods and wares (crates, escalators, wooden frames) No chemical or D.G. stored onsite This site is generally tidy and the ground is concrete-paved with no suspected oil stains, according to the site inspection | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS/M57/004 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|--|---|--|---|---|---|
| W2 | 2-04 | Vacant area. Historic peripheral land use: Unknown cylinder structure, unknown above ground tanks | Locomotive Running Shed for maintenance of diesel-powered locomotives | <ul style="list-style-type: none"> The Locomotive Running Shed has been in operation for more than 40 years Oil stains were observed on metals decking at the bottom of the services bay. The ground inside the shed is paved. Storage of mechanical parts was ubiquitous in the shed; storage of paint, degreasing agent and grease were observed in cabinets within the shed. Chemical waste storages with secondary containments were found near the entrance of the shed. Oil stains were observed beneath the containments. A workshop was found at the southern end and extending to the outside of the shed. According to the site representative, motor testing and welding were carried out at the workshop inside the shed, while maintenance of the motors were performed at the workshop extension outside (southwest) of the shed. Motors with grease were observed to be placed on cardboard paper or wood shelves above ground in the workshop inside the shed. Locomotive under repair observed at the service bay. Bottom of the service bay covered by metal decking with oil stains observed. Storage of mechanical parts and tools observed along the tracks. Paints, degreasing agent and grease found in cabinets. Chemical waste stored in drums were observed with secondary containments underneath near the entrance of the Locomotive Running Shed. Oil stains beneath containments were observed. | Yes | <ul style="list-style-type: none"> <u>Workshop</u>: possible spillage/leakage of chemicals/ oil during maintenance, welding and testing motors Area occupied for this potentially contaminating land use is about 200 m² <u>Locomotive maintenance area</u>: possible spillage/leakage of paint/ oil/ other chemicals of concern and locomotive maintenance activities Area occupied for this potentially contaminating land use is about 800 m² <u>Chemical waste storage area</u>: possible spillage/leakage of chemical wastes Area occupied for this potentially contaminating land use is about 15 m² | NEX2213/C/361/ENS/M57/004 & NEX2213/C/361/ENS/M57/009 |
| W2 | 2-05 | Unknown cylinder structure | Underground Storage Tanks (USTs) for diesel | <ul style="list-style-type: none"> The USTs containing diesel with pipelines connected to the shed is at the close northeast to the shed. The area around the USTs is bounded by fence. The USTs have been in existence for more than 10 | Yes | <ul style="list-style-type: none"> <u>USTs and underground pipelines</u>: Potential spillage/leakage of stored fuel. Possible migration of the contaminant plume with | NEX2213/C/361/ENS/M57/004 & NEX2213/C/361/ENS/M57/009 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---|--|---|---|--|---|
| | | | storage | years. Volumes of the USTs were not known. | | groundwater flow. <ul style="list-style-type: none"> Area occupied for this potentially contaminating land use is about 150 m² | |
| W2 | 2-06 | Vacant area. Historic peripheral land use: unknown cylinder structure and above ground tanks | Above ground tank for lubricating oil storage | <ul style="list-style-type: none"> A lubricating oil tank (9,092 L) is located above ground between the USTs and the Running Shed. This tank has been in operation for more than 10 years | Yes | <ul style="list-style-type: none"> <u>Above-ground lubricating oil container</u>: potential spillage/leakage when fuelling. Area for this potentially contaminating land use is about 10 m² | NEX2213/C/361/ENS/M57/004 & NEX2213/C/361/ENS/M57/009 |
| W2 | 2-07 | | Fuel dispenser/pump island | <ul style="list-style-type: none"> Two fuelling points (dispensers) were identified at the north and west of the Running Shed. The ground near both dispensers was paved and oil stains were observed. | Yes | <ul style="list-style-type: none"> <u>Dispensers</u>: Possible spillage/leakage of fuel (diesel) during refuelling/pumping. Area occupied for this potentially contaminating land use is about 10 m² | NEX2213/C/361/ENS/M57/004 & NEX2213/C/361/ENS/M57/009 |
| W2 | 2-09 | Vacant area and open storage | Only two D.G. store containers found near the Southern Warehouse | <ul style="list-style-type: none"> Used for Category 5 D.G. store Four 200 L diesel drums and two 200 L lubricating oil drums were observed inside this D.G. store, for fuelling and maintenance of the container stacker, according to the site representative. The D.G.s were stored inside of the containers sitting on a concrete paved ground This D.G. store has been in operation for about three years | Yes | <ul style="list-style-type: none"> <u>D.G. store</u>: possible spillage/leakage of oil during handling. Area occupied for this potentially contaminating land use is about 20 m² | NEX2213/C/361/ENS/M57/004 & NEX2213/C/361/ENS/M57/010 |
| W2 | 2-08 | Sea, reclaimed area, vacant area, open storage and railway tracks | Railway tracks for goods yard | <ul style="list-style-type: none"> Only some of the railway tracks in this area were accessible during the site inspection Trains usually parked inside of the HFT, therefore contamination of the railway tracks in the covered section of this area is more likely. Oil stains (suspected to be lubricating oil) were observed along some accessible tracks in HFT. Therefore all the railway tracks within the covered section of HFT were assessed for a conservative approach | Yes | <ul style="list-style-type: none"> <u>Railway tracks area within the works area</u>: G10, G12, G13, G15, G17 and G18 are within the C&C construction area and will be demolished during Phase I. If contamination due to oil leakage is present, ballast-based tracks are more vulnerable to deeper contamination, compared to | NEX2213/C/361/ENS/M57/005 & NEX2213/C/361/ENS/M57/012 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---------------------|-------------------|---|---|---|------------------|
| | | | | <ul style="list-style-type: none"> • Railway tracks Nos. G10, G12, G13 and G15 are for parking of the Electrical Multiple Unit (EMU), for which only lubrication of the wheels are involved onsite • The other railway tracks with the initial “G” in this area are for loading/ unloading goods, where goods vehicles are parked. • According to MTR, Tracks T1 through T7 in the western portion of HFT will not be demolished; instead they will continue to operate for Intercity Through Trains. • According to the site personnel, lubricating oil leakage might be possible from wheels of the EMU cars parked on tracks nos. G10, G12, G13 and G15, while such leakage might be possible from the locomotive and wheels of goods wagons parked on the other tracks for goods yard (with the initial “G”) • In the covered section of HFT and within this site, ballast-based railway tracks are: the entire G1 through G4, the northern half of G6 and G7/G8, G10, G12, G13, and G15; concrete-based are G1A, G7, G8, G17, G18, G21 through G23, and the southern half of G6 • No D.G. including diesel is allowed to be conveyed by freight train or stored at HFT; only low risk chemical goods (mostly solid industrial material, such as salt and plastics) are allowed for transportation in HFT. • According to the site representative of MTR, no chemical spillage/ leakage accident has been recorded during the operation of HFT | | <p>concrete-based ones where more surface contamination is expected, and therefore ballast-based tracks require a greater sampling depth.</p> <ul style="list-style-type: none"> • Due to random observation of oil stains along some of the railway tracks in HFT, potential land contamination due to demolition and excavation is estimated to be present. • Area occupied for the total area of railway tracks covered in Area 2 is about 15,000 m². | |

*: Current land use is identified based on street maps and site inspections.

iii. **Area 3: Works Area South of the Covered Section of HFT**

Review of Historic and Current Land Uses

International Mail Centre

- 4.20 This area was mainly vacant in 1967. An open storage was noted in this area in 1973. The International Mail Centre was noted in this area in 1989. No major land use changes were observed since then.

Hung Hom Freight Yard

- 4.21 This area was mainly vacant in 1967. It was used as open storage in 1973. This area was noted as the Hung Hom Freight Yard in 1989. No major land use changes were noted since then.

Pier and Its Peripheral South of Hung Hom Freight Terminal at Hung Hom Waterfront

- 4.22 This area was previously sea; it was noted as a reclaimed area in 1964 and was vacant in 1967. An unknown structure was noted in this area in 1973. It has been used as a pier for loading/ unloading cargos since 1989. In 1992, the area was further reclaimed, extending in the southwest direction. No major land use changes were noted since then.

Site Inspection

- 4.23 Site inspection for Area 3 was conducted in November and December 2008. Area 3 mainly covers the International Mail Centre (IMC) and the open section of HFT. Sites identified with potentially contaminating land use are indicated in **Table 4.4**. IMC overlaps the works areas for the East-West Line (EWL). For easy reference, these sites have been assigned a letter as a unique Site ID, e.g. 3-01, 3-02, 3-03, etc. in this area.

Table 4.4 Summary of Site Appraisal Results for Area 3

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|-------------------------------------|--|--|---|--|---|
| WS. 110 | 3-01 | Vacant area, open storage, and road | An entry pathway (Hong Wan Path) between the HFT and IMC | A concrete-paved, gently-sloped entry access between the HFT and IMC | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS/M57/006 |
| WS. 115 | L17 | Vacant area, open storage, and road | Building for mail sorting, distribution and storage, along with associated facilities, streets | <ul style="list-style-type: none"> • A Category 5 D.G. store and a store room of lubricating oil outside the IMC main building were identified on the north portion onsite. Cans of Kerosene (more than 10 cans, about 5 L each) were stored in a secondary containment in the D.G. store; cans of paint and thinner (more than 10 cans, about 1 L each) were placed in drip trays were observed in the D.G. room • The store room next door contained three 200 L lubricating oil drums (with secondary containment) and containers of used lubricating oil (without secondary containment) • The ground of both rooms is concrete-paved and no apparent oil stain was observed • An emergency generator room and associated fuel tank room, operating for more than 20 years, are located on the ground floor at the southwest corner of the IMC main building. The day tank (above ground) contains about 1,000 L of diesel. The emergency generator was installed on concrete slabs with batteries. The ground of both the emergency generator room and the fuel tank room was concrete-paved and suspected oil stains were observed. • The paved open areas in the centre of | Yes | <ul style="list-style-type: none"> • <u>D.G. store and chemical storage room</u>: possible spillage/ leakage oil/ chemicals handling and possible migration of the contamination plume into the nearby hoarding area • Area occupied for this potentially contaminating land use is about 20 m² • <u>Historic unknown open storage</u>: No sufficient information regarding the stored goods/ chemicals and past contamination records • Area of the whole IMC is about 6,978 m² • Site L17 is the overlapping works area under both this Project and EWL. Sampling locations for potential contamination hotspots for this site are proposed with reference to the approved CAP of this area under EWL, as listed in Table 5.1. | NEX2213/C/361/ENS/M57/006 & NEX2213/C/361/ENS/M57/010 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|-------------------------------------|-----------------------------|--|---|--|---|
| | | | | <p>IMC were currently used as a car park. The IMC main building situated at the southern portion of this site contains offices and working areas for sorting and storing of the mails on the ground floor. This area is entirely concrete-paved with no observable oil stain</p> <ul style="list-style-type: none"> An accident of aluminium powder spillage near this area was recoded in 2006 by FSD. However, it is considered that spillage of aluminium powder would not cause significant land contamination as the ground around this area is entirely concrete paved | | | |
| W3 | 3-02 | Vacant area, open storage, and road | Hung Hom Freight Yard (HFY) | <ul style="list-style-type: none"> An open area yard for loading, unloading and stacking containers According to the site representative, refuelling (diesel) and lubrication of the container stacker are carried out in the area northeast of KFB, and these activities have been conducted onsite for about 10 years No underground storage tanks or pipelines are present onsite Refuelling is conducted about 2-3 times/ week. Diesel for refuelling is stored in the D.G. store near the South Warehouse. Diesel is pumped into the vehicle from containers (4 x 50 gallons each) on a tray, therefore the source of contamination is most likely mobile. Lubrication is carried out by contractors about once every quarter. Waste lubricating oil is collected by contractors and therefore there is no (waste) lubricating oil stored onsite The entire area is paved. Apparent oil | Yes | <ul style="list-style-type: none"> <u>Container stacker refuelling and maintenance area</u>: part of this area where oil stains were observed were within the proposed cut & cover area for Phase I construction; potential contamination risks from contaminant plume due to possible spillage/ leakage of diesel and/ or lubricating oil during refuelling and maintenance – since the potential contamination hotspot is not located within the hoarding area or works area Area occupied for this potentially contaminating land use is about 700 m². | NEX2213/C/361/ENS/M57/006 & NEX2213/C/361/ENS/M57/010 |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---------------------------------|---|---|---|--|---|
| | | | | stains were observed in this area around the refuelling area; minor stains were observed on the ground surface north of KFB | | | |
| W3 | 3-03 | Sea, reclaimed area, cargo pier | Pier at Hung Hom waterfront for loading/ unloading cargos | <ul style="list-style-type: none"> Numerous cargo containers were observed at the pier Ships were loading/ unloading containers during the site inspection As reported by the site representative, there are no storage of chemicals of concern in this area | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/ENS/M57/006 & NEX2213/C/361/ENS/M57/010 |

*: Current land use is identified based on street maps and site inspections.

iv. Area 4: Supporting Works Area

Review of Historic and Current Land Uses

Area around Cheong Tung Road and Hung Lok Road

4.24 This area was sea from 1967 to 1976. Reclamation of this area was noted in 1989 and was completed in 1999. It was noted as the Cheong Tung Road and Hung Lok Road in 1999. No major land use changes were noted since then.

Area South of Royal Peninsula

4.25 This area was sea from 1967 to 1976. Reclamation of this area was noted in 1989. Reclamation of this area was completed and this area was noted as traffic roads in 1999. No major land use changes were noted since then.

Area East of Harbourview Horizon

4.26 This area was sea from 1967 to 1976. Reclamation of this area was noted in 1989. Reclamation of this area was completed and this area was mainly used as an open car park as noted in 1999. No major land use changes were noted since then.

Area Northeast of Harbourview Horizon

4.27 This area was sea from 1967 to 1976. Based on the aerial photograph of 1998, this area was reclaimed and vacant. A low-rise concrete building was observed in the north-western portion of this area from 2002 to 2006. The south-eastern portion of this area was occupied by a low-rise concrete building with open car parks in 2002. No major land use changes were noted since then.

Site Inspection

4.28 In addition to Areas 1, 2 and 3, there are four supporting works areas of Phase I under this Project. Land use in Area 4 includes vacant area, site office, open storage, green belts and streets/ highways.

4.29 Site inspection for Area 4 was conducted in November and December 2008. Sites identified with potentially contaminating land use are indicated in **Table 4.5**. For easy reference, these sites have been assigned a letter as a unique Site ID, e.g. 4-01, 4-02 etc, in this area.

Table 4.5 Summary of Site Appraisal Results for Area 4

| Land Ref. No. | Site ID | Historic Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---|--|--|--|--|----------------------------|
| WS. 112 | 4-01 | Sea, and reclaimed area | Highway structures, streets, vacant areas, green areas | <ul style="list-style-type: none"> Highways, streets, vacant areas and green areas are the main land use for this area | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/E NS/M57/007 |
| WA. 102 | 4-02 | Sea, reclaimed area, and open car park | Open car park | <ul style="list-style-type: none"> An open car park, based on review of street maps and aerial photos | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/E NS/M57/007 |
| WA. 103 | 4-03 | Sea, reclaimed area, and traffic roads | Vacant area covered by vegetation | <ul style="list-style-type: none"> This area was vacant and covered by vegetation during the site inspection It is unpaved and partly covered by vegetation | No | No adverse contaminated land impacts are identified based on site appraisal. | NEX2213/C/361/E NS/M57/007 |
| NSL-034 | 4-04 | Sea, reclaimed area, low-rise building, open car park | Site office, open car park and open storage | <ul style="list-style-type: none"> A site office of the Drainage Service Department (DSD) was observed on the north-western portion of this area. The site office area includes low-rise buildings, an open car park, and an open storage of construction materials (e.g. concrete pipes, road blocks, soil and stones) and a waste oil storage area, where about eight drums for waste diesel storage were observed shelved on secondary containment | Yes (for the waste diesel storage area of the DSD site office) | <ul style="list-style-type: none"> Oil drums storage area: possible contamination due to spillage/leakage of waste oil. Total area of the DSD site office is about 5,400 m². Area occupied for this oil drums storage area with potential contamination concerns is about 20 m² | NEX2213/C/361/E NS/M57/007 |

| Land Ref. No. | Site ID | Historic Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|-------------------|-------------------|---|---|---------------------------------------|------------------|
| | | | | <p>near the northern corner of this area.</p> <ul style="list-style-type: none"> • This site office area of DSD was partly concrete-paved with no observable oil stains except some apparent oil stains were found on unpaved area near the waste diesel storage area. • An open storage occupied by Sun Fook Kong (Civil) Limited (新福港(土木)有限公司). Low rise site office buildings, construction materials (e.g. wood plates, iron sticks, metal pipes, bricks, concrete drums) and a portable crane was observed onsite. • Based on the site observation, the ground is generally concrete-paved with no observable oil stains. | | | |

*: Current land use is identified based on street maps and site inspection.

v. Areas Inaccessible for Site Inspection

4.30 Several areas within the Assessment Area were not able to be accessed due to being locked or access was denied by the occupier; thus they were restricted from onsite inspection and/ or (further) site inspection. Details regarding these sites were summarised in **Table 4.6** below.

Table 4.6 Areas Restricted from Onsite Inspection

| Site ID of Inaccessible Site | Review of Available Information | Initial Contamination Evaluation of Those Inaccessible Sites and Possible Remediation Methods | Confirmation of whether the contamination problem at this/these site(s) would be surmountable | Sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of this/these site(s) | Schedule of submission of revised CAP (if necessary), CAR, RAP and RR |
|-----------------------------------|--|---|---|--|---|
| 2-08 (part of the railway tracks) | <p><u>Site Appraisal</u></p> <p>This area is reportedly to be used as railway tracks for the goods yard. A number of the tracks were restricted for access; hence site inspection could not be performed.</p> <p>For railway tracks that were inspected, oil stains (suspected to be lubricating oil) were observed along the tracks.</p> <p>For railway tracks that were restricted from onsite inspection, they are used as the goods yard. According to the site personnel, lubricating</p> | <p><u>Initial Contamination Evaluation</u></p> <p>According to information provided by the site personnel, lubricating oil leakage from locomotives and/ or wheels of cars/ wagons are possible.</p> <p>Such leakage may cause surface land contamination at concrete-based tracks and deeper contamination at ballast-based tracks, depend on soil properties.</p> <p>Furthermore, this site has been in operation for more than 10 years; land contamination is therefore considered as possible.</p> <p><u>Possible Contaminants</u></p> <p>Petroleum hydrocarbons, heavy metal (lead), BTEX</p> <p><u>Possible Remediation Methods</u></p> <p>Depending on the contaminated</p> | <p>The contamination hotspots of this site mainly concentrate at areas along the railway tracks. Potentially contaminating activities are related to leakage of lubricating oil only, hence the contaminant types are limited.</p> <p>Therefore, land contamination problems are considered surmountable</p> <p>Moreover, there are available and commonly adopted remediation methods for the potential contaminants.</p> <p>Furthermore, should land contamination be identified when this site is demolished, there are readily available and commonly adopted remediation measures available.</p> | <p>A total of 5 sampling locations are proposed for an initial screening of the presence of land contamination in this area where cut & cover railway construction will be adopted, as a preliminary representation of potential contamination within the railway tracks in this area. Sampling will be based on a regular grid pattern (100 m x 100 m) and practical conditions when conducting SI, with reference to Guidance Note 2.</p> <p>If contamination is identified and/ or further SI considered necessary further site investigation would be recommended upon agreement with MTR.</p> <p>Sampling plan and testing parameters are detailed in</p> | <p><u>Revised CAP</u></p> <p>Upon site access is granted, site inspection should be carried out to ascertain any other contaminated hotspots within this site. A CAP should then be submitted to EPD for endorsement.</p> <p><u>CAR and RAP</u></p> <p>Upon completion of SI and laboratory testing, a CAR should be submitted to EPD for endorsement. If contamination is identified, a RAP should also be submitted to EPD for endorsement.</p> <p><u>RR</u></p> <p>A RR should be submitted to demonstrate</p> |

| Site ID of Inaccessible Site | Review of Available Information | Initial Contamination Evaluation of Those Inaccessible Sites and Possible Remediation Methods | Confirmation of whether the contamination problem at this/these site(s) would be surmountable | Sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of this/these site(s) | Schedule of submission of revised CAP (if necessary), CAR, RAP and RR |
|------------------------------|--|---|---|--|--|
| | oil leakage might be possible from wheels of the EMU cars parked on tracks nos. G10, G12, G13 and G15, while such leakage might be possible from the locomotive and wheels of goods wagons parked on the other tracks for goods yard (with the initial "G") Site appraisal results are detailed in Table 4.3 . | soil quantity and quality, possibly: Cement stabilization/solidification for heavy metals. Bioremediation such as bio-pile and composting for organic contaminants. | | Table 5.2. | completion of remediation works before construction work starts at the site. |

vi. Potentially Contaminated Sites Close to the Assessment Area

4.31 The migration of pollution within groundwater from sites up hydraulic gradient, may affect the Assessment Area, even if the potential source is not within the designated Project area. Therefore, supplementary to review of potentially contaminating land uses within the Assessment Area, the general environment in close vicinity of the Assessment Area and the Project area was reviewed based on street maps and site inspection. Relevant details were detailed in **Table 4.7** below.

Table 4.7 Potentially Contaminated Sites Close to the Assessment Area

| Name and Nature of Business | Site Location | Review of Available Information | Initial Contamination Evaluation of the Site |
|-----------------------------|---|---|--|
| ESSO Petrol Filling Station | Located about 200 m upstream north of the Assessment Area, on the tunnel between Chi Man Street and Princess Margaret Road. | <p><u>Site Appraisal</u></p> <p>Diesel, liquefied petroleum gas (LPG), gasoline (Synergy F-1 and 8000) are stored and served in this PFS.</p> <p>An LPG store was observed southwest of the PFS.</p> <p>The area of the PFS is entirely concrete-paved and is in good condition during site inspection.</p> | <p><u>Initial Contamination Evaluation</u></p> <p>This PFS is located about 200 m north of the nearest boundary of the Assessment Area.</p> <p>It is built on the tunnel where there is rock and a tunnel protection zone and a vertical space above the railway alignment</p> <p>Even if there was a leakage, LPG would have minimal land contamination concerns due to its physical properties.</p> <p>Therefore, potential contamination affecting the Assessment Area due to possible plume migration from this PFS is minimal</p> |

Other Relevant Information

- 4.32 In order to evaluate the potential land contamination concerns from previous land uses, inquiries were made to the Environmental Protection Department (EPD), Fire Services Department (FSD) and the Lands Department (LandsD) on 17 November 2008 for:
- i. records on any chemical and chemical waste releases within the Project Area,
 - ii. records of current and past registration of dangerous goods storages and reported accidents of spillage/leakage and,
 - iii. historical land uses of the Project Area.
- 4.33 A reply letter from FSD dated 2 January 2009 indicates that three accidents of spillage/ leakage of dangerous goods occurred within the assessment area from 1 January 2000 to 31 July 2008. According to the FSD personnel, the three accidents included:
- i. aluminium powder spillage at 80 Salisbury Road on 9 October 2006,
 - ii. acetylene spillage at Metropolis Drive on 13 June 2002 and,
 - iii. oil spillage at KCRC Railway Tracks on 2 April 2005.
- 4.34 However, information regarding the exact location, degree and extend of the spillage was not provided. Metropolis Drive is located on the podium level at the eastern part of the Metropolis. The accident of acetylene spillage at Metropolis Drive is not considered having any land contamination concern. Information regarding chemical waste producers was reviewed on 12 December 2008 and no registration of chemical waste producer was identified within the Project area other than those identified during site inspections in November and December 2008.
- 4.35 In relation to the third incident record, based on further clarification of MTR, it was found that the chimney of a locomotive caught on fire and that the fire was put out in a short time. According to MTR, no oil leakage or spillage was recorded from this accident, and the location of this accident was at the middle portion of the railway track G17. Therefore, this is not considered as causing land contamination concerns in the corresponding area of the Assessment Area.
- 4.36 Owing to the changes in the proposed works areas, further inquiries were made to FSD to identify any spillage/ leakage accidents within these proposed works areas. However, FSD has not yet responded during the time of the submission of this report.
- 4.37 Historical land use information was gathered through reviews of aerial photographs of the potential contaminated areas.
- 4.38 Standard Form Table 3.1 adopted from EPD's Guidance Manual summarising the past, current and future land uses of the potentially contaminating sites is provided in **Appendix D**.

5. SAMPLING PLAN FOR SITE INVESTIGATION

Sampling Locations

- 5.1 Site investigations undertaken in **Section 4** have identified that HFY and some facilities in Areas 1 through 4 may have potential land contamination. A total of 24 boreholes and 4 trial pits are proposed, including both the SI for the present stage and for sites after decommissioning. The location plans of the proposed Site Investigation (SI) sampling locations are illustrated in **Figure nos. NEX2213/C/361/ENS/M57/008** through **NEX2213/C/361/ENS/M57/012**.

Sampling Parameters

- 5.2 The selection of chemicals of concern (COCs) recommended for laboratory analysis at each of the proposed sampling locations is based on desktop review and site investigation as described in **Sections 3 and 4** and with reference to Guidance Notes 1 and 2 and the Guidance Manual. Where the desktop review and site investigation observed historical land use of a specific industry type, reference was also made to **Appendix E** “*Chemical Contaminants Listed by Industry Type*” of Australian Standard 4482.1-1997 “*Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*”.
- 5.3 The exact sampling locations of the SI shall be determined onsite as it is subject to adjustment based on site conditions encountered (e.g. presence of foundations, underground utilities, delivery pipes and services). The location should be agreed with the land contamination specialist prior to drilling/excavation and sampling.
- 5.4 If unexpected contamination is observed during the SI (i.e. extensive contamination observed beneath the removed concrete), an increased number of sample locations, sample depths or number of analytes would be recommended to MTR in order to further investigate the extent of contamination present. However, further investigation will only be undertaken upon MTR’s written authorisation.
- 5.5 The testing locations, basis for further investigation, investigation techniques, proposed number of samples, together with the analytical regime is summarised in **Table 5.1**.
- 5.6 Sites which may contain contamination but were unable to be investigated due to constraints caused by current railway operation or the land being not yet acquired are listed in **Table 5.2**. SI works shall be carried out once these sites are available for investigation.
- 5.7 The sampling and testing plan is detailed in **Appendix F**.

Table 5.1 Sampling and Testing Plan for Potentially Contaminated Sites

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | Parameters to Be Tested | Figure Reference | |
|---------------|---|--|-----------------|---------------|--|---------------------------------------|---------------------------|
| Area 1 | | | | | | | |
| 1-10 | Demolished storage for paints, currently used as an open storage for construction materials Approx. area of 100 m ² | At the hotspot to verify any residual contamination 2209/SCL/EDH249(P) | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, Zinc VOCs, SVOCs, Cyanide | NEX2213/C/361/ENS/M57/008 |
| | | | | GW | One GW sample per location if encountered. | VOCs, SVOCs | |
| 1-18 | Emergency generator room and the associated fuel tank room at STA Building Approx. area of 30 m ² | Close to but outside both rooms, due to sampling constraints at this stage. 2209/SCL/ETT103 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m Since this site is within the cut & cover works area where excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/008 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| Area 2 | | | | | | | |
| 2-05 | USTs near the Locomotive Running Shed Approx. area of 150 m ² | Northwest of the USTs 2209/SCL/EDH246 (Two extra sampling locations at the west, southeast of the USTs are proposed and will be conducted during the decommissioning of this site; | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | | Parameters to Be Tested | Figure Reference |
|---------------|---|--|-----------------|---------------|--|-------------------------|---------------------------|
| | | detailed in Table 5.2) | | | | | |
| 2-06 | Above ground lubricating oil tank near the Locomotive Running Shed Approx. area of 10 m ² | Close to and south of the lubricating oil tank 2209/SCL/ETT102 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m bgs | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-07 | Dispenser west of the Locomotive Running Shed Approx. area of 10 m ² | Next to the hotspot 2209/SCL/EDH244 | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-09 | D.G storage containers near the Southern Warehouse Approx. area of 20 m ² | Close to but outside of the D.G. storage containers, due to sampling constraints at this stage. 2209/SCL/EDH231 | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. Since this site is within the hoarding area where excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| Area 3 | | | | | | | |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | | Parameters to Be Tested | Figure Reference |
|---------|--|---|-----------------|---------------|--|--|---------------------------|
| L17* | D.G. store and chemical storage room at the IMC Approx. area of 20 m ² | Close to but outside (west) of both rooms, due to sampling constraints at this stage. 2209/SCL/ETT068 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m bgs. Since the D.G. store and chemical storage room are within the works area and close to the hoarding area, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | VOCs, SVOCs, full list of metals, TPH, Cyanide | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | | |
| | Emergency generator room and the associated fuel tank room Approx. area of 20 m ² | Close to but outside (north) of both rooms, due to sampling constraints at this stage. 2209/SCL/ETT106 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m bgs. Since the D.G. store and chemical storage room are within the works area and close to the hoarding area, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | VOCs, SVOCs, full list of metals, TPH | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | | |
| | Historic unknown open storage Approx. area of 2000 m ² (within the hoarding area) | At the historic open storage area of IMC 2209/SCL/EDH256 and 2209/SCL/EDH257 | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. Since this site is within the works area and partly within the hoarding area where | VOCs, SVOCs, full list of metals, TPH | NEX2213/C/361/ENS/M57/010 |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | Parameters to Be Tested | Figure Reference |
|---------|--|--|-----------------|---|---|---------------------------|
| | | | | excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | | |
| | | | | GW | One GW sample per location if encountered. | VOCs, SVOCs, Mercury, TPH |
| 3-02 | Container stacker refuelling and maintenance area at Hung Hom Freight Year (HFY) Approx. area of 700 m ² | Sampling between this area and the works area for preliminary screening of the presence of contamination plume 2209/SCL/EDH229 and 2209/SCL/EDH124(P) | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, BTEX, TPH, PAHs |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs |

Notes:

- *: Site L17 is the overlapping works area under both this Project and EWL. Sampling locations are proposed for potential contamination hotspots for Site L17 with reference to the approved CAP of this area under EWL.
1. bgs: below ground surface; GW = groundwater
 2. VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
 3. BTEX = *Benzene, Toluene, Ethylbenzene* and *Xylene*.
 4. PAHs = The whole of COCs listed under group of SVOCs in the RBRGs Table except *bis-(2-Ethylhexyl)phthalate, Hexachlorobenzene* and *Phenol*. Since RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene Dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.
 5. Heavy Metals - The whole list of COCs listed under Metals in Appendix IV of Guidance Note 1.
 6. Since the RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene bis-(2-Ethylhexyl)phthalate Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
 7. If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

vii. Areas with Site Investigation (SI) Constraints at This Stage

5.8 In addition to areas which are not feasible for inspection or identification of hot spots, sites with constraints for sampling works at current stage are listed in **Table 5.2** below. Supplementary CAP(s) will be prepared and submitted for EPD endorsement; CAR, RAP and RR will be prepared and submitted subsequently, if necessary.

Table 5.2 Sampling and Testing Plan of SI Works for Sites upon Decommissioning

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | Parameters to Be Tested | Figure Reference |
|---------------|---|---|-----------------|---------------|--|---------------------------|
| Area 2 | | | | | | |
| 2-04 | The following hotspots are all located in the Locomotive Running Shed: Workshop, approx. area of 300 m ² Servicing area, approx. area of 500 m ² Chemical storage area, approx. area of 20 m ² Waste oil storage area, approx. area of 20 m ² | Workshop: HUH-2 (section inside the running shed), HUH-9 (section outside the running shed): Servicing area: HUH-3, HUH-5 Chemical storage area: HUH-4 Waste oil storage area: HUH-6 | Borehole | Soil | Workshop: Lead, Chromium, Copper, TPH, VOCs, SVOCs Servicing area: Lead, Chromium, Copper, TPH, VOCs, SVOCs Chemical storage area: Lead, TPH, VOCs, SVOCs Waste oil storage area: Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. Workshop: VOCs, SVOCs, TPH Servicing area: VOCs, SVOCs, TPH Chemical storage area: VOCs, SVOCs, TPH Waste oil storage area: BTEX, TPH, | |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | | Parameters to Be Tested | Figure Reference |
|---------|---|---|---|---------------|--|-------------------------|---------------------------|
| | | | | | | PAHs | |
| 2-05 | USTs near the Locomotive Running Shed Approx. area of 150 m ² | West of the USTs: HUH-8 Southeast of the USTs: HUH-10 | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-07 | North dispenser of the Locomotive Running Shed Approx. area of 10 m ² | Exactly at this hotspot HUH-7 | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs, | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-02 | Traverser and the ground underneath Total approx. area of 800 m ² ; approx. area within the cut & cover works area where excavation is expected is < 100 m ² | At the hotspot for preliminary screening of the presence of potential land contamination HUH-1 Should contamination be confirmed, deeper and more extensive sampling will be proposed with reference to Guidance Note 2, upon agreement with MTR. | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-08 | Railway tracks in W2 Total approx. area of 15,000 m ² | Sampling based on grid (100 m x 100 m). Total sampling locations in this area: 5 (RWT-1 through RWT-5) Five locations in Area W2: Railway tracks nos. G10, G12, G13, G15, | Borehole If contamination is confirmed, further SI would be recommended and conducted, | Soil | For concrete-based railway tracks in this area (G17 and G18): soil samples at depths of 0.5, 1.5 3.0, 4.5 and 6.0 m bgs. For ballast-based railway tracks in this area (G10, G12 G13, G15 and the northern section of G6): soil | Lead, BTEX, PAHs, TPH | NEX2213/C/361/ENS/M57/012 |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | Parameters to Be Tested | Figure Reference |
|---------------|--|--|-------------------------|--|--|-----------------------|
| | | G17 and G18, based on a 100 m x 100 m grid pattern, between two neighbouring tracks: RWT-1 through RWT-5 Exact sampling locations and number shall also depend on the practical conditions when sampling is conducted | upon agreement with MTR | samples at depths of 0.5, 1.5, 3.0 and 6.0 m; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. If contamination is confirmed, further (smaller grid, e.g. 50 m interval) and deeper (sampling until the bedrock or the bottom of excavation, whichever is shallower) site inspection would be conducted upon agreement with MTR | | |
| | | | | GW | One GW sample per location if encountered. | BTEX, PAHs, TPH |
| Area 4 | | | | | | |
| 4-04 | Waste diesel storage area at DSD site office | Exactly at the hotspot DSD-1 | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, PAHs, TPH |
| | | | | GW | One GW sample per location if encountered. | BTEX, PAHs, TPH |

Notes:

- bgs = below ground surface; GW = groundwater
- VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
- BTEX = *Benzene, Toluene, Ethylbenzene* and *Xylene*.
- PAHs = The whole of COCs listed under group of SVOCs in the RBRGs Table except *bis-(2-Ethylhexyl)phthalate, Hexachlorobenzene* and *Phenol*. Since RBRGs value of *Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene* and *Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.
- Heavy Metals - The whole list of COCs listed under Metals in Appendix IV of Guidance Note 1.
- Since the RBRGs value of *Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, bis-(2-Ethylhexyl)phthalate, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.

7. If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions

- 5.9 Through an initial site assessment consisting of the desktop review and site walkover detailed in **Section 4**, it is considered likely that remediation of impacted soil and or groundwater may be required at one or more locations. SI results will be discussed in the CAR; if land contamination is confirmed, possible remedial techniques will be provided in the subsequent RAP.
- 5.10 SI works shall be carried out by the main contractor of the Project upon decommission or acquisition of the above listed sites at a later stage. AECOM will submit one revised CAP including all further identified contamination. One revised CAR, RAP and RR will also be prepared once the status of contamination status of these sites has been determined.

Soil Sampling Method and Depth of Sampling

- 5.11 All soil boring / excavation and sampling should be supervised by a land contamination specialist.
- 5.12 Boreholes should be advanced by means of dry rotary drilling method, i.e. without the use of flushing medium as far as applicable. For safety reasons, an inspection pit should be excavated down to 1.5 m below ground to inspect for underground utilities at the proposed borehole location. If necessary, other forms (e.g. ground penetration radar, metal detection) of utilities checking should be performed to ensure clearance of underground structures. Disturbed soil samples should be collected at the depth of 0.5 m below ground surface (bgs), and 1.5 m bgs if inspection pit was excavated.
- 5.13 In areas with no excavation works or excavation works not more than 6 m of soil boring should be undertaken to a depth of 6.0 m bgs. For sites where excavation deeper than 6 m is planned, drilling should be undertaken to the specified depth or upon encountering bedrock, whichever is shallower.
- 5.14 Soil boring using drill rigs should then be performed for depth from 1 m to the maximum boring depth. Undisturbed soil samples shall be collected by sampler (e.g. U100/U76) made of stainless steel or other materials considered appropriate at 0.5 m, 1.5 m, 3 m and 6 m bgs and at 3 m intervals for deeper excavations. Where there are suspected signs of contamination, extra samples should be taken for laboratory analysis. If there are any spatial and/ or headroom constraints for the proposed borehole(s), trial pit(s) should be considered as an alternative to collecting the soil samples.
- 5.15 At each sampling location/ depth, sufficient quantity of soil sample (as specified by the laboratory) should be taken. All soil samples should be uniquely labelled and documented on a Chain of Custody form. Backup samples should be retained and stored at 0 - 4 °C in laboratory. Guidelines on sample size and handling for soil sample are given in **Table 5.3** below.

Table 5.3 Guidelines of Sample Size and Handling for Soil Sample

| Matrix | | | Soil | | |
|----------------------|------|-------------|---|--------------|-------------|
| Container Per Sample | | | Parameters | Preservation | Temperature |
| No. of Bottles | Size | Type | | | |
| 1 | 1 kg | Amber Glass | Full list of metals, VOCs & SVOCs, PAHs, PCBs, TPH, MTBE, BTEX, cyanide | None | 0-4°C |

Strata Logging

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

Free Product and Groundwater Level Measurement

- 5.17 The thickness of any free product and ground water level if present at sampling locations should be measured with an interface probe. The free product if encountered in sufficient amount should be collected for laboratory analysis to determine the composition.

Groundwater Sampling

- 5.18 It is proposed to collect groundwater samples if groundwater is encountered at the sampling locations.
- 5.19 For each proposed borehole sampling location of which groundwater is encountered, a groundwater well should be installed into the borehole if it is feasible upon considerations of engineering constraints. A typical design of the groundwater sampling well as shown in **Appendix G**, however installation of the well should take into account local conditions.
- 5.20 Each well should first be developed by removing approximately five well volumes of groundwater to remove silt and drilling fluid residue (if present) from the wells. The wells should then be allowed to stand for 24 hours to permit groundwater conditions to equilibrate. Groundwater levels and thickness of free product layer, if present, should be measured at each well before groundwater samples are taken.
- 5.21 In the case of more than one groundwater well being installed, the top of the casing of each groundwater well should first be surveyed to a recognized height datum. All groundwater wells should then be gauged at the same time in order to map the groundwater flow regime present at the site.
- 5.22 Prior to groundwater sampling, the monitoring wells should be purged (at least three well volumes) to remove fine-grained materials and to collect freshly refilled representative groundwater samples. Time for each groundwater purging/recharge should be recorded as well as the estimated groundwater flow.
- 5.23 After purging, one groundwater sample should first be collected using a decontaminated stainless steel or Teflon bailer and placed into a decontaminated container with the following water quality parameters recorded using a water quality meter; temperature, pH, total dissolved solids, dissolved oxygen, and Redox potential.
- 5.24 One groundwater sample should then be collected at each well using a decontaminated stainless steel bailer and decanted into appropriate sample vials or bottles in a manner that minimizes agitation and volatilization of VOCs from the samples. All samples should be uniquely labelled.
- 5.25 Trial pits are to be considered as an alternative for sampling due to any constraints such as overhead access. Groundwater samples should also be collected at all trial pits if it is encountered during excavation. Groundwater from trial pits should be collected using a decontaminated bucket. Water quality parameters should also be recorded where the volume of water is great enough (priority should be placed on collecting a groundwater sampling for laboratory analysis).
- 5.26 Immediately after collection, groundwater samples should be transferred to new, clean, laboratory-supplied glass jars for sample storage/ transport. The sampling glass jars should be of “darken” type. Groundwater samples should be placed in the glass jars with zero headspace and promptly sealed with a septum-lined cap. Immediately following collection, samples should be placed in ice chests, cooled and maintained at a temperature of about 4°C until delivered to the analytical laboratory.

Sample Size and Decontamination Procedures

- 5.27 All equipment in contact with the ground or groundwater should be thoroughly decontaminated between each excavation, drilling and sampling event to minimize the potential for cross

contamination. The equipment (including drilling pit, digging tools and soil/groundwater samplers) should be decontaminated by steam cleaning or high-pressure hot water jet, then washed by phosphate-free detergent and finally rinsed by distilled/ deionised water.

- 5.28 Prior to sampling, the laboratory responsible for analysis should be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis.
- 5.29 The sample containers should be laboratory cleaned, sealable, water-tight, made of glass or other suitable materials with aluminium or Teflon-lined lids, so that the container surface will not react with the sample or adsorb contaminants. No headspace should be allowed in the containers which contain samples to be analyzed for VOCs, Total Petroleum Hydrocarbon (TPH) fractions or other volatile chemicals.
- 5.30 The containers should be marked with the sampling location codes and the depths at which the samples were taken. If the contents are hazardous, this should be clearly marked on the container and precautions taken during transport. Samples should be stored at between 0-4 °C but never frozen. Samples should be delivered to laboratory within 24 hours of the samples being collected and analyzed within the respective retention period for the requested analysis but should not more than 10 days. Guidelines on sample sizes and handling for groundwater samples are given in **Table 5.4** below.

Table 5.4 Guidelines on Sample Size and Handling for Groundwater Sample

| Matrix | | | Groundwater | | |
|----------------------|-----------|----------------|---------------------------------|------------------|-------------|
| Container Per Sample | | | Parameters | Preservation | Temperature |
| No. of Bottles | Size (mL) | Type | | | |
| 1 | 250 | Plastic bottle | Full list of metals | HNO ₃ | 0-4°C |
| 1 | 1000 | Amber Glass | PAHs | None | 0-4°C |
| 1 | 1000 | Amber Glass | PCBs | None | 0-4°C |
| 1 | 1000 | Amber Glass | TPH | None | 0-4°C |
| 2 | 40 | Brown vial | BTEX, Full list of VOCs & SVOCs | HCl | 0-4°C |
| 1 | 250 | Plastic bottle | Cyanide | NaOH | 0-4°C |

QA/QC Procedures

- 5.31 QA/QC samples should be collected with reference to the following frequency criteria where appropriate during the SI Chain of Custody protocol should be adopted.
- 1 duplicate per 20 samples for the full suite analysis ;
 - 1 equipment blank per 20 samples for the full suite analysis;
 - 1 field blank per 20 samples for the full suite analysis; and
 - 1 trip blank per trip for the analysis of volatile parameters.

Laboratory Analysis

- 5.32 Laboratory analysis is proposed in order to screen the presence of potential contaminants that are of concern at the Assessment Area. **Table 5.5** summarises the parameters, the minimum requirement of the reporting limits and reference methods for the laboratory analyses of soil and groundwater samples for this land contamination study.

Table 5.5 Parameters, Reporting Limits and Reference Methods for Laboratory Analyses

| Item | Parameter | Soil | | Groundwater | |
|---------------|---|---|------------------|--|------------------|
| | | Reporting Limit (mg/kg) or Otherwise Stated | Reference Method | Reporting Limit (µg/L) or Otherwise Stated | Reference Method |
| VOCs | | | | | |
| 1 | Acetone | 5 [^] | USEPA 8260 | 50 [^] | USEPA 8260 |
| 2 | Benzene | 0.5 | | 5 | |
| 3 | Bromodichloromethane | 0.5 | | 5 | |
| 4 | 2-Butanone | 5 | | 50 | |
| 5 | Chloroform | 0.5 | | 5 | |
| 6 | Ethylbenzene | 0.5 | | 5 | |
| 7 | Methyl tert-Butyl Ether | 0.5 [^] | | 5 [^] | |
| 8 | Methylene Chloride | 5 [^] | | 50 [^] | |
| 9 | Styrene | 0.5 | | 5 | |
| 10 | Tetrachloroethene | 0.5 | | 5 | |
| 11 | Toluene | 0.5 | | 5 | |
| 12 | Trichloroethene | 0.5 | | 5 | |
| 13 | Xylenes (Total) | 1.5 | | 15 | |
| SVOCs | | | | | |
| 14 | Acenaphthene | 0.5 | USEPA 8270 | 2 | USEPA 8270 |
| 15 | Acenaphthylene | 0.5 | | 2 | |
| 16 | Anthracene | 0.5 | | 2 | |
| 17 | Benzo(a)anthracene | 0.5 | | NA | |
| 18 | Benzo(a)pyrene | 0.5 | | NA | |
| 19 | Benzo(b)fluoranthene& Benzo(k)fluoranthene | 1 | | 4 | |
| 20 | Benzo(g,h,i)perylene | 0.5 | | NA | |
| 21 | bis-(2-Ethylhexyl) phthalate | 5 | | NA | |
| 22 | Chrysene | 0.5 | | 2 | |
| 23 | Dibenzo(a,h)anthracen | 0.5 | | NA | |
| 24 | Fluoranthene | 0.5 | | 2 | |
| 25 | Fluorene | 0.5 | | 2 | |
| 26 | Hexachlorobenzene | 0.2 [^] | | 4 | |
| 27 | Indeno(1,2,3-cd)pyrene | 0.5 | | NA | |
| 28 | Naphthalene | 0.5 | | 2 | |
| 29 | Phenanthrene | 0.5 | | 2 | |
| 30 | Phenol | 0.5 | | NA | |
| 31 | Pyrene | 0.5 | 2 | | |
| Metals | | | | | |

| Item | Parameter | Soil | | Groundwater | |
|----------------------------------|---------------|---|---|--|---|
| | | Reporting Limit (mg/kg) or Otherwise Stated | Reference Method | Reporting Limit (µg/L) or Otherwise Stated | Reference Method |
| 32 | Antimony | 1 | USEPA 6020 | NA | USEPA 6020 |
| 33 | Arsenic | 1 | | NA | |
| 34 | Barium | 1 | | NA | |
| 35 | Cadmium | 0.2 | | NA | |
| 36 | Chromium III | 0.5 [^] | | NA | |
| 37 | Chromium VI | 0.5 | | NA | |
| 38 | Cobalt | 1 | | NA | |
| 39 | Copper | 1 | | NA | |
| 40 | Lead | 1 | | NA | |
| 41 | Manganese | 1 | | NA | |
| 42 | Mercury | 0.05 | | APHA 3112 Hg: B | |
| 43 | Molybdenum | 1 | USEPA 6020 | NA | |
| 44 | Nickel | 1 | | NA | |
| 45 | Tin | 1 | | NA | |
| 46 | Zinc | 1 | | NA | |
| Petroleum Carbon Ranges | | | | | |
| 47 | C6 - C8 | 5 | USEPA 8015 | 20 | USEPA 8015 |
| 48 | C9 - C16 | 200 | | 500 | |
| 49 | C17 - C35 | 500 | | 500 | |
| PCBs | | | | | |
| 50 | PCBs | 0.1 | USEPA 8270 | 1 | USEPA 8270 |
| Other Inorganic Compounds | | | | | |
| 51 | Cyanide, free | 1 [^] | APHA 4500 CN | NA | APHA 4500 CN |
| Organometallics | | | | | |
| 52 | TBTO** | 5 | Krone <i>et al.</i> – Marine Environmental Research, 27, 1 – 18, 1989 | 0.1 | Krone <i>et al.</i> – Marine Environmental Research, 27, 1 – 18, 1989 |

Notes:

[^]: The HOKLAS accreditation of the testing method of the COC not available in major laboratories in Hong Kong; analyses will be done with reference to the established protocol of the individual lab.

NA= Not Applicable

- 5.33 For sampling and laboratory analyses, Chain of Custody procedure should be included as QA/QC procedure.
- 5.34 All laboratory analyses for soil and groundwater samples should be conducted by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory. All laboratory test methods should be accredited by the HOKLAS or one of its Mutual Recognition Arrangement partners with reference to the Guidance Manual as far as possible, unless otherwise specified in **Table 5.6** or as agreed by EPD. It should be noted that alternative methods or similar reporting limits may be

used subject to the laboratory availability and capability. The relevant supporting document of the laboratory to be employed for this study should be given in the future CAP or CAR/RAP.

- 5.35 Extra soil samples shall be stored at 0-4 °C and tested for Toxicity Characteristics Leaching Procedure (TCLP) before submission of Remediation Action Plan (RAP) if excavation and landfill disposal is identified as the last resort.
- 5.36 The criteria are set primarily in terms of TCLP limits shown in **Table 5.6**.

Table 5.6 Laboratory Testing Requirements for TCLP Analysis

| Parameter | Test Methods* | Reporting Limit (mg/L) | Landfill Disposal Criteria TCLP Limit (ppm) |
|--|--|------------------------|--|
| TCLP Leachate Preparation allowed by analysis for: | | | |
| Antimony (Sb) | USEPA1311 USEPA6020 & USEPA 7112 | 1 | 150 |
| Arsenic (As) | | 1 | 50 |
| Barium (Ba) | | 1 | 1,000 |
| Beryllium (Be) | | 1 | 10 |
| Cadmium (Cd) | | 0.2 | 10 |
| Chromium (Cr) | | 1 | 50 |
| Copper (Cu) | | 1 | 250 |
| Lead (Pb) | | 1 | 50 |
| Nickel (Ni) | | 1 | 250 |
| Selenium (Se) | | 0.2 | 1 |
| Silver (Ag) | | 1 | 50 |
| Thallium (Tl) | | 1 | 50 |
| Tin (Sn) | | 1 | 250 |
| Vanadium (V) | | 1 | 250 |
| Zinc (Zn) | | 1 | 250 |
| Mercury (Hg) | | 0.2 | 1 |

* Equivalent internationally recognised standard methods could also be used.

6. INTERPRETATION OF RESULTS

- 6.1 With reference to the Guidance Note 1, interpretation of results should make reference to the Guidance Manual. The soil and groundwater samples collected for this study will be compared with Risk-based Remediation Goals (RBRGs) as stipulated in Table 2.1 and Table 2.2 of the Guidance Manual.
- 6.2 The RBRGs are developed based on a risk assessment approach to suit the local environmental conditions and community needs in Hong Kong. Decisions on contaminated soil and groundwater remediation are based on the nature and extent of the potential risks that are posed to human receptors as a result of exposure to chemicals in the soil and/or groundwater. Four types of land use scenarios are set under RBRGs to reflect the typical physical settings in Hong Kong under which people could be exposed to contaminated soil and groundwater. A description of each land use is as follows:
- Urban residential – Sites located in an urban area where main activities involve habitation by individuals. The typical physical setting is a high rise residential building situated in a housing estate that has amenity facilities such as landscaped yards and children's playgrounds. The receptors are residents who stay indoors most of the time except for a short period each day, during which they are outdoors and have the chance of being in direct contact with soil at landscaping or play areas within the estate.
 - Rural residential – Sites located in a rural area where the main activities involve habitation by individuals. These sites typically have village-type houses or low rise residential blocks surrounded by open space. The receptors are rural residents who stay at home and spend some time each day outdoors on activities such as gardening or light sports. The degree of contact with the soil under the rural setting is more than that under the urban setting both in terms of the intensity and frequency of contact.
 - Industrial – Any site where activities involve manufacturing, chemical or petrochemical processing, storage of raw materials, transport operations, energy production or transmission, etc. Receptors include those at sites where part of the operation is carried out directly on land and the workers are more likely to be exposed to soil than those working in multi-storey factory buildings.
 - Public parks – Receptors include individuals and families who frequent parks and play areas where there is contact with soil present in lawns, walkways, gardens and play areas. Parks are considered to be predominantly hard covered with limited areas of predominantly landscaped soil. Furthermore, public parks are not considered to have buildings present on them.
- 6.3 In addition to the RBRGs, screening criteria (soil saturation limits, Csat, developed for Non-aqueous Phase Liquid [NAPL] in soil and water solubility limits for NAPL in groundwater) for the more mobile organic chemicals must be considered to determine whether a site requires further action.
- 6.4 Since this Project involves the construction of a new railway, the Assessment Area is considered to be occupied for industrial purpose in the future and therefore RBRGs for Industrial Land Use will be adopted as the assessment criteria for this land contamination assessment. Relevant soil and groundwater RBRGs for this land contamination study including the Soil Saturation and Solubility Limits are presented in **Table 6.1**.

Table 6.1 Relevant RBRGs for Soil and Groundwater

| Chemical | Soil (mg/kg) | | Groundwater (µg/L) | |
|-----------------------------|----------------------|-----------------------|----------------------|------------------|
| | RBRGs for Industrial | Soil Saturation Limit | RBRGs for Industrial | Solubility Limit |
| VOCs | | | | |
| Acetone | 10,000 | *** | 10,000,000 | *** |
| Benzene | 9.21 | 336 | 54,000 | 1,750,000 |
| Bromodichloromethane | 2.85 | 1,030 | 26,200 | 6,740,000 |
| 2-Butanone | 10,000 | *** | 10,000,000 | *** |
| Chloroform | 1.54 | 1,100 | 11,300 | 7,920,000 |
| Ethylbenzene | 8,240 | 138 | 10,000,000 | 169,000 |
| Methyl tert-Butyl Ether | 70.1 | 2,380 | 1,810,000 | *** |
| Methylene Chloride | 13.9 | 921 | 224,000 | *** |
| Styrene | 10,000 | 497 | 10,000,000 | 310,000 |
| Tetrachloroethene | 0.777 | 97.1 | 2,950 | 200,000 |
| Toluene | 10,000 | 235 | 10,000,000 | 526,000 |
| Trichloroethene | 5.68 | 488 | 14,200 | 1,100,000 |
| Xylenes (Total) | 1,230 | 150 | 1,570,000 | 175,000 |
| SVOCs | | | | |
| Acenaphthene | 10,000 | 60.2 | 10,000,000 | 4,240 |
| Acenaphthylene | 10,000 | 19.8 | 10,000,000 | 3,930 |
| Anthracene | 10,000 | 2.56 | 10,000,000 | 43.4 |
| Benzo(a)anthracene | 91.8 | NA | NA | NA |
| Benzo(a)pyrene | 9.18 | NA | NA | NA |
| Benzo(b)fluoranthene | 17.8 | NA | 7,530 | 1.5 |
| Benzo(g,h,i)perylene | 10,000 | NA | NA | NA |
| Benzo(k)fluoranthene | 918 | NA | NA | NA |
| bis-(2-Ethylhexyl)phthalate | 91.8 | NA | NA | NA |
| Chrysene | 1,140 | NA | 812,000 | 1.6 |
| Dibenzo(a,h)anthracene | 9.18 | NA | NA | NA |
| Fluoranthene | 10,000 | NA | 10,000,000 | 206 |
| Fluorene | 10,000 | 54.7 | 10,000,000 | 1,980 |
| Hexachlorobenzene | 0.582 | NA | 695 | 6,200 |
| Indeno(1,2,3-cd)pyrene | 91.8 | NA | NA | NA |
| Naphthalene | 453 | 125 | 862,000 | 31,000 |
| Phenanthrene | 10,000 | 28 | 10,000,000 | 1000 |
| Phenol | 10,000 | 7,260 | NA | NA |
| Pyrene | 10,000 | NA | 10,000,000 | 135 |
| Metals | | | | |

| Chemical | Soil (mg/kg) | | Groundwater (µg/L) | |
|--|----------------------|-----------------------|----------------------|------------------|
| | RBRGs for Industrial | Soil Saturation Limit | RBRGs for Industrial | Solubility Limit |
| Cadmium | 653 | NA | NA | NA |
| Chromium III | 10,000 | NA | NA | NA |
| Chromium VI | 1,960 | NA | NA | NA |
| Copper | 10,000 | NA | NA | NA |
| Lead | 2,290 | NA | NA | NA |
| Mercury | 38.4 | NA | 6,790 | NA |
| Nickel | 10,000 | NA | NA | NA |
| Zinc | 10,000 | NA | NA | NA |
| Petroleum Carbon Ranges | | | | |
| C6 - C8 | 10,000 | 1000 | 1,150,000 | 5,230 |
| C9 - C16 | 10,000 | 3000 | 9,980,000 | 2,800 |
| C17 - C35 | 10,000 | 5000 | 178,000 | 2,800 |
| PCB | | | | |
| PCB | 0.748 | NA | 5,110 | 31 |
| Other Inorganic Compound | | | | |
| Cyanide, Free | 10,000 | NA | NA | NA |
| Note: NA - Not Available *** indicates that the Csat value /solubility limit exceeds the 'ceiling limit' therefore the RBRGs applies) | | | | |

7. REPORTING

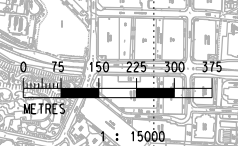
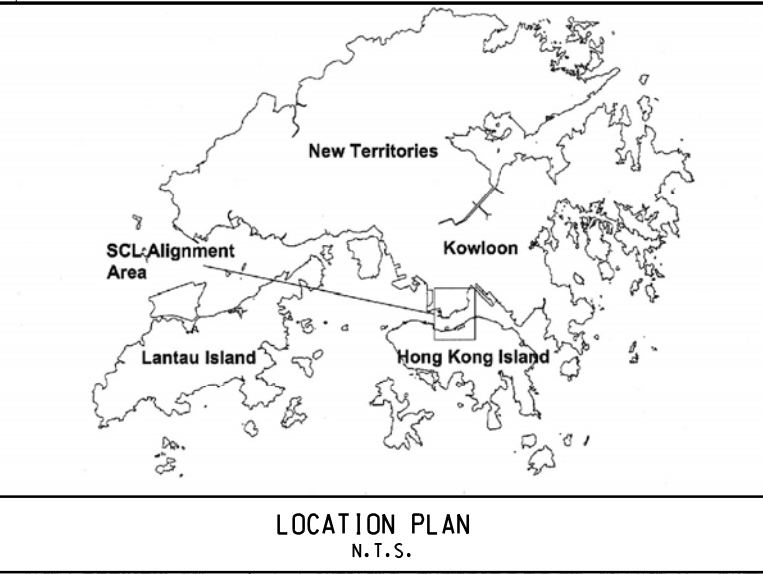
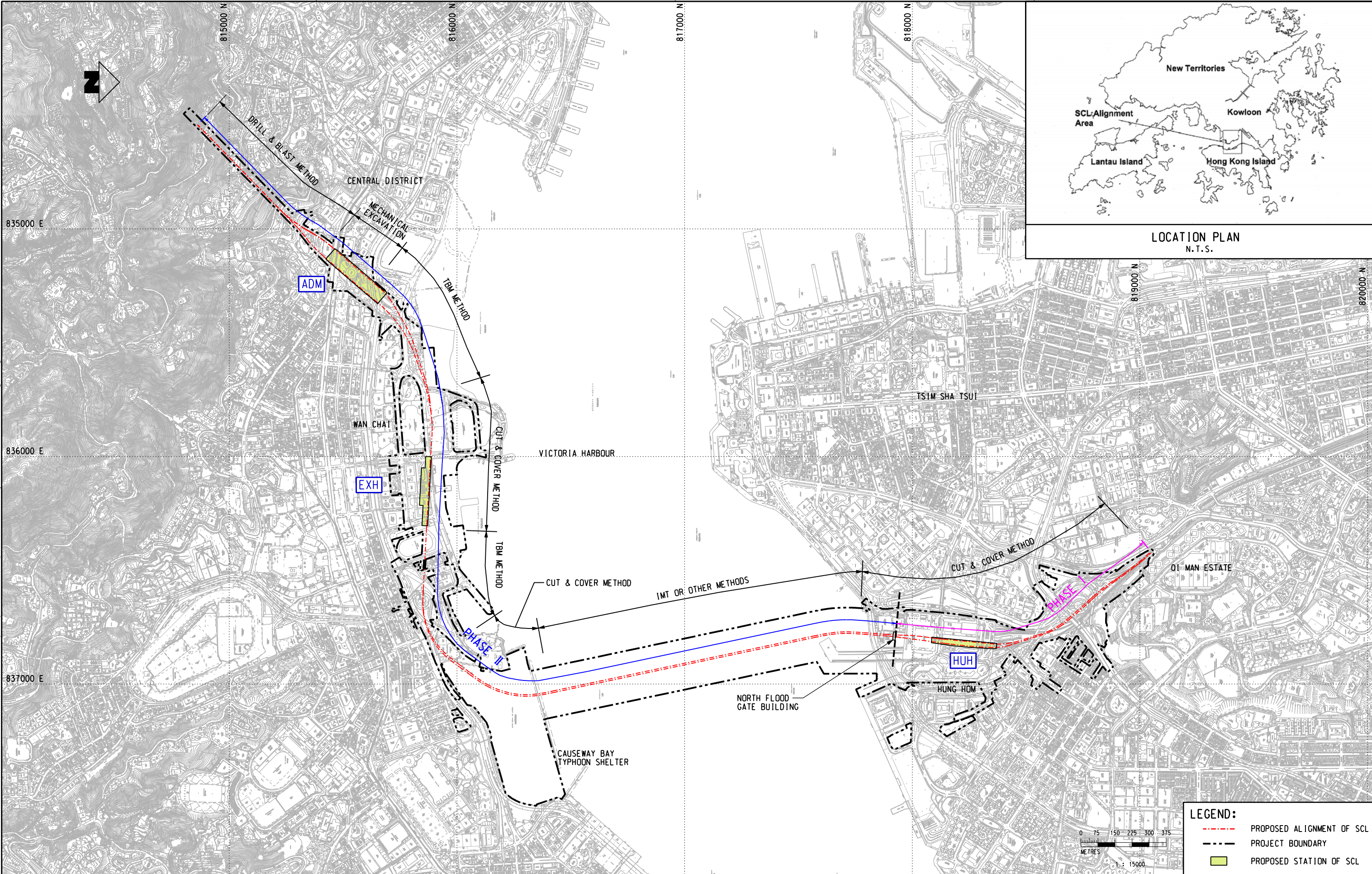
- 7.1 After completion of the site investigation, a CAR which summarises the detailed methodology of site investigation, assessment criteria, onsite observations and the analytical results from the site investigation works will be prepared for EPD endorsement.
- 7.2 Should significant contamination be identified within the works areas, a Remediation Action Plan (RAP) will be prepared. The RAP will set out:
- i. the objectives of remediation action,
 - ii. evaluation of different remediation alternatives and,
 - iii. the design and operation of the proposed remediation method.
- 7.3 The RAP will be submitted either separately or together with the CAR under different sections for EPD endorsement. Site cleanup will commence once the CAR/RAP are vetted and approved by EPD.
- 7.4 A Remediation Report (RR) for demonstration of adequate clean-up should be prepared and submitted to EPD for endorsement prior to the commencement of any construction/development works within the site(s)/ area(s). Construction/development works will only be carried out upon obtaining the endorsement of this RR from EPD.

- 7.5 If contamination is found and landfill disposal is identified as the last resort to remediate the contaminated soil, three impacted soil samples shall be conducted for TCLP test to determine whether they comply with the criteria for landfill disposal in accordance with the Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops before landfill disposal.

Figures

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PLOT DRW: F:\usr\mtr\p1\p1\DRIVER\WINDOWS\13 COC\001.dwg
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 DATE: 2009-8-5 17:50
 PRINTED BY: DANK
 PLOTTED BY: DANK



LEGEND:

- - - PROPOSED ALIGNMENT OF SCL
- PROJECT BOUNDARY
- PROPOSED STATION OF SCL

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
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| APPROVED | --- |
| DATE | 14/MAY/2009 |

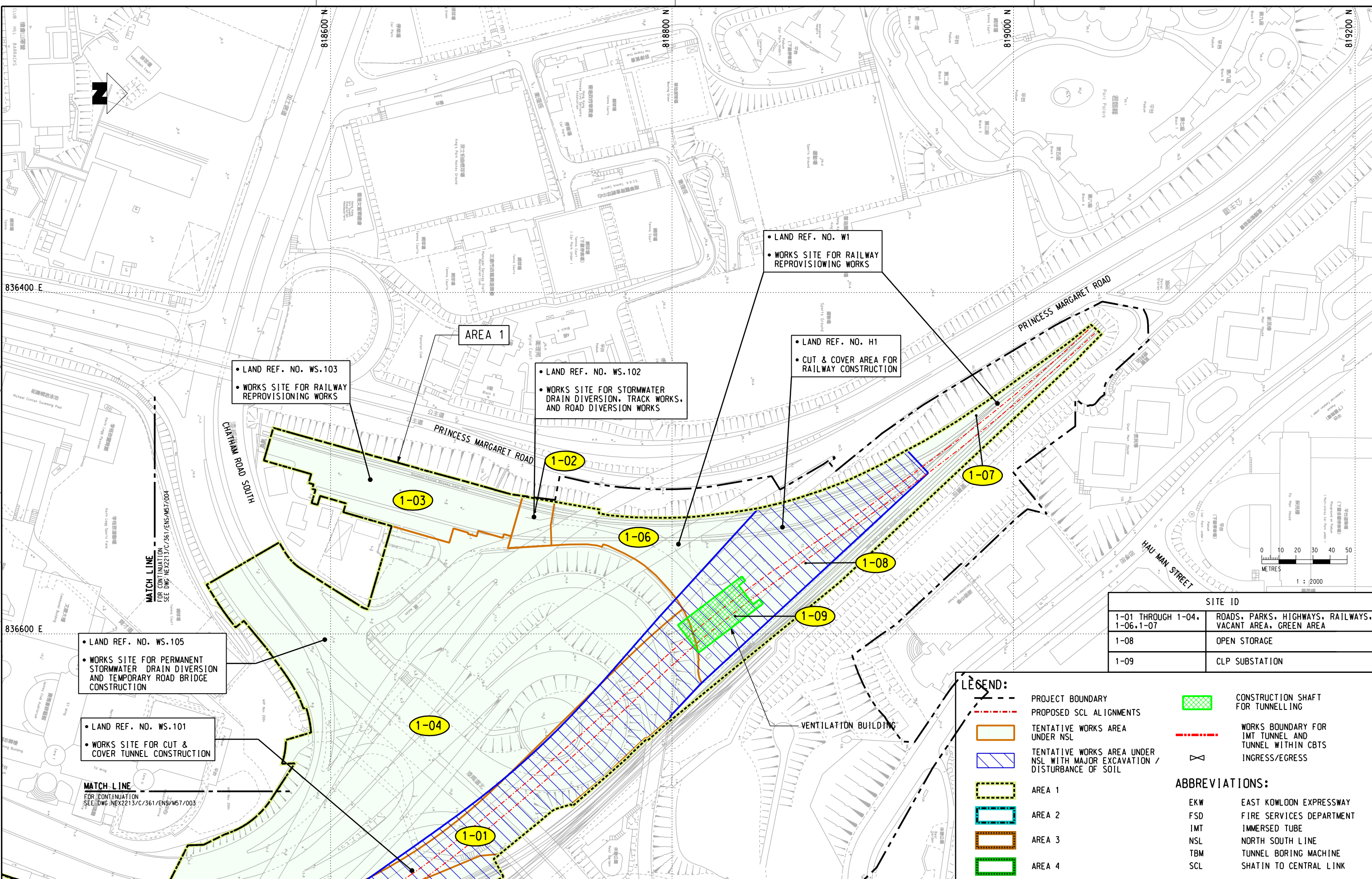
SHATIN TO CENTRAL LINK

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| | | | |
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| TITLE | | NEX/2213 - CROSS HARBOUR SECTION EIA STUDY SCL OVERALL ALIGNMENT (PHASE I & PHASE II) | |
| SCALE | FIGURE NO. | | |
| 1 : 15000 (A3) | NEX2213/C/361/ENS/M50/001 | | |
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| SITE ID | |
|-------------------------------|---|
| 1-01 THROUGH 1-04, 1-06, 1-07 | ROADS, PARKS, HIGHWAYS, RAILWAYS, VACANT AREA, GREEN AREA |
| 1-08 | OPEN STORAGE |
| 1-09 | CLP SUBSTATION |

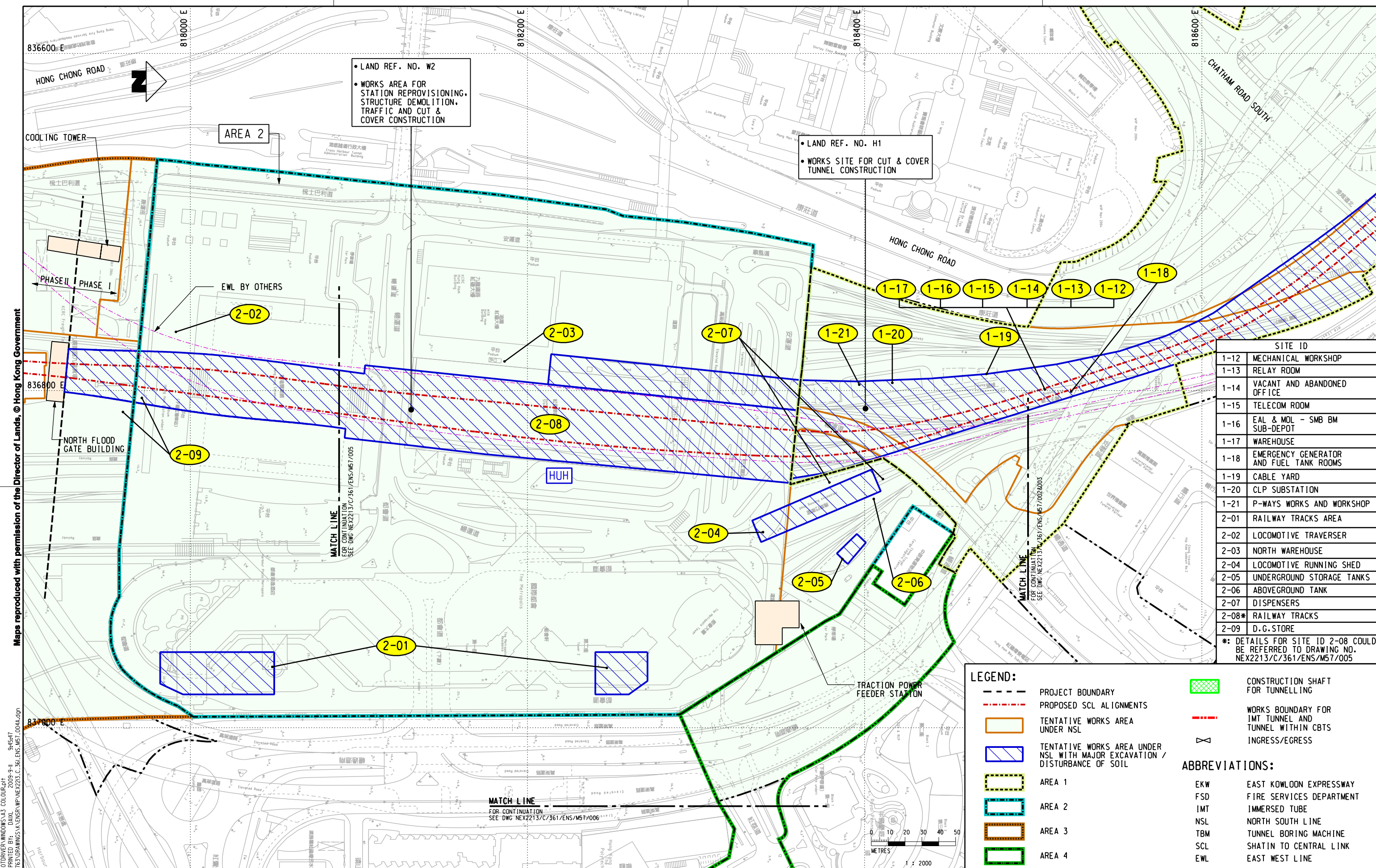
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- PROJECT BOUNDARY (Black dashed line)
- PROPOSED SCL ALIGNMENTS (Red dashed line)
- TENTATIVE WORKS AREA UNDER NSL (Orange outline)
- TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL (Blue outline)
- AREA 1 (Green outline)
- AREA 2 (Cyan outline)
- AREA 3 (Orange outline)
- AREA 4 (Green outline)
- CONSTRUCTION SHAFT FOR TUNNELLING (Green cross-hatch)
- WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS (Red dashed line)
- INGRESS/EGRESS (Black dashed line with 'X' symbol)

ABBREVIATIONS:

- EKW: EAST KOWLOON EXPRESSWAY
- FSD: FIRE SERVICES DEPARTMENT
- IMT: IMMERSED TUBE
- NSL: NORTH SOUTH LINE
- TBM: TUNNEL BORING MACHINE
- SCL: SHATIN TO CENTRAL LINK

| | | | | | | | | | | | | | | | | | | | |
|--|-------------|----|------|-------------------|-----|-------------|----|-------------------------------|----------|-----------|--------------------------------|--|--|--|--|--------|--|--|--|
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• LAND REF. NO. W2
 • WORKS AREA FOR STATION REPROVISIONING, STRUCTURE DEMOLITION, TRAFFIC AND CUT & COVER CONSTRUCTION

• LAND REF. NO. H1
 • WORKS SITE FOR CUT & COVER TUNNEL CONSTRUCTION

| SITE ID | |
|---------|---|
| 1-12 | MECHANICAL WORKSHOP |
| 1-13 | RELAY ROOM |
| 1-14 | VACANT AND ABANDONED OFFICE |
| 1-15 | TELECOM ROOM |
| 1-16 | EAL & MOL - SMB BM SUB-DEPOT |
| 1-17 | WAREHOUSE |
| 1-18 | EMERGENCY GENERATOR AND FUEL TANK ROOMS |
| 1-19 | CABLE YARD |
| 1-20 | CLP SUBSTATION |
| 1-21 | P-WAYS WORKS AND WORKSHOP |
| 2-01 | RAILWAY TRACKS AREA |
| 2-02 | LOCOMOTIVE TRAVERSER |
| 2-03 | NORTH WAREHOUSE |
| 2-04 | LOCOMOTIVE RUNNING SHED |
| 2-05 | UNDERGROUND STORAGE TANKS |
| 2-06 | ABOVEGROUND TANK |
| 2-07 | DISPENSERS |
| 2-08* | RAILWAY TRACKS |
| 2-09 | D.G.STORE |

*: DETAILS FOR SITE ID 2-08 COULD BE REFERRED TO DRAWING NO. NEX2213/C/361/ENS/M57/005

LEGEND:

- PROJECT BOUNDARY
 - PROPOSED SCL ALIGNMENTS
 - TENTATIVE WORKS AREA UNDER NSL
 - TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
 - AREA 1
 - AREA 2
 - AREA 3
 - AREA 4
 - CONSTRUCTION SHAFT FOR TUNNELING
 - WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
 - INGRESS/EGRESS
- ABBREVIATIONS:**
- EKW EAST KOWLOON EXPRESSWAY
 - FSD FIRE SERVICES DEPARTMENT
 - IMT IMMERSED TUBE
 - NSL NORTH SOUTH LINE
 - TBM TUNNEL BORING MACHINE
 - SCL SHATIN TO CENTRAL LINK
 - EWL EAST WEST LINE

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 FILE NAME: M57/004A.dgn

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| DRAWN | HY |
| DESIGNED | --- |
| CHECKED | LCR |
| APPROVED | --- |
| DATE | 05/MAY/2009 |

MTR

SHATIN TO CENTRAL LINK

AECOM

CADD REF. NEX2213_C_361_ENS_M57_004A.dgn

TITLE: NEX/2213 - CROSS HARBOUR SECTION EIA STUDY
 AREA 1 (PART) AND AREA 2
 PHASE 1 - MONG KOK EAST TO HUNG HOM
 CONTAMINATION ASSESSMENT PLAN

SCALE: 1 : 2000 (A3) FIGURE NO. NEX2213/C/361/ENS/M57/004 REV. A

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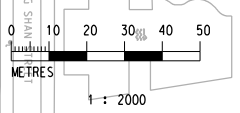
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• LAND REF. NO. W2
 • WORKS AREA FOR STATION REPROVISIONING, STRUCTURE DEMOLITION, TRAFFIC AND CUT & COVER CONSTRUCTION

LEGEND:

- PROJECT BOUNDARY
- - - PROPOSED SCL ALIGNMENTS
- TENTATIVE WORKS AREA UNDER NSL
- ▨ TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- POTENTIALLY CONTAMINATED AREA
- ⊘ INGRESS/EGRESS



| SITE ID | |
|---------|----------------|
| 2-08 | RAILWAY TRACKS |

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
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| DRAWN | GXH |
| DESIGNED | --- |
| CHECKED | LCR |
| APPROVED | --- |
| DATE | 20/JAN/2009 |

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SHATIN TO CENTRAL LINK

AECOM

ORIGINATOR

CADD REF. NEX2213_C_361_ENS_M57_005A.dgn

TITLE

NEX/2213 - CROSS HARBOUR SECTION EIA STUDY

AREA 2 (RAILWAY TRACKS)

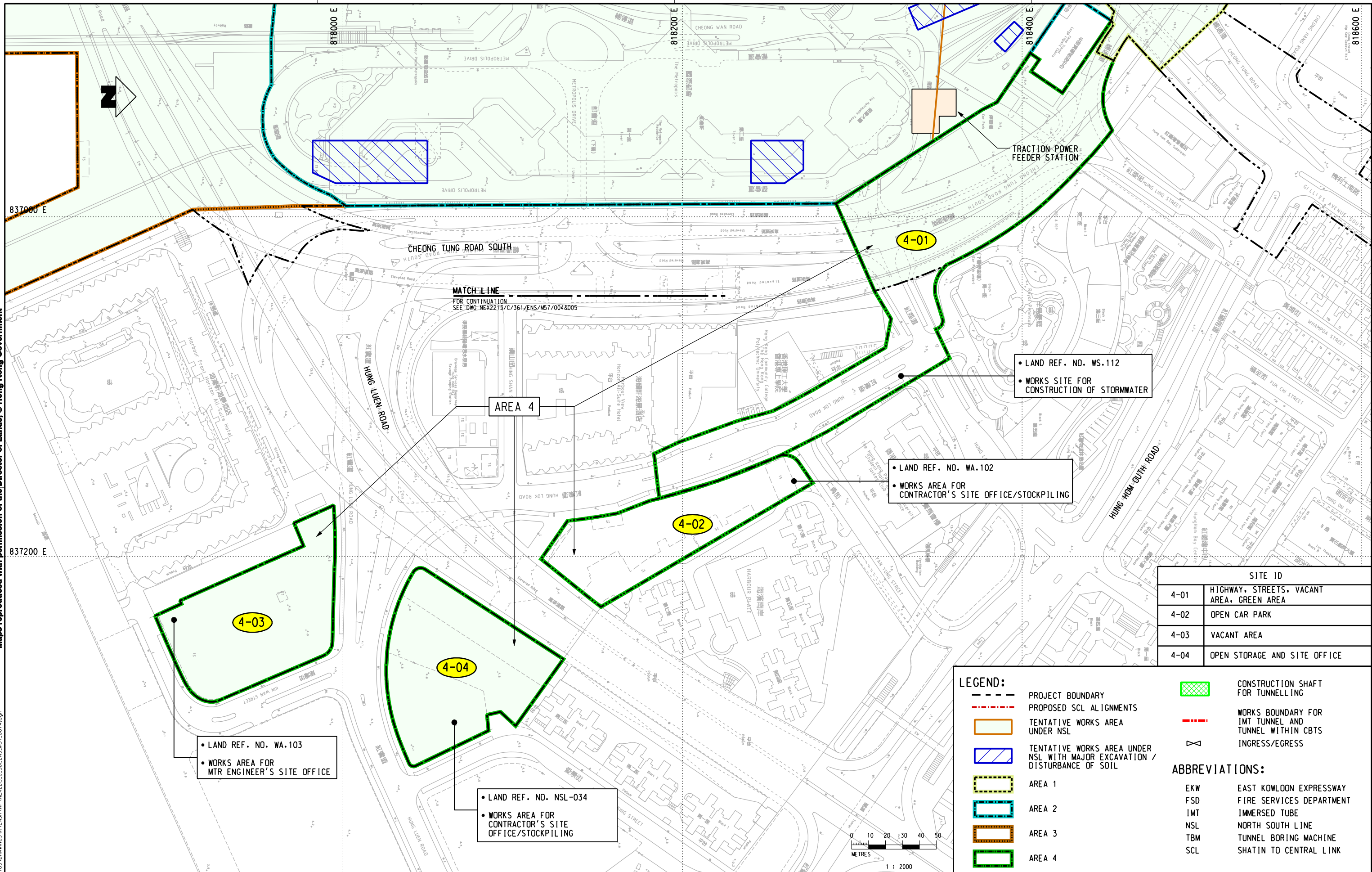
PHASE 1 - MONKG KOK EAST TO HUNG HOM

CONTAMINATION ASSESSMENT PLAN

SCALE 1 : 2000 (A3)

FIGURE NO. NEX2213/C/361/ENS/M57/005

REV. A



| SITE ID | |
|---------|---|
| 4-01 | HIGHWAY, STREETS, VACANT AREA, GREEN AREA |
| 4-02 | OPEN CAR PARK |
| 4-03 | VACANT AREA |
| 4-04 | OPEN STORAGE AND SITE OFFICE |

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
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| APPROVED | --- |
| DATE | 05/MAY/2009 |

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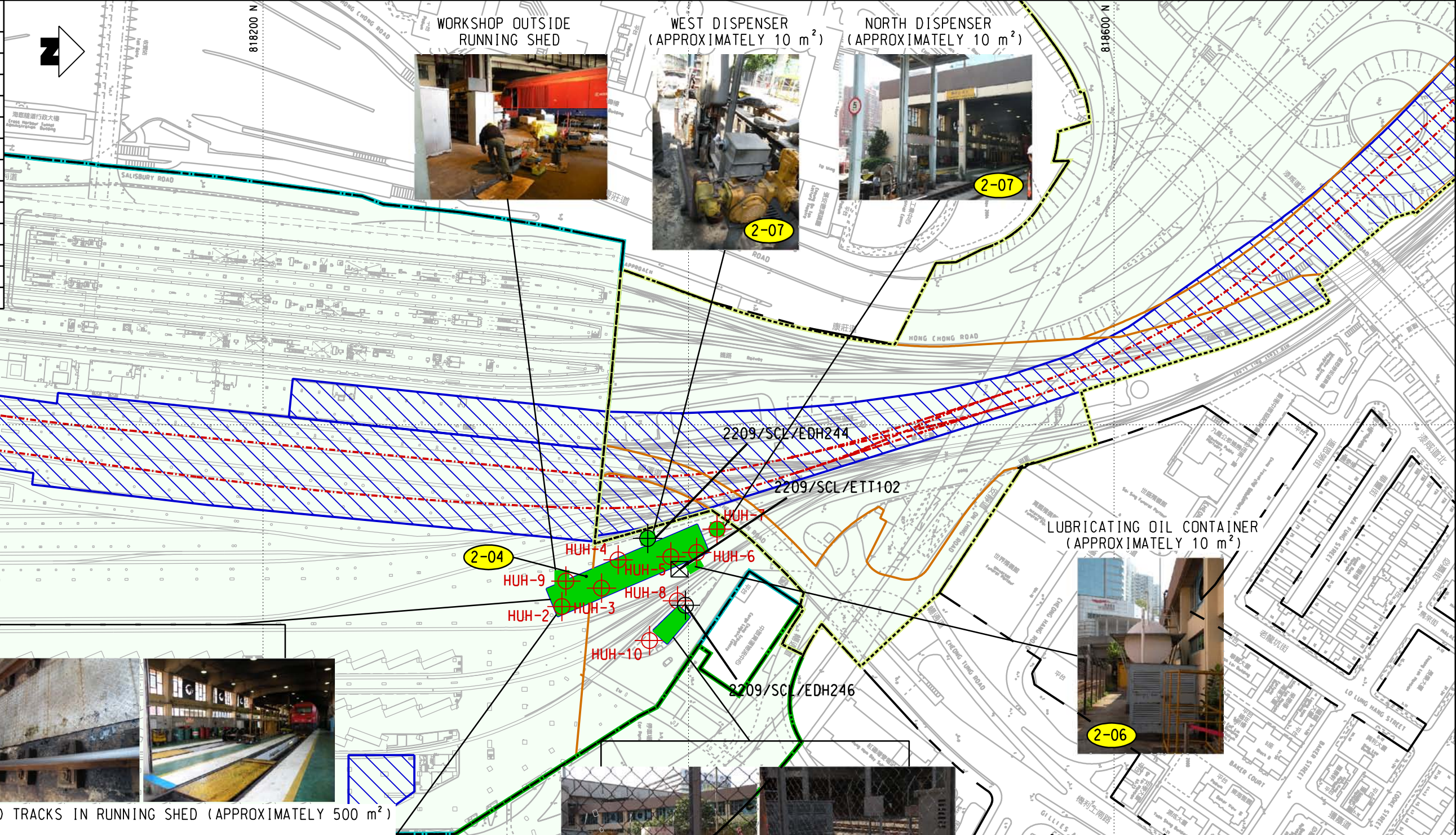
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AECOM

CADD REF. NEX2213_C_361_ENS_M57_007A.dgn

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| TITLE | NEX/2213 - CROSS HARBOUR SECTION EIA STUDY | | |
| | AREA 4 | | |
| | PHASE 1 - MONG KOK EAST TO HUNG HOM | | |
| | CONTAMINATION ASSESSMENT PLAN | | |
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| REV. | A | | |

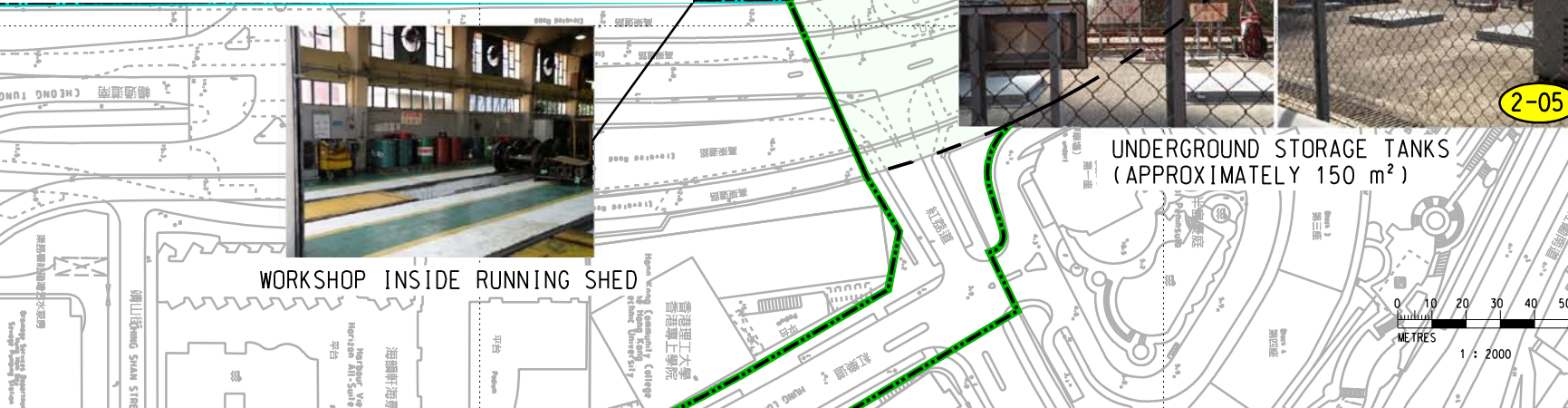
| PROPOSED CO-ORDINATES FOR SAMPLING LOCATIONS | | |
|--|-----------|-----------|
| LOCATION ID | EASTING | NORTHING |
| 2209/SCL/EDH244 | 836853.33 | 818380.84 |
| 2209/SCL/EDH246 | 836884.75 | 818398.59 |
| 2209/SCL/ETT102 | 836867.78 | 818395.79 |
| HUH-2 | 836885.33 | 818340.53 |
| HUH-3 | 836876.66 | 818359.14 |
| HUH-4 | 836863.38 | 818366.93 |
| HUH-5 | 836861.94 | 818391.74 |
| HUH-6 | 836859.92 | 818403.88 |
| HUH-7 | 836849.00 | 818413.45 |
| HUH-8 | 836882.62 | 818394.82 |
| HUH-9 | 836873.35 | 818342.38 |
| HUH-10 | 836901.31 | 818381.69 |



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| SITE ID | |
|---------|---------------------------|
| 2-04 | LOCOMOTIVE RUNNING SHED |
| 2-05 | UNDERGROUND STORAGE TANKS |
| 2-06 | ABOVEGROUND TANK |
| 2-07 | DISPENSERS |

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
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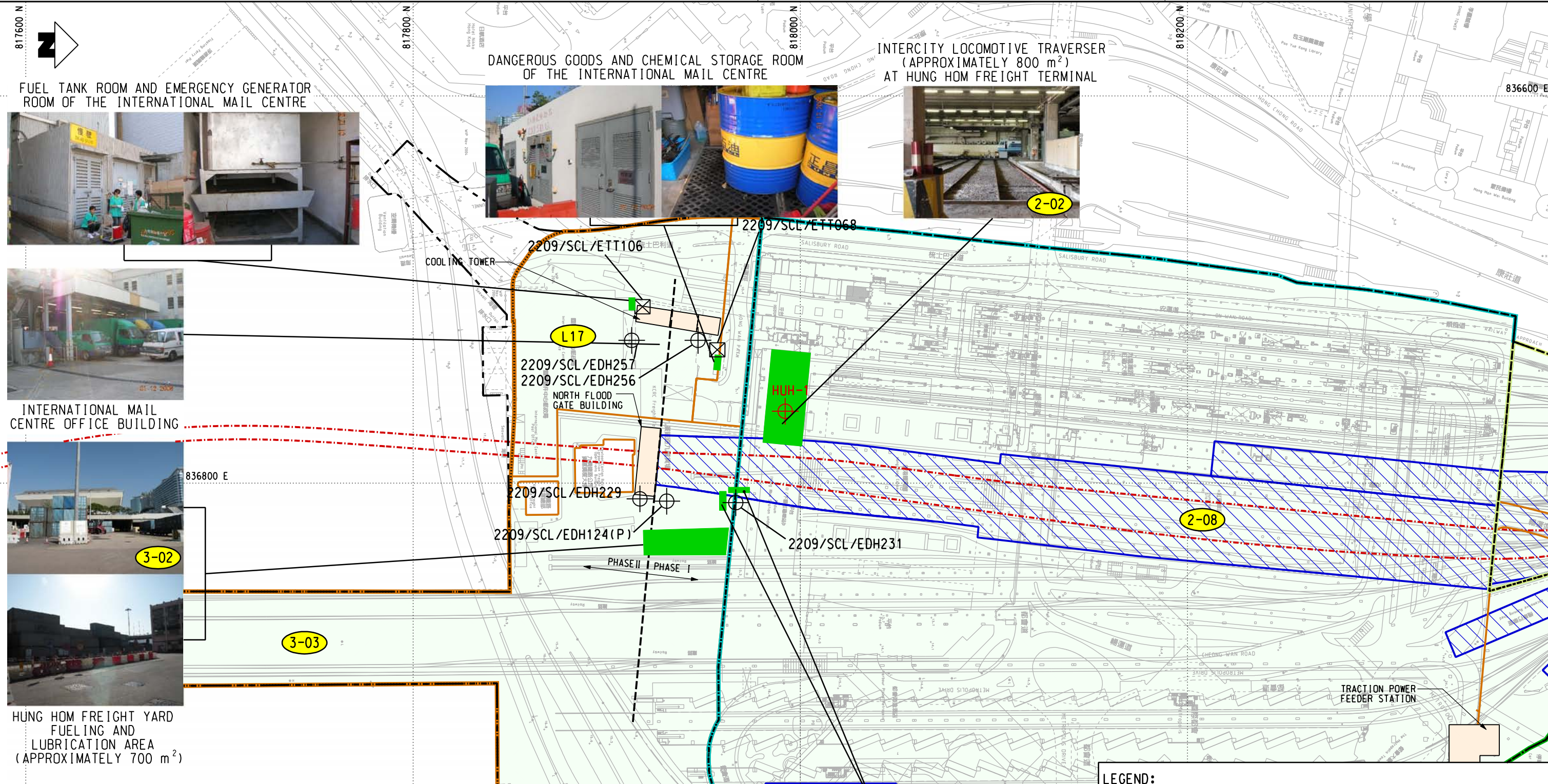
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- - - PROPOSED SCL ALIGNMENTS
- . - . WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- - - TENTATIVE WORKS AREA UNDER NSL
- ▨ TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- ▨ AREA 1
- ▨ AREA 2
- ▨ AREA 3
- ▨ AREA 4
- ⊗ PROPOSED TRIAL PIT LOCATION
- POTENTIALLY CONTAMINATED AREA
- ⊕ PROPOSED DRILLHOLE LOCATION
- ⊕ PROPOSED DRILLHOLE LOCATION FOR SITE UPON DECOMMISSIONING
- ⊕ INGRESS/EGRESS

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| TITLE NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED SAMPLING LOCATIONS AT AREA 2 PHASE 1 - MONKG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN | | |
| SCALE | FIGURE NO. | REV. |
| 1 : 2000 (A3) | NEX2213/C/361/ENS/M57/009 | A |

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FUEL TANK ROOM AND EMERGENCY GENERATOR ROOM OF THE INTERNATIONAL MAIL CENTRE



INTERCITY LOCOMOTIVE TRAVERSER (APPROXIMATELY 800 m²) AT HUNG HOM FREIGHT TERMINAL

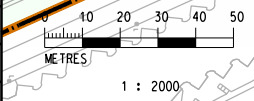


INTERNATIONAL MAIL CENTRE OFFICE BUILDING



HUNG HOM FREIGHT YARD FUELING AND LUBRICATION AREA (APPROXIMATELY 700 m²)

| PROPOSED CO-ORDINATES FOR SAMPLING LOCATIONS | | | | |
|--|-----------|-----------|---------|---------------------------|
| LOCATION ID | EASTING | NORTHING | | |
| 2209/SCL/ETT068 | 836731.12 | 817957.16 | | |
| 2209/SCL/ETT106 | 836708.88 | 817918.50 | SITE ID | |
| 2209/SCL/EDH256 | 836726.23 | 817947.19 | 2-02 | LOCOMOTIVE TRAVERSER |
| 2209/SCL/EDH257 | 836726.23 | 817912.97 | 2-08 | RAILWAY TRACKS |
| 2209/SCL/EDH229 | 836808.11 | 817917.21 | 2-09 | D.G. STORE |
| 2209/SCL/EDH124(P) | 836809.32 | 817931.05 | L17 | INTERNATIONAL MAIL CENTRE |
| 2209/SCL/EDH231 | 836810.08 | 817966.73 | 3-02 | HUNG HOM FREIGHT YARD |
| HUH-1 | 836762.87 | 817992.25 | 3-03 | PIER AND FINGER PIER |



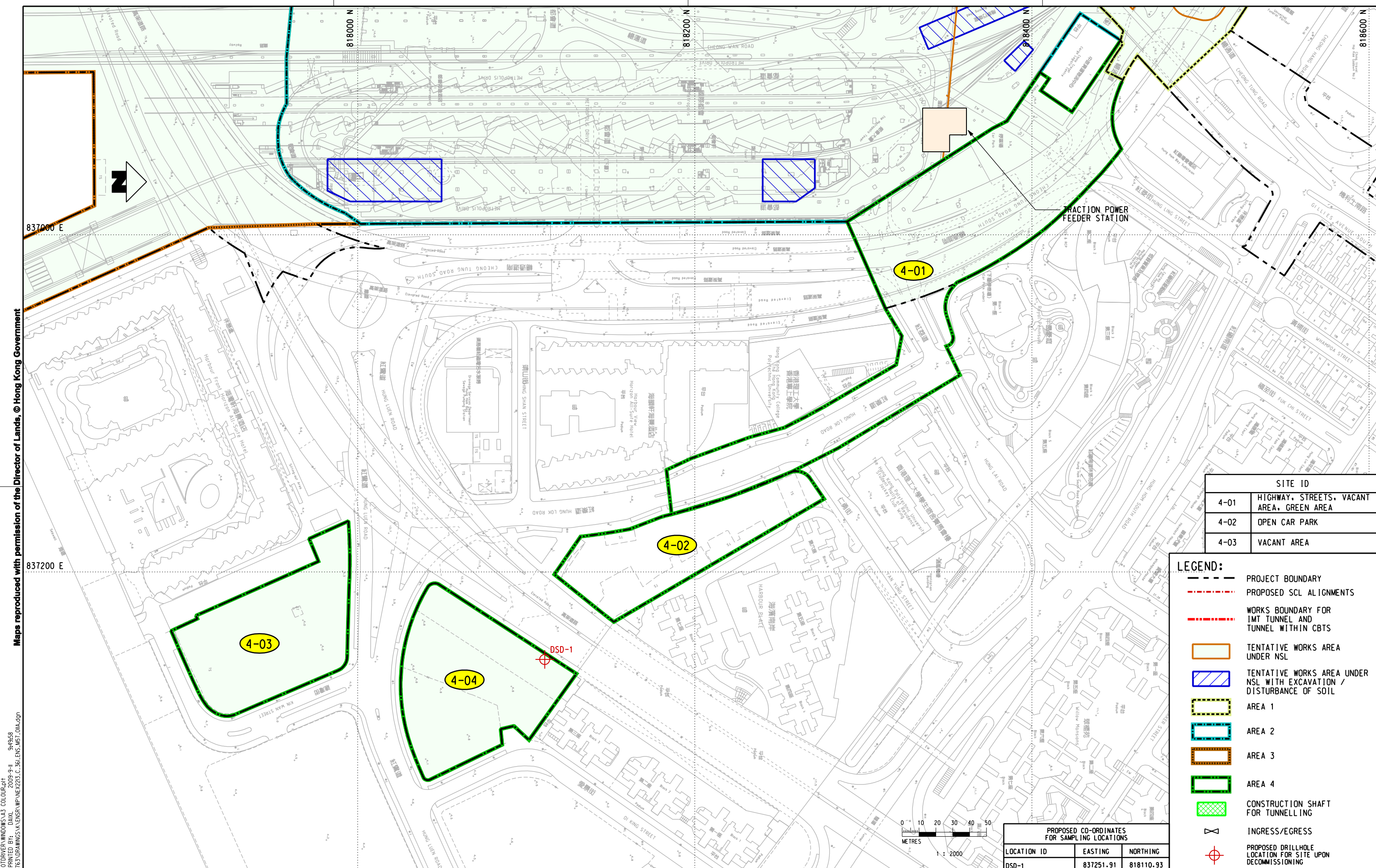
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- . - . - WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- TENTATIVE WORKS AREA UNDER NSL
- ▨ TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- ⊗ PROPOSED TRIAL PIT LOCATION
- POTENTIALLY CONTAMINATED AREA
- ⊕ PROPOSED DRILLHOLE LOCATION
- ⊕ PROPOSED DRILLHOLE LOCATION FOR SITE DECOMMISSIONING
- ⊕ INGRESS/EGRESS



DANGEROUS GOODS STORE CONTAINERS (APPROXIMATELY 20 m²)

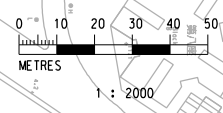
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|---|--|---------------------------------------|---|



| SITE ID | |
|---------|---|
| 4-01 | HIGHWAY, STREETS, VACANT AREA, GREEN AREA |
| 4-02 | OPEN CAR PARK |
| 4-03 | VACANT AREA |

| LEGEND: | |
|---------|--|
| | PROJECT BOUNDARY |
| | PROPOSED SCL ALIGNMENTS |
| | WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS |
| | TENTATIVE WORKS AREA UNDER NSL |
| | TENTATIVE WORKS AREA UNDER NSL WITH EXCAVATION / DISTURBANCE OF SOIL |
| | AREA 1 |
| | AREA 2 |
| | AREA 3 |
| | AREA 4 |
| | CONSTRUCTION SHAFT FOR TUNNELLING |
| | INGRESS/EGRESS |
| | PROPOSED DRILLHOLE LOCATION FOR SITE UPON DECOMMISSIONING |

| PROPOSED CO-ORDINATES FOR SAMPLING LOCATIONS | | |
|--|-----------|-----------|
| LOCATION ID | EASTING | NORTHING |
| DSD-1 | 837251.91 | 818110.93 |



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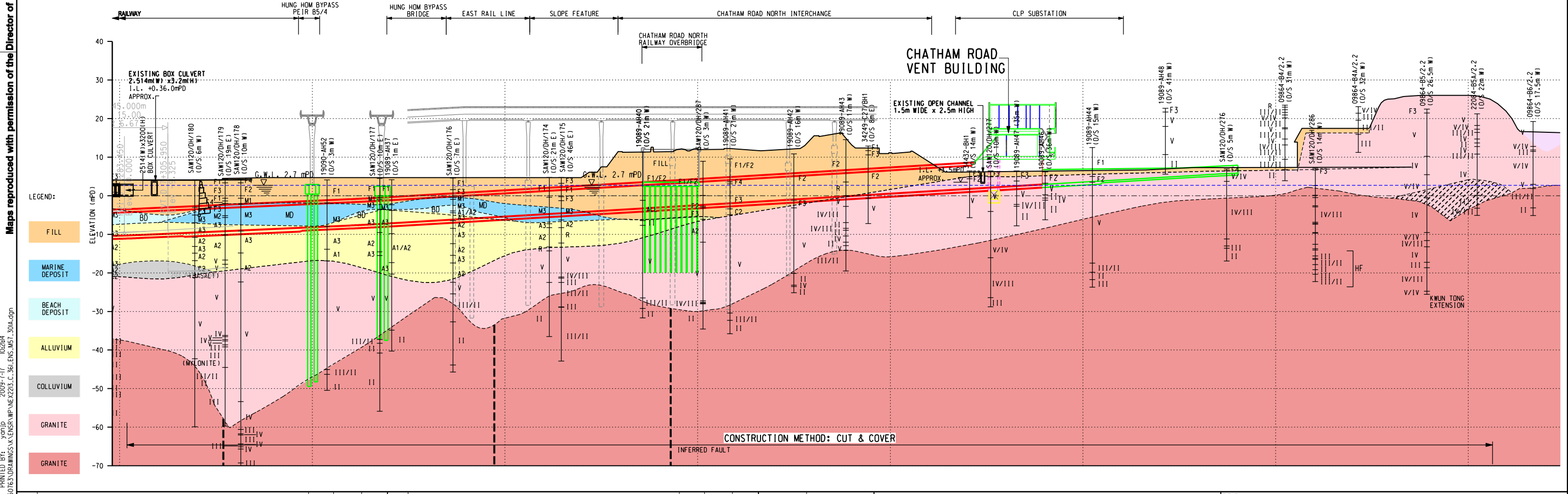
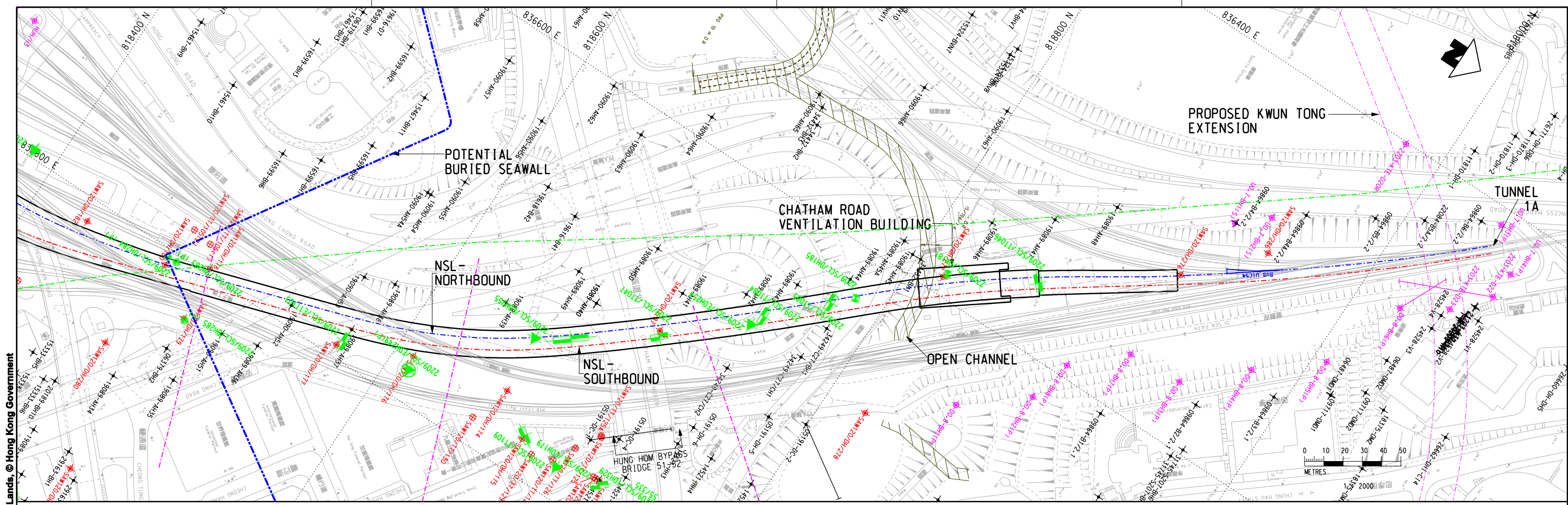
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| TITLE | |
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| NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED SAMPLING LOCATIONS AT AREA 4 PHASE 1 - MONKG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN | |
| SCALE | FIGURE NO. |
| 1 : 2000 (A3) | NEX2213/C/361/ENS/M57/011 |
| REV. | A |

Appendix A
Geotechnical Profile

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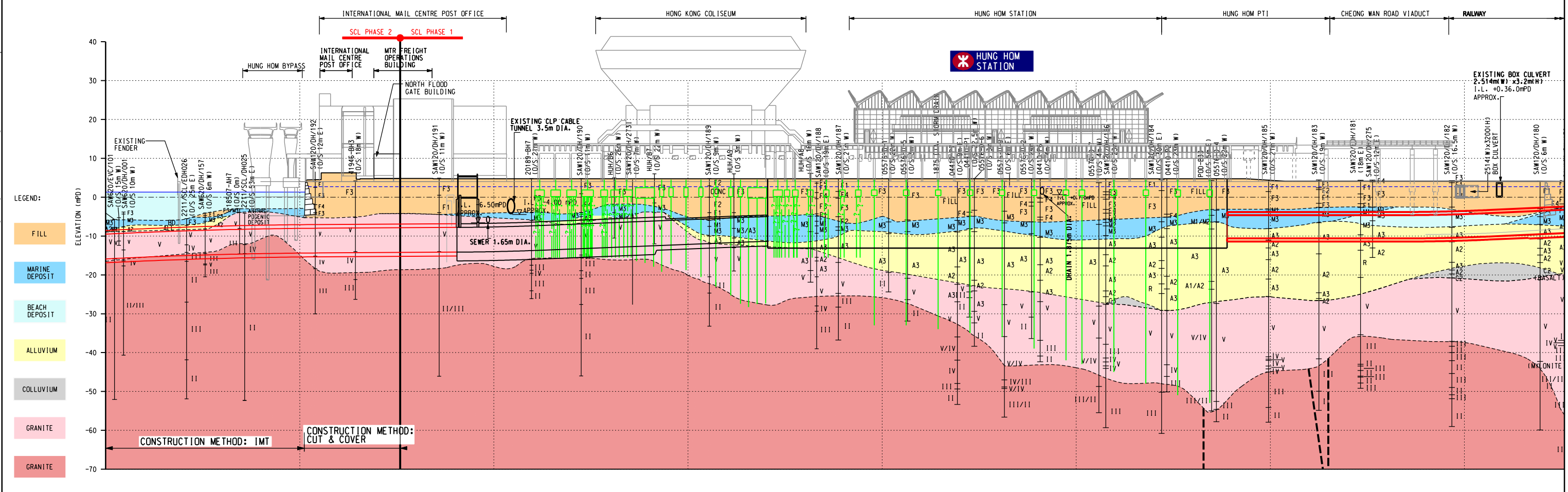
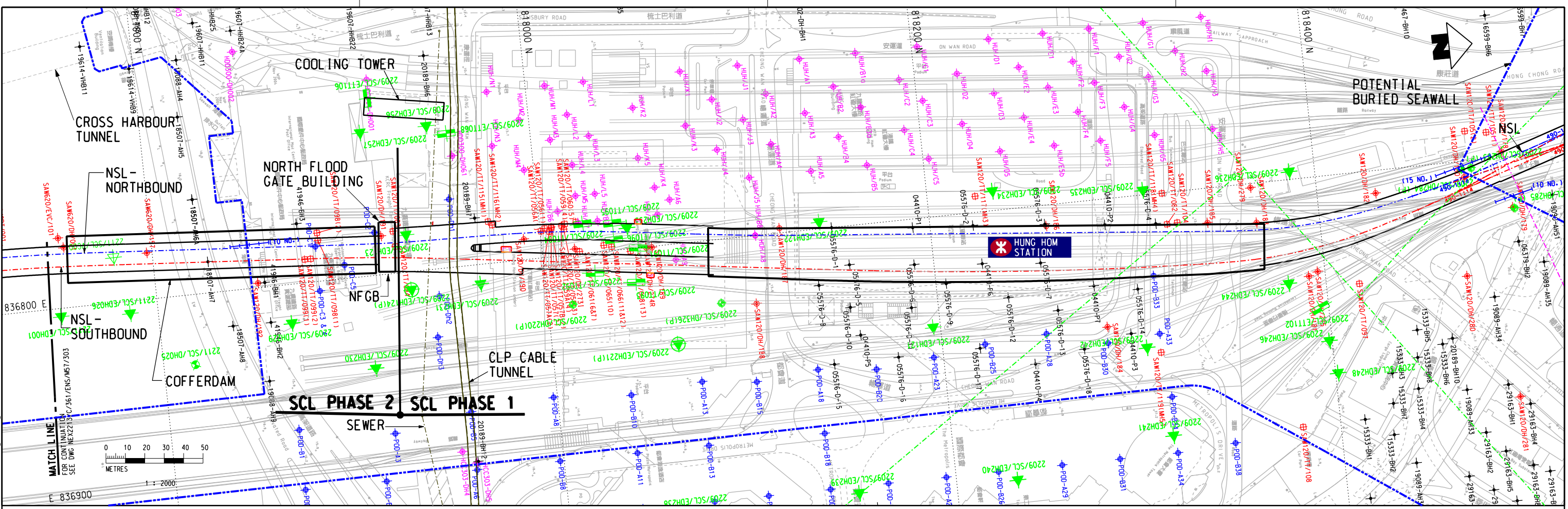


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| DESIGNED | LCLL | | |
| CHECKED | LCLL | | |
| APPROVED | IMW | | |
| DATE | 16/JUL/2009 | ORIGINATOR | |
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| CADD REF. | | NEX2213_C_361_ENS_M57_301A.dgn | |

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| TITLE NEX/2213 - CROSS HARBOUR SECTION EIA STUDY GEOTECHNICAL PROFILE (SHEET 1 OF 3) | | | |
| SCALE | FIGURE NO. | REV. | |
| 1 : 2000 (A3) | NEX2213/C/361/ENS/M57/301 | A | |

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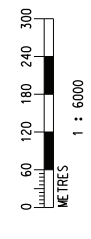


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 ID: 1669

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|---|-------------|--|--|
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| DESIGNED | LCLL | | |
| CHECKED | LCLL | | |
| APPROVED | IMW | | |
| DATE | 16/JUL/2009 | ORIGINATOR | SCALE |
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| | | | NEX2213/C/361/ENS/M57/302 |
| | | | REV. |
| | | | A |

Appendix B
Reclamation History



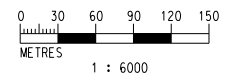
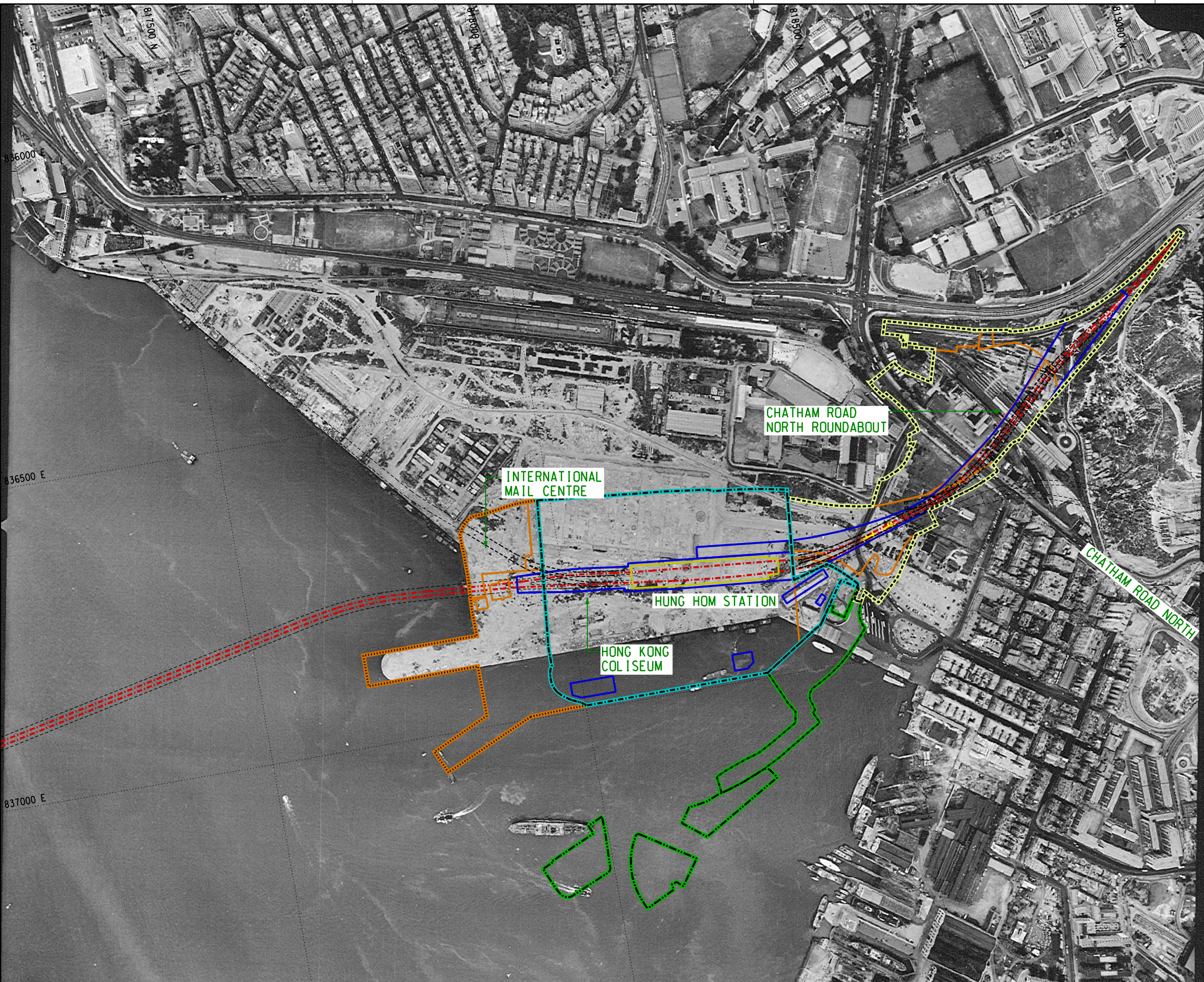
NOTE:
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 YEAR: 2006
 PHOTO NO: CW71959
 DRAWING IS INDICATIVE ONLY.
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LEGEND:

- PROPOSED SCL ALIGNMENTS
- 1904
- 1924
- 1964
- 1992
- RECLAMATION YEAR

| | | | | | | | |
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| SHATIN TO CENTRAL LINK | | ORIGINATOR AECOM | | CAD REF. NEX2213_C_361_ENS_M57_201A.dgn | | MTR | |
| DRAWN DESIGNED CHECKED APPROVED DATE 30/APR/2009 | NO --- LCR --- | APPROVED DATE 30/APR/2009 | APPROVED DATE 30/APR/2009 | APPROVED DATE 30/APR/2009 | APPROVED DATE 30/APR/2009 | APPROVED DATE 30/APR/2009 | APPROVED DATE 30/APR/2009 |
| DESCRIPTION --- | DESCRIPTION --- | DESCRIPTION --- | DESCRIPTION --- | DESCRIPTION --- | DESCRIPTION --- | DESCRIPTION --- | DESCRIPTION --- |

Appendix C
Aerial Photographs



NOTE:
 LOCATION: HUNG HOM
 YEAR: 1967
 PHOTO NO: 5415
 DRAWING IS INDICATIVE ONLY.
 THE LAYOUT MAY NOT BE TO SCALE

LEGEND:

- - - PROPOSED SCL ALIGNMENTS
- TENTATIVE WORKS AREA UNDER NSL
- TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4

| | | | | | | | | | |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
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| DRAWN | LJ |
| DESIGNED | --- |
| CHECKED | LCR |
| APPROVED | --- |
| DATE | 09/MAY/2009 |

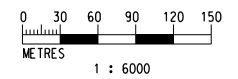
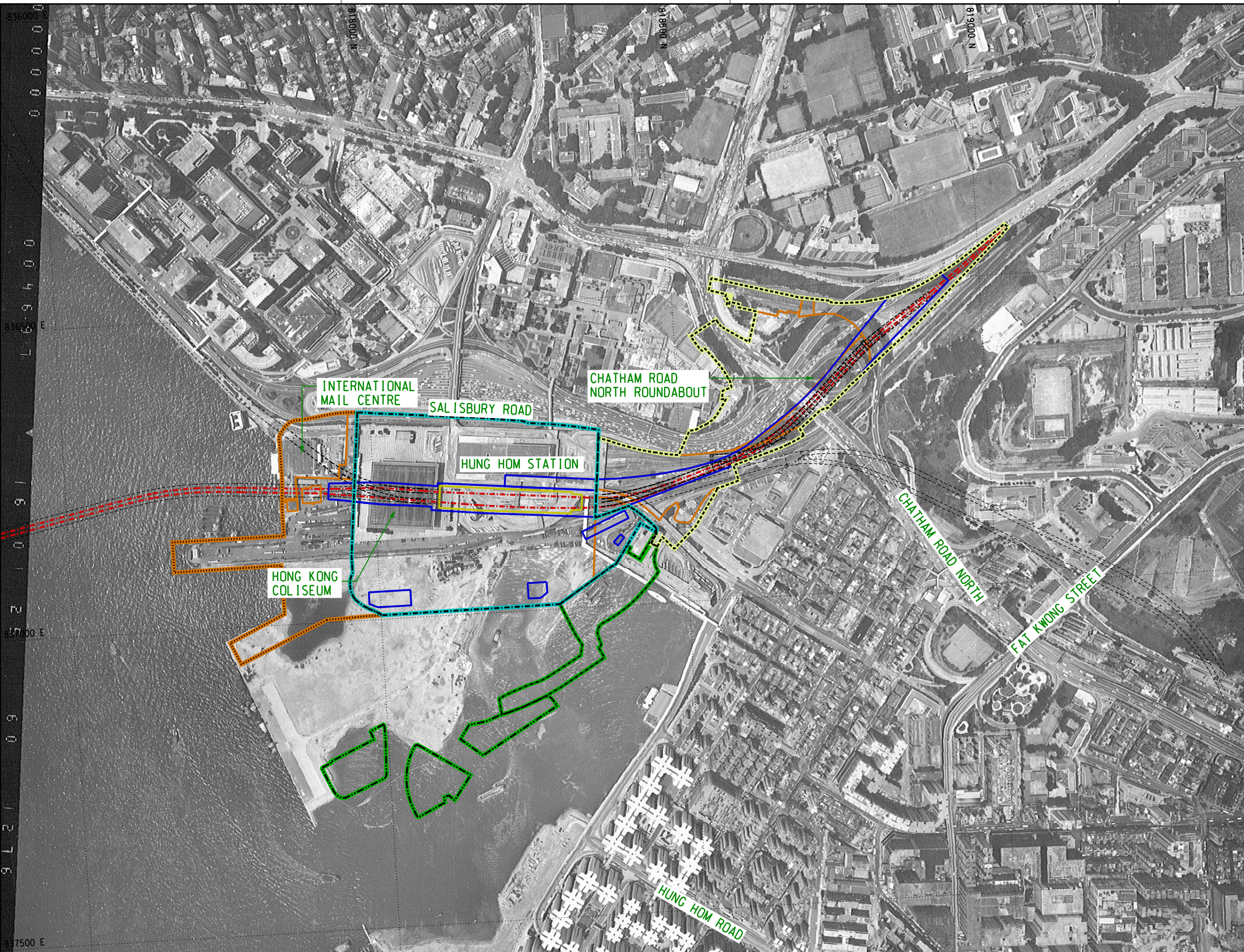
MTR

SHATIN TO CENTRAL LINK

AECOM

CADD REF. NEX2213_C_361_ENS_M57_101A.dgn

| | | | |
|-------------------------------------|---------------------------|----------------------------------|--|
| TITLE | | NEX/2213 - CROSS HARBOUR SECTION | |
| EIA STUDY | | AERIAL PHOTOGRAPHS | |
| PHASE I - MONG KOK EAST TO HUNG HOM | | CONTAMINATION ASSESSMENT PLAN | |
| SCALE | FIGURE NO. | REV. | |
| 1 : 6000 (A3) | NEX2213/C/361/ENS/M57/101 | A | |



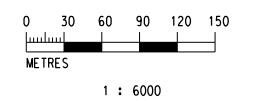
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 YEAR: 1989
 PHOTO NO: A17997
 DRAWING IS INDICATIVE ONLY.
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- LEGEND:**
- - - PROPOSED SCL ALIGNMENTS
 - TENTATIVE WORKS AREA UNDER NSL
 - TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
 - AREA 1
 - AREA 2
 - AREA 3
 - AREA 4

| | | | | | | | | | |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
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| DRAWN | WO | |
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| DATE | 30/APR/2009 | ORIGINATOR |
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| | | |
|---|---------------------------|------|
| TITLE | | |
| NEX/2213 - CROSS HARBOUR SECTION EIA STUDY AERIAL PHOTOGRAPHS PHASE I - MONG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN | | |
| SCALE | FIGURE NO. | REV. |
| 1 : 6000 (A3) | NEX2213/C/361/ENS/M57/103 | A |



NOTE:
 LOCATION: HUNG HOM
 YEAR: 2006
 PHOTO NO: CW71959
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 THE LAYOUT MAY NOT BE TO SCALE

- LEGEND:**
- - - PROPOSED SCL ALIGNMENTS
 - TENTATIVE WORKS AREA UNDER NSL
 - TENTATIVE SORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
 - AREA 1
 - AREA 2
 - AREA 3
 - AREA 4

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |

| | |
|----------|-------------|
| DRAWN | WO |
| DESIGNED | --- |
| CHECKED | LCR |
| APPROVED | --- |
| DATE | 30/APR/2009 |

MTR

SHATIN TO CENTRAL LINK

AECOM

CADD REF. NEX2213_C_361_ENS_M57_105A.dgn

| | | | |
|-------|--|------------|---------------------------|
| TITLE | NEX/2213 - CROSS HARBOUR SECTION EIA STUDY | | |
| | AERIAL PHOTOGRAPHS | | |
| | PHASE I - MONG KOK EAST TO HUNG HOM | | |
| | CONTAMINATION ASSESSMENT PLAN | | |
| SCALE | 1 : 6000 (A3) | FIGURE NO. | NEX2213/C/361/ENS/M57/105 |
| REV. | A | | |

Appendix D

**Standard Form 3.1 - Summary of On-Site Land Use Adopted
from Guidance Manual for Use of Risk-based Remediation
Goals for Contaminated Land Management**

Appendix D Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Property Name: SCL Alignment

Current Use

| ID | Type of facility/business | On-site property land use | Date began ¹ | Description of business process/primary products | Owner or Occupier | Approximately size of on-site property | Off-site property affected? | |
|------|--|---------------------------|-------------------------|--|-------------------|---|-----------------------------|----|
| | | | | | | | Yes | No |
| 1-10 | Open storage for construction materials | Industrial | 1982 | Open storage of construction materials | MTR | 100 m ² | | No |
| 1-18 | Emergency generator room and fuel tank | Industrial | 1982 | Emergency generator and associated fuel tank (diesel) | MTR | 30 m ² | | No |
| 2-02 | Locomotive traverser | Industrial | - | Traversing the first car of the train and certain maintenance works (e.g. lubrication) | MTR | 800 m ² | | No |
| 2-04 | Locomotive running shed for locomotive maintenance | Industrial | 1973 | Maintenance and repair of locomotives; welding and testing motors | MTR | 1100 m ² (whole running shed area) | | No |
| 2-05 | Underground storage tanks | Industrial | 1973 | Storage of diesel and connected to the running shed through underground pipelines | MTR | 150 m ² | | No |
| 2-06 | Aboveground lubricating oil tank | Industrial | - | Storage of lubricating oil | MTR | 10 m ² | | No |
| 2-07 | Pumping areas (dispensers) for locomotive running shed | Industrial | 1973 | Pump station/ dispensers serving the running shed | MTR | 20 m ² (two dispensers in total) | | No |
| 2-08 | Railway tracks | Industrial | - | For depot, platform and cargo transport in the freight terminal | MTR | 15,000 m ² | | No |
| 2-09 | D.G. store | Industrial | - | Storage of Category 5 D.G., including diesel and lubricating oil | MTR | 20 m ² | | No |
| L17 | International Mail Centre | Industrial | 1982 | Loading, sorting and dispatching mail; car park; Emergency generator and associated fuel tank (diesel) | Hongkong Post | 6978 m ² | | No |
| 3-02 | Freight yard and maintenance area for container stackers | Industrial | 1973 | Loading, unloading and stacking containers; maintenance of the container stacker | MTR | 700 m ² | | No |
| 4-04 | Waste diesel storage area at DSD site office | Industrial | - | Storage of waste diesel | DSD | 5400 m ² (Total area of the DSD site office) | | No |

¹ Specify the approximate year in which the current use of the on-site property began

Appendix D Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Past Use

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

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

| ID | Type of facility/business | On-site property land use | Date began ² | Date ended ³ | Description of business process/primary products | Owner or Occupier | Approximately size of on-site property (if different from current size) | Off-site property affected? | |
|------------------|---------------------------|---------------------------|-------------------------|-------------------------|--|-------------------|---|-----------------------------|----|
| | | | | | | | | Yes | No |
| 1-10, 1-18 | Industrial | Industrial | 1973 | 1982 | Open storage | - | - | No | |
| 2-02, 2-08, 2-09 | Industrial | Industrial | 1964 | 1989 | Vacant, open storage | - | - | No | |
| L17 | Industrial | Industrial | 1973 | 1982 | Open Storage | - | - | No | |
| 3-02 | Vacant | Public Park | 1967 | 1989 | Vacant | - | - | No | |
| 4-04 | Vacant | Public Park | 1998 | 2002 | Vacant | - | - | No | |
| | Low-rise buildings | Rural Residential | 2002 | 2006 | Low-rise buildings and open car park | - | - | No | |

Future Use

Will future uses be different from current uses? Yes No If Yes, complete this section.

| ID | Type of facility/business | On-site property land use | Description of business process/primary products | Owner or Occupier | Approximately size of on-site property |
|--|---------------------------|---------------------------|--|-------------------|--|
| 1-10, 1-18, 2-02, 2-04 through 2-09, L17, 3-02, 4-04 | Railway | Industrial | Railway operations | MTR | 30,308 m ² |

² Specify the approximate year in which the past use of the on-site property began

³ Specify the approximate year in which the past use of the on-site property ended

Appendix E

**Chemical Contaminants Listed by Industry Type, of Australian
Standard 4482.1-1997 “Guide to the sampling and
investigation of potentially contaminated soil. Part 1:
Non-volatile and semi-volatile compounds”**

APPENDIX I
CHEMICAL CONTAMINANTS LISTED BY INDUSTRY TYPE

Table II lists chemicals used in various industries. The exact nature of the contaminant associated with the particular industry is site specific, depending on the standard of management and the practice and safety procedures employed at each site.

This is not an all inclusive list of industries using chemicals and some of the chemicals mentioned are no longer used (e.g. carbon tetrachloride in the dry cleaning industry).

TABLE II
LIST OF INDUSTRIES

| Industry | Type of chemical | Associated chemicals |
|---------------------------------------|------------------------|---|
| Agricultural/horticultural activities | | See fertilizer, insecticides, fungicides, herbicides under chemicals manufacture and use |
| Airports | Hydrocarbons Metals | Aviation fuels Particularly aluminium, magnesium, chromium |
| Asbestos production and disposal | | Asbestos |
| Battery manufacture and recycling | Metals Acids | Lead, manganese, zinc, cadmium, nickel, cobalt, mercury, silver, antimony Sulfuric acid |
| Breweries/distilleries | Alcohol | Ethanol, methanol, esters |

(continued)

TABLE II (continued)

| Industry | Type of chemical | Associated chemicals |
|-------------------------------|---|--|
| Chemicals manufacture and use | Acid/alkali | Mercury (chlor/alkali), sulfuric, hydrochloric and nitric acids, sodium and calcium hydroxides |
| | Adhesives/resins | Polyvinyl acetate, phenols, formaldehyde, acrylates, phthalates |
| | Dyes | Chromium, titanium, cobalt, sulfur and nitrogen organic compounds, sulfates, solvents |
| | Explosives | Acetone, nitric acid, ammonium nitrate, pentachlorophenol, ammonia, sulfuric acid, nitroglycerine, calcium cyanamide, lead, ethylene glycol, methanol, copper, aluminium, bis(2-ethylhexyl) adipate, dibutyl phthalate, sodium hydroxide, mercury, silver |
| | Fertilizer | Calcium phosphate, calcium sulfate, nitrates, ammonium sulfate, carbonates, potassium, copper, magnesium, molybdenum, boron, cadmium |
| | Flocculants | Aluminium |
| | Foam production | Urethane, formaldehyde, styrene |
| | Fungicides | Carbamates, copper sulfate, copper chloride, sulfur, chromium, zinc |
| | Herbicides | Ammonium thiocyanate, carbamates, organochlorines, organophosphates, arsenic, mercury, triazines |
| | Paints | |
| | Heavy metals | Arsenic, barium, cadmium, chromium, cobalt, lead, manganese, mercury, selenium, zinc |
| | Solvents | Titanium |
| | Pesticides | Toluene oils natural (e.g. pine oil) or synthetic |
| | Active ingredients | Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulfur, synthetic pyrethroids |
| | Solvents | Xylene, kerosene, methyl isobutyl ketone, amyl acetate, chlorinated solvents |
| | Pharmaceutical | |
| | Solvents | Acetone, cyclohexane, methylene chloride, ethyl acetate, butyl acetate, methanol, ethanol, isopropanol, butanol, pyridine methyl ethyl ketone, methyl isobutyl ketone, tetrahydrofuran |
| | Photography | Hydroquinone, sodium carbonate, sodium sulfite, potassium bromide, monomethyl para-aminophenol sulfate, ferricyanide, chromium, silver, thiocyanate, ammonium compounds, sulfur compounds, phosphate, phenylene diamine, ethyl alcohol, thiosulfates, formaldehyde |
| | Plastics | Sulfates, carbonates, cadmium, solvents, acrylates, phthalates, styrene |
| | Rubber | Carbon black |
| Soap/detergent | | |
| General | Potassium compounds, phosphates, ammonia, alcohols, esters, sodium hydroxide, surfactants (sodium lauryl sulfate), silicate compounds | |
| Acids | Sulfuric acid and stearic acid | |
| Oils | Palm, coconut, pine, teatree | |
| Solvents | | |
| General | Ammonia | |
| Hydrocarbons | e.g. BTEX (benzene, toluene, ethylbenzene, xylene) | |
| Chlorinated organics | e.g., trichloroethane, carbon tetrachloride, methylene chloride | |

(continued)

TABLE 11 (continued)

| Industry | Type of chemical | Associated chemicals |
|----------------------------------|---|--|
| Defence works | | See explosives under chemicals manufacture and use, foundries, engine works, service stations |
| Drum reconditioning | | See chemicals manufacture and use |
| Dry cleaning | | Trichloroethylene and 1, 1, 1 - trichloroethane Carbon tetrachloride Perchloroethylene |
| Electrical | | PCBs (transformers and capacitors), solvents, tin, lead, copper, mercury |
| Engine works | Hydrocarbons Metals Solvents Acids/alkalis Refrigerants Antifreeze | Chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons Ethylene glycol, nitrates, phosphates, silicates |
| Foundries | Metals Acids | Particularly aluminium, manganese, iron, copper, nickel, chromium zinc, cadmium and lead and oxides, chlorides, fluorides and sulfates of these metals Sulfuric and phosphoric Phenolics and amines Coke/graphite dust |
| Gas works | Inorganics Organics | Ammonia, cyanide, nitrate, sulfide, thiocyanate Aluminium, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium, zinc BTEX, phenolics, PAHs and coke |
| Iron and steel works | | BTEX, phenolics, PAHs, Metals and oxides of iron, nickel, copper, chromium, magnesium manganese and graphite |
| Landfill sites | | Alkanes and ammonia, sulfides, heavy metals, organic acids |
| Marinas | Antifouling paints | See engine works, electroplating metals under metal treatments Copper, tributyltin (TBT) |
| Metal treatments | Electroplating Metals Acids General Liquid carburizing baths | Nickel, chromium, zinc, aluminium, copper, lead, cadmium, tin Sulfuric, hydrochloric, nitric, phosphoric Sodium hydroxide, 1,1,1-trichloroethane, tetrachloroethylene, toluene, ethylene glycol, cyanide compounds Sodium, cyanide, barium, chloride, potassium chloride, sodium chloride, sodium carbonate, sodium cyanate |
| Mining and extractive industries | | Arsenic, mercury and cyanides and also refer to explosives. Aluminium, arsenic, copper, chromium, cobalt, lead, manganese, nickel, selenium, zinc and radio-radionuclides. The list of heavy metals should be decided according to the composition of the deposit and known impurities |

(continued)

TABLE II (continued)

| Industry | Type of chemical | Associated chemicals |
|--|-------------------|---|
| Power stations | | Asbestos, PCBs, fly ash metals, water treatment chemicals |
| Printing shops | | Acids, alkalis, solvents, chromium (see photography) |
| Railway yards | | Hydrocarbons, arsenic, phenolics (creosote), heavy metals, nitrates and ammonia |
| Scrap yards | | Hydrocarbons, metals, solvents |
| Service stations and fuel storage facilities | | Aliphatic hydrocarbons BTEX (i.e., benzene, toluene, ethylbenzene, xylene) PAHs Phenols Lead |
| Sheep and cattle dips | | Arsenic, organochlorines and organophosphates, carbamates, and synthetic pyrethroids |
| Smelting and refining | | Metals and the fluorides, chlorides and oxides of copper, tin, silver, gold, selenium, lead, aluminium |
| Tanning and associated trades | Metals General | Chromium, manganese, aluminium Ammonium sulfate, ammonia, ammonium nitrate, arsenic phenolics, formaldehyde, sulfide, tannic acid |
| Water and sewerage treatment plant | Metals | Aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, fluoride, lime and zinc |
| Wood preservation | Metals General | Chromium, copper, arsenic Naphthalene, ammonia, pentachlorophenol, dibenzofuran, anthracene, biphenyl, ammonium sulfate, quinoline, boron, creosote, organochlorine pesticides |

Appendix F
Sampling and Testing Schedule

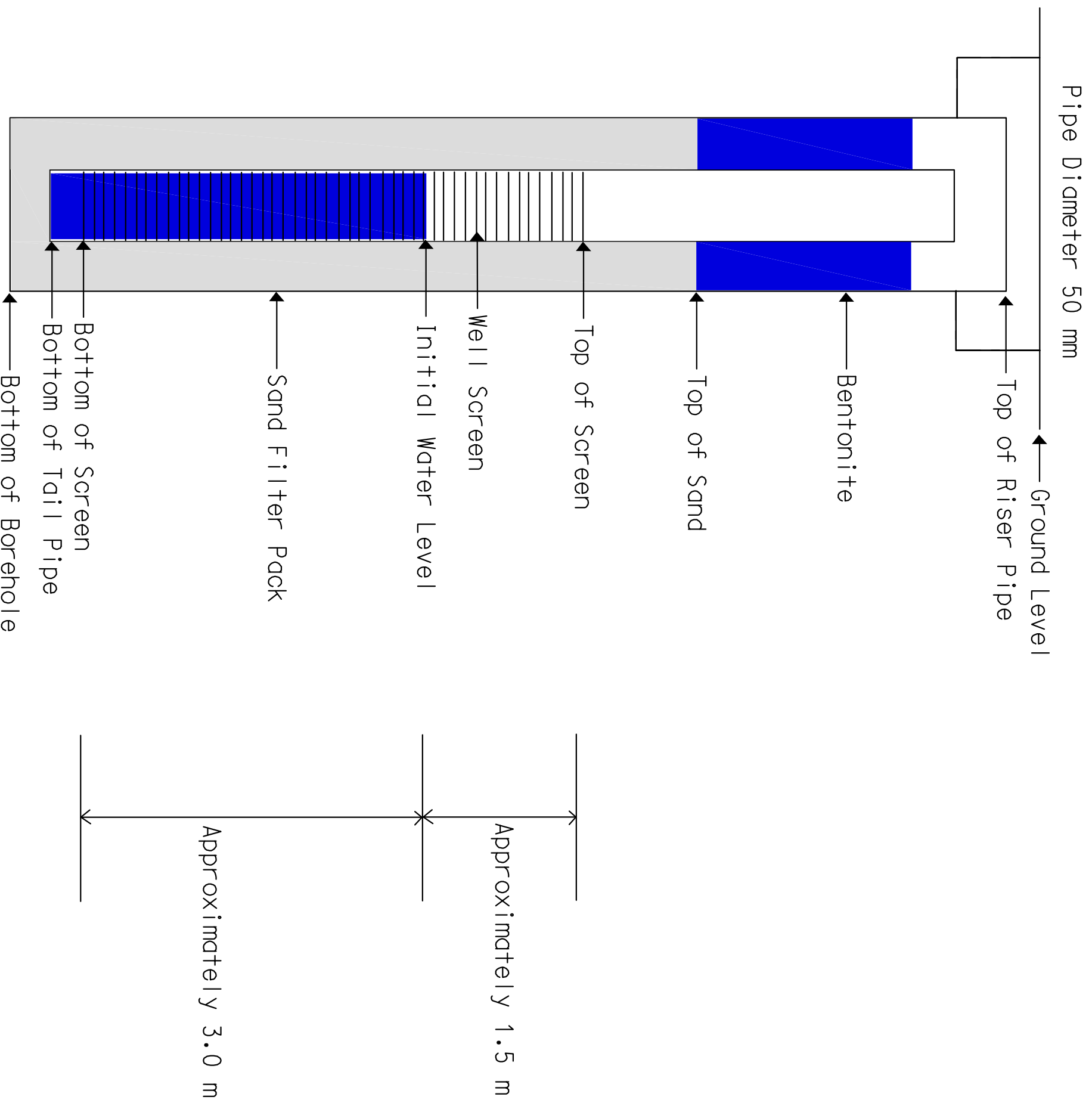
Locations and Testing Parameters of Soil Sampling for Phase I at Current Stage

| Sample ID | Lead | Zinc | BTEX | TPH | PAHs | Full List of VOCs | Full List of SVOCs | Full List of Metals | Cyanide |
|--------------------|------|------|------|-----|------|-------------------|--------------------|---------------------|---------|
| 2209/SCL/EDH249(P) | ✓ | ✓ | | | | ✓ | ✓ | | ✓ |
| 2209/SCL/ETT103 | ✓ | | ✓ | ✓ | ✓ | | | | |
| 2209/SCL/EDH246 | ✓ | | ✓ | ✓ | ✓ | | | | |
| 2209/SCL/ETT102 | ✓ | | ✓ | ✓ | ✓ | | | | |
| 2209/SCL/EDH244 | ✓ | | ✓ | ✓ | ✓ | | | | |
| 2209/SCL/EDH231 | ✓ | | ✓ | ✓ | ✓ | | | | |
| 2209/SCL/ETT068 | | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 2209/SCL/ETT106 | | | | ✓ | | ✓ | ✓ | ✓ | |
| 2209/SCL/EDH256 | | | | ✓ | | ✓ | ✓ | ✓ | |
| 2209/SCL/EDH257 | | | | ✓ | | ✓ | ✓ | ✓ | |
| 2209/SCL/EDH229 | ✓ | | ✓ | ✓ | ✓ | | | | |
| 2209/SCL/EDH124(P) | ✓ | | ✓ | ✓ | ✓ | | | | |

Locations and Testing Parameters of Soil Sampling for Phase I upon Decommissioning

| Sample ID | Lead | Chromium | Copper | BTEX | TPH | PAHs | Full List of VOCs | Full List of SVOCs |
|---------------------|------|----------|--------|------|-----|------|-------------------|--------------------|
| HUH-1 | ✓ | | | ✓ | ✓ | ✓ | | |
| HUH-2 | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-3 | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-4 | ✓ | | | | ✓ | | ✓ | ✓ |
| HUH-5 | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-6 | ✓ | | | ✓ | ✓ | ✓ | | |
| HUH-7 | ✓ | | | ✓ | ✓ | ✓ | | |
| HUH-8 | ✓ | | | ✓ | ✓ | ✓ | | |
| HUH-9 | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-10 | ✓ | | | ✓ | ✓ | ✓ | | |
| RWT-1 through RWT-5 | ✓ | | | ✓ | ✓ | ✓ | | |
| DSD-1 | ✓ | | | ✓ | ✓ | ✓ | | |

Appendix G
Typical Design of the Groundwater Monitoring Well



| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |

| | | |
|--|--|--|
| DRAWN: VTHL CHECKED: APPROVED: DATE: 31May2008 <small>DO NOT SCALE DIMENSIONS. ALL DIMENSIONS SHALL BE VERIFIED ON SITE. LIMITED TO THE SCOPE OF THE PROJECT. IN THE EVENT OF THIS DRAWING / DOCUMENT IS OWNED BY THE WIRE CORPORATION LIMITED OR HONG KONG, NO PART OF THIS DRAWING OR DOCUMENT IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM THE WIRE CORPORATION LIMITED.</small> | SHATTIN TO CENTRAL LINK | ORIGINATOR SCALE: N.T.S. DRAWING NO. |
| TITLE NEXX2213 - CROSS HARBOUR SECTION EIA STUDY PHASE 1 - MONG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN TYPICAL DESIGN OF THE GROUNDWATER MONITORING WELL | CAD REF. | REV. |



MTR Corporation Limited

**Shatin to Central Link -
Consultancy Agreement No. NEX/2213**

**Environmental Impact Assessment
(EIA) for Cross Harbour Section**

**Supplementary Contamination Assessment
Plan for Phase I –
Mong Kok East to Hung Hom**

Feb 2010

| | Name | Signature |
|----------------------|----------------|--|
| Prepared & Checked: | Laurent Cheung |  |
| Reviewed & Approved: | Freeman Cheung |  |

| | | | |
|---|---|-------|-------------|
| Version: | A | Date: | 12 Feb 2010 |
| <p>The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and AECOM Environment accepts no responsibility for its use by others.</p> <p>This report is copyright and may not be reproduced in whole or in part without prior written permission.</p> | | | |

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| Appendix A | Extracted Figures from the Approved Contamination Assessment Plan |
| Appendix B | Standard Form 3.1 - Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management |
| Appendix C | Chemical Contaminants Listed by Industry Type, of Australian Standard 4482.1-1997 “Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds” |
| Appendix D | Sampling and Testing Schedule |
| Appendix E | Typical Design of the Groundwater Monitoring Well |

1. INTRODUCTION

- 1.1 A Contamination Assessment Plan (CAP) for North South Line (NSL) Phase I under the Shatin to Central Link (SCL) has been prepared and was approved by the Environmental Protection Department (EPD) under the EIA Study Brief (ESB) No. ESB-192/2008 on 8 October 2009. The overall project layout based on the latest design is shown in **Figure no. NEX2213/C/361/ENS/M50/001**. During the preparation of the CAP, some land lots/ facilities within the development area were not fully surveyed and/ or assessed due to site constraints and current land use. Site investigation (SI) for potentially contaminated areas is, therefore, divided into two stages. Stage 2 SI is proposed to be carried out after decommissioning of the relevant facilities and prior to the commencement of the constructions works at respective sites. The majority of the facilities under Stage 2 SI are located in the covered section of Hung Hom Freight Terminal (HFT) as shown in **Figure no. NEX2213/C/361/ENS/M57/009, 010 and 012** extracted from the approved CAP in **Appendix A**.
- 1.2 To facilitate the overall Project program and potential remediation works (if contamination is detected through the SI), the Stage 2 SI is proposed to be advanced at sites within MTR property including the locomotive traverser, railway tracks, and the locomotive running shed along with its supporting facilities (e.g. the aboveground lubricating oil tank) in Area 2. The location of these areas is described in detail in the approved CAP. In this respect, part of the Stage 2 SI will be conducted prior to facility decommissioning and the sampling locations will therefore be relocated and assessed in this supplementary CAP, with the updated sampling and testing schedules based on the current site conditions. This advanced Stage 2 SI will be referred to as Post-Stage 1 SI in this report.
- 1.3 A new works area, Mong Kok Freight Terminal (MFT) located in Mong Kok East, as shown in **Figure no. NEX2213/C/361/ENS/M57/504A**, is included in the updated site layout plan. This area was not covered in the approved CAP and is therefore assessed in this supplementary CAP to identify any potential contamination.
- 1.4 This supplementary CAP is prepared to summarise the findings of further site appraisal at sites specified in Sections 1.1 through 1.3, as a supplement to the approved CAP. Supplementary Contamination Assessment Reports (CARs) and if contamination is found, a Remediation Action Plan (RAP) should be submitted to EPD for endorsement prior to the commencement of construction works at the respective site(s).

2. ENVIRONMENTAL LEGISLATION, STANDARDS AND GUIDELINES

- 2.1 Assessment of land contamination sources shall be conducted in accordance with the approved CAP as well as environmental standards and non-statutory guidelines recommended in the approved CAP which mainly include “*Guidance Note for Contaminated Land Assessment Remediation*” (Guidance Note 1) and “*Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshop*” (Guidance Note 2) issued by EPD. In addition, the Risk Based Remediation Goals (RBRGs) stipulated in the “*Guidance Manual for Use of Risk-based Remediation Goals for Contamination Management*” (The Guidance Manual) issued by EPD shall also be adopted as the criteria for assessing soil and groundwater contamination.

3. ADDITIONAL ASSESSMENT AREA

- 3.1 According to the latest information provided by MTR, MFT will be included as an additional works area under Phase I. To be consistent with the nomenclature system of the approved CAP, this additional assessment area, mainly covering Grand Century Place shopping mall and the Mong Kok East station, was named as Area 5. Works areas within Area 5 are listed in **Table 3.1** below.

Table 3.1 Works Area in Area 5 (Mong Kok Freight Terminal)

| Land Ref. No.# | Location | Brief Description | Figure Reference |
|----------------|---|---|----------------------------|
| NSL-MTR-022 | Northern section of Area 5, mainly covering the Grand Century Place | <ul style="list-style-type: none"> Tentative works area for modification of the existing goods yard at Grand Century Place | NEX2213/C/361/ENS/M57/504A |
| NSL-MTR-021 | Southern section of Area 5, south of the Grand Century Place | <ul style="list-style-type: none"> Tentative works site for modification of existing railway facilities | NEX2213/C/361/ENS/M57/504A |

#: As provided by MTR. The Land Ref. No. shall be revised as per any amendments to the scheme.

4. SITE APPRAISAL

Regional Geological Setting

- 4.1 The regional geological setting of Area 2 within the HFT has been covered in the approved CAP.
- 4.2 A review of the Hong Kong Geological Topography (Series: HGM20) – Sheet No. 11, 1: 20,000 Scale (1996) indicates that the regional geological conditions in Area 5 is likely to consist predominantly of medium grained granite bedrock (Jurassic-Cretaceous aged), with coverage of Quaternary-aged debris flow deposits (sand/ silt, gravel, cobbles and boulders; unsorted) present over a small area immediately west of this area.
- 4.3 Reviews of previous Ground Investigation (GI) reports were conducted at the Civil Engineering and Development Department's (CEDD's) Geotechnical Information Library to obtain information regarding the geological conditions at or in the vicinity of the Assessment Area. The GI reports reviewed are listed below:
- P.W.D. Contract No. 402181 Site Investigation Hong Kong and Kowloon (Term Contract) Final Report, Site Investigation Transport Interchange at Mong Kok Station, Works Order No. Q7/2/6.85 (1982) (CEDD's Geotechnical Information Unit Report No. 3261)*
 - Kowloon – Canton Railway Corporation Contract No. 2/IWM/1993 Noise Mitigation Measures, Site Investigation Final Report (Volume I) (1993) (CEDD's Geotechnical Information Unit Report No. 17777)*
 - Terms of Contract No.2/GCO/83, Works Order No. PW7/2/09.190, Additional Site Investigation; KCR, Construction of Mong Kok Goods Yard, Area Reference: 11NW14D6, D9, 11NW19B, 19B6 (1985) (CEDD's Geotechnical Information Unit Report No. 5979)*
 - Terms of Contract No. 2/GCO/1983, Works Order No.: PW7/2/9.115, Site Investigation Mong Kok Goods Yard, Area Reference: 11NE12A3 (1984) (CEDD's Geotechnical Information Unit Report No. 5577)*
- 4.4 Review of these reports indicated that no reclamation history was related to Area 5 within MFT. The majority of this area is covered by a layer of fill material composed of silty sand and gravel of approximately 1.5 m thick; underlying that is silty to coarse sand approximately 10-20 m thick. Moderately to slightly decomposed granite was likely to be present beneath the coarse sand.

Site Inspection and Appraisal

Sources of Historical Information

- 4.5 A review of historical information relating to Area 2 within HFT has been covered in the approved CAP. Historic information review is thus only undertaken for the additional works area, Area 5, in this supplementary CAP. Site inspection was carried out for both areas for the purpose of this report.

Sources of Historical Information

- 4.6 The assessment involved an initial review of the current and historic land use of all works areas along the construction profile.
- 4.7 A review of aerial photographs obtained from the Survey and Mapping Office, Lands Department was also undertaken. The aim of the review was to identify those lands within the project area which may have been contaminated through previous land uses. A list of aerial photographs which have been reviewed for Area 5 is provided in **Table 4.1**.

Table 4.1 Review of Aerial Photographs for Area 5

| Year | Height (Feet) | Photograph Reference Number |
|------|---------------|-----------------------------|
| 1945 | 20000 | 4153 |
| 1961 | 30000 | 88 |
| 1976 | 2000 | 15262 |
| 1992 | 3000 | CN3093 |
| 1996 | 4000 | CN13585 |
| 2007 | 6000 | CS05989 |

Source: Survey and Mapping Office, Lands Department

- 4.8 The existing land uses of the ground level of the inspected areas include low- and high-rise buildings, a railway station, open space and planted areas.

Review of Historic and Current Land Uses

- 4.9 The northern part of Area 5 was mainly mountainous and was scattered with low-rise houses in 1945 while the southern part mainly included low-rise buildings and planted areas. The area then became vacant in 1961, and a major portion was later converted into an open space during 1976 to 1992. Building structures were noted in 1992 but those structures in the northern section were later demolished and became a works site. In 1996, a high-rise structure was noted in the northern section (Grand Century Place Blocks 1 and 2) and low-rise buildings currently occupied by Mongkok Government Offices and attached to the MKK station were observed in the southern section. No major land use changes were noted since then.

Site Inspection

- 4.10 A further site inspection at Area 2 was conducted on 23 December 2009. Facilities revisited were the locomotive traverser, the locomotive running shed and its ancillary facilities, and the railway tracks through the HFT. Results of this site inspection in comparison with the previous ones are listed in **Table 4.2** and illustrated in **Figure nos. NEX2213/C/361/ENS/M57/501A** through **NEX2213/C/361/ENS/M57/503A**. Site IDs for Area 2 were adopted from the approved CAP for consistency and easy reference.
- 4.11 Since drillholes are not permitted within the underground storage tank (UST) area (Site ID 2-05) northeast of the locomotive running shed, and no alternative locations can be proposed, sampling and testing at HUH-8 and HUH-10 (**Figure no. NEX2213/C/361/ENS/M57/501A**) will be conducted under the Stage 2 SI, as scheduled in the approved CAP.
- 4.12 Site inspection for Area 5 was undertaken on 23 December 2009 at MTR's Mong Kok Goods Yard. At the time of the inspection, the area was mainly used as storage for drinks by Carlsberg Group. Sites identified with potentially contaminating land use are indicated in **Table 4.3** and illustrated in

Figure no. NEX2213/C/361/ENS/M57/504A. For easy reference, a unique Site ID has been assigned to the sites in this area.

Table 4.2 Findings from the Further Site Inspection at Area 2 in Hung Hom Freight Terminal

| Site ID (Description) | Approximate Area of the Site (m ²) | SI Proposed in the Approved CAP | Further Site Inspection Results | SI Proposed in the Supplementary CAP and Justification | Figure Reference |
|-----------------------------------|--|--|---|--|--------------------------------|
| 2-02 (Locomotive traverser) | <ul style="list-style-type: none"> • Total area occupied by the locomotive traverse: ~800 m² • Area of this site overlapping the cut & cover works area: < 100 m² | <p>This site was in operation at the time of the site inspection. It was identified as a potentially contaminated area based on the observation of oil stains onsite and its historic land use.</p> <p>A sampling location (HUH-1) was proposed at the eastern side of the traverser.</p> | <p>The locomotive traverse transports and reverses the locomotive by moving between the tracks onsite. Due to the mechanical design of the traverser, it stops approx. 1 m from the eastern end of the site that overlaps the NSL cut & cover area.</p> <p>The headspace around this facility is about 4.8 m.</p> <p>The method of SI will be decided upon the confirmation from the operation staff.</p> | <p>The drillhole proposed under the approved CAP is suggested to be shifted to the southern edge of this site where SI will not disturb its operation.</p> | NEX2213/C/361 /ENS/M57/502A |

| Site ID (Description) | Approximate Area of the Site (m ²) | SI Proposed in the Approved CAP | Further Site Inspection Results | SI Proposed in the Supplementary CAP and Justification | Figure Reference |
|--------------------------------------|--|--|--|---|--------------------------------|
| 2-04 (Locomotive running shed) | <ul style="list-style-type: none"> • Total area occupied by this facility ~1,100 m² • Area of the workshop: ~200 m² • Area of the locomotive maintenance area: ~800 m² • Area of the chemical waste storage area: ~15 m² | <p>This site was in operation at the time of the site inspection. Based on the historic and current land use, three hotspots were identified within it, namely the mechanical workshop, the locomotive maintenance area and the chemical waste storage area.</p> <p>A total of six sampling locations were proposed:</p> <ul style="list-style-type: none"> • Workshop: HUH-2 (inside) and HUH-9 (outside) • Servicing area: HUH-3, HUH-5 • Chemical storage area: HUH-4 • Waste oil storage area: HUH-6 | <p>This facility was in operation at the time of the further site inspection. According to the site personnel, it will be in operation until being demolished.</p> | <p>Based on the confirmation from the site personnel no drillhole shall be permitted within the premises (Sites 2-04, 2-06 and 2-07), a total of seven new SI locations are proposed around the perimeter of the Locomotive running shed to replace the old ones in the approved CAP.</p> <p>Based on the further site inspection and practical site constraints (e.g. entrance size, space for drilling machine), two SI locations were proposed at the upstream (north/ northwest) of these facilities; five downstream (south/ southeast) of the facilities.</p> <p>The proposed drillholes surrounding the running shed are deemed sufficient to investigate the potential for contamination at Sites 2-04, 2-06 and 2-07</p> | NEX2213/C/361 /ENS/M57/501A |

| Site ID (Description) | Approximate Area of the Site (m ²) | SI Proposed in the Approved CAP | Further Site Inspection Results | SI Proposed in the Supplementary CAP and Justification | Figure Reference |
|---|---|--|--|--|-----------------------------|
| 2-06 (Aboveground tank for lubricating oil storage) | ~10 m ² | This site was in operation at the time of the site inspection. It was identified as a potentially contaminated area based on the review of its historic information and current land use. SI was proposed at the site (ETT102) and has been completed under Stage 1. All sample results indicated compliance. However, it should be noted that based on the analytical results, the concentration of longer-chained TPH (e.g. C9-C35) increased with the sampling depth, even though the detected level is lower than the relevant RBRGs. Further SI (i.e. borehole) was, therefore, recommended for this location under Stage 2 in the relevant CAR. | SI for this site under Stage 1 has been completed and the sampling location has been backfilled at the time of this further site inspection. No borehole could be drilled exactly at this site for further SI, due to site constraints (space) and current land use (tank under operation). | Refer to 2-04 | NEX2213/C/361 /ENS/M57/501A |
| 2-07 (Pumping areas west of the locomotive running shed) | Area of the pumping areas west of the locomotive running shed: ~10 m ² | This site was in operation at the time of the site inspection. Based on the site observation and review on the land use, it was identified as a potentially contaminated area. SI has been proposed at this site (HUH-7) in the approved CAP. | This facility was in operation at the time of the further site inspection. It will be in operation until being demolished. According to the confirmation from the facility personnel, no drillholes shall be permitted inside this facility. | Refer to 2-04 | NEX2213/C/361 /ENS/M57/501A |

| Site ID (Description) | Approximate Area of the Site (m ²) | SI Proposed in the Approved CAP | Further Site Inspection Results | SI Proposed in the Supplementary CAP and Justification | Figure Reference |
|---|--|---|--|---|------------------------------------|
| 2-05 (Underground storage tanks, USTs) | ~150 m ² | <p>This site was in operation at the time of the site inspection. Three sampling locations were proposed:</p> <ul style="list-style-type: none"> • Northwest of the USTs: 2209/SCL/EDH246 (drillhole). It was later changed to a trial pit due to underground utilities. SI for this sampling location has been completed and the trial pit backfilled. • West of the USTs: HUH-8 • Southeast of the USTs: HUH-10 | <p>This facility was in operation at the time of the further site inspection. According to the site personnel, it will be in operation until being demolished.</p> | <p>SI for HUH-8 and HUH-10 as proposed in the approved CAP will be conducted during the SI under Stage 2 (after decommissioning of the facility).</p> | <p>NEX2213/C/361 /ENS/M57/501A</p> |

| Site ID (Description) | Approximate Area of the Site (m ²) | SI Proposed in the Approved CAP | Further Site Inspection Results | SI Proposed in the Supplementary CAP and Justification | Figure Reference |
|-----------------------------|---|--|--|---|--------------------------------|
| 2-08 (Railway tracks) | <ul style="list-style-type: none"> • Mainly railway tracks G10, G12, G13, G15, G17 and G18 are covered in this area, which will be a cut & cover construction site for this Project. • Total area covered: ~ 15,000 m² | <p>This site was in operation and was not fully accessed and surveyed at the time of the site inspection. Based on the site observation, current land use and historic information review, five SI locations (RWT-1 through RWT-5) were proposed on a 100 m x 100 m grid for this site.</p> | <p>This site was fully accessed during the further site inspection.</p> <p>According to the site personnel, the height of overhead cables in this site is about 5 m.</p> <p>As reported by the Geotechnical Team of MTR, all previously proposed boreholes in this area were rejected by the Railway Protection Engineer (RPE) due to current land use (railway operations) and safety considerations. However, trial trenches inside the track area were possible, as informed by the site personnel.</p> | <p>Within the undercover railway tracks (G10, G12, G13, G15, G17, and G18) in HFT, trial trenches are now proposed to be excavated down to the water table (approx. 2.5 – 3 m bgs, based on SI results under Stage 1) in order to investigate the potential for contamination resulting from historical hydrocarbon leaks from trains and other vehicles in the area.</p> <p>Given that the investigation target is the presence of hydrocarbon contamination, which in its non-aqueous form will float on top of the water table and when dissolved into groundwater normally migrates at the top of the water column, the usage of trial trenches which intercept the top of the groundwater is considered an appropriate investigative technique to assess the presence of contamination in the railway tracks area.</p> <p>Changed locations in this facility can be referred to in the related figure.</p> | NEX2213/C/361 /ENS/M57/503A |

Table 4.3 Findings of the Site Inspection for Area 5 in Mong Kok Freight Terminal

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|-----------------------------|---------|--|--|---|---|--|----------------------------|
| NSL-MTR-022 and NSL-MTR-021 | 5-01 | Vacant area, open storage, building structures, planted area | MTR goods yard operated by Carlsberg Group | <ul style="list-style-type: none"> According to the site personnel, this goods yard has been in operation for more than 10 years. It was initially occupied by Hop Cheong Paper Co. Ltd. (合昌紙行有限公司) for approx. 8-9 years as storage for paper and stainless steel. The site was then used as an open storage for non-liquid goods for more than 10 years. Storage of chemicals is not permitted onsite. At the time of the site inspection, Carlsberg Group has been occupying this site for approximately a year, as informed by the site personnel. The goods yard is currently used by Carlsberg Group mainly for storage of drinks (mainly beer) and containers, and as areas for loading and unloading. A mechanic workshop on concrete about one meter above ground was observed located on the western portion of this site. According to the site personnel, this workshop is mainly for the maintenance of storage equipment maintenance by Carlsberg Group. A temporary area for forklift mechanical maintenance was observed near the workshop. According to the site personnel, all forklifts in this goods yard are electricity-powered since Carlsberg Group's occupancy; battery charging for the forklifts is carried out above ground level. Two chambers for Liquefied Petroleum Gas (LPG) storage were found on the southwestern part of the site. Approx. 20 full LPG cylinders (approx. 16 kg each) were stored in the northern chamber at the time of the site inspection; according to the site personnel, the southern chamber is only used for storage of empty | No | <p>No adverse contaminated land impacts are identified based on site appraisal.</p> <p>A new railway track will be built along the eastern side of this site; no significant soil excavation is expected to be involved.</p> | NEX2213/C/361/ENS/M57/504A |

| Land Ref. No. | Site ID | Historical Land Use | Current Land Use* | Site Appraisal Results | Necessary for Further Site Investigation? | Justification and Hotspots Identified | Figure Reference |
|---------------|---------|---------------------|-------------------|---|---|---------------------------------------|------------------|
| | | | | <p>cylinders.</p> <ul style="list-style-type: none"> • 3-5 buckets (approx. 5 L each) of ethanol were found stored on a shelf above the concrete-paved ground near the southern tip of this goods yard. A drum (approx. 200 L) of propylene glycol, an additive in food/ drug and coolant for beer glycol jacketed fermentation tanks, was observed next to the ethanol buckets. • Southeast of the above ethanol and propylene glycol, a temporary cleaning area was found, for the purpose of cleaning the beer containers using water prior to export. No chemical suspected to cause land contamination were observed onsite. • This site, entirely concrete-paved, is in a clean and tidy condition, with no observable oil stains or detected hydrocarbon odour. | | | |

Other Relevant Information

- 4.13 In order to evaluate the potential land contamination concerns from previous land uses, inquiries were made to the Environmental Protection Department (EPD), Fire Services Department (FSD) and the Lands Department (LandsD) on 5 January 2010 for:
- records on any chemical and chemical waste releases within the Additional Assessment Area,
 - records of current and past registration of dangerous goods storages and reported accidents of spillage/leakage at the Additional Assessment Area, and
 - historical land uses of the Additional Assessment Area.
- 4.14 The inquired government departments, i.e. EPD, FSD and LandsD, have not yet responded during the time of the submission of this report. This section will be updated as soon as the reply is obtained from these bodies.
- 4.15 Historical land use information was gathered through reviews of aerial photographs of the potential contaminated areas.
- 4.16 Standard Form Table 3.1 adopted from EPD's Guidance Manual summarising the past, current and future land uses of the potentially contaminating sites is provided in **Appendix B**.

5. SAMPLING PLAN FOR SITE INVESTIGATION

Sampling Locations

- 5.1 Based on information from the approved CAP and results of the further site inspections at Area 2, a total of 9 boreholes and 4 trial pits are proposed in three major facilities (locomotive traverser, locomotive running shed and the railway tracks in Area 2), as a replacement of the proposed SI locations in the approved CAP. The location plans of the proposed Site Investigation (SI) sampling locations are illustrated in **Figure nos. NEX2213/C/361/ENS/M57/501A** through **NEX2213/C/361/ENS/M57/503A**.
- 5.2 No intrusive SI is proposed for Area 5, based on the site appraisal results.

Sampling Parameters

- 5.3 Chemicals of concern (COCs) recommended for laboratory analysis at each of the relocated sampling locations are based on the proposed sampling and testing plan from the approved CAP and the further site inspection. Reference is made to Guidance Notes 1 and 2 and the Guidance Manual. Where the desktop review and site investigation observed historical land use of a specific industry type, reference was also made to **Appendix C** "*Chemical Contaminants Listed by Industry Type*" of Australian Standard 4482.1-1997 "*Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*".
- 5.4 To be conservative, testing parameters for the relocated sampling locations around the perimeter of the locomotive running shed will generally include both the originally proposed parameters for the workshops and the locomotive servicing area (i.e. lead, chromium copper, BTEX, TPH, PAHs, VOCs and SVOCs).
- 5.5 The exact sampling locations of the SI shall be determined onsite and subject to fine adjustments due to site-specific conditions (e.g. headspace, presence of foundations, underground utilities, delivery pipes and services) and approval from relevant operation staff/ engineers.

- 5.6 If unexpected contamination is observed during the SI (i.e. extensive contamination observed beneath the removed concrete), an increased number of sample locations, sample depths or number of analytes would be recommended to MTR in order to further investigate the extent of contamination present. However, further investigation will only be undertaken upon MTR's written authorisation.
- 5.7 The testing locations, basis for further investigation, investigation techniques, proposed number of samples, together with the analytical regime is summarised in **Table 5.1**.
- 5.8 The sampling and testing plan is detailed in **Appendix D**.

Table 5.1 Changes in Sampling and Testing Plan at Area 2 in Hung Hom Freight Terminal

| Site ID (Description) | Hotspot Identified (Based on the Approved CAP) | Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP) | Sampling Method (Based on This Supplementary CAP) | Sample Matrix (Based on This Supplementary CAP) | Parameters to Be Tested (Based on This Supplementary CAP) | Figure Reference | |
|--|--|---|---|---|---|--|-----------------------------|
| 2-02 (Locomotive traverser) | Locomotive traverse and the ground underneath Total approx. area ~800 m ² ; approx. area within the cut & cover area where excavation is expected: <100 m ² | HUH-1a : at the edge of the site due to current land use and site constraints (Original location under Stage 2 SI: HUH-1 at the centre of the site) | Borehole | Soil | <ul style="list-style-type: none"> Borehole: soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | NEX2213/C/3 61/ENS/M57/501A |
| | | | | GW | One GW sample per location if encountered | BTEX, TPH, PAHs | |
| Locomotive running shed (LRS) and its affiliating facilities 2-04 (LRS), 2-06 (Aboveground lubricating oil tank), and 2-07 (Pumping area) | <u>LRS</u> : Total approx. area of this site: ~1,100 m ² The following potential hotspots identified are all located inside the Locomotive running shed: <ul style="list-style-type: none"> Workshop: ~ 300 m² Servicing area: ~500 m² Chemical storage: ~20 m² Waste oil storage: ~20 m² <u>Above ground lubricating oil tank</u> : Approx. area 10 m ² <u>Pumping area (west of LRS)</u> : Approx. area of 10 m ² | A total of seven boreholes (two up hydraulic gradient and five down hydraulic gradient) are proposed around the LRS. HUH-2a : northwest and upstream of LRS HUH-3a : north and upstream of LRS HUH-4a : upper southeast and downstream of LRS HUH-5a : lower south and downstream of LRS HUH-6a : south of LRS HUH-7a : lower | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, Chromium, Copper, TPH, VOCs, SVOCs | NEX2213/C/3 61/ENS/M57/502A |
| | | | | GW | One GW sample per location if encountered | TPH, VOCs, SVOCs | |

| Site ID (Description) | Hotspot Identified (Based on the Approved CAP) | Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP) | Sampling Method (Based on This Supplementary CAP) | Sample Matrix (Based on This Supplementary CAP) | | Parameters to Be Tested (Based on This Supplementary CAP) | Figure Reference |
|-----------------------|---|--|---|---|--|---|-----------------------------|
| | | southwest and downstream of LRS HUH-8a: upper southwest and downstream of LRS (Original locations under Stage 2 SI: HUH-2 and HUH-9 for the workshop; HUH-3 and HUH-5 for the servicing area; HUH-4 for the chemical storage; HUH-6 for the waste oil storage area, and HUH-7 for the north dispenser) | | | | | |
| 2-08 (Railway tracks) | Railway tracks Total approx. area: 15, 000 m ² (within the future cut & cover works area) | Sampling (RWT-1a through RWT-5a) generally based on a 100 m x 100 m grid. (These proposed sampling locations have been slightly shifted as compared to approved CAP due to site constraints.) (The original locations under Stage 2 SI: five sampling locations based on 100 m x 100 m grid pattern, between two neighbouring | Trial pit (for all locations in this site except RWT-3a, due to overhead constraints) | Soil Soil samples at depths of 0.5, 1.5 and 3.0 m bgs Since this site is within the works area and partly within the hoarding area where excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation. | One GW sample per location if encountered. | Lead, BTEX, TPH, PAHs BTEX, TPH, PAHs | NEX2213/C/3 61/ENS/M57/503A |

| Site ID (Description) | Hotspot Identified (Based on the Approved CAP) | Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP) | Sampling Method (Based on This Supplementary CAP) | Sample Matrix (Based on This Supplementary CAP) | | Parameters to Be Tested (Based on This Supplementary CAP) | Figure Reference |
|-----------------------|--|---|---|---|--|---|------------------|
| | | railway tracks of G10, G12, G13, G15, G17 and G18) | Borehole (for RWT-3a only) | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |

Remarks:

- bgs: below ground surface; GW = groundwater
- VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
- BTEX = *Benzene, Toluene, Ethylbenzene* and *Xylene*.
- PAHs = The whole of COCs listed under group of SVOCs in the RBRGs Table except *bis-(2-Ethylhexyl)phthalate, Hexachlorobenzene* and *Phenol*. Since RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene Dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.
- Since the RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene bis-(2-Ethylhexyl)phthalate Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
- If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

Soil Sampling Method and Depth of Sampling

- 5.9 All soil boring / excavation and sampling should be supervised by a land contamination specialist.
- 5.10 Boreholes should be advanced by means of dry rotary drilling method, i.e. without the use of flushing medium as far as applicable. For safety reasons, an inspection pit should be excavated down to 1.5 m below ground to inspect for underground utilities at the proposed borehole location. If necessary, other forms (e.g. ground penetration radar, metal detection) of utilities checking should be performed to ensure clearance of underground structures. Disturbed soil samples should be collected at the depth of 0.5 m below ground surface (bgs), and 1.5 m bgs if inspection pit was excavated.
- 5.11 In areas with no excavation works not more than 6 m of soil boring should be undertaken to a depth of 6.0 m bgs. For sites where excavation deeper than 6 m is planned, drilling should be undertaken to the specified depth or upon encountering bedrock, whichever is shallower.
- 5.12 Soil boring using drill rigs should then be performed to 1 m to the maximum boring depth. Undisturbed soil samples shall be collected by sampler (e.g. U100/U76) made of stainless steel or other materials considered appropriate at 0.5 m, 1.5 m, 3 m and 6 m bgs and at 3 m intervals for deeper excavations. Where there are suspected signs of contamination, extra samples should be taken for laboratory analysis. If there are any spatial and/ or headroom constraints for the proposed borehole(s), trial pit(s) should be considered as an alternative to collecting the soil samples.
- 5.13 At each sampling location/ depth, sufficient quantity of soil sample (as specified by the laboratory) should be taken. All soil samples should be uniquely labelled and documented on a Chain of Custody form. Backup samples should be retained and stored at 0 - 4 °C in laboratory. Guidelines on sample size and handling for soil sample are given in **Table 5.2** below.

Table 5.2 Guidelines of Sample Size and Handling for Soil Sample

| Matrix | | | Soil | | |
|----------------------|------|-------------|---|--------------|-------------|
| Container Per Sample | | | Parameters | Preservation | Temperature |
| No. of Bottles | Size | Type | | | |
| 1 | 1 kg | Amber Glass | Full list of metals, VOCs & SVOCs, PAHs, TPH, MTBE, BTEX, cyanide | None | 0-4°C |

Strata Logging

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

Free Product and Groundwater Level Measurement

- 5.15 The thickness of any free product and ground water level if present at sampling locations should be measured with an interface probe. The free product if encountered in sufficient volume should be collected for laboratory analysis to determine the composition.

Groundwater Sampling

- 5.16 It is proposed to collect groundwater samples if groundwater is encountered in sufficient quantity at the both the trial pit and borehole sampling locations. Collection of groundwater from a trial pit will be undertaken using a disposal bailer or decontaminated bucket, where feasible.

- 5.17 For each proposed borehole sampling location of which groundwater is encountered, a groundwater well should be installed into the borehole if it is feasible upon considerations of engineering constraints. A typical design of the groundwater sampling well as shown in **Appendix E**, however installation of the well should take into account local conditions.
- 5.18 Each well should first be developed by removing approximately five well volumes of groundwater to remove silt and drilling fluid residue (if present) from the wells. The wells should then be allowed to stand for 24 hours to permit groundwater conditions to equilibrate. Groundwater levels and thickness of free product layer, if present, should be measured at each well before groundwater samples are taken.
- 5.19 In the case of more than one groundwater well being installed, the top of the casing of each groundwater well should first be surveyed to a recognized height datum. All groundwater wells should then be gauged at the same time in order to allow mapping of the groundwater flow regime present at the site.
- 5.20 Prior to groundwater sampling, the monitoring wells should be purged (at least three well volumes) to remove fine-grained materials and to collect freshly refilled representative groundwater samples. Time for each groundwater purging/recharge should be recorded as well as the estimated groundwater flow.
- 5.21 After purging, one groundwater sample should first be collected using a decontaminated stainless steel or Teflon bailer and placed into a decontaminated container with the following water quality parameters recorded using a water quality meter; temperature, pH, total dissolved solids, dissolved oxygen, and Redox potential.
- 5.22 One groundwater sample should then be collected at each well using a decontaminated stainless steel bailer and decanted into appropriate sample vials or bottles in a manner that minimizes agitation and volatilization of VOCs from the samples. All samples should be uniquely labelled.
- 5.23 Trial pits are to be considered as an alternative for sampling due to constraints such as overhead access. Groundwater samples should also be collected at all trial pits if it is encountered in sufficient volume during excavation. Groundwater from trial pits should be collected using a decontaminated bucket. Water quality parameters should also be recorded where the volume of water is great enough (priority should be placed on collecting a groundwater sampling for laboratory analysis).
- 5.24 Immediately after collection, groundwater samples should be transferred to new, clean, laboratory-supplied glass jars for sample storage/ transport. The sampling glass jars should be of “darken” type. Groundwater samples should be placed in the glass jars with zero headspace and promptly sealed with a septum-lined cap. Immediately following collection, samples should be placed in ice chests, cooled and maintained at a temperature of about 4°C until delivered to the analytical laboratory.

Sample Size and Decontamination Procedures

- 5.25 All equipment in contact with the ground or groundwater should be thoroughly decontaminated between each excavation, drilling and sampling event to minimize the potential for cross contamination. The equipment (including drilling pit, digging tools and soil/groundwater samplers) should be decontaminated by steam cleaning or high-pressure hot water jet, then washed by phosphate-free detergent and finally rinsed by distilled/ deionised water.
- 5.26 Prior to sampling, the laboratory responsible for analysis should be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis.
- 5.27 The sample containers should be laboratory cleaned, sealable, water-tight, made of glass or other suitable materials with aluminium or Teflon-lined lids, so that the container surface will not react with the sample or adsorb contaminants. No headspace should be allowed in the containers which contain samples to be analyzed for VOCs, Total Petroleum Hydrocarbon (TPH) fractions or other volatile chemicals.

5.28 The containers should be marked with the sampling location codes and the depths at which the samples were taken. If the contents are hazardous, this should be clearly marked on the container and precautions taken during transport. Samples should be stored at between 0-4 °C but never frozen. Samples should be delivered to laboratory within 24 hours of the samples being collected and analyzed within the respective retention period for the requested analysis but should not more than 10 days. Guidelines on sample sizes and handling for groundwater samples are given in **Table 5.3** below

Table 5.3 Guidelines on Sample Size and Handling for Groundwater Sample

| Matrix | | | Groundwater | | |
|----------------------|-----------|----------------|---------------------------------|------------------|-------------|
| Container Per Sample | | | Parameters | Preservation | Temperature |
| No. of Bottles | Size (mL) | Type | | | |
| 1 | 250 | Plastic bottle | Full list of metals | HNO ₃ | 0-4°C |
| 1 | 1000 | Amber Glass | PAHs | None | 0-4°C |
| 1 | 1000 | Amber Glass | PCBs | None | 0-4°C |
| 1 | 1000 | Amber Glass | TPH | None | 0-4°C |
| 2 | 40 | Brown vial | BTEX, Full list of VOCs & SVOCs | HCl | 0-4°C |
| 1 | 250 | Plastic bottle | Cyanide | NaOH | 0-4°C |

QA/QC Procedures

5.29 QA/QC samples should be collected with reference to the following frequency criteria where appropriate during the SI Chain of Custody protocol should be adopted.

- 1 duplicate per 20 samples for the full suite analysis;
- 1 equipment blank per 20 samples for the full suite analysis;
- 1 field blank per 20 samples for the full suite analysis; and
- 1 trip blank per trip for the analysis of volatile parameters.

Laboratory Analysis

Laboratory analysis is proposed in order to screen the presence of potential contaminants that are of concern at the Assessment Area. **Table 5.4** summarises the parameters, the minimum requirement of the reporting limits and reference methods for the laboratory analyses of soil and groundwater samples for this land contamination study.

Table 5.4 Parameters, Reporting Limits and Reference Methods for Laboratory Analyses

| Item | Parameter | Soil | | Groundwater | |
|-------------|----------------------|---|------------------|--|------------------|
| | | Reporting Limit (mg/kg) or Otherwise Stated | Reference Method | Reporting Limit (µg/L) or Otherwise Stated | Reference Method |
| VOCs | | | | | |
| 1 | Acetone | 5 [^] | USEPA 8260 | 50 [^] | USEPA 8260 |
| 2 | Benzene | 0.5 | | 5 | |
| 3 | Bromodichloromethane | 0.5 | | 5 | |
| 4 | 2-Butanone | 5 | | 50 | |

| Item | Parameter | Soil | | Groundwater | | | |
|---------------|---|---|------------------|--|------------------|-----|------------|
| | | Reporting Limit (mg/kg) or Otherwise Stated | Reference Method | Reporting Limit (µg/L) or Otherwise Stated | Reference Method | | |
| 5 | Chloroform | 0.5 | | 5 | | | |
| 6 | Ethylbenzene | 0.5 | | 5 | | | |
| 7 | Methyl tert-Butyl Ether | 0.5 [^] | | 5 [^] | | | |
| 8 | Methylene Chloride | 5 [^] | | 50 [^] | | | |
| 9 | Styrene | 0.5 | | 5 | | | |
| 10 | Tetrachloroethene | 0.5 | | 5 | | | |
| 11 | Toluene | 0.5 | | 5 | | | |
| 12 | Trichloroethene | 0.5 | | 5 | | | |
| 13 | Xylenes (Total) | 1.5 | | 15 | | | |
| SVOCs | | | | | | | |
| 14 | Acenaphthene | 0.5 | | USEPA 8270 | | 2 | USEPA 8270 |
| 15 | Acenaphthylene | 0.5 | | | | 2 | |
| 16 | Anthracene | 0.5 | | | | 2 | |
| 17 | Benzo(a)anthracene | 0.5 | NA | | | | |
| 18 | Benzo(a)pyrene | 0.5 | NA | | | | |
| 19 | Benzo(b)fluoranthene& Benzo(k)fluoranthene | 1 | 4 | | | | |
| 20 | Benzo(g,h,i)perylene | 0.5 | NA | | | | |
| 21 | bis-(2-Ethylhexyl) phthalate | 5 | NA | | | | |
| 22 | Chrysene | 0.5 | 2 | | | | |
| 23 | Dibenzo(a,h)anthracen | 0.5 | NA | | | | |
| 24 | Fluoranthene | 0.5 | 2 | | | | |
| 25 | Fluorene | 0.5 | 2 | | | | |
| 26 | Hexachlorobenzene | 0.2 [^] | 4 | | | | |
| 27 | Indeno(1,2,3-cd)pyrene | 0.5 | NA | | | | |
| 28 | Naphthalene | 0.5 | 2 | | | | |
| 29 | Phenanthrene | 0.5 | 2 | | | | |
| 30 | Phenol | 0.5 | NA | | | | |
| 31 | Pyrene | 0.5 | 2 | | | | |
| Metals | | | | | | | |
| 32 | Antimony | 1 | USEPA 6020 | NA | USEPA 6020 | | |
| 33 | Arsenic | 1 | | NA | | | |
| 34 | Barium | 1 | | NA | | | |
| 35 | Cadmium | 0.2 | | NA | | | |
| 36 | Chromium III | 0.5 [^] | | NA | | | |
| 37 | Chromium VI | 0.5 | | NA | | | |
| 38 | Cobalt | 1 | | NA | | | |
| 39 | Copper | 1 | | NA | | | |
| 40 | Lead | 1 | | NA | | | |
| 41 | Manganese | 1 | | NA | | | |
| 42 | Mercury | 0.05 | | APHA 3112 Hg: B | | 0.5 | |
| 43 | Molybdenum | 1 | USEPA 6020 | NA | | | |

| Item | Parameter | Soil | | Groundwater | |
|----------------------------------|---------------|---|---|--|---|
| | | Reporting Limit (mg/kg) or Otherwise Stated | Reference Method | Reporting Limit (µg/L) or Otherwise Stated | Reference Method |
| 44 | Nickel | 1 | | NA | |
| 45 | Tin | 1 | | NA | |
| 46 | Zinc | 1 | | NA | |
| Petroleum Carbon Ranges | | | | | |
| 47 | C6 - C8 | 5 | USEPA 8015 | 20 | USEPA 8015 |
| 48 | C9 - C16 | 200 | | 500 | |
| 49 | C17 - C35 | 500 | | 500 | |
| PCBs | | | | | |
| 50 | PCBs | 0.1 | USEPA 8270 | 1 | USEPA 8270 |
| Other Inorganic Compounds | | | | | |
| 51 | Cyanide, free | 1 [^] | APHA 4500 CN | NA | APHA 4500 CN |
| Organometallics | | | | | |
| 52 | TBTO** | 5 | Krone <i>et al.</i> – Marine Environmental Research, 27, 1 – 18, 1989 | 0.1 | Krone <i>et al.</i> – Marine Environmental Research, 27, 1 – 18, 1989 |

Notes:

[^]: The HOKLAS accreditation of the testing method of the COC is not available in major laboratories in Hong Kong; analyses and will be done with reference to the established protocol of the individual lab.

NA= Not Applicable

- 5.30 For sampling and laboratory analyses, Chain of Custody procedure should be included as QA/QC procedure.
- 5.31 All laboratory analysis for soil and groundwater samples should be conducted by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory. All laboratory test methods should be accredited by the HOKLAS or one of its Mutual Recognition Arrangement partners with reference to the Guidance Manual as far as possible, unless otherwise specified in **Table 5.6** or as agreed by EPD. It should be noted that alternative methods or similar reporting limits may be used subject to the laboratory availability and capability. The relevant supporting document of the laboratory to be employed for this study should be given in the future CAP or CAR/RAP.
- 5.32 Extra soil samples shall be stored at 0-4 °C and tested for Toxicity Characteristics Leaching Procedure (TCLP) before submission of Remediation Action Plan (RAP) if excavation and landfill disposal is identified as the last resort.
- 5.33 The criteria are set primarily in terms of TCLP limits shown in **Table 5.5**.

Table 5.5 Laboratory Testing Requirements for TCLP Analysis

| Parameter | Test Methods* | Reporting Limit (mg/L) | Landfill Disposal Criteria TCLP Limit (ppm) |
|--|--|------------------------|--|
| TCLP Leachate Preparation allowed by analysis for: | | | |
| Antimony (Sb) | USEPA1311 USEPA6020 & USEPA 7112 | 1 | 150 |
| Arsenic (As) | | 1 | 50 |
| Barium (Ba) | | 1 | 1,000 |
| Beryllium (Be) | | 1 | 10 |
| Cadmium (Cd) | | 0.2 | 10 |
| Chromium (Cr) | | 1 | 50 |
| Copper (Cu) | | 1 | 250 |
| Lead (Pb) | | 1 | 50 |
| Nickel (Ni) | | 1 | 250 |
| Selenium (Se) | | 0.2 | 1 |
| Silver (Ag) | | 1 | 50 |
| Thallium (Tl) | | 1 | 50 |
| Tin (Sn) | | 1 | 250 |
| Vanadium (V) | | 1 | 250 |
| Zinc (Zn) | | 1 | 250 |
| Mercury (Hg) | | 0.2 | 1 |

* Equivalent internationally recognised standard methods could also be used.

6. INTERPRETATION OF RESULTS

6.1 With reference to the Guidance Note 1, interpretation of results should make reference to the Guidance Manual. The soil and groundwater samples collected for this study will be compared with Risk-based Remediation Goals (RBRGs) as stipulated in Table 2.1 and Table 2.2 of the Guidance Manual.

6.2 The RBRGs are developed based on a risk assessment approach to suit the local environmental conditions and community needs in Hong Kong. Decisions on contaminated soil and groundwater remediation are based on the nature and extent of the potential risks that are posed to human receptors as a result of exposure to chemicals in the soil and/or groundwater. Four types of land use scenarios are set under RBRGs to reflect the typical physical settings in Hong Kong under which people could be exposed to contaminated soil and groundwater. A description of each land use is as follows.

- Urban residential – Sites located in an urban area where main activities involve habitation by individuals. The typical physical setting is a high rise residential building situated in a housing estate that has amenity facilities such as landscaped yards and children’s playgrounds. The receptors are residents who stay indoors most of the time except for a short period each day, during which they are outdoors and have the chance of being in direct contact with soil at landscaping or play areas within the estate.
- Rural residential – Sites located in a rural area where the main activities involve habitation by individuals. These sites typically have village-type houses or low rise residential blocks surrounded by open space. The receptors are rural residents who stay at home and spend some time each day outdoors on activities such as gardening or light sports. The degree of contact with the soil under the rural setting is more than that under the urban setting both in terms of the intensity and frequency of contact.
- Industrial – Any site where activities involve manufacturing, chemical or petrochemical

processing, storage of raw materials, transport operations, energy production or transmission, etc. Receptors include those at sites where part of the operation is carried out directly on land and the workers are more likely to be exposed to soil than those working in multi-storey factory buildings.

- **Public parks** – Receptors include individuals and families who frequent parks and play areas where there is contact with soil present in lawns, walkways, gardens and play areas. Parks are considered to be predominantly hard covered with limited areas of predominantly landscaped soil. Furthermore, public parks are not considered to have buildings present on them.

6.3 In addition to the RBRGs, screening criteria (soil saturation limits, C_{sat}, developed for Non-aqueous Phase Liquid [NAPL] in soil and water solubility limits for NAPL in groundwater) for the more mobile organic chemicals must be considered to determine whether a site requires further action.

6.4 Since this Project involves the construction of a new railway, the Assessment Area is considered to be occupied for industrial purpose in the future and therefore RBRGs for Industrial Land Use will be adopted as the assessment criteria for this land contamination assessment. Relevant soil and groundwater RBRGs for this land contamination study including the Soil Saturation and Solubility Limits are presented in **Table 6.1**.

Table 6.1 Relevant RBRGs for Soil and Groundwater

| Chemical | Soil (mg/kg) | | Groundwater (µg/L) | |
|-------------------------|----------------------|------------------------|----------------------|-------------------|
| | RBRGs for Industrial | Soil Saturation Limits | RBRGs for Industrial | Solubility Limits |
| VOCs | | | | |
| Acetone | 10,000 | *** | 10,000,000 | *** |
| Benzene | 9.21 | 336 | 54,000 | 1,750,000 |
| Bromodichloromethane | 2.85 | 1,030 | 26,200 | 6,740,000 |
| 2-Butanone | 10,000 | *** | 10,000,000 | *** |
| Chloroform | 1.54 | 1,100 | 11,300 | 7,920,000 |
| Ethylbenzene | 8,240 | 138 | 10,000,000 | 169,000 |
| Methyl tert-Butyl Ether | 70.1 | 2,380 | 1,810,000 | *** |
| Methylene Chloride | 13.9 | 921 | 224,000 | *** |
| Styrene | 10,000 | 497 | 10,000,000 | 310,000 |
| Tetrachloroethene | 0.777 | 97.1 | 2,950 | 200,000 |
| Toluene | 10,000 | 235 | 10,000,000 | 526,000 |
| Trichloroethene | 5.68 | 488 | 14,200 | 1,100,000 |
| Xylenes (Total) | 1,230 | 150 | 1,570,000 | 175,000 |
| SVOCs | | | | |
| Acenaphthene | 10,000 | 60.2 | 10,000,000 | 4,240 |
| Acenaphthylene | 10,000 | 19.8 | 10,000,000 | 3,930 |
| Anthracene | 10,000 | 2.56 | 10,000,000 | 43.4 |
| Benzo(a)anthracene | 91.8 | NA | NA | NA |
| Benzo(a)pyrene | 9.18 | NA | NA | NA |
| Benzo(b)fluoranthene | 17.8 | NA | 7,530 | 1.5 |

| Chemical | Soil (mg/kg) | | Groundwater (µg/L) | |
|--------------------------------|----------------------|------------------------|----------------------|-------------------|
| | RBRGs for Industrial | Soil Saturation Limits | RBRGs for Industrial | Solubility Limits |
| Benzo(g,h,i)perylene | 10,000 | NA | NA | NA |
| Benzo(k)fluoranthene | 918 | NA | NA | NA |
| bis-(2-Ethylhexyl)phthalate | 91.8 | NA | NA | NA |
| Chrysene | 1,140 | NA | 812,000 | 1.6 |
| Dibenzo(a,h)anthracene | 9.18 | NA | NA | NA |
| Fluoranthene | 10,000 | NA | 10,000,000 | 206 |
| Fluorene | 10,000 | 54.7 | 10,000,000 | 1,980 |
| Hexachlorobenzene | 0.582 | NA | 695 | 6,200 |
| Indeno(1,2,3-cd)pyrene | 91.8 | NA | NA | NA |
| Naphthalene | 453 | 125 | 862,000 | 31,000 |
| Phenanthrene | 10,000 | 28 | 10,000,000 | 1000 |
| Phenol | 10,000 | 7,260 | NA | NA |
| Pyrene | 10,000 | NA | 10,000,000 | 135 |
| Metals | | | | |
| Chromium III | 10,000 | NA | NA | NA |
| Chromium VI | 1,960 | NA | NA | NA |
| Copper | 10,000 | NA | NA | NA |
| Lead | 2,290 | NA | NA | NA |
| Petroleum Carbon Ranges | | | | |
| C6 - C8 | 10,000 | 1000 | 1,150,000 | 5,230 |
| C9 - C16 | 10,000 | 3000 | 9,980,000 | 2,800 |
| C17 - C35 | 10,000 | 5000 | 178,000 | 2,800 |

Note: NA - Not Available

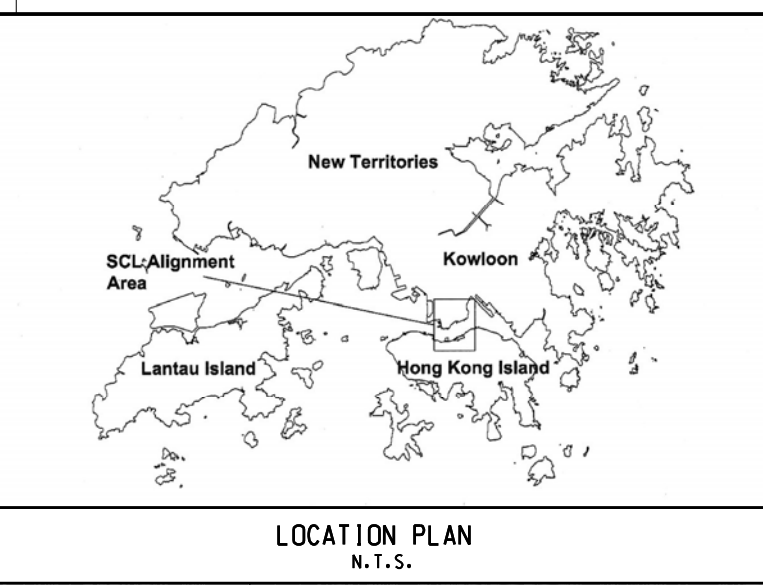
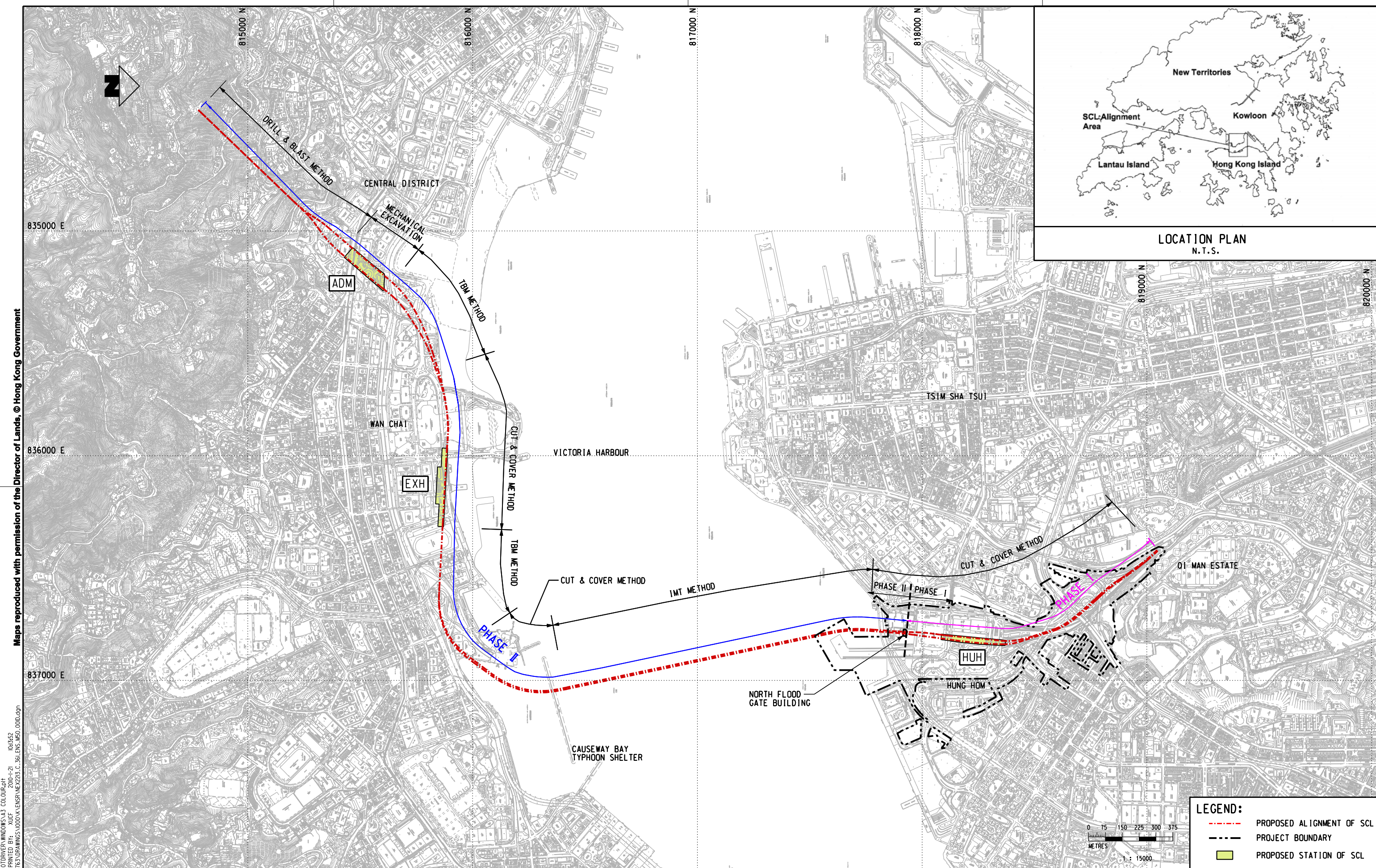
*** indicates that the Csat value/ solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

7. REPORTING

- 7.1 After completion of the post-Stage 1 SI, a CAR which summarises the detailed methodology of site investigation, assessment criteria, onsite observations and the analytical results from the site investigation works will be prepared for EPD endorsement.
- 7.2 Should significant contamination be identified within the works areas, a Remediation Action Plan (RAP) will be prepared. The RAP will set out.
- i. the objectives of remediation action,
 - ii. evaluation of different remediation alternatives and,
 - iii. the design and operation of the proposed remediation method.

- 7.3 The RAP will be submitted either separately or together with the CAR under different sections for EPD endorsement. Site cleanup will commence once the CAR/RAP are vetted and approved by EPD.
- 7.4 A Remediation Report (RR) for demonstration of adequate clean-up should be prepared and submitted to EPD for endorsement prior to the commencement of any construction/development works within the site(s)/ area(s). Construction/development works will only be carried out upon obtaining the endorsement of this RR from EPD.
- 7.5 If contamination is found and landfill disposal is identified as the last resort to remediate the contaminated soil, three impacted soil samples shall be conducted for TCLP test to determine whether they comply with the criteria for landfill disposal in accordance with the Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops before landfill disposal.

Figures

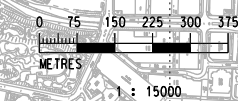


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PLOT DRW: R:\us\msh\NTR\PI\DRIVER\WINDOWS\13 COLOUR.dwg
 MODELNAME: NEX2213_C_361_ENS_M50_001.dgn
 FILENAME: M:\projects\DRAWINGS\NEX2213_C_361_ENS_M50_001.dgn
 DATE: 14/5/2009 10:35:52

LEGEND:

- - - PROPOSED ALIGNMENT OF SCL
- PROJECT BOUNDARY
- PROPOSED STATION OF SCL



| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |

| | |
|--|-------------|
| DRAWN | WDF |
| DESIGNED | --- |
| CHECKED | LCR |
| APPROVED | --- |
| DATE | 14/MAY/2009 |
| DO NOT SCALE DRAWINGS. ALL DIMENSIONS SHALL BE VERIFIED ON SITE. © MTR CORPORATION LIMITED 2008. COPYRIGHT IN RESPECT OF THIS DRAWING / DOCUMENT IS OWNED BY THE MTR CORPORATION LIMITED OF HONG KONG. NO REPRODUCTION OF THE DRAWING / DOCUMENT OR ANY PART BY WHATEVER MEANS IS PERMITTED WITHOUT THE PRIOR WRITTEN CONSENT OF THE MTR CORPORATION LIMITED. | |

SHATIN TO CENTRAL LINK

ORIGINATOR
 CADD REF. NEX2213_C_361_ENS_M50_001.dgn

TITLE
 NEX/2213 - CROSS HARBOUR SECTION
 EIA STUDY
 SCL OVERALL ALIGNMENT (WITH PHASE I BOUNDARY)

SCALE 1 : 15000 (A3) FIGURE NO. NEX2213/C/361/ENS/M50/001 REV. D

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PLOT DRY: R:\ustms\mtr\p1\DRIVER\WINDOWS\13\COLOUR.dwg
 MODELNAME: MTR\PROJECTS\DRAWINGS\000\ENR\M57\501A.dgn
 FILENAME: 160609
 2009-2-2
 PRINTED BY: DANK
 DATE: 2009-2-2
 DRAWN BY: DANK
 DATE: 2009-2-2
 CHECKED BY: LCR
 DATE: 2009-2-2
 APPROVED BY: ---
 DATE: 2009-2-2



| SITE ID | |
|---------|---------------------------|
| 2-04 | LOCOMOTIVE RUNNING SHED |
| 2-05 | UNDERGROUND STORAGE TANKS |
| 2-06 | ABOVEGROUND TANK |
| 2-07 | DISPENSERS |

| PROPOSED CO-ORDINATES UNDER POST-STAGE 1 SI | | |
|---|-----------|-----------|
| LOCATION ID | EASTING | NORTHING |
| HUH-2a | 836844.30 | 818400.02 |
| HUH-3a | 836856.60 | 818423.00 |
| HUH-4a | 836890.26 | 818349.11 |
| HUH-5a | 836891.51 | 818328.44 |
| HUH-6a | 836879.42 | 818318.62 |
| HUH-7a | 836861.51 | 818340.71 |
| HUH-8a | 836864.27 | 818350.94 |

| PROPOSED CO-ORDINATES UNDER STAGE 2 SI | | |
|--|-----------|-----------|
| LOCATION ID | EASTING | NORTHING |
| HUH-8 | 836882.62 | 818394.82 |
| HUH-10 | 836901.31 | 818381.69 |

NOTE:
 1. THE PROJECT BOUNDARY IS SLIGHTLY CHANGED IN THE CAR AFTER THE APPROVAL OF THE RELEVANT CAP, BUT THE SITE INVESTIGATION HAS NOT BEEN AFFECTED.

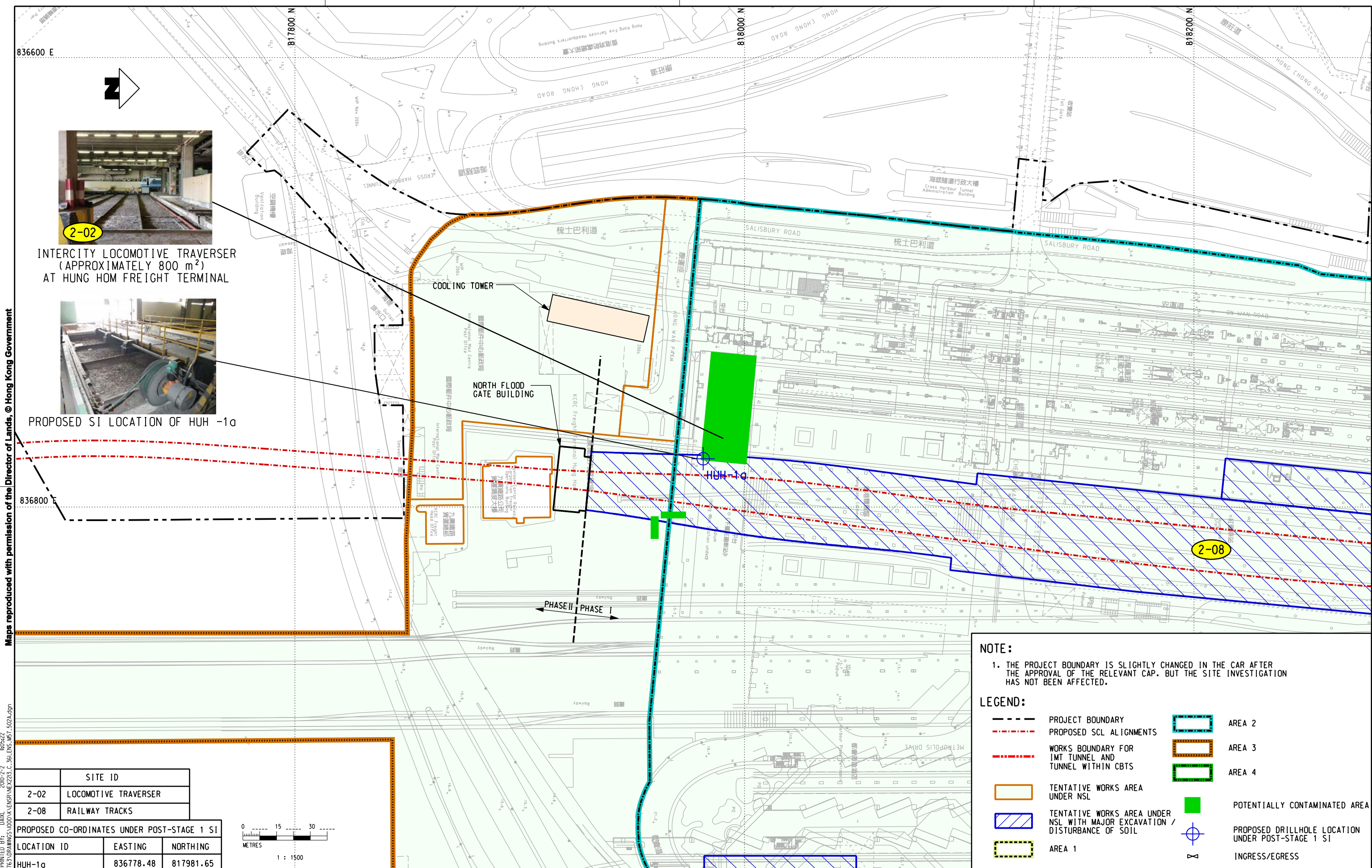
LEGEND:

- PROJECT BOUNDARY
- - - PROPOSED SCL ALIGNMENTS
- · - · WORKS BOUNDARY FOR TMT TUNNEL AND TUNNEL WITHIN CBTS
- TENTATIVE WORKS AREA UNDER NSL
- TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- POTENTIALLY CONTAMINATED AREA
- ⊕ PROPOSED DRILLHOLE LOCATION UNDER POST-STAGE 1 SI
- ⊕ PROPOSED DRILLHOLE LOCATION UNDER STAGE 2 SI
- ↔ INGRESS/EGRESS

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|--|---------------|--|--|--|--------------|--|--|--|---------------|--|--|--|--|--|--|--|----------------------|--|--|--|---|--|--|--|--------|--|--|--|
| DRAWN: GXH | | | | DESIGNED: --- | | | | CHECKED: LCR | | | | APPROVED: --- | | | | DATE: 20/JAN/2009 | | | | ORIGINATOR: MTR | | | | TITLE: NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED POST-STAGE 1 SI LOCATION AT AREA 2 SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN | | | | | | | |
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 MODELNAME: MTR\PROJECTS\DRAWINGS\000\X\ENR\M57-502A.dgn
 FILENAME: 160522
 2008-2-2
 PRINTED BY: DANK
 DATE: 160522



INTERCITY LOCOMOTIVE TRAVERSER
 (APPROXIMATELY 800 m²)
 AT HUNG HOM FREIGHT TERMINAL



PROPOSED SI LOCATION OF HUH -1a

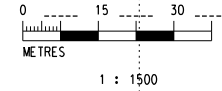
2-08

NOTE:
 1. THE PROJECT BOUNDARY IS SLIGHTLY CHANGED IN THE CAR AFTER THE APPROVAL OF THE RELEVANT CAP. BUT THE SITE INVESTIGATION HAS NOT BEEN AFFECTED.

LEGEND:

- PROJECT BOUNDARY
- - - PROPOSED SCL ALIGNMENTS
- . - . WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- TENTATIVE WORKS AREA UNDER NSL
- ▨ TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- POTENTIALLY CONTAMINATED AREA
- ⊕ PROPOSED DRILLHOLE LOCATION UNDER POST-STAGE 1 SI
- ⌵ INGRESS/EGRESS

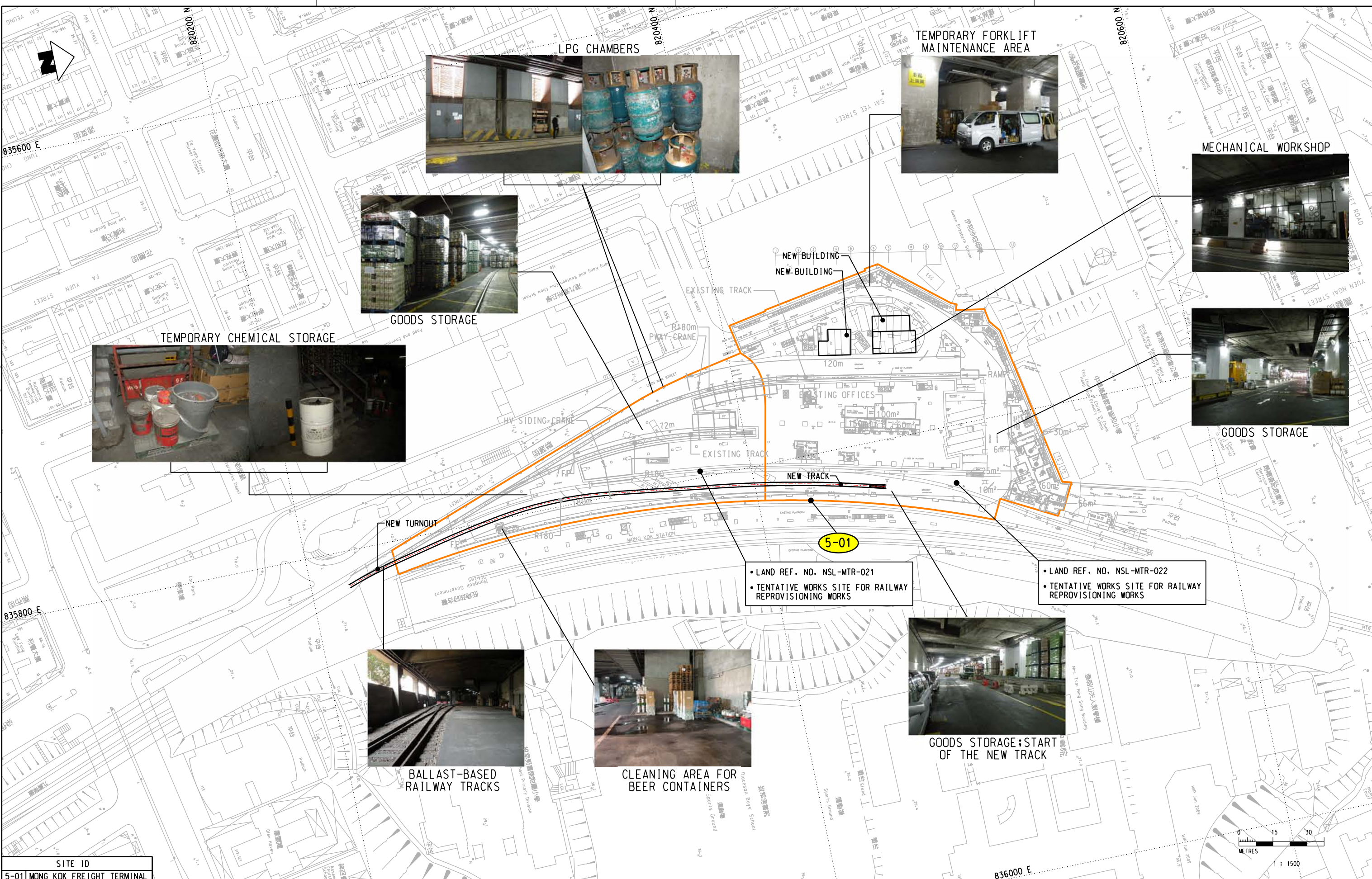
| | | |
|---|----------------------|-----------|
| SITE ID | | |
| 2-02 | LOCOMOTIVE TRAVERSER | |
| 2-08 | RAILWAY TRACKS | |
| PROPOSED CO-ORDINATES UNDER POST-STAGE 1 SI | | |
| LOCATION ID | EASTING | NORTHING |
| HUH-1a | 836778.48 | 817981.65 |



| DRAWN: YJP | | | | DESIGNED: --- | | | | CHECKED: LCR | | | | APPROVED: --- | | | | DATE: 11/JAN/2010 | | | | ORIGINATOR: MTR | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------|---|------|---------------|-----|-------------|----|--------------|----------|--|--|---------------|--|--|--|--|-------------|----|------|--------------------|-----|-------------|----|--------------------------------------|----------|--|--|--------|--|--|--|--|--|--|--|--|--|--|--|-------|--|--|--|---|--|---|--|
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| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TITLE | | NEX/2213 - CROSS HARBOUR SECTION EIA STUDY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROPOSED POST-STAGE 1 SI LOCATION AT AREA 2 | | SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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PLOT DRY: R:\us\ins\mtr\p1\DRIVER\WINDOWS\33\COLOUR.dwg
 MODEL NAME: MONG KOK FREIGHT TERMINAL
 FILE NAME: MONG KOK FREIGHT TERMINAL
 DATE: 2009-2-9
 ID: 05553
 PROJECT: MONG KOK FREIGHT TERMINAL



SITE ID
 5-01 MONG KOK FREIGHT TERMINAL

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |

| | |
|----------|-------------|
| DRAWN | KTH |
| DESIGNED | LCLL |
| CHECKED | LCLL |
| APPROVED | IMW |
| DATE | 18/MAY/2009 |

MTR

SHATIN TO CENTRAL LINK

AECOM

ORIGINATOR

CADD REF. NEX2213_C_361_ENS_M57_504A.dgn

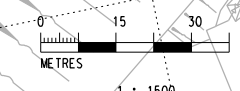
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**NEX/2213 - CROSS HARBOUR SECTION
 EIA STUDY
 SITE INSPECTION RESULTS AT AREA 5 (MONG KOK FREIGHT
 TERMINAL) PHASE I - MONG KOK EAST TO HUNG HOM
 SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN**

SCALE 1 : 1500 (A3)

FIGURE NO. NEX2213/C/361/ENS/M57/504

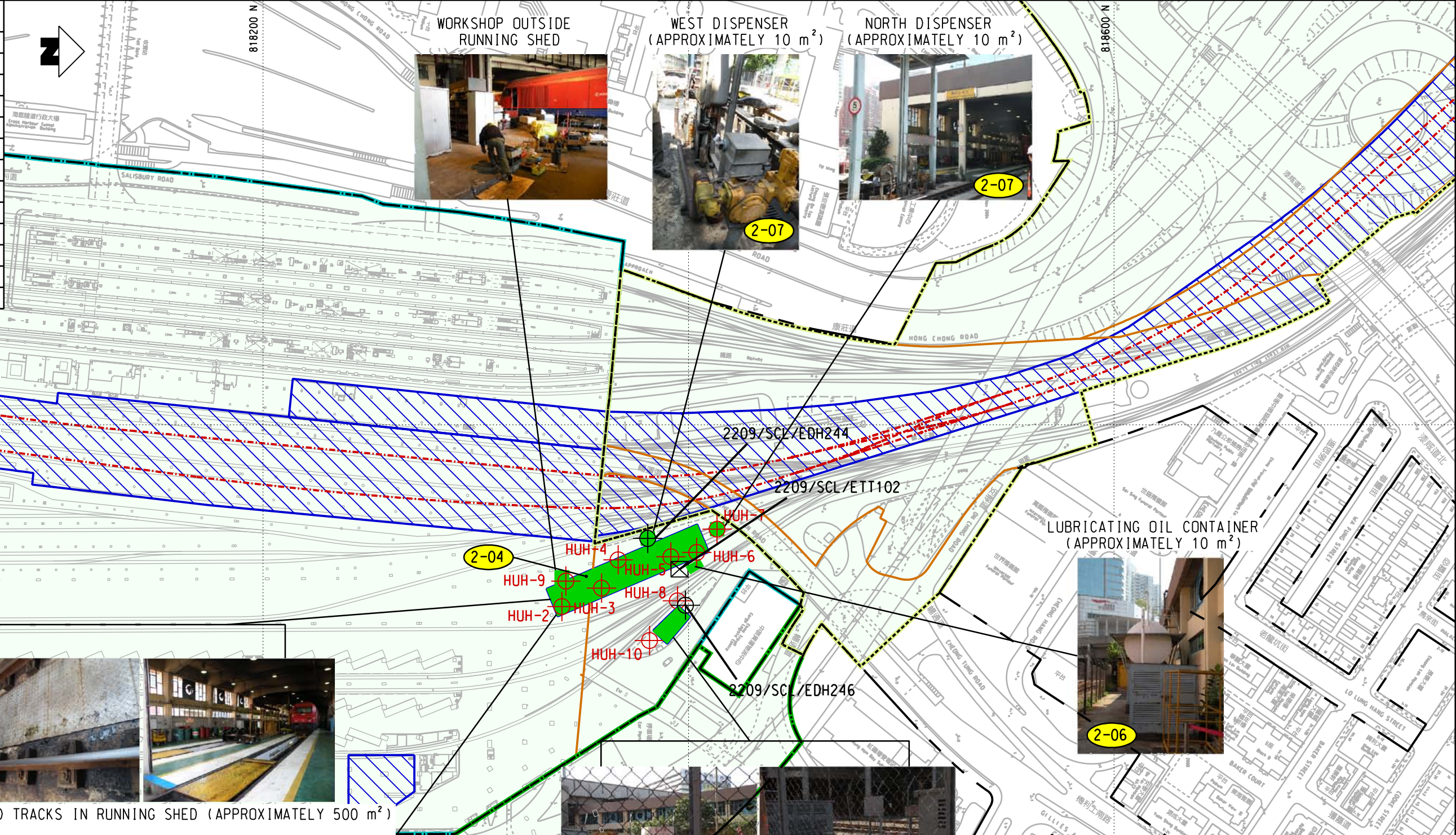
REV. A



Appendix A

**Extracted Figures from the Approved
Contamination Assessment Plan**

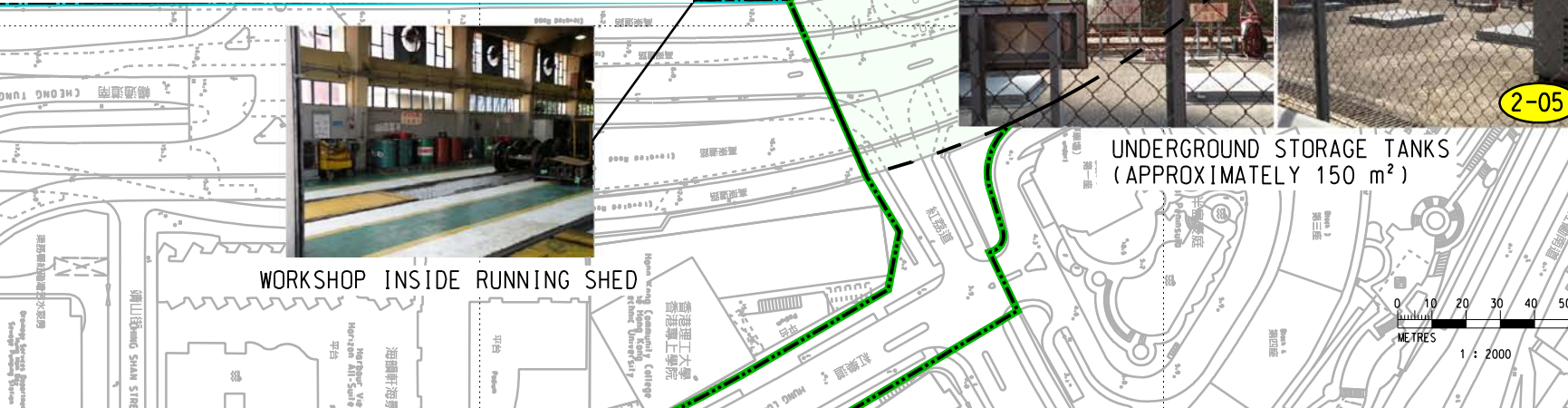
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|--|-----------|-----------|
| LOCATION ID | EASTING | NORTHING |
| 2209/SCL/EDH244 | 836853.33 | 818380.84 |
| 2209/SCL/EDH246 | 836884.75 | 818398.59 |
| 2209/SCL/ETT102 | 836867.78 | 818395.79 |
| HUH-2 | 836885.33 | 818340.53 |
| HUH-3 | 836876.66 | 818359.14 |
| HUH-4 | 836863.38 | 818366.93 |
| HUH-5 | 836861.94 | 818391.74 |
| HUH-6 | 836859.92 | 818403.88 |
| HUH-7 | 836849.00 | 818413.45 |
| HUH-8 | 836882.62 | 818394.82 |
| HUH-9 | 836873.35 | 818342.38 |
| HUH-10 | 836901.31 | 818381.69 |



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| SITE ID | |
|---------|---------------------------|
| 2-04 | LOCOMOTIVE RUNNING SHED |
| 2-05 | UNDERGROUND STORAGE TANKS |
| 2-06 | ABOVEGROUND TANK |
| 2-07 | DISPENSERS |

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |
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| | | | | | | | | | |



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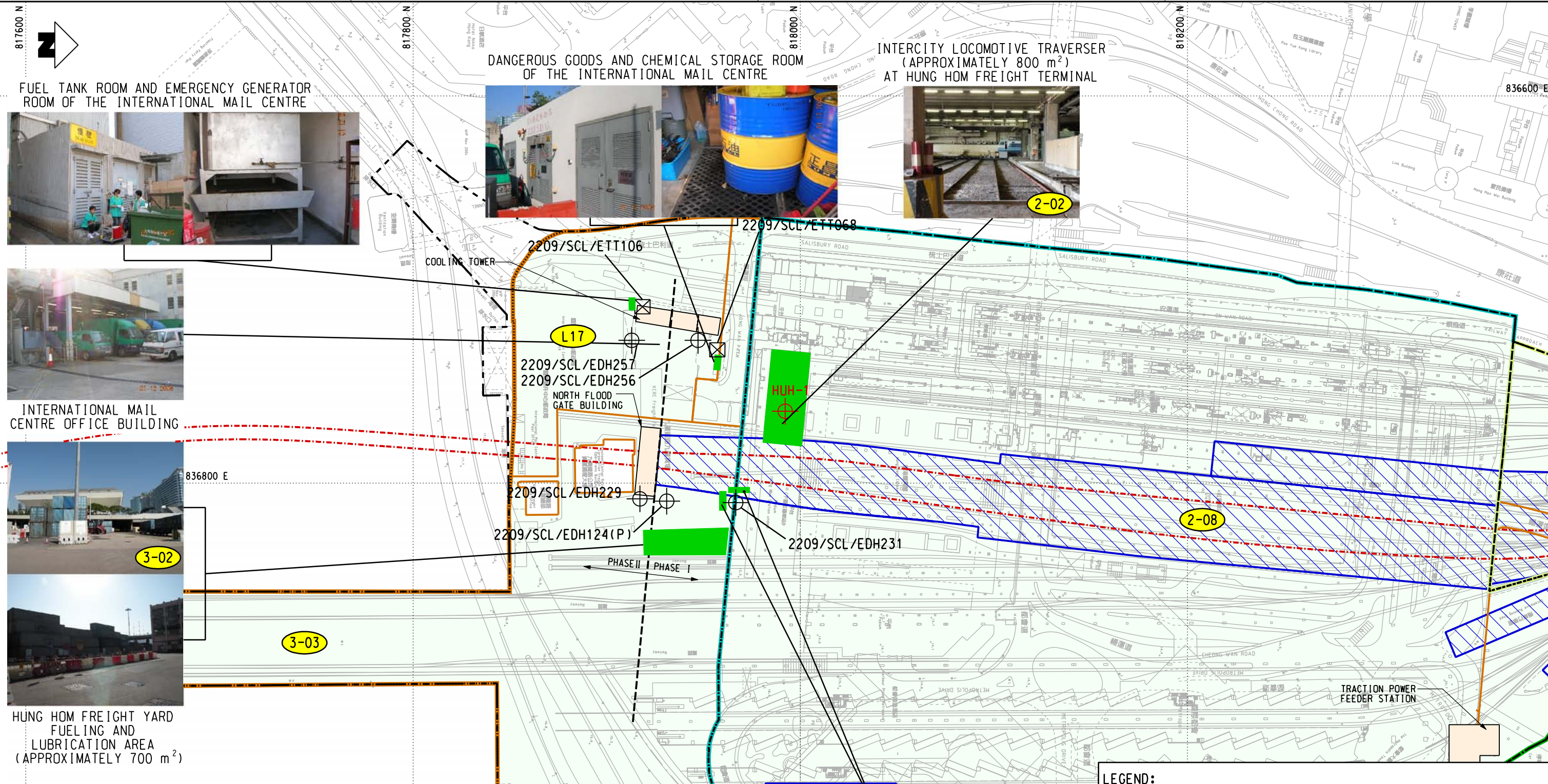
- PROJECT BOUNDARY
- - - - PROPOSED SCL ALIGNMENTS
- . - . - WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- - - - TENTATIVE WORKS AREA UNDER NSL
- ▨ TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- ▨ AREA 1
- ▨ AREA 2
- ▨ AREA 3
- ▨ AREA 4
- ⊗ PROPOSED TRIAL PIT LOCATION
- POTENTIALLY CONTAMINATED AREA
- ⊕ PROPOSED DRILLHOLE LOCATION
- ⊕ PROPOSED DRILLHOLE LOCATION FOR SITE UPON DECOMMISSIONING
- ⊕ INGRESS/EGRESS

PLOT DRY: F:\nst\mtr\p\ot\DRIVER\WINDOWS\13 COL\04\p.dgn 94755
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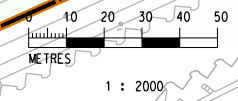
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|----------|-------------|---|-----------------------|
| DRAWN | GXH | | ORIGINATOR |
| DESIGNED | --- | | |
| CHECKED | LCR | | |
| APPROVED | --- | | |
| DATE | 20/JAN/2009 | CADD REF. NEX2213_C_361_ENS_M57_009A.dgn | |

| | | |
|---|---------------------------|------|
| TITLE NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED SAMPLING LOCATIONS AT AREA 2 PHASE 1 - MONKG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN | | |
| SCALE | FIGURE NO. | REV. |
| 1 : 2000 (A3) | NEX2213/C/361/ENS/M57/009 | A |

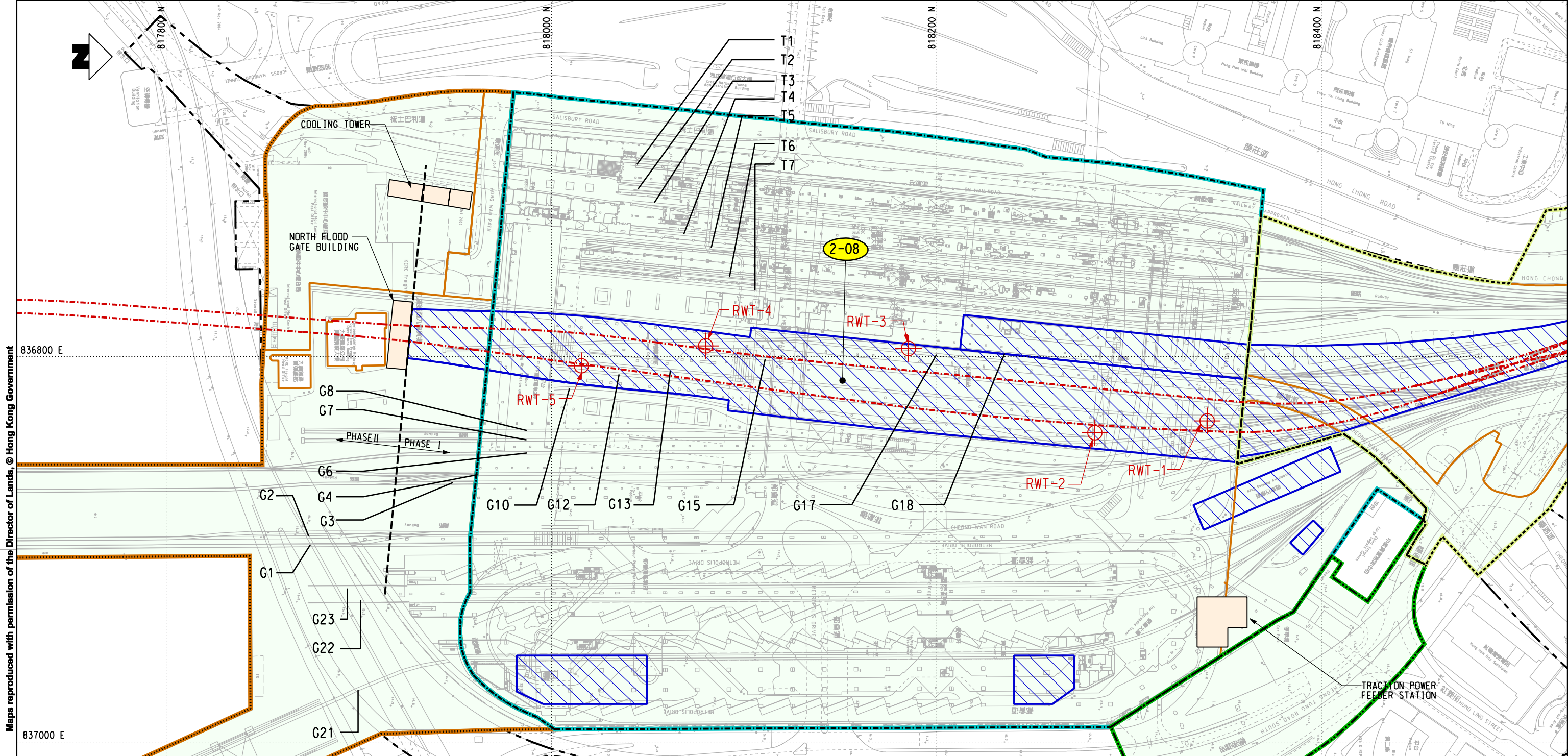
Maps reproduced with permission of the Director of Lands, © Hong Kong Government
 P:\nst\set\mtr\p\ot\DRIVER\WINDOWS\33 COL\09\p\01 94922
 MODELNAME: MEX2213_C_361_ENS_M57_010A.dgn
 FILENAME:



| PROPOSED CO-ORDINATES FOR SAMPLING LOCATIONS | | | | |
|--|-----------|-----------|---------|---------------------------|
| LOCATION ID | EASTING | NORTHING | | |
| 2209/SCL/ETT068 | 836731.12 | 817957.16 | | |
| 2209/SCL/ETT106 | 836708.88 | 817918.50 | SITE ID | |
| 2209/SCL/EDH256 | 836726.23 | 817947.19 | 2-02 | LOCOMOTIVE TRAVERSER |
| 2209/SCL/EDH257 | 836726.23 | 817912.97 | 2-08 | RAILWAY TRACKS |
| 2209/SCL/EDH229 | 836808.11 | 817917.21 | 2-09 | D.G. STORE |
| 2209/SCL/EDH124(P) | 836809.32 | 817931.05 | L17 | INTERNATIONAL MAIL CENTRE |
| 2209/SCL/EDH231 | 836810.08 | 817966.73 | 3-02 | HUNG HOM FREIGHT YARD |
| HUH-1 | 836762.87 | 817992.25 | 3-03 | PIER AND FINGER PIER |



| | | | | | |
|--|--|------------------------|--|---|--|
| DRAWN GXH DESIGNED --- CHECKED LCR APPROVED --- DATE 20/JAN/2009 | | | | TITLE NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED SAMPLING LOCATIONS AT AREAS 2 AND 3 PHASE I - MONKG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN | |
| ORIGINATOR AECOM | | SCALE 1 : 2000 (A3) | | FIGURE NO. NEX2213/C/361/ENS/M57/010 | |
| CADD REF. NEX2213_C_361_ENS_M57_010A.dgn | | REV. A | | | |

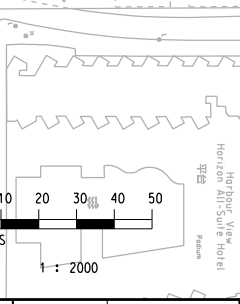


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 MODELNAME: M57_012A.dgn
 FILENAME: M57_012A.dgn
 PRINTED BY: DANKI
 DATE: 2009-9-11
 95620

| SITE ID | |
|---------|----------------|
| 2-08 | RAILWAY TRACKS |

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |



| PROPOSED CO-ORDINATES FOR SAMPLING LOCATIONS | | |
|--|-----------|-----------|
| LOCATION ID | EASTING | NORTHING |
| RWT-1 | 836833.39 | 818340.37 |
| RWT-2 | 836839.54 | 818282.08 |
| RWT-3 | 836795.80 | 818185.38 |
| RWT-4 | 836794.46 | 818080.07 |
| RWT-5 | 836804.79 | 818015.57 |

LEGEND:

- PROJECT BOUNDARY
- PROPOSED SCL ALIGNMENTS
- WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- TENTATIVE WORKS AREA UNDER NSL
- TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- X PROPOSED TRIAL PIT LOCATION
- POTENTIALLY CONTAMINATED AREA
- + PROPOSED DRILLHOLE LOCATION
- + PROPOSED DRILLHOLE LOCATION FOR SITE UPON DECOMMISSIONING
- X INGRESS/EGRESS

MTR

SHATIN TO CENTRAL LINK

AECOM

DATE: 20/JAN/2009

ORIGINATOR: AECOM

CADD REF: NEX2213_C_361_ENS_M57_012A.dgn

TITLE

**NEX/2213 - CROSS HARBOUR SECTION
EIA STUDY
PROPOSED SAMPLING LOCATIONS WITHIN RAILWAY TRACKS
PHASE I - MONKG KOK EAST TO HUNG HOM
CONTAMINATION ASSESSMENT PLAN**

SCALE: 1 : 2000 (A3) FIGURE NO: NEX2213/C/361/ENS/M57/012 REV: A

Appendix B

**Standard Form 3.1 – Summary of On-Site Land Use Adopted
from Guidance Manual for Use of Risk-based Remediation
Goals for Contaminated Land Management**

Appendix B Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Property Name: SCL Alignment

Current Use

| ID | Type of facility/business | On-site property land use | Date began ¹ | Description of business process/primary products | Owner or Occupier | Approximately size of on-site property | Off-site property affected? | |
|------|--|---------------------------|-------------------------|--|-------------------|---|-----------------------------|----|
| | | | | | | | Yes | No |
| 2-02 | Locomotive traverser | Industrial | - | Traversing the first car of the train and certain maintenance works (e.g. lubrication) | MTR | 800 m ² | No | |
| 2-04 | Locomotive Running Shed for locomotive maintenance | Industrial | 1973 | Maintenance and repair of locomotives; welding and testing motors | MTR | 1,100 m ² (whole Locomotive Running Shed area) | No | |
| 2-05 | Underground storage tanks | Industrial | 1973 | Storage of diesel and connected to the locomotive running shed through underground pipelines | MTR | 150 m ² | No | |
| 2-06 | Aboveground lubricating oil tank | Industrial | - | Storage of lubricating oil | MTR | 10 m ² | No | |
| 2-07 | Pumping area north of the Locomotive Running Shed | Industrial | 1973 | Pump station/ dispensers serving the running shed | MTR | 10 m ² (north dispensers) | No | |
| 2-08 | Railway tracks | Industrial | - | For depot, platform and cargo transport in the freight terminal | MTR | 15,000 m ² | No | |

¹ Specify the approximate year in which the current use of the on-site property began

Appendix B Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Past Use

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

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

| ID | Type of facility/business | On-site property land use | Date began ² | Date ended ³ | Description of business process/primary products | Owner or Occupier | Approximately size of on-site property (if different from current size) | Off-site property affected? Yes No |
|-------------------|---------------------------|---------------------------|-------------------------|-------------------------|---|-------------------|---|---------------------------------------|
| 2-02, 2-08 | Industrial | Industrial | 1964 | 1989 | Vacant, open storage | - | - | No |
| 2-04 through 2-07 | Industrial | Industrial | 1967 | 1973 | Structures of the locomotive running shed and the affiliated structures | - | - | No |

Future Use

Will future uses be different from current uses? Yes No If Yes, complete this section.

| ID | Type of facility/business | On-site property land use | Description of business process/primary products | Owner or Occupier | Approximately size of on-site property |
|--------------------------|---------------------------|---------------------------|--|-------------------|--|
| 2-02, 2-04, through 2-08 | Railway | Industrial | Railway operations | MTR | 17,070 m ² |

² Specify the approximate year in which the past use of the on-site property began

³ Specify the approximate year in which the past use of the on-site property ended

Appendix C

**Chemical Contaminants Listed by Industry Type, of Australian
Standard 4482.1-1997 "Guide to the sampling and
investigation of potentially contaminated soil. Part 1:
Non-volatile and semi-volatile compounds"**

APPENDIX I
CHEMICAL CONTAMINANTS LISTED BY INDUSTRY TYPE

Table II lists chemicals used in various industries. The exact nature of the contaminant associated with the particular industry is site specific, depending on the standard of management and the practice and safety procedures employed at each site.

This is not an all inclusive list of industries using chemicals and some of the chemicals mentioned are no longer used (e.g. carbon tetrachloride in the dry cleaning industry).

TABLE II
LIST OF INDUSTRIES

| Industry | Type of chemical | Associated chemicals |
|---------------------------------------|------------------------|---|
| Agricultural/horticultural activities | | See fertilizer, insecticides, fungicides, herbicides under chemicals manufacture and use |
| Airports | Hydrocarbons Metals | Aviation fuels Particularly aluminium, magnesium, chromium |
| Asbestos production and disposal | | Asbestos |
| Battery manufacture and recycling | Metals Acids | Lead, manganese, zinc, cadmium, nickel, cobalt, mercury, silver, antimony Sulfuric acid |
| Breweries/distilleries | Alcohol | Ethanol, methanol, esters |

(continued)

TABLE II (continued)

| Industry | Type of chemical | Associated chemicals |
|-------------------------------|---|--|
| Chemicals manufacture and use | Acid/alkali | Mercury (chlor/alkali), sulfuric, hydrochloric and nitric acids, sodium and calcium hydroxides |
| | Adhesives/resins | Polyvinyl acetate, phenols, formaldehyde, acrylates, phthalates |
| | Dyes | Chromium, titanium, cobalt, sulfur and nitrogen organic compounds, sulfates, solvents |
| | Explosives | Acetone, nitric acid, ammonium nitrate, pentachlorophenol, ammonia, sulfuric acid, nitroglycerine, calcium cyanamide, lead, ethylene glycol, methanol, copper, aluminium, bis(2-ethylhexyl) adipate, dibutyl phthalate, sodium hydroxide, mercury, silver |
| | Fertilizer | Calcium phosphate, calcium sulfate, nitrates, ammonium sulfate, carbonates, potassium, copper, magnesium, molybdenum, boron, cadmium |
| | Flocculants | Aluminium |
| | Foam production | Urethane, formaldehyde, styrene |
| | Fungicides | Carbamates, copper sulfate, copper chloride, sulfur, chromium, zinc |
| | Herbicides | Ammonium thiocyanate, carbamates, organochlorines, organophosphates, arsenic, mercury, triazines |
| | Paints | |
| | Heavy metals | Arsenic, barium, cadmium, chromium, cobalt, lead, manganese, mercury, selenium, zinc |
| | Solvents | Titanium |
| | Pesticides | Toluene oils natural (e.g. pine oil) or synthetic |
| | Active ingredients | Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulfur, synthetic pyrethroids |
| | Solvents | Xylene, kerosene, methyl isobutyl ketone, amyl acetate, chlorinated solvents |
| | Pharmaceutical | |
| | Solvents | Acetone, cyclohexane, methylene chloride, ethyl acetate, butyl acetate, methanol, ethanol, isopropanol, butanol, pyridine methyl ethyl ketone, methyl isobutyl ketone, tetrahydrofuran |
| | Photography | Hydroquinone, sodium carbonate, sodium sulfite, potassium bromide, monomethyl para-aminophenol sulfate, ferricyanide, chromium, silver, thiocyanate, ammonium compounds, sulfur compounds, phosphate, phenylene diamine, ethyl alcohol, thiosulfates, formaldehyde |
| | Plastics | Sulfates, carbonates, cadmium, solvents, acrylates, phthalates, styrene |
| | Rubber | Carbon black |
| Soap/detergent | | |
| General | Potassium compounds, phosphates, ammonia, alcohols, esters, sodium hydroxide, surfactants (sodium lauryl sulfate), silicate compounds | |
| Acids | Sulfuric acid and stearic acid | |
| Oils | Palm, coconut, pine, teatree | |
| Solvents | | |
| General | Ammonia | |
| Hydrocarbons | e.g. BTEX (benzene, toluene, ethylbenzene, xylene) | |
| Chlorinated organics | e.g., trichloroethane, carbon tetrachloride, methylene chloride | |

(continued)

TABLE 11 (continued)

| Industry | Type of chemical | Associated chemicals |
|----------------------------------|---|--|
| Defence works | | See explosives under chemicals manufacture and use, foundries, engine works, service stations |
| Drum reconditioning | | See chemicals manufacture and use |
| Dry cleaning | | Trichloroethylene and 1, 1, 1 - trichloroethane Carbon tetrachloride Perchloroethylene |
| Electrical | | PCBs (transformers and capacitors), solvents, tin, lead, copper, mercury |
| Engine works | Hydrocarbons Metals Solvents Acids/alkalis Refrigerants Antifreeze | Chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons Ethylene glycol, nitrates, phosphates, silicates |
| Foundries | Metals Acids | Particularly aluminium, manganese, iron, copper, nickel, chromium zinc, cadmium and lead and oxides, chlorides, fluorides and sulfates of these metals Sulfuric and phosphoric Phenolics and amines Coke/graphite dust |
| Gas works | Inorganics Organics | Ammonia, cyanide, nitrate, sulfide, thiocyanate Aluminium, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium, zinc BTEX, phenolics, PAHs and coke |
| Iron and steel works | | BTEX, phenolics, PAHs, Metals and oxides of iron, nickel, copper, chromium, magnesium manganese and graphite |
| Landfill sites | | Alkanes and ammonia, sulfides, heavy metals, organic acids |
| Marinas | Antifouling paints | See engine works, electroplating metals under metal treatments Copper, tributyltin (TBT) |
| Metal treatments | Electroplating Metals Acids General Liquid carburizing baths | Nickel, chromium, zinc, aluminium, copper, lead, cadmium, tin Sulfuric, hydrochloric, nitric, phosphoric Sodium hydroxide, 1,1,1-trichloroethane, tetrachloroethylene, toluene, ethylene glycol, cyanide compounds Sodium, cyanide, barium, chloride, potassium chloride, sodium chloride, sodium carbonate, sodium cyanate |
| Mining and extractive industries | | Arsenic, mercury and cyanides and also refer to explosives. Aluminium, arsenic, copper, chromium, cobalt, lead, manganese, nickel, selenium, zinc and radio-radionuclides. The list of heavy metals should be decided according to the composition of the deposit and known impurities |

(continued)

TABLE II (continued)

| Industry | Type of chemical | Associated chemicals |
|--|-------------------|---|
| Power stations | | Asbestos, PCBs, fly ash metals, water treatment chemicals |
| Printing shops | | Acids, alkalis, solvents, chromium (see photography) |
| Railway yards | | Hydrocarbons, arsenic, phenolics (creosote), heavy metals, nitrates and ammonia |
| Scrap yards | | Hydrocarbons, metals, solvents |
| Service stations and fuel storage facilities | | Aliphatic hydrocarbons BTEX (i.e., benzene, toluene, ethylbenzene, xylene) PAHs Phenols Lead |
| Sheep and cattle dips | | Arsenic, organochlorines and organophosphates, carbamates, and synthetic pyrethroids |
| Smelting and refining | | Metals and the fluorides, chlorides and oxides of copper, tin, silver, gold, selenium, lead, aluminium |
| Tanning and associated trades | Metals General | Chromium, manganese, aluminium Ammonium sulfate, ammonia, ammonium nitrate, arsenic phenolics, formaldehyde, sulfide, tannic acid |
| Water and sewerage treatment plant | Metals | Aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, fluoride, lime and zinc |
| Wood preservation | Metals General | Chromium, copper, arsenic Naphthalene, ammonia, pentachlorophenol, dibenzofuran, anthracene, biphenyl, ammonium sulfate, quinoline, boron, creosote, organochlorine pesticides |

Appendix D
Sampling and Testing Schedule

Locations and Testing Parameters of Soil Sampling for Phase I under Post-Stage I Site Investigation

| Sample ID | Lead | Chromium | Copper | BTEX | TPH | PAHs | Full List of VOCs | Full List of SVOCs |
|-----------|------|----------|--------|------|-----|------|-------------------|--------------------|
| HUH-1a | ✓ | | | ✓ | ✓ | ✓ | | |
| HUH-2a | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-3a | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-4a | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-5a | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-6a | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-7a | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| HUH-8a | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| RWT-1a | ✓ | | | ✓ | ✓ | ✓ | | |
| RWT-2a | ✓ | | | ✓ | ✓ | ✓ | | |
| RWT-3a | ✓ | | | ✓ | ✓ | ✓ | | |
| RWT-4a | ✓ | | | ✓ | ✓ | ✓ | | |
| RWT-5a | ✓ | | | ✓ | ✓ | ✓ | | |

Locations and Testing Parameters of Groundwater Sampling for Phase I under Post-Stage I Site Investigation

| Sample ID | BTEX | TPH | PAHs | Full List of VOCs | Full List of SVOCs |
|-----------|------|-----|------|-------------------|--------------------|
| HUH-1a | ✓ | ✓ | ✓ | | |
| HUH-2a | | ✓ | | ✓ | ✓ |
| HUH-3a | | ✓ | | ✓ | ✓ |
| HUH-4a | | ✓ | | ✓ | ✓ |
| HUH-5a | | ✓ | | ✓ | ✓ |
| HUH-6a | | ✓ | | ✓ | ✓ |
| HUH-7a | | ✓ | | ✓ | ✓ |
| HUH-8a | | ✓ | | ✓ | ✓ |
| RWT-1a | ✓ | ✓ | ✓ | | |
| RWT-2a | ✓ | ✓ | ✓ | | |
| RWT-3a | ✓ | ✓ | ✓ | | |
| RWT-4a | ✓ | ✓ | ✓ | | |
| RWT-5a | ✓ | ✓ | ✓ | | |

Appendix E
Typical Design of the Groundwater Monitoring Well

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1. INTRODUCTION

Project Background

- 1.1 A Contamination Assessment Plan (CAP) for Shatin to Central Link (SCL) – Mong Kok East to Hung Hom Section [SCL (MKK-HUH)] had been prepared and was approved by the Environmental Protection Department (EPD) under the EIA Study Brief (ESB) No. ESB-192/2008 on 8 October 2009 (the “approved CAP”). Due to site constraints/current land use, the site investigation (SI) for potentially contaminated areas was proposed to be divided into two stages, namely Stage 1 and Stage 2. Stage 2 SI was planned to be carried out after decommissioning of facilities and prior to commencement of construction works at relevant sites.
- 1.2 Subsequent to the approval of the abovementioned CAP, part of the Stage 2 SI at sites within MTR property was proposed to be advanced before the decommissioning stage as “Post-Stage 1 SI” by relocation of the sampling locations so as to overcome the site constraints. A subsequent Supplementary CAP (the “approved Supplementary CAP”) was submitted and approved on 11 March 2010 for these land lots/ facilities, together with an additional works area at Mong Kok Freight Terminal.
- 1.3 Another change subsequent to the approval of the above-mentioned CAPs involved minor shift of the Project alignment at the section from Portal 1A to Chatham Road Interchange (CRI). The SI plan for one of the Assessment Areas (i.e. Area 1) in the approved CAP is slightly modified to accommodate the alignment and works changes. A Supplementary CAP for Works Area in Area 1 (the “approved Supplementary CAP for Area 1”) for the shifted alignment was submitted to EPD on 7 October 2010 and it was approved on 23 November 2010. Proposed sampling works for the shifted alignment together with the remaining sampling locations required for Stage 2 SI under the approved CAP were carried out accordingly, known as Stage 2 SI.
- 1.4 The latest project layout is shown in **Figure No. NEX2213/C/361/ENS/M50/501**.
- 1.5 The ESB requires a land contamination assessment to be carried out, including the submission of a CAP, Contamination Assessment Report (CAR) and, if land contamination is confirmed, a Remediation Action Plan (RAP) to the Director of Environmental Protection (DEP) for endorsement.
- 1.6 Land contamination impact is required to be addressed in the EIA study in accordance with *Clause 3.4.5 of the ESB*. The Site Investigation (SI) works were conducted by the following parties:
- Stage 1 Gammon Construction Limited
 - Post-Stage 1 Geotechnics & Concrete Engg. (H.K.) Ltd.
 - Stage 2 Driltech Ground Engineering Ltd.
- 1.7 SI included rotary drilling of boreholes, logging of ground materials, groundwater sampling and reinstatement of excavations. All laboratory analyses were carried out by ALS Technician (HK) Pty Limited (ALS) and the results were tabulated for preparation of this CAR. AECOM [rebranding the former “ENSR Asia (HK) Limited”] collated the information obtained and prepared this CAR.

Objectives

- 1.8 This CAR is prepared to fulfil the requirements of *Clauses 3.4.5.5 of the ESB* and aims to present the findings and to assess the nature, level and extent of contamination.

2. CONTAMINATION ASSESSMENT REPORT

Introduction

- 2.1 Details of the sampling rationale for sites under Stage 1, Post-Stage 1 and Stage 2 SI have been documented in the approved CAP, approved Supplementary CAP and approved Supplementary CAP for Area 1. For easy reference, an extract of the sampling schedule for all SI sites is provided in **Appendix A**. This CAR presents findings on SI works including fieldworks, laboratory analyses and the assessment of the nature, level and extent of contamination.

Progress of Site Investigation Works

- 2.2 As described in Sections 1.7 and 1.8, the Stage 1, Post-Stage 1 and Stage 2 SI have been completed in accordance to the relevant CAPs. The as-built sampling locations are shown in **Figure Nos. NEX2213/C/361/ENS/M57/507** through **NEX2213/C/361/ENS/M57/510**. Summary of the SI works is summarised in **Table 2.1** below.

Table 2.1 Summary of Site Investigation Works

| Site ID (Description) | Sampling Locations | Stage of SI | Actual Coordinates | |
|--|--------------------|--------------|--------------------|-----------|
| | | | Easting | Northing |
| Area 1 | | | | |
| 1-10 (Demolished paint storage) Figure No. NEX2213/C/361/ENS/M57/507 | 2209/SCL/EDH249(P) | Stage 1 | 836785.58 | 818603.26 |
| 1-18 (Emergency generator room and the associated fuel tank room at STA Building) Figure No. NEX2213/C/361/ENS/M57/507 | 2209/SCL/ETT103 | Stage 1 | 836786.86 | 818601.59 |
| 1-22 (MTR railway operations (Historic railway maintenance facility area)) Figure No. NEX2213/C/361/ENS/M57/507 | 11203/SCL/EB118 | Stage 2 | 836699.64 | 818714.86 |
| | 11203/SCL/EB119 | | 836762.46 | 818714.41 |
| | 11203/SCL/EB120 | | 836754.58 | 818763.39 |
| | 11203/SCL/EB121 | | 836720.38 | 818757.59 |
| | 11203/SCL/EB122 | | 836678.71 | 818798.80 |
| | 11203/SCL/EB123 | | 836639.40 | 818786.76 |
| Area 2 | | | | |
| 2-02 (Locomotive traverser) Figure No. NEX2213/C/361/ENS/M57/509 | 11202/SCL/EDH136 | Post-Stage 1 | 836778.96 | 817985.86 |

| Site ID (Description) | Sampling Locations | Stage of SI | Actual Coordinates | |
|---|---|--------------|--------------------|-----------|
| | | | Easting | Northing |
| 2-04 (Locomotive running shed) Figure No. NEX2213/C/361/ENS/M57/508 (The seven boreholes are shared among Sites 2-04, 2-06 and 2-07) | 11202/SCL/EDH138 | Post-Stage 1 | 836867.98 | 818332.14 |
| | 11202/SCL/EDH139 | | 836869.68 | 818340.35 |
| | 11202/SCL/EDH140 | | 836844.75 | 818408.40 |
| | 11202/SCL/EDH141 | | 836855.61 | 818420.81 |
| | 11202/SCL/EDH142 | | 836888.11 | 818350.03 |
| | 11202/SCL/EDH143 | | 836888.58 | 818328.63 |
| | 11202/SCL/EDH144 | | 836872.78 | 818319.26 |
| | 11203/SCL/EB146 (New sampling location near 11202/SCL/EDH142 due to uncompleted SI) | Stage 2 | 836896.61 | 818348.41 |
| 2-05 (USTs near the locomotive running shed) Figure No. NEX2213/C/361/ENS/M57/508 | 2209/SCL/ETT165 | Stage 1 | 836883.32 | 818399.37 |
| | 11203/SCL/EB140 | Stage 2 | 836884.25 | 818397.89 |
| | 11203/SCL/EB141 | | 836901.58 | 818384.08 |
| 2-06 (Aboveground lubricating oil storage tank near the locomotive running shed) Figure No. NEX2213/C/361/ENS/M57/508 | 2209/SCL/ETT102 | Stage 1 | 836867.21 | 818395.13 |
| | Refer to Site 2-04 for the description of the seven boreholes shared among Sites 2-04, 2-06 and 2-07. | | | |
| 2-07 (Dispenser west and north of the locomotive running shed) Figure No. NEX2213/C/361/ENS/M57/508 | 2209/SCL/EDH244 | Stage 1 | 836851.31 | 818388.31 |
| | Refer to Site 2-04 for the description of the seven boreholes shared among Sites 2-04, 2-06 and 2-07. | | | |
| 2-08 (Railway tracks) Figure No. NEX2213/C/361/ENS/M57/510 | 11202/SCL/ETP027 | Post-Stage 1 | 836839.45 | 818354.63 |
| | 11202/SCL/ETP012 | | 836803.07 | 818182.61 |
| | 11202/SCL/ETP042 | | 836810.98 | 818006.38 |
| | 11202/SCL/ETP043 | | 836805.41 | 818091.11 |
| | 11202/SCL/ETP044 | | 836838.91 | 818277.13 |

| Site ID (Description) | Sampling Locations | Stage of SI | Actual Coordinates | |
|--|--|-------------|--------------------|-----------|
| | | | Easting | Northing |
| 2-09 (D.G. storage containers near the Southern Warehouse) Figure No. NEX2213/C/361/ENS/M57/509 | 2209/SCL/EDH231 | Stage 1 | 836810.43 | 817977.08 |
| Area 3 | | | | |
| L17 (International Mail Centre) Figure No. NEX2213/C/361/ENS/M57/509 | 2209/SCL/ETT106 (Emergency generator and associated fuel tank) | Stage 1 | 836710.06 | 817916.85 |
| | 2209/SCL/ETT068 (D.G. store) | Stage 1 | 836732.49 | 817957.03 |
| | 2209/SCL/EDH256 (Car park, previous open storage) | Stage 1 | 836711.21 | 817926.48 |
| | 2209/SCL/EDH257(P) (Car park, previous open storage) | Stage 1 | 836737.00 | 817918.06 |
| 3-02 (Container stacker refuelling and maintenance area at Hung Hom Freight Yard) Figure No. NEX2213/C/361/ENS/M57/509 | 2209/SCL/EDH229 (P) | Stage 1 | 836788.17 | 817875.41 |
| | 2209/SCL/EDH124 (P) | | 836810.60 | 817937.70 |
| Area 4 | | | | |
| 4-04 [Waste diesel storage area at the site office of Drainage Services Department (DSD)] | According to the latest design, no works will be carried out at Area 4. No SI will, therefore, be carried out. | | | |

Assessment Methodology

Soil Boring and Sampling

- 2.3 The Stage 1 SI works were carried out from March 2008 to July 2009. A total of seven boreholes and five trial pits were constructed at the assessment areas.
- 2.4 The Post-Stage 1 SI works were carried out from March to July 2010. A total of eight boreholes and five trial pits were constructed.
- 2.5 The Stage 2 SI works were carried out from October to December 2010. A total of nine boreholes were constructed.

- 2.6 In general, soil samples were collected at depths of 0.5 m, 1.5 m, and 3.0 m below ground surface (bgs) for trial pits, and at 3 m intervals thereafter to the bottom of excavation or until bedrock was encountered for boreholes. Soil samples that could not be collected at the depths proposed in the approved CAPs and any changes in sampling locations are summarised in **Table 2.2**.
- 2.7 Before excavation and/or drilling, the sampling tools and all equipment in contact with the ground were thoroughly decontaminated prior to use at each sampling location by laboratory-grade detergent and steam-cleaning/high-pressure hot water jet.
- 2.8 Soil samples were properly labelled and stored in cool boxes at approximately 4°C until delivered to the analytical laboratory. All the collected soil samples were analysed by ALS in accordance with the analysis schedules as detailed in the relevant CAPs.

Table 2.2 Changes of SI Sampling Plan Due to Site Constraints

| Sampling Locations (Stage of SI) | Sampling Depth (m bgs) | Changes Made | Justifications and Precautionary Measures |
|-------------------------------------|---|------------------------------------|---|
| 2209/SCL/ETT103 | 0.5, 1.5, 3.0 | Sampling location slightly shifted | Relocated due to the site constraints (original sampling location close to a road with busy traffic). Visual inspection for the signs of contamination should be carried out during excavation works in proximity to this sampling location. If signs of land contamination are found during the visual inspection, further sampling and testing, and remediation (if contamination found) should be carried out. |
| 11202/SCL/EDH138 | 0.5, 1.5, 3.0 and every 3 m interval until 24.0 | Sampling location slightly shifted | Slightly shifted to suit the workshop in operation at the locomotive running shed. |
| 11202/SCL/EDH139 | 0.5, 1.5, 3.0 and every 3 m interval until 36.0 | Sampling location slightly shifted | Slightly shifted to suit the workshop in operation at the locomotive running shed. |
| 11202/SCL/EDH140 | 0.5, 1.5, 3.0 and every 3 m interval until 36.0 | Sampling location slightly shifted | Slightly shifted to suit the operations at the locomotive running shed. |
| 11202/SCL/EDH141 | 0.5, 1.5, 3.0 and every 3 m interval until 42.0 | Sampling location slightly shifted | Slightly shifted to suit the operations at the locomotive running shed. |
| 11202/SCL/EDH142 | 0.5, 1.5, and 3.0 | Borehole converted to a trial pit | Could not be drilled to the proposed depth since obstruction was encountered at 3.13 m bgs. Another inspection pit was excavated at a nearby possible location but an obstruction (presumed to be a concrete slab) was encountered at 2.8 bgs. Other potential sampling locations are constrained by limited working space. Further sampling have been conducted during Stage 2 SI at 11203/SCL/EB146. |

| Sampling Locations (Stage of SI) | Sampling Depth (m bgs) | Changes Made | Justifications and Precautionary Measures |
|-------------------------------------|---|---|--|
| 2209/SCL/ ETT165 | 0.5, 1.5, 3.0 | Borehole converted to a trial pit and renamed | A box culvert was encountered during the construction of the inspection pit; sampling from a trial pit was conducted during Stage 1 SI. Visual inspection for the signs of contamination should be carried out during excavation works in proximity to this sampling location. If signs of land contamination are found during the visual inspection, further sampling and testing, and remediation (if contamination found) should be carried out. |
| 2209/SCL/EDH231 | 0.5, 1.5, 3.0 and every 3 m interval until 15.0 | Sampling location slightly shifted | Slightly relocated to adjust to the site conditions (currently operated as a freight yard and area for traffic). |
| 2209/SCL/EDH256 | 0.5, 1.5, 3.0 and every 3 m interval until 12.0 | Sampling location relocated to the nearby area in the open car park | Slightly relocated due to site constraints (currently operating as an open car park of the International Mail Centre) This location was previously proposed in the CAP to assess potential land contamination due to its historic operations as an open storage with unknown purposes. The relocated sampling location does not compromise the original objective. |
| 2209/SCL/EDH257 (P) | 0.5, 1.5, 3.0 and every 3 m interval until 12.0 | Sampling location relocated to the nearby area in the open car park | Slightly relocated due to site constraints (currently operated as an open car park of the International Mail Centre). This location was previously proposed in the CAP to assess potential land contamination due to its historic operations as an open storage with unknown purposes. The relocated sampling location does not compromise the original objective. |
| 2209/SCL/EDH229 (P) | 0.5, 1.5, 3.0 and every 3 m interval until 12.0 | Sampling location slightly shifted and renamed | Slightly relocated to adjust to the site conditions (currently operated as a freight yard and area for traffic). |
| 11203/SCL/EB118 | 0.5, 1.5 and 3.0 | Borehole to 3m by hand held tool | The proposed Temporary Traffic Management Plan for drilling rig mobilisation was rejected by the RMO and therefore only hand held tools can be deployed for this location. Visual inspection for the signs of contamination should be carried out during excavation works in proximity to this sampling location. If signs of land contamination are found during the visual inspection, further sampling and testing, and remediation (if contamination found) should be carried out. |

| Sampling Locations (Stage of SI) | Sampling Depth (m bgs) | Changes Made | Justifications and Precautionary Measures |
|-------------------------------------|--|----------------------------------|--|
| 11203/SCL/EB119 | 0.5, 1.5, 3.0 and every 3 m interval until 6.0 | Borehole to 6.5m | The existing Water Services Department watermain were encountered during the drilling. Visual inspection for the signs of contamination should be carried out during excavation works in proximity to this sampling location. If signs of land contamination are found during the visual inspection, further sampling and testing, and remediation (if contamination found) should be carried out. |
| 11203/SCL/EB121 | 0.5, 1.5 and 3.0 | Borehole to 3m by hand held tool | Existing utilities were encountered during the construction of inspection pit. Visual inspection for the signs of contamination should be carried out during excavation works in proximity to this sampling location. If signs of land contamination are found during the visual inspection, further sampling and testing, and remediation (if contamination found) should be carried out. |

Strata Logging

- 2.9 Strata logging for boreholes was undertaken during the course of drilling and sampling by qualified geologists. The logs included general stratigraphic descriptions, depth of soil sampling, sample notation and level of groundwater (if encountered). The presence of rocks/boulders/cobbles and foreign materials such as metals, wood and plastics was also recorded.

Groundwater Sampling

- 2.10 After completion of soil sampling, groundwater samples, if encountered, were collected. All groundwater samples were analysed in accordance with the analysis schedules detailed in the relevant CAPs and reproduced in **Appendix A**.

Assessment Criteria

Criteria for Soil and Groundwater Contamination

- 2.11 The assessment methodology is adopted in accordance with the *Guidance Note for Contaminated Land Assessment and Remediation* (Guidance Note 1), *Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management* (Guidance Manual) and *Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops* (Guidance Note 2) issued by the EPD.
- 2.12 Interpretation of results has made reference to those Risk-Based Remediation Goals (RBRGs) presented in Tables 2.3 and 2.4 as stipulated in the Guidance Manual.
- 2.13 The new RBRGs were developed based on a risk assessment approach to suit the local environmental conditions and community needs in Hong Kong. Decisions on contaminated soil and groundwater remediation are based on the nature and extent of the potential risks that are posed to human receptors as a result of exposure to chemicals in the soil and/or groundwater. RBRGs are

developed for four different land use scenarios reflecting the typical physical settings in Hong Kong under which people could be exposed to contaminated soil and groundwater. A description of each land use scenario is as follows:

- Urban residential – Sites located in an urban area where main activities involve habitation by individuals. The typical physical setting is a high rise residential building situated in a housing estate that has amenity facilities such as landscaped yards and children’s playgrounds. The receptors are residents who stay indoors most of the time except for a short period each day, during which they are outdoors and have the chance of being in direct contact with soil at landscaping or play areas within the estate.
- Rural residential – Sites located in a rural area where the main activities involve habitation by individuals. These sites typically have village-type houses or low rise residential blocks surrounded by open space. The receptors are rural residents who stay at home and spend some time each day outdoors on activities such as gardening or light sports. The degree of contact with the soil under the rural setting is more than that under the urban setting both in terms of the intensity and frequency of contact.
- Industrial – Any site where activities involve manufacturing, chemical or petrochemical processing, storage of raw materials, transport operations, energy production or transmission, etc. Receptors include those at sites where part of the operation is carried out directly on land and the workers are more likely to be exposed to soil than those working in multi-storey factory buildings.
- Public parks – Receptors include individuals and families who frequent parks and play areas where there is contact with soil present in lawns, walkways, gardens and play areas. Parks are considered to be predominantly hard covered with limited areas of predominantly landscaped soil. Furthermore, public parks are not considered to have buildings present on them.

- 2.14 In addition to the RBRGs, screening criteria (soil saturation limits, C_{sat} , developed for Non-Aqueous Phase Liquid [NAPL] in soil and water solubility limits for organic chemicals in groundwater) for the more mobile organic chemicals must be considered to determine whether a site requires further action.
- 2.15 Since this Project involves the construction of a new railway, the Industrial RBRGs are adopted for this land contamination assessment.
- 2.16 Relevant soil and groundwater RBRGs for this land contamination assessment including C_{sat} and the Solubility Limits are selectively presented in **Table 2.3** below.

Table 2.3 Relevant RBRGs for Soil and Groundwater

| Chemical | Soil (mg/kg) | | Groundwater (µg/L) | |
|-------------------------|----------------------|------------------------|----------------------|-------------------|
| | RBRGs for Industrial | Soil Saturation Limits | RBRGs for Industrial | Solubility Limits |
| VOCs | | | | |
| Acetone | 10,000 | *** | 10,000,000 | *** |
| Benzene | 9.21 | 336 | 54,000 | 1,750,000 |
| Bromodichloromethane | 2.85 | 1,030 | 26,200 | 6,740,000 |
| 2-Butanone | 10,000 | *** | 10,000,000 | *** |
| Chloroform | 1.54 | 1,100 | 11,300 | 7,920,000 |
| Ethylbenzene | 8,240 | 138 | 10,000,000 | 169,000 |
| Methyl tert-Butyl Ether | 70.1 | 2,380 | 1,810,000 | *** |

| Chemical | Soil (mg/kg) | | Groundwater (µg/L) | |
|-----------------------------|----------------------|------------------------|----------------------|-------------------|
| | RBRGs for Industrial | Soil Saturation Limits | RBRGs for Industrial | Solubility Limits |
| Methylene Chloride | 13.9 | 921 | 224,000 | *** |
| Styrene | 10,000 | 497 | 10,000,000 | 310,000 |
| Tetrachloroethene | 0.777 | 97.1 | 2,950 | 200,000 |
| Toluene | 10,000 | 235 | 10,000,000 | 526,000 |
| Trichloroethene | 5.68 | 488 | 14,200 | 1,100,000 |
| Xylenes (Total) | 1,230 | 150 | 1,570,000 | 175,000 |
| SVOCs | | | | |
| Acenaphthene | 10,000 | 60.2 | 10,000,000 | 4,240 |
| Acenaphthylene | 10,000 | 19.8 | 10,000,000 | 3,930 |
| Anthracene | 10,000 | 2.56 | 10,000,000 | 43.4 |
| Benzo(a)anthracene | 91.8 | NA | NA | NA |
| Benzo(a)pyrene | 9.18 | NA | NA | NA |
| Benzo(b)fluoranthene | 17.8 | NA | 7,530 | 1.5 |
| Benzo(g,h,i)perylene | 10,000 | NA | NA | NA |
| Benzo(k)fluoranthene | 918 | NA | NA | NA |
| bis-(2-Ethylhexyl)phthalate | 91.8 | NA | NA | NA |
| Chrysene | 1,140 | NA | 812,000 | 1.6 |
| Dibenzo(a,h)anthracene | 9.18 | NA | NA | NA |
| Fluoranthene | 10,000 | NA | 10,000,000 | 206 |
| Fluorene | 10,000 | 54.7 | 10,000,000 | 1,980 |
| Hexachlorobenzene | 0.582 | NA | 695 | 6,200 |
| Indeno(1,2,3-cd)pyrene | 91.8 | NA | NA | NA |
| Naphthalene | 453 | 125 | 862,000 | 31,000 |
| Phenanthrene | 10,000 | 28 | 10,000,000 | 1000 |
| Phenol | 10,000 | 7,260 | NA | NA |
| Pyrene | 10,000 | NA | 10,000,000 | 135 |
| Metals | | | | |
| Antimony | 261 | NA | NA | NA |
| Arsenic | 196 | NA | NA | NA |
| Barium | 10,000 | NA | NA | NA |
| Cadmium | 653 | NA | NA | NA |
| Chromium III | 10,000 | NA | NA | NA |
| Chromium VI | 1,960 | NA | NA | NA |
| Cobalt | 10,000 | NA | NA | NA |
| Copper | 10,000 | NA | NA | NA |

| Chemical | Soil (mg/kg) | | Groundwater (µg/L) | |
|---|----------------------|------------------------|----------------------|-------------------|
| | RBRGs for Industrial | Soil Saturation Limits | RBRGs for Industrial | Solubility Limits |
| Lead | 2,290 | NA | NA | NA |
| Manganese | 10,000 | NA | NA | NA |
| Mercury | 38.4 | NA | 6,790 | NA |
| Molybdenum | 3,260 | NA | NA | NA |
| Nickel | 10,000 | NA | NA | NA |
| Tin | 10,000 | NA | NA | NA |
| Zinc | 10,000 | NA | NA | NA |
| Petroleum Carbon Ranges | | | | |
| C6 - C8 | 10,000 | 1000 | 1,150,000 | 5,230 |
| C9 - C16 | 10,000 | 3000 | 9,980,000 | 2,800 |
| C17 - C35 | 10,000 | 5000 | 178,000 | 2,800 |
| PCB | | | | |
| PCB | 0.748 | NA | 5,110 | 31 |
| Other Inorganic Compound | | | | |
| Cyanide, Free | 10,000 | NA | NA | NA |
| Note: NA - Not Available *** indicates that the C _{sat} value/ solubility limit exceeds the 'ceiling limit' therefore the RBRGs applies | | | | |

Results and Interpretation

Field Records

- 2.17 Stage 1, Post-Stage 1 and Stage 2 SI works were undertaken in accordance with the sampling plan detailed in the relevant CAPs. Soil profile logs results are summarised in **Appendix B**.

Laboratory Analytical Results

- 2.18 A total of 231 soil samples (66 for Stage 1; 113 for Post-Stage 1; 52 for Stage 2) and 20 groundwater samples (6 for Stage 1; 8 for Post-Stage 1 SI; and 6 for Stage 2 SI) were collected for laboratory analyses. A summary table of laboratory testing results are presented in **Appendix C**. A summary of the laboratory testing results for Stage 1, Post-Stage 1 and Stage 2 SI are presented in **Table 2.4** below.

Table 2.4 Summary of Laboratory Testing Results

| Site ID (Description) | Sampling Locations | No. of Sample Tested | | Compliance to Industrial RBRGs |
|--|--------------------|----------------------|-------------|--|
| | | Soil | Groundwater | |
| Stage 1 | | | | |
| Area 1 | | | | |
| 1-18 (Emergency generator room and the associated fuel tank room) | 2209/SCL/ETT103 | 3 | 0 | All sample results indicated compliance |
| 1-10 (Open storage and previous paint storage area) | 2209/SCL/EDH249(P) | 10 | 1 | All sample results indicated compliance |
| Area 2 | | | | |
| 2-05 (USTs near the locomotive running shed) | 2209/SCL/ETT165 | 3 | 0 | All sample results indicated compliance |
| 2-06 (Aboveground storage tank of lubricating oil near the locomotive running shed) | 2209/SCL/ETT102 | 3 | 0 | All sample results indicated compliance. |
| 2-07 (Dispenser west and north of the locomotive running shed) | 2209/SCL/EDH244 | 11 | 1 | All sample results indicated compliance |
| 2-09 (D.G. storage containers near the Southern Warehouse) | 2209/SCL/EDH231 | 7 | 1 | All sample results indicated compliance |
| L17* (International Mail Centre) | 2209/SCL/ETT106 | 3 | 0 | All sample results indicated compliance |
| | 2209/SCL/ETT068 | 3 | 0 | All sample results indicated compliance |
| | 2209/SCL/EDH256 | 6 | 1 | All sample results indicated compliance |
| | 2209/SCL/EDH257(P) | 6 | 1 | All sample results indicated compliance |
| Area 3 | | | | |
| 3-02 (Container stacker refuelling and maintenance area at Hung Hom Freight Yard) | 2209/SCL/EDH229(P) | 6 | 1 | All sample results indicated compliance |
| | 2209/SCL/EDH124(P) | 5 | 0 | All sample results indicated compliance |
| Post-Stage 1 | | | | |
| Area 2 | | | | |

| Site ID (Description) | Sampling Locations | No. of Sample Tested | | Compliance to Industrial RBRGs |
|---|--------------------|----------------------|-------------|---|
| | | Soil | Groundwater | |
| 2-02 (Locomotive traverse) | 11202/SCL/EDH136 | 7 | 1 | All sample results indicated compliance |
| 2-04, 2-06, and 2-07 (Locomotive running shed and associated facilities) | 11202/SCL/EDH138 | 10 | 1 | All sample results indicated compliance |
| | 11202/SCL/EDH139 | 14 | 1 | All sample results indicated compliance |
| | 11202/SCL/EDH140 | 14 | 1 | All sample results indicated compliance |
| | 11202/SCL/EDH141 | 16 | 1 | All sample results indicated compliance |
| | 11202/SCL/EDH142 | 3 | 0 | All sample results indicated compliance |
| | 11202/SCL/EDH143 | 13 | 1 | All sample results indicated compliance |
| | 11202/SCL/EDH144 | 13 | 1 | All sample results indicated compliance |
| 2-08 (Railway tracks) | 11202/SCL/ETP027 | 3 | 0 | All sample results indicated compliance |
| | 11202/SCL/ETP012 | 11 | 1 | All sample results indicated compliance |
| | 11202/SCL/ETP042 | 3 | 0 | All sample results indicated compliance |
| | 11202/SCL/ETP043 | 3 | 0 | All sample results indicated compliance |
| | 11202/SCL/ETP044 | 3 | 0 | All sample results indicated compliance |
| Stage 2 | | | | |
| Area 1 | | | | |
| 1-22 (MTR railway operations (Historic railway maintenance facility area)) | 11203/SCL/EB118 | 3 | 0 | All sample results indicated compliance |
| | 11203/SCL/EB119 | 4 | 0 | All sample results indicated compliance |
| | 11203/SCL/EB120 | 9 | 1 | All sample results indicated compliance |
| | 11203/SCL/EB121 | 3 | 0 | All sample results indicated compliance |
| | 11203/SCL/EB122 | 7 | 1 | All sample results indicated compliance |
| | 11203/SCL/EB123 | 11 | 1 | All sample results indicated compliance |
| Area 2 | | | | |
| 2-04, 2-06 and 2-07 (Locomotive running shed and associated facilities) | 11203/SCL/EB146 | 5 | 1 | All sample results indicated compliance |

| Site ID (Description) | Sampling Locations | No. of Sample Tested | | Compliance to Industrial RBRGs |
|---|--------------------|----------------------|-------------|--|
| | | Soil | Groundwater | |
| 2-05 (USTs near the locomotive running shed) | 11203/SCL/EB140 | 5 | 1 | All sample results indicated compliance |
| | 11203/SCL/EB141 | 5 | 1 | All sample results indicated compliance |
| Total number of samples tested | | 231 | 20 | - |

*: Site investigation details on Site L17 (Extracted from *Section 12 Land Contamination Assessment of SCL – NEX/2206 EIA Study for Tai Wai to Hung Hom Section*) can be referred to in **Appendix D**.

- 2.19 The analytical results indicate that soil and groundwater concentrations of the Chemicals of Concern (COCs) analysed at all investigated sites in **Table 2.4** above did not exceed the adopted RBRG (industrial), saturation limits or solubility limits.

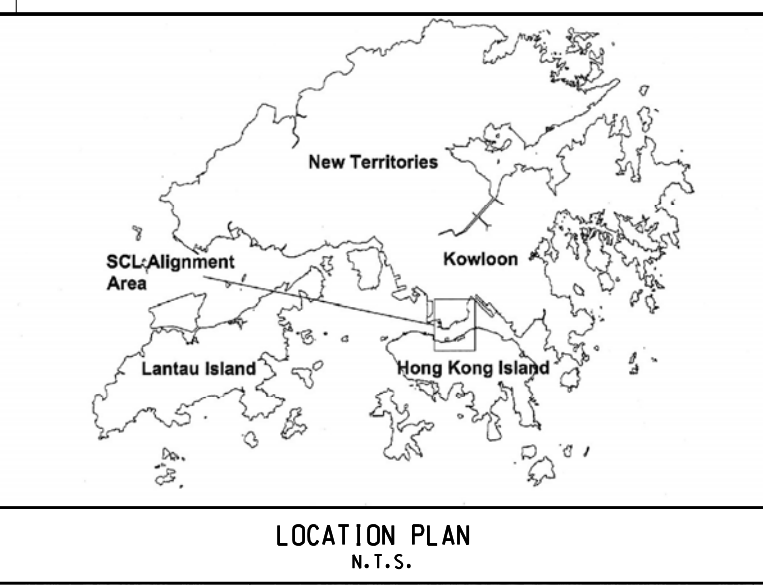
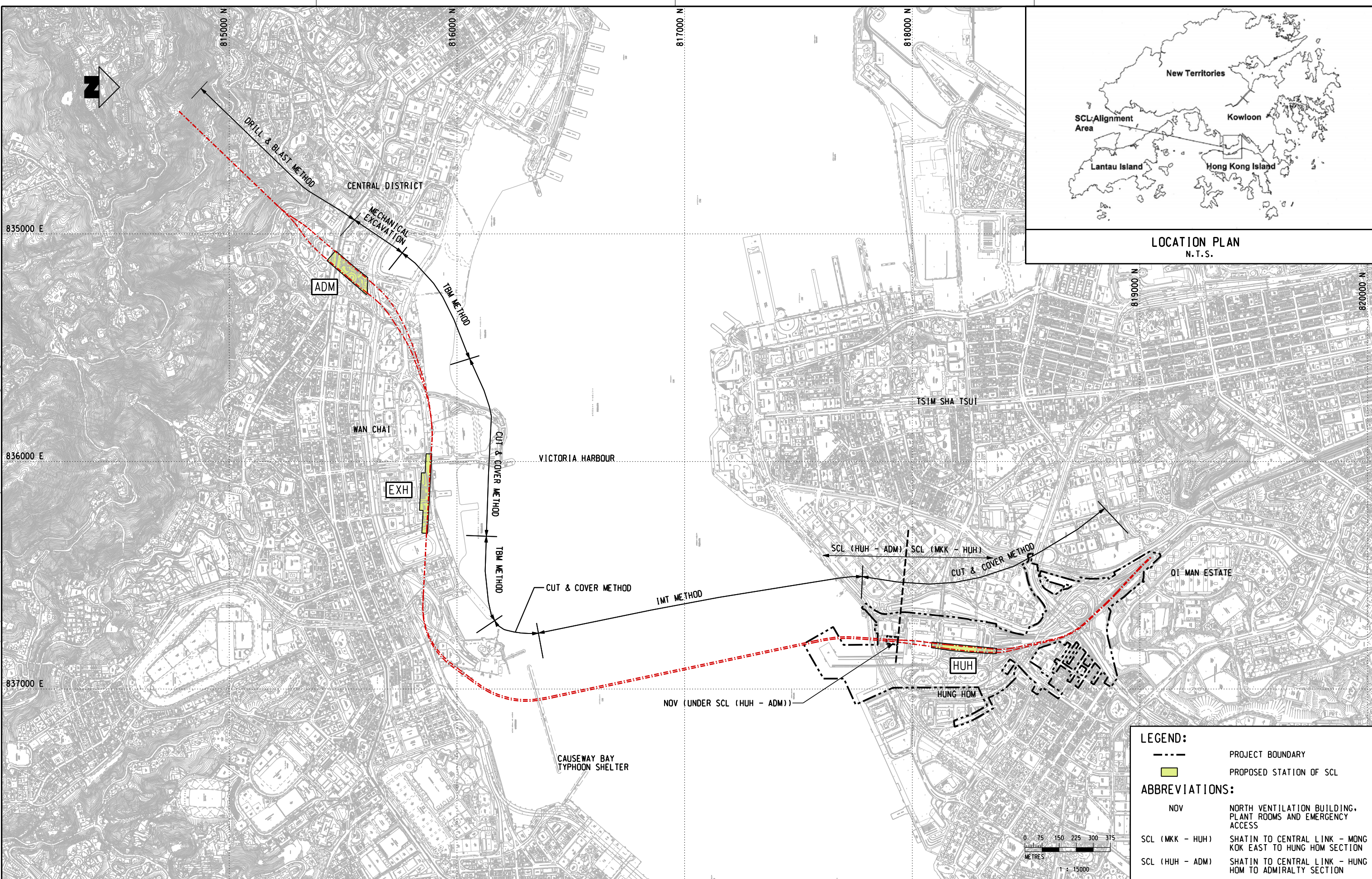
Conclusion and Recommendation

- 2.20 A total of 231 soil samples and 20 groundwater samples were collected at 34 locations identified as potentially contaminated sites. According to the analytical results, no exceedances of the adopted RBRGs (industrial) were found among any of the soil and groundwater samples analysed and as such remediation of soil or groundwater is not required at the investigated sites.

Figures

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 2011-1-4

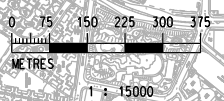


LEGEND:

- PROJECT BOUNDARY
- PROPOSED STATION OF SCL

ABBREVIATIONS:

- NOV NORTH VENTILATION BUILDING, PLANT ROOMS AND EMERGENCY ACCESS
- SCL (MCK - HUH) SHATIN TO CENTRAL LINK - MONG KOK EAST TO HUNG HOM SECTION
- SCL (HUH - ADM) SHATIN TO CENTRAL LINK - HUNG HOM TO ADMIRALTY SECTION



| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |

| | |
|----------|-------------|
| DRAWN | WDF |
| DESIGNED | --- |
| CHECKED | LCR |
| APPROVED | --- |
| DATE | 14/MAY/2009 |

MTR

SHATIN TO CENTRAL LINK

AECOM

CADD REF. NEX2213_C_361_ENS_M50_501A.dgn

TITLE

NEX/2213
EIA STUDY FOR SCL (MCK - HUH)
SCL OVERALL ALIGNMENT (WITH BOUNDARY OF SCL - MONG KOK EAST TO HUNG HOM SECTION)

SCALE 1 : 15000 (A3) FIGURE NO. NEX2213/C/361/ENS/M50/501 REV. A

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 PRINTED BY: MONTY
 DATE: 2011-12-09



| SITE ID | |
|---------|---|
| 1-10 | OPEN STORAGE |
| 1-18 | EMERGENCY GENERATOR AND FUEL TANK ROOM |
| 1-22 | HISTORICAL RAILWAY MAINTENANCE FACILITY |

| AS-BUILT COORDINATES FOR SAMPLING LOCATIONS | | |
|---|-----------|-----------|
| LOCATION ID | EASTING | NORTHING |
| 2209/SCL/EDH249(P) | 836785.58 | 818603.26 |
| 2209/SCL/ETT103 | 836786.86 | 818601.59 |
| 11203/SCL/EB118 | 836699.64 | 818714.86 |
| 11203/SCL/EB119 | 836762.46 | 818714.41 |
| 11203/SCL/EB120 | 836754.58 | 818763.39 |
| 11203/SCL/EB121 | 836720.38 | 818757.59 |
| 11203/SCL/EB122 | 836678.71 | 818798.80 |
| 11203/SCL/EB123 | 836639.40 | 818786.76 |

LEGEND:

- - - PROPOSED SCL ALIGNMENT
- PROJECT BOUNDARY
- TENTATIVE WORKS AREA UNDER SCL (MKK - HUH)
- TENTATIVE WORKS AREA UNDER SCL (MKK - HUH) WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AS-BUILT LOCATIONS FOR TRIAL PITS
- POTENTIALLY CONTAMINATED AREA
- + AS-BUILT LOCATIONS FOR BOREHOLES

ABBREVIATIONS:

- SCL SHATIN TO CENTRAL LINK
- SCL (MKK - HUH) SHATIN TO CENTRAL LINK - MONG KOK EAST TO HUNG HOM SECTION

| | | | | | | | | | | | | | | | | | | | | |
|--|--|-----|----------|-----|---------|-----|----------|-----|------|-------------|---------------------------------------|--|-------|--|-------|---------------|------------|---------------------------|------|---|
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 50%;">DRAWN</td><td>YJP</td></tr> <tr><td>DESIGNED</td><td>---</td></tr> <tr><td>CHECKED</td><td>LCR</td></tr> <tr><td>APPROVED</td><td>---</td></tr> <tr><td>DATE</td><td>02/NOV/2010</td></tr> </table> <p style="font-size: small;">DO NOT SCALE DRAWINGS. ALL DIMENSIONS SHALL BE VERIFIED ON SITE. © MTR CORPORATION LIMITED 2008. COPYRIGHT IN RESPECT OF THIS DRAWING / DOCUMENT IS OWNED BY THE MTR CORPORATION LIMITED OF HONG KONG. NO REPRODUCTION OF THE DRAWING / DOCUMENT OR ANY PART BY WHATEVER MEANS IS PERMITTED WITHOUT THE PRIOR WRITTEN CONSENT OF THE MTR CORPORATION LIMITED.</p> | DRAWN | YJP | DESIGNED | --- | CHECKED | LCR | APPROVED | --- | DATE | 02/NOV/2010 | SHATIN TO CENTRAL LINK | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">TITLE</td> <td>NEX/2213 EIA STUDY FOR SCL (MKK - HUH) POTENTIALLY CONTAMINATED SITES IDENTIFIED AND AS-BUILT SAMPLING LOCATIONS AT AREA 1</td> </tr> <tr> <td>SCALE</td> <td>1 : 2000 (A3)</td> </tr> <tr> <td>FIGURE NO.</td> <td>NEX2213/C/361/ENS/M57/507</td> </tr> <tr> <td>REV.</td> <td>A</td> </tr> </table> | TITLE | NEX/2213 EIA STUDY FOR SCL (MKK - HUH) POTENTIALLY CONTAMINATED SITES IDENTIFIED AND AS-BUILT SAMPLING LOCATIONS AT AREA 1 | SCALE | 1 : 2000 (A3) | FIGURE NO. | NEX2213/C/361/ENS/M57/507 | REV. | A |
| DRAWN | YJP | | | | | | | | | | | | | | | | | | | |
| DESIGNED | --- | | | | | | | | | | | | | | | | | | | |
| CHECKED | LCR | | | | | | | | | | | | | | | | | | | |
| APPROVED | --- | | | | | | | | | | | | | | | | | | | |
| DATE | 02/NOV/2010 | | | | | | | | | | | | | | | | | | | |
| TITLE | NEX/2213 EIA STUDY FOR SCL (MKK - HUH) POTENTIALLY CONTAMINATED SITES IDENTIFIED AND AS-BUILT SAMPLING LOCATIONS AT AREA 1 | | | | | | | | | | | | | | | | | | | |
| SCALE | 1 : 2000 (A3) | | | | | | | | | | | | | | | | | | | |
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AS-BUILT COORDINATES FOR SAMPLING LOCATIONS

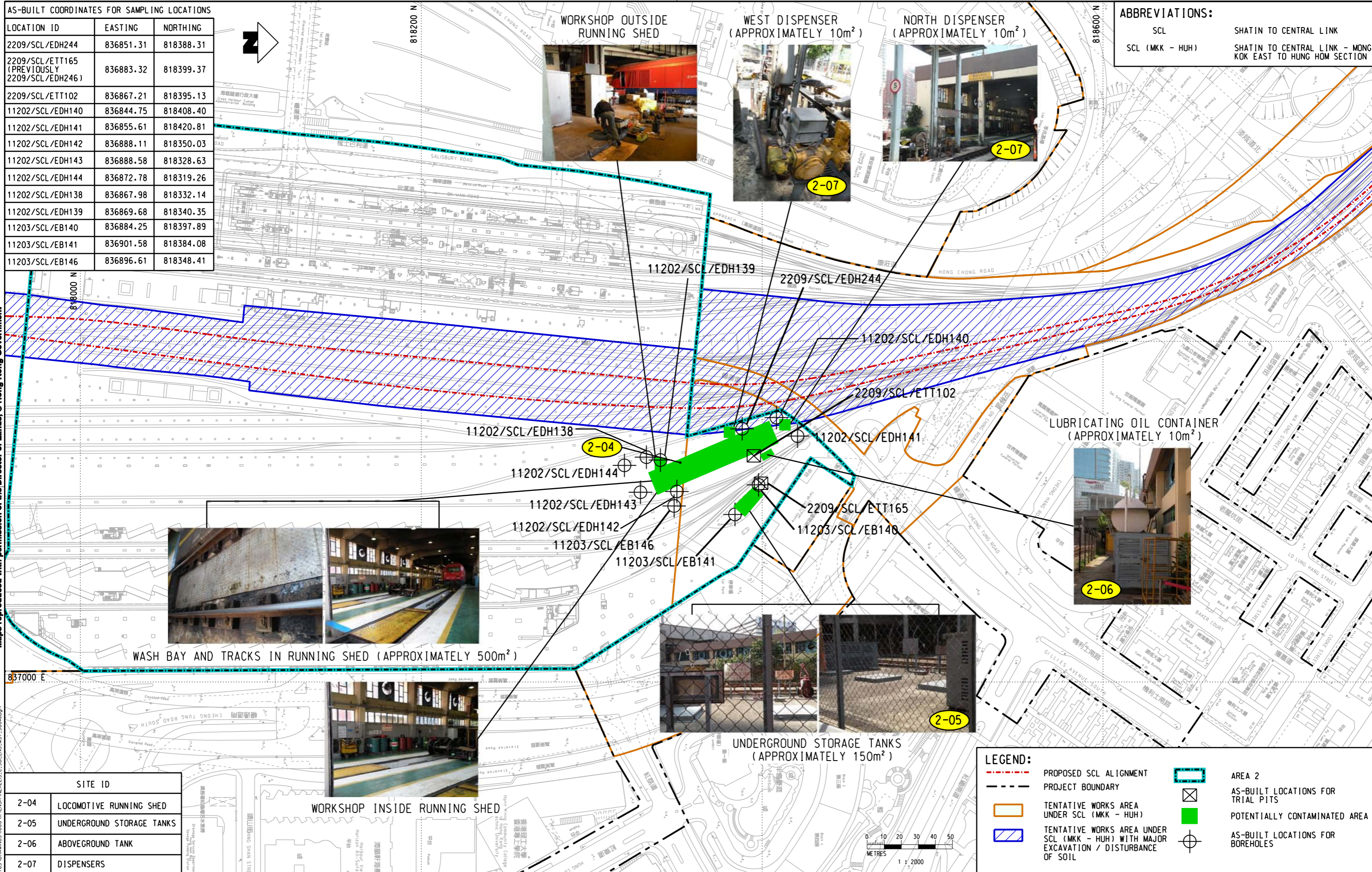
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|--|-----------|-----------|
| 2209/SCL/EDH244 | 836851.31 | 818388.31 |
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| 2209/SCL/ETT102 | 836867.21 | 818395.13 |
| 11202/SCL/EDH140 | 836844.75 | 818408.40 |
| 11202/SCL/EDH141 | 836855.61 | 818420.81 |
| 11202/SCL/EDH142 | 836888.11 | 818350.03 |
| 11202/SCL/EDH143 | 836888.58 | 818328.63 |
| 11202/SCL/EDH144 | 836872.78 | 818319.26 |
| 11202/SCL/EDH138 | 836867.98 | 818332.14 |
| 11202/SCL/EDH139 | 836869.68 | 818340.35 |
| 11203/SCL/EB140 | 836884.25 | 818397.89 |
| 11203/SCL/EB141 | 836901.58 | 818384.08 |
| 11203/SCL/EB146 | 836896.61 | 818348.41 |



ABBREVIATIONS:

| | |
|-----------------|--|
| SCL | SHATIN TO CENTRAL LINK |
| SCL (MCK - HUH) | SHATIN TO CENTRAL LINK - MONG KOK EAST TO HUNG HOM SECTION |

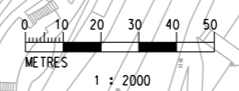
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| SITE ID | |
|---------|---------------------------|
| 2-04 | LOCOMOTIVE RUNNING SHED |
| 2-05 | UNDERGROUND STORAGE TANKS |
| 2-06 | ABOVEGROUND TANK |
| 2-07 | DISPENSERS |

LEGEND:

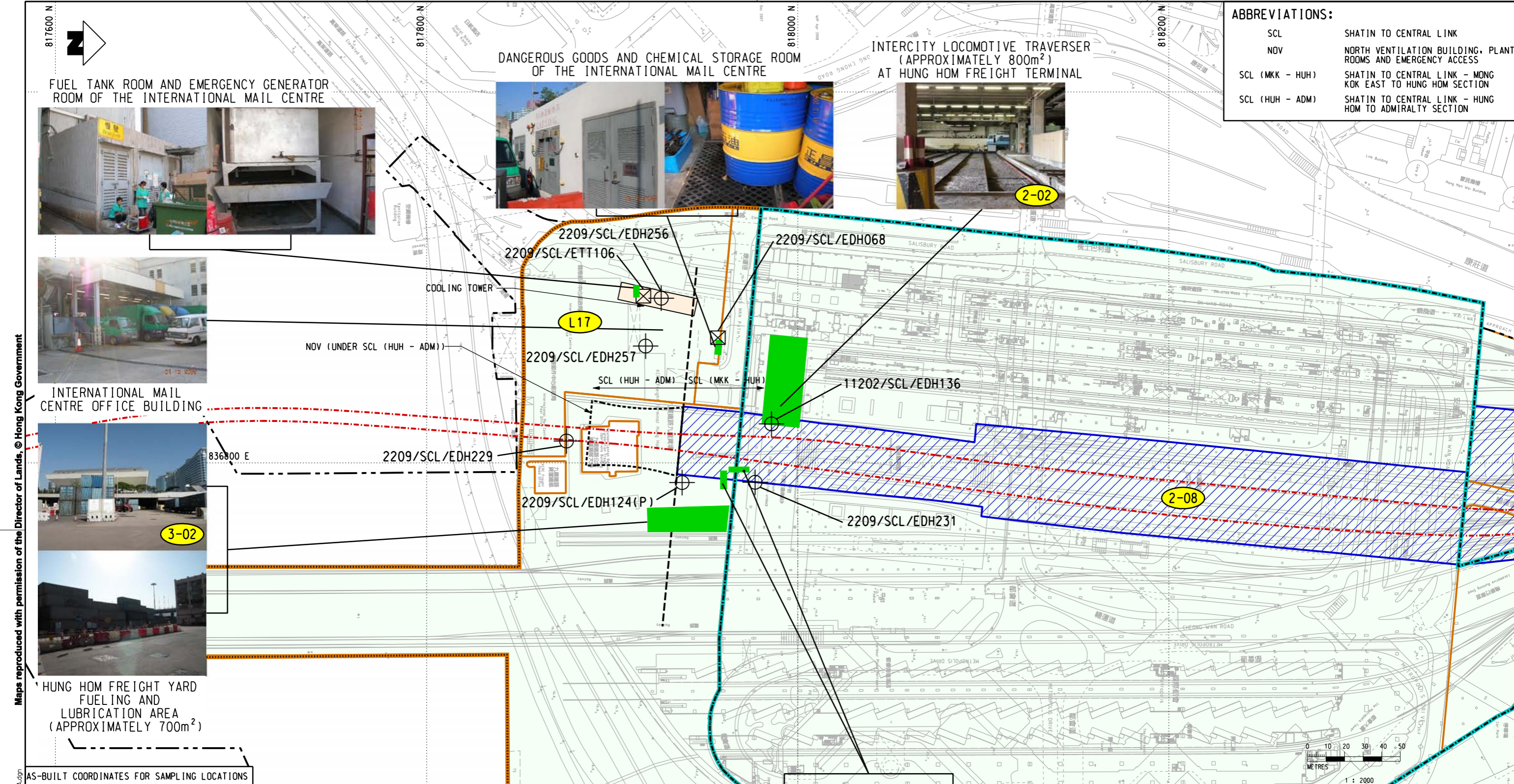
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| | PROPOSED SCL ALIGNMENT | | AREA 2 |
| | PROJECT BOUNDARY | | POTENTIALLY CONTAMINATED AREA |
| | TENTATIVE WORKS AREA UNDER SCL (MCK - HUH) | | AS-BUILT LOCATIONS FOR TRIAL PITS |
| | TENTATIVE WORKS AREA UNDER SCL (MCK - HUH) WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL | | AS-BUILT LOCATIONS FOR BOREHOLES |



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| DESIGNED | --- | | |
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| TITLE NEX/2213 EIA STUDY FOR SCL (MCK - HUH) POTENTIALLY CONTAMINATED SITES IDENTIFIED AND AS-BUILT SAMPLING LOCATIONS AT AREA 2 | |
| SCALE | FIGURE NO. |
| 1 : 2000 (A3) | NEX2213/C/361/ENS/M57/508 |
| REV. | A |



ABBREVIATIONS:

| | |
|-----------------|--|
| SCL | SHATIN TO CENTRAL LINK |
| NOV | NORTH VENTILATION BUILDING, PLANT ROOMS AND EMERGENCY ACCESS |
| SCL (MKK - HUH) | SHATIN TO CENTRAL LINK - MONG KOK EAST TO HUNG HOM SECTION |
| SCL (HUH - ADM) | SHATIN TO CENTRAL LINK - HUNG HOM TO ADMIRALTY SECTION |

INTERCITY LOCOMOTIVE TRAVERSER (APPROXIMATELY 800m²) AT HUNG HOM FREIGHT TERMINAL



AS-BUILT COORDINATES FOR SAMPLING LOCATIONS

| LOCATION ID | EASTING | NORTHING |
|--------------------|-----------|-----------|
| 2209/SCL/EDH068 | 836732.49 | 817957.03 |
| 2209/SCL/ETT106 | 836710.06 | 817916.85 |
| 2209/SCL/EDH256 | 836711.21 | 817926.48 |
| 2209/SCL/EDH257 | 836737.00 | 817918.06 |
| 2209/SCL/EDH229 | 836788.17 | 817875.41 |
| 2209/SCL/EDH124(P) | 836810.60 | 817937.70 |
| 2209/SCL/EDH231 | 836810.43 | 817977.08 |
| 11202/SCL/EDH136 | 836778.96 | 817985.86 |

| LOCATION ID | SITE ID |
|--------------------|---------|
| 2209/SCL/EDH068 | 2-02 |
| 2209/SCL/ETT106 | 2-08 |
| 2209/SCL/EDH256 | 2-09 |
| 2209/SCL/EDH257 | L17 |
| 2209/SCL/EDH229 | 3-02 |
| 2209/SCL/EDH124(P) | 3-02 |
| 2209/SCL/EDH231 | 3-02 |
| 11202/SCL/EDH136 | 3-02 |



DANGEROUS GOODS STORE CONTAINERS (APPROXIMATELY 20 m²)

LEGEND:

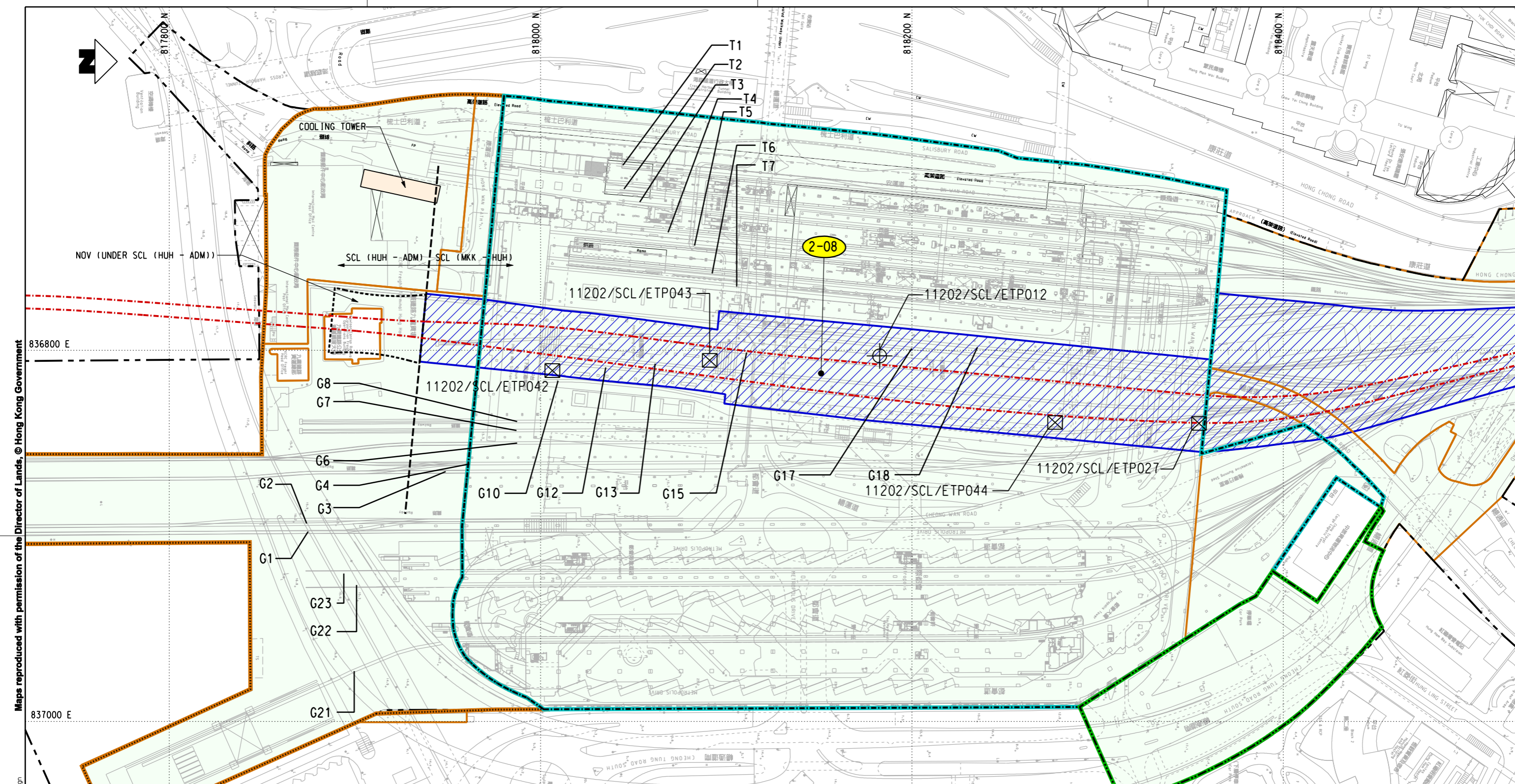
| | | | |
|--|--|--|-----------------------------------|
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| | PROJECT BOUNDARY | | AREA 3 |
| | TENTATIVE WORKS AREA UNDER SCL (MKK - HUH) | | AS-BUILT LOCATIONS FOR TRIAL PITS |
| | TENTATIVE WORKS AREA UNDER SCL (MKK - HUH) WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL | | POTENTIALLY CONTAMINATED AREA |
| | | | AS-BUILT LOCATIONS FOR BOREHOLES |

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| DESIGNED | --- | | |
| CHECKED | LCR | | |
| APPROVED | --- | | |
| DATE | 02/NOV/2010 | | |
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| | | CADD REF. | NEX2213_C_361_ENS_M57_509A.dgn |

| | |
|---|---------------------------|
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| SCALE | FIGURE NO. |
| 1 : 2000 (A3) | NEX2213/C/361/ENS/M57/509 |
| REV. | A |



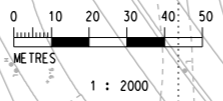
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 DATE: 02/11/2010
 USER: 15444

| SITE ID | |
|---------|----------------|
| 2-08 | RAILWAY TRACKS |

| REV | DESCRIPTION | BY | DATE | APPROVED | REV | DESCRIPTION | BY | DATE | APPROVED |
|-----|-------------|----|------|----------|-----|-------------|----|------|----------|
| | | | | | | | | | |

| LOCATION ID | EASTING | NORTHING |
|------------------|-----------|-----------|
| 11202/SCL/ETP027 | 836839.45 | 818354.63 |
| 11202/SCL/ETP044 | 836838.91 | 818277.13 |
| 11202/SCL/ETP012 | 836803.07 | 818182.61 |
| 11202/SCL/ETP043 | 836805.41 | 818091.11 |
| 11202/SCL/ETP042 | 836810.98 | 818006.38 |



LEGEND:

- - - PROPOSED SCL ALIGNMENT
- PROJECT BOUNDARY
- TENTATIVE WORKS AREA UNDER SCL (MKK - HUH)
- TENTATIVE WORKS AREA UNDER SCL (MKK - HUH) WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 2
- AREA 3
- AREA 4
- AS-BUILT LOCATIONS FOR TRIAL PITS
- POTENTIALLY CONTAMINATED AREA
- AS-BUILT LOCATIONS FOR BOREHOLES

ABBREVIATIONS:

- SCL SHATIN TO CENTRAL LINK
- NOV NORTH VENTILATION BUILDING, PLANT ROOMS AND EMERGENCY ACCESS
- SCL (MKK - HUH) SHATIN TO CENTRAL LINK - MONG KOK EAST TO HUNG HOM SECTION
- SCL (HUH - ADM) SHATIN TO CENTRAL LINK - HUNG HOM TO ADMIRALTY SECTION

| | | | |
|--|--|---------------------------------------|---|
| DRAWN DESIGNED CHECKED LCR APPROVED DATE 02/NOV/2010 | | SHATIN TO CENTRAL LINK | TITLE NEX/2213 EIA STUDY FOR SCL (MKK - HUH) POTENTIALLY CONTAMINATED SITES IDENTIFIED AND AS-BUILT SAMPLING LOCATION WITHIN RAILWAY TRACKS |
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CADD REF. NEX2213.C_361.ENS_M57_510A.dgn

Appendix A

Sampling and Testing Plan for Potential Contaminated Sites

Table 5.1 Sampling and Testing Plan for Potentially Contaminated Sites

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | Parameters to Be Tested | Figure Reference | |
|---------------|---|--|-----------------|---------------|--|---------------------------------------|---------------------------|
| Area 1 | | | | | | | |
| 1-10 | Demolished storage for paints, currently used as an open storage for construction materials Approx. area of 100 m ² | At the hotspot to verify any residual contamination 2209/SCL/EDH249(P) | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, Zinc VOCs, SVOCs, Cyanide | NEX2213/C/361/ENS/M57/008 |
| | | | | GW | One GW sample per location if encountered. | VOCs, SVOCs | |
| 1-18 | Emergency generator room and the associated fuel tank room at STA Building Approx. area of 30 m ² | Close to but outside both rooms, due to sampling constraints at this stage. 2209/SCL/ETT103 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m Since this site is within the cut & cover works area where excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/008 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| Area 2 | | | | | | | |
| 2-05 | USTs near the Locomotive Running Shed Approx. area of 150 m ² | Northwest of the USTs 2209/SCL/EDH246 (Two extra sampling locations at the west, southeast of the USTs are proposed and will be conducted during the decommissioning of this site; | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | | Parameters to Be Tested | Figure Reference |
|---------------|---|--|-----------------|---------------|--|-------------------------|---------------------------|
| | | detailed in Table 5.2) | | | | | |
| 2-06 | Above ground lubricating oil tank near the Locomotive Running Shed Approx. area of 10 m ² | Close to and south of the lubricating oil tank 2209/SCL/ETT102 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m bgs | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-07 | Dispenser west of the Locomotive Running Shed Approx. area of 10 m ² | Next to the hotspot 2209/SCL/EDH244 | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-09 | D.G storage containers near the Southern Warehouse Approx. area of 20 m ² | Close to but outside of the D.G. storage containers, due to sampling constraints at this stage. 2209/SCL/EDH231 | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. Since this site is within the hoarding area where excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| Area 3 | | | | | | | |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | | Parameters to Be Tested | Figure Reference |
|---------|--|---|-----------------|---------------|--|--|---------------------------|
| L17* | D.G. store and chemical storage room at the IMC Approx. area of 20 m ² | Close to but outside (west) of both rooms, due to sampling constraints at this stage. 2209/SCL/ETT068 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m bgs. Since the D.G. store and chemical storage room are within the works area and close to the hoarding area, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | VOCs, SVOCs, full list of metals, TPH, Cyanide | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | | |
| | Emergency generator room and the associated fuel tank room Approx. area of 20 m ² | Close to but outside (north) of both rooms, due to sampling constraints at this stage. 2209/SCL/ETT106 | Trial pit | Soil | Soil samples at depths of 0.5, 1.5 and 3.0 m bgs. Since the D.G. store and chemical storage room are within the works area and close to the hoarding area, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | VOCs, SVOCs, full list of metals, TPH | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | | |
| | Historic unknown open storage Approx. area of 2000 m ² (within the hoarding area) | At the historic open storage area of IMC 2209/SCL/EDH256 and 2209/SCL/EDH257 | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. Since this site is within the works area and partly within the hoarding area where | VOCs, SVOCs, full list of metals, TPH | NEX2213/C/361/ENS/M57/010 |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | Parameters to Be Tested | Figure Reference |
|---------|--|--|-----------------|---|---|---------------------------|
| | | | | excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation | | |
| | | | | GW | One GW sample per location if encountered. | VOCs, SVOCs, Mercury, TPH |
| 3-02 | Container stacker refuelling and maintenance area at Hung Hom Freight Year (HFY) Approx. area of 700 m ² | Sampling between this area and the works area for preliminary screening of the presence of contamination plume 2209/SCL/EDH229 and 2209/SCL/EDH124(P) | Borehole | Soil | 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. | Lead, BTEX, TPH, PAHs |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs |

Notes:

- *: Site L17 is the overlapping works area under both this Project and EWL. Sampling locations are proposed for potential contamination hotspots for Site L17 with reference to the approved CAP of this area under EWL.
- bgs: below ground surface; GW = groundwater
 - VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
 - BTEX = *Benzene, Toluene, Ethylbenzene* and *Xylene*.
 - PAHs = The whole of COCs listed under group of SVOCs in the RBRGs Table except *bis-(2-Ethylhexyl)phthalate, Hexachlorobenzene* and *Phenol*. Since RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene Dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.
 - Heavy Metals - The whole list of COCs listed under Metals in Appendix IV of Guidance Note 1.
 - Since the RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene bis-(2-Ethylhexyl)phthalate Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
 - If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

vii. Areas with Site Investigation (SI) Constraints at This Stage

5.8 In addition to areas which are not feasible for inspection or identification of hot spots, sites with constraints for sampling works at current stage are listed in **Table 5.2** below. Supplementary CAP(s) will be prepared and submitted for EPD endorsement; CAR, RAP and RR will be prepared and submitted subsequently, if necessary.

Table 5.2 Sampling and Testing Plan of SI Works for Sites upon Decommissioning

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | Parameters to Be Tested | Figure Reference |
|---------------|---|---|-----------------|---------------|--|---------------------------|
| Area 2 | | | | | | |
| 2-04 | The following hotspots are all located in the Locomotive Running Shed: Workshop, approx. area of 300 m ² Servicing area, approx. area of 500 m ² Chemical storage area, approx. area of 20 m ² Waste oil storage area, approx. area of 20 m ² | Workshop: HUH-2 (section inside the running shed), HUH-9 (section outside the running shed): Servicing area: HUH-3, HUH-5 Chemical storage area: HUH-4 Waste oil storage area: HUH-6 | Borehole | Soil | Workshop: Lead, Chromium, Copper, TPH, VOCs, SVOCs Servicing area: Lead, Chromium, Copper, TPH, VOCs, SVOCs Chemical storage area: Lead, TPH, VOCs, SVOCs Waste oil storage area: Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. Workshop: VOCs, SVOCs, TPH Servicing area: VOCs, SVOCs, TPH Chemical storage area: VOCs, SVOCs, TPH Waste oil storage area: BTEX, TPH, | |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | | Parameters to Be Tested | Figure Reference |
|---------|---|---|---|---------------|--|-------------------------|---------------------------|
| | | | | | | PAHs | |
| 2-05 | USTs near the Locomotive Running Shed Approx. area of 150 m ² | West of the USTs: HUH-8 | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/009 |
| | | Southeast of the USTs: HUH-10 | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-07 | North dispenser of the Locomotive Running Shed Approx. area of 10 m ² | Exactly at this hotspot HUH-7 | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs, | NEX2213/C/361/ENS/M57/009 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-02 | Traverser and the ground underneath Total approx. area of 800 m ² ; approx. area within the cut & cover works area where excavation is expected is < 100 m ² | At the hotspot for preliminary screening of the presence of potential land contamination HUH-1 Should contamination be confirmed, deeper and more extensive sampling will be proposed with reference to Guidance Note 2, upon agreement with MTR. | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | NEX2213/C/361/ENS/M57/010 |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |
| 2-08 | Railway tracks in W2 Total approx. area of 15,000 m ² | Sampling based on grid (100 m x 100 m). Total sampling locations in this area: 5 (RWT-1 through RWT-5) Five locations in Area W2: Railway tracks nos. G10, G12, G13, G15, | Borehole If contamination is confirmed, further SI would be recommended and conducted, | Soil | For concrete-based railway tracks in this area (G17 and G18): soil samples at depths of 0.5, 1.5 3.0, 4.5 and 6.0 m bgs. For ballast-based railway tracks in this area (G10, G12 G13, G15 and the northern section of G6): soil | Lead, BTEX, PAHs, TPH | NEX2213/C/361/ENS/M57/012 |

| Site ID | Hotspot Identified | Sampling Location/ Sampling ID | Sampling Method | Sample Matrix | | Parameters to Be Tested | Figure Reference |
|---------------|--|--|-------------------------|---------------|--|-------------------------|---------------------------|
| | | G17 and G18, based on a 100 m x 100 m grid pattern, between two neighbouring tracks: RWT-1 through RWT-5 Exact sampling locations and number shall also depend on the practical conditions when sampling is conducted | upon agreement with MTR | | samples at depths of 0.5, 1.5, 3.0 and 6.0 m; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. If contamination is confirmed, further (smaller grid, e.g. 50 m interval) and deeper (sampling until the bedrock or the bottom of excavation, whichever is shallower) site inspection would be conducted upon agreement with MTR | | |
| | | | | GW | One GW sample per location if encountered. | BTEX, PAHs, TPH | |
| Area 4 | | | | | | | |
| 4-04 | Waste diesel storage area at DSD site office | Exactly at the hotspot DSD-1 | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, PAHs, TPH | NEX2213/C/361/ENS/M57/011 |
| | | | | GW | One GW sample per location if encountered. | BTEX, PAHs, TPH | |

Notes:

- bgs = below ground surface; GW = groundwater
- VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
- BTEX = *Benzene, Toluene, Ethylbenzene* and *Xylene*.
- PAHs = The whole of COCs listed under group of SVOCs in the RBRGs Table except *bis-(2-Ethylhexyl)phthalate, Hexachlorobenzene* and *Phenol*. Since RBRGs value of *Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene* and *Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.
- Heavy Metals - The whole list of COCs listed under Metals in Appendix IV of Guidance Note 1.
- Since the RBRGs value of *Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, bis-(2-Ethylhexyl)phthalate, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.

7. If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions

Table 5.1 Changes in Sampling and Testing Plan at Area 2 in Hung Hom Freight Terminal

| Site ID (Description) | Hotspot Identified (Based on the Approved CAP) | Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP) | Sampling Method (Based on This Supplementary CAP) | Sample Matrix (Based on This Supplementary CAP) | Parameters to Be Tested (Based on This Supplementary CAP) | Figure Reference | |
|--|--|---|---|---|---|--|-----------------------------|
| 2-02 (Locomotive traverser) | Locomotive traverse and the ground underneath Total approx. area ~800 m ² ; approx. area within the cut & cover area where excavation is expected: <100 m ² | HUH-1a : at the edge of the site due to current land use and site constraints (Original location under Stage 2 SI: HUH-1 at the centre of the site) | Borehole | Soil | <ul style="list-style-type: none"> Borehole: soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | NEX2213/C/3 61/ENS/M57/501A |
| | | | | GW | One GW sample per location if encountered | BTEX, TPH, PAHs | |
| Locomotive running shed (LRS) and its affiliating facilities 2-04 (LRS), 2-06 (Aboveground lubricating oil tank), and 2-07 (Pumping area) | <u>LRS</u> : Total approx. area of this site: ~1,100 m ² The following potential hotspots identified are all located inside the Locomotive running shed: <ul style="list-style-type: none"> Workshop: ~ 300 m² Servicing area: ~500 m² Chemical storage: ~20 m² Waste oil storage: ~20 m² <u>Above ground lubricating oil tank</u> : Approx. area 10 m ² <u>Pumping area (west of LRS)</u> : Approx. area of 10 m ² | A total of seven boreholes (two up hydraulic gradient and five down hydraulic gradient) are proposed around the LRS. HUH-2a : northwest and upstream of LRS HUH-3a : north and upstream of LRS HUH-4a : upper southeast and downstream of LRS HUH-5a : lower south and downstream of LRS HUH-6a : south of LRS HUH-7a : lower | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, Chromium, Copper, TPH, VOCs, SVOCs | NEX2213/C/3 61/ENS/M57/502A |
| | | | | GW | One GW sample per location if encountered | TPH, VOCs, SVOCs | |

| Site ID (Description) | Hotspot Identified (Based on the Approved CAP) | Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP) | Sampling Method (Based on This Supplementary CAP) | Sample Matrix (Based on This Supplementary CAP) | | Parameters to Be Tested (Based on This Supplementary CAP) | Figure Reference |
|--------------------------|--|--|--|---|--|---|------------------------------------|
| | | southwest and downstream of LRS HUH-8a: upper southwest and downstream of LRS (Original locations under Stage 2 SI: HUH-2 and HUH-9 for the workshop; HUH-3 and HUH-5 for the servicing area; HUH-4 for the chemical storage; HUH-6 for the waste oil storage area, and HUH-7 for the north dispenser) | | | | | |
| 2-08 (Railway tracks) | Railway tracks Total approx. area: 15, 000 m ² (within the future cut & cover works area) | Sampling (RWT-1a through RWT-5a) generally based on a 100 m x 100 m grid. (These proposed sampling locations have been slightly shifted as compared to approved CAP due to site constraints.) (The original locations under Stage 2 SI: five sampling locations based on 100 m x 100 m grid pattern, between two neighbouring | Trial pit (for all locations in this site except RWT-3a, due to overhead constraints) | Soil Soil samples at depths of 0.5, 1.5 and 3.0 m bgs Since this site is within the works area and partly within the hoarding area where excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation. | One GW sample per location if encountered. | Lead, BTEX, TPH, PAHs BTEX, TPH, PAHs | NEX2213/C/3 61/ENS/M57/ 503A |

| Site ID (Description) | Hotspot Identified (Based on the Approved CAP) | Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP) | Sampling Method (Based on This Supplementary CAP) | Sample Matrix (Based on This Supplementary CAP) | | Parameters to Be Tested (Based on This Supplementary CAP) | Figure Reference |
|-----------------------|--|---|---|---|--|---|------------------|
| | | railway tracks of G10, G12, G13, G15, G17 and G18) | Borehole (for RWT-3a only) | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m | Lead, BTEX, TPH, PAHs | |
| | | | | GW | One GW sample per location if encountered. | BTEX, TPH, PAHs | |

Remarks:

- bgs: below ground surface; GW = groundwater
- VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
- BTEX = *Benzene, Toluene, Ethylbenzene* and *Xylene*.
- PAHs = The whole of COCs listed under group of SVOCs in the RBRGs Table except *bis-(2-Ethylhexyl)phthalate, Hexachlorobenzene* and *Phenol*. Since RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene Dibenzo(a,h)anthracene and Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.
- Since the RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene bis-(2-Ethylhexyl)phthalate Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
- If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

Table 5.1 Proposed SI at the Assessment Area near CRI under Area 1 for the Historical Railway Maintenance Facility

| SI Location | Hotspot Identified at the Area | Proposed SI Method | Proposed Sample Matrix | | Parameters to Be Tested | Figure Reference |
|--|---|--------------------|------------------------|---|---|---------------------------|
| Historical railway maintenance facility near the CRI | Historical railway maintenance facility Total area of the historical railway maintenance facility: approx. 30,000 m ² ; Total area of the railway maintenance facility overlapping the major excavation works areas: approx. 15,000 m ² A total of six SI locations proposed, i.e. CHT-1 through CHT-6 | Borehole | Soil | Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. Visual should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation. | TPH, Metals PCBs, SVOCs, and VOCs (part, see Remarks 2) | NEX2213/C/361/ENS/M57/702 |
| | | | GW | One GW sample per location if encountered. | | |

Remarks:

1. bgs: below ground surface; GW = groundwater
2. VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1, except for Acetone, Methyl tert-Butyl Ether, and Methylene Chloride; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
3. Metals - The whole list of COCs listed under Metals in Appendix IV of Guidance Note 1.
4. Since the RBRGs value of *Benzo(a)anthracene*, *Benzo(a)pyrene*, *Benzo(g,h,i)perylene*, *Benzo(k)fluoranthene*, *bis-(2-Ethylhexyl)phthalate*, *Dibenzo(a,h)anthracene*, *Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
5. If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

Appendix B
Soil Profile Logs

Soil Profile Logs under Stage 1 SI

Site ID 1-10
(2209/SCL/EDH249(P))



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH249P

SHEET 1 of 5

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836785.58
N 818603.26

DATE from 14/04/2009 **to** 21/04/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.19 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|--------|------------------------|------|-------|---------------|-----------|--------|-------|---|
| | | | | | | | | | No. | Type | Depth | | | | | |
| 14/04/2009 | PX | 08:00 | | | | | | | | | | | | | | Dark brown and grey, silty fine to coarse SAND with some angular fine to coarse gravel sized rock, concrete and brick fragments. (FILL) |
| | | | | | | | | | | | | | | | | Medium dense, yellowish brown, silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments. (FILL) |
| 14/04/2009 | | Dry at 18:00 | | | | | | | | | | | | | | |
| 15/04/2009 | | Dry at 08:00 | | 100 | | | | 21 bls | | | | | | | | |
| | | | | 80 | | | | 20 bls | | | | | | | | |
| | | | | | | | | | 3.2 3.3,2.3 N=11 | | | | | | | |
| | | | | 80 | | | | 36 bls | | | | | | | | Grey, silty fine to coarse SAND with occasional shell fragments. (ALLUVIUM) |
| 15/04/2009 | | 2.82m at 18:00 | | | | | | | | | | | | | | |
| 16/04/2009 | | 2.98m at 08:00 | | 80 | | | | 19 bls | | | | | | | | Light greyish brown, clayey silty fine to coarse SAND with occasional shell fragments. (ALLUVIUM) |
| | | | | | | | | | 3.4 4.3,3.5 N=15 | | | | | | | Medium dense, light greyish brown, silty fine to coarse SAND. (ALLUVIUM) |
| | | | | 90 | | | | 27 bls | | | | | | | | 9.00 - 10.50m: With occasional shell fragments. |

| | | | |
|---|---|---|---|
| <ul style="list-style-type: none"> ● Small disturbed sample ○ Large disturbed sample ▨ SPT liner sample ▩ U76 undisturbed sample ■ U100 undisturbed sample ▨ Mazier sample ▩ Piston sample | <ul style="list-style-type: none"> ▲ Water sample □ Piezometer / standpipe tip ↓ Standard penetration test ⊥ Water absorption (Packer) test ⊥ Permeability test ⊥ Impression packer test ∇ In-situ vane shear test | <p>LOGGED W K SIU</p> <p>DATE 22/04/2009</p> <p>CHECKED P O POON</p> <p>DATE 23/04/2009</p> | <p>REMARKS</p> <ol style="list-style-type: none"> 1. Inspection pit was dug to 3.00m depth. 2. Standpipe was installed at 6.00m depth. 3. Piezometer was installed at 34.99m depth. 4. Acoustic televiewer survey was carried out at 31.63m-39.63m depth. 5. Packer (Water Absorption) test was cancelled. 6. Water sample was taken at 6.00m depth. |
|---|---|---|---|

t:\gin\w\library\1july2009_gib\drillhole (1 feb 09) (Hung Horn)



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH249P

SHEET **2** of **5**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836785.58
N 818603.26

DATE from 14/04/2009 **to** 21/04/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.19 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|---|---------|------|-------------------------|---------------|-----------|--------|-------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | | | | 0 | | | | 61 bls | | | 10.50 | -6.31 | 10.50 | | | As sheet 1 of 5. |
| | | | | | | | | 3,3 5,7,9,13 N=34 | 15 | U76 | 10.90 10.95 11.00 | | | | | Dense, light brown, spotted orange, silty fine to coarse SAND with some subangular fine gravel sized quartz fragments. (ALLUVIUM) |
| | | | | | | | | | 17 | U100 | 11.40 11.45 | | | | | |
| | | | | 80 | | | | Oil stain - N Odour - N Sheen - N | 114 bls | | 12.00 | -7.81 | 12.00 | | | Medium dense, brownish grey, slightly clayey silty fine to coarse SAND with some to much subangular fine gravel sized quartz fragments. (ALLUVIUM) |
| | | | | | | | | | 19 | U76 | 12.40 12.45 | | | | | |
| | | | | 85 | | | | | 52 bls | | 13.50 | -9.31 | 13.50 | | | 13.50 - 15.00m: Yellowish brown. |
| | | | | | | | | 3,3 4,3,4,4 N=15 | 20 | U76 | 13.90 13.95 14.00 | | | | | |
| | | | | | | | | | 21 | U100 | 14.40 14.45 | | | | | |
| | | | | 90 | | | | Oil stain - N Odour - N Sheen - N | 100 bls | | 15.00 | -10.81 | 15.00 | | | |
| | | | | | | | | | 24 | U76 | 16.15 15.40 15.45 | | | | | |
| | | | | 95 | | | | | 34 bls | | 16.50 | -12.31 | 16.50 | | | Dark brown, clayey silty fine to coarse SAND with occasional decayed plant remains. (ALLUVIUM) |
| | | | | | | | | 2,2 3,2,3,3 N=11 | 26 | U76 | 16.90 16.95 17.00 | | | | | |
| | | | | | | | | | 27 | U100 | 17.40 17.45 | | | | | Firm, dark brown, sandy SILT with some decayed wood pieces. (ALLUVIUM) |
| | | 2.69m at 18:00 | | | | | | | 28 | U76 | 18.00 | | | | | |
| | | 3.00m at 08:00 | | 90 | | | | Oil stain - N Odour - N Sheen - N | 39 bls | | 18.40 | -14.21 | 18.40 | | | 18.40 - 18.45m: Dark brown, decayed WOOD pieces. (ALLUVIUM) |
| | | | | | | | | | 30 | U76 | 18.40 18.45 | | | | | |
| | | | | 95 | | | | | 31 | U100 | 19.50 | -15.31 | 19.50 | | | Dense, yellowish brown, silty fine to coarse SAND with some subangular fine gravel sized quartz fragments. (ALLUVIUM) |
| | | | | | | | | | 32 | U76 | 19.90 | | | | | |
| | | | | | | | | | 33 | U100 | 19.90 | -15.81 | 20.00 | | | |

- Small disturbed sample
- Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- ▩ Piston sample
- ▲ Water sample
- Piezometer / standpipe tip
- ↓ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED **W K SIU**

DATE **22/04/2009**

CHECKED **P O POON**

DATE **23/04/2009**

REMARKS



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH249P

SHEET **3** of **5**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836785.58
N 818603.26

DATE from 14/04/2009 **to** 21/04/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.19 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|----------------------------------|---------|------|-------------------------------------|---------------|-----------|--------|-------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | | | | | | | | 6,7,9,9,15,15 N=48 | 34 | □ | 19.95 20.00 | -15.81 | 20.00 | | | 20.00 - 22.50m: Light orangish brown. |
| | | | | | | | | | 35 | ● | 20.40 20.45 | | | | | |
| | | | | | | | | 101 bls | 36 | ■ | 21.00 | | | | | |
| | | | | | | | | | 37 | ● | 21.40 21.45 | | | | | |
| | | | | | | | | | 38 | ■ | 22.50 | -18.31 | 22.50 | V | | Extremely weak, light brown, spotted reddish brown and black, completely decomposed GRANITE. (Stiff, sandy SILT with some subangular fine to medium gravel sized quartz fragments) |
| | | | | | | | | 198 bls | 39 | ■ | 22.90 23.35 | -18.81 | 23.00 | V | | |
| | | | | | | | | 8,8,9,8,12,10 N=39 | 40 | □ | 23.35 23.00 | | | | | |
| | | | | | | | | | 41 | ● | 23.40 23.45 | | | | | Extremely weak, pinkish brown, mottled light brown, completely decomposed GRANITE. (Stiff, sandy SILT with some subangular fine to medium gravel sized quartz fragments) |
| | | | | | | | | 173 bls | 42 | ■ | 24.00 | -19.81 | 24.00 | V | | Extremely weak, pinkish red, spotted white, completely decomposed GRANITE. (Silty fine to medium SAND with some angular to subangular fine gravel sized quartz fragments) |
| | | | | | | | | | 43 | ● | 24.40 24.45 | | | | | |
| | | | | | | | | | 44 | ■ | 25.50 | -21.31 | 25.50 | | | 25.50 - 26.00m: Purplish red. |
| | | | | | | | | | 45 | ● | 25.80 25.85 | | | | | |
| | | | | | | | | | 46 | □ | 26.00 | -21.81 | 26.00 | | | |
| | | | | | | | | | 47 | ● | 26.40 26.45 | | | | | |
| | | | | | | | | | 48 | ■ | 27.00 27.105 27.155 | | | | | |
| | | | | | | | | | 49 | ■ | 28.50 28.585 28.585 28.635 | | | | | |
| | | | | | | | | | 50 | ● | 29.00 29.15 29.20 | -24.81 | 29.00 | V | | Extremely weak, brown, mottled black and white, completely decomposed GRANITE. (Clayey silty fine to coarse SAND with some subangular fine gravel sized quartz fragments) |
| | | | | | | | | 15.31 100/50mm 100bls/50mm | | | | -25.81 | 30.00 | | | |

Fine
17/04/2009
Fine
18/04/2009

2.78m at 18:00
2.99m at 08:00

t:\gintw\library\1july2009.gib\drillhole (1 feb 09) (Hung Horn)

- Small disturbed sample
- Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- ▩ Piston sample
- ▲ Water sample
- Piezometer / standpipe tip
- ↓ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED **W K SIU**
DATE **22/04/2009**
CHECKED **P O POON**
DATE **23/04/2009**

REMARKS

Site ID 1-18
(2209/SCL/ETT103)



Gammon Construction Limited
Ground Engineering & Substructure Department

Project : Ground Investigation (Land) for Shatin to Central Link

Logged by : W K SIU
Date logged : 02/06/2009
Checked by : P O POON
Date checked : 03/06/2009

Co-ordinates :
E 836786.86
N 818601.59
Ground Level :
+ 4.23 mPD

Excavation Dates:
29/05/2009 to 01/06/2009
Backfill Dates:
05/06/2009

Trial Pit No.
2209/SCL/ETT103

TRIAL PIT RECORD

Contract No. : NEX/2209

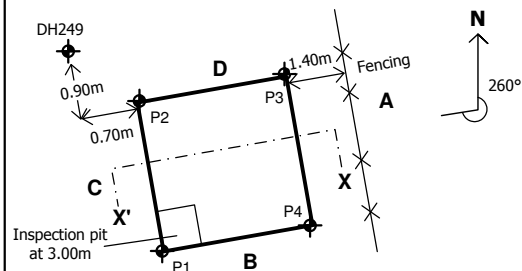
Job No.: J3251

| Sample & Tests | Depth (m) | Sketch | | | | Depth (m) | Legend | Description | Grade |
|----------------|--|---------------|---------------|---------------|---------------|-----------|--------|---|-------|
| | | Face A 1.00 m | Face B 1.00 m | Face C 1.00 m | Face D 1.00 m | | | | |
| | | | | | | | | | |
| | 0.15 | | | | | 0.15 | △△△ | CONCRETE slab. (With diameter 5mm steel bar @ 0.10m spacing) | |
| | 0.22 | | | | | 0.22 | ▨ | Loose, moist, greyish brown, fine to coarse SAND with medium fine to coarse gravel sized rock fragments. (FILL) | |
| | 0.80 | | | | | 0.80 | ▨ | Dense, moist, dark brown, mottled black, silty fine to coarse SAND with some angular fine to coarse gravel sized brick, rock and concrete fragments. (FILL) | |
| | 1.10 | | | | | 1.10 | ▨ | Dense, moist, brown, silty fine to coarse SAND with some subangular fine to medium gravel sized quartz fragments. (FILL) | |
| | End of trial pit at 1.10m depth. (maximum 3.00m) | | | | | | | | |

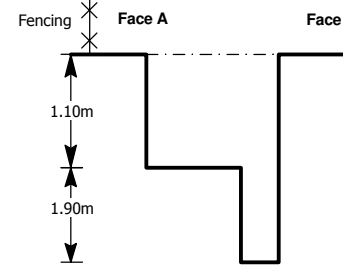
SYMBOL

- Small disturbed sample
- ⬆ Large disturbed sample
- ▬ Undisturbed vertical sample
- ▬ Undisturbed horizontal sample
- ▣ Block sample
- ⊥ In-situ density test
- ▲ Water sample
- ↘ Water seepage
- ▼ N - Schmidt Hammer Test

PLAN



SECTION (X - X')



REMARKS

1. No shoring.
2. No seepage observed.
Co-ordinates:
P1 : 818601.35 N 836786.69 E G.L. 4.23 m.P.D.
P2 : 818602.37 N 836786.55 E G.L. 4.24 m.P.D.
P3 : 818602.49 N 836787.59 E G.L. 4.25 m.P.D.
P4 : 818601.50 N 836787.75 E G.L. 4.24 m.P.D.

Site ID 2-05
(2209/SCL/ETT165)



Gammon Construction Limited
Ground Engineering & Substructure Department

Project : Ground Investigation (Land) for Shatin to Central Link

Logged by : W K SIU
Date logged : 04/07/2009
Checked by : P O POON
Date checked : 06/07/2009

Co-ordinates :
E 836883.32
N 818399.37
Ground Level :
+ 4.42 mPD

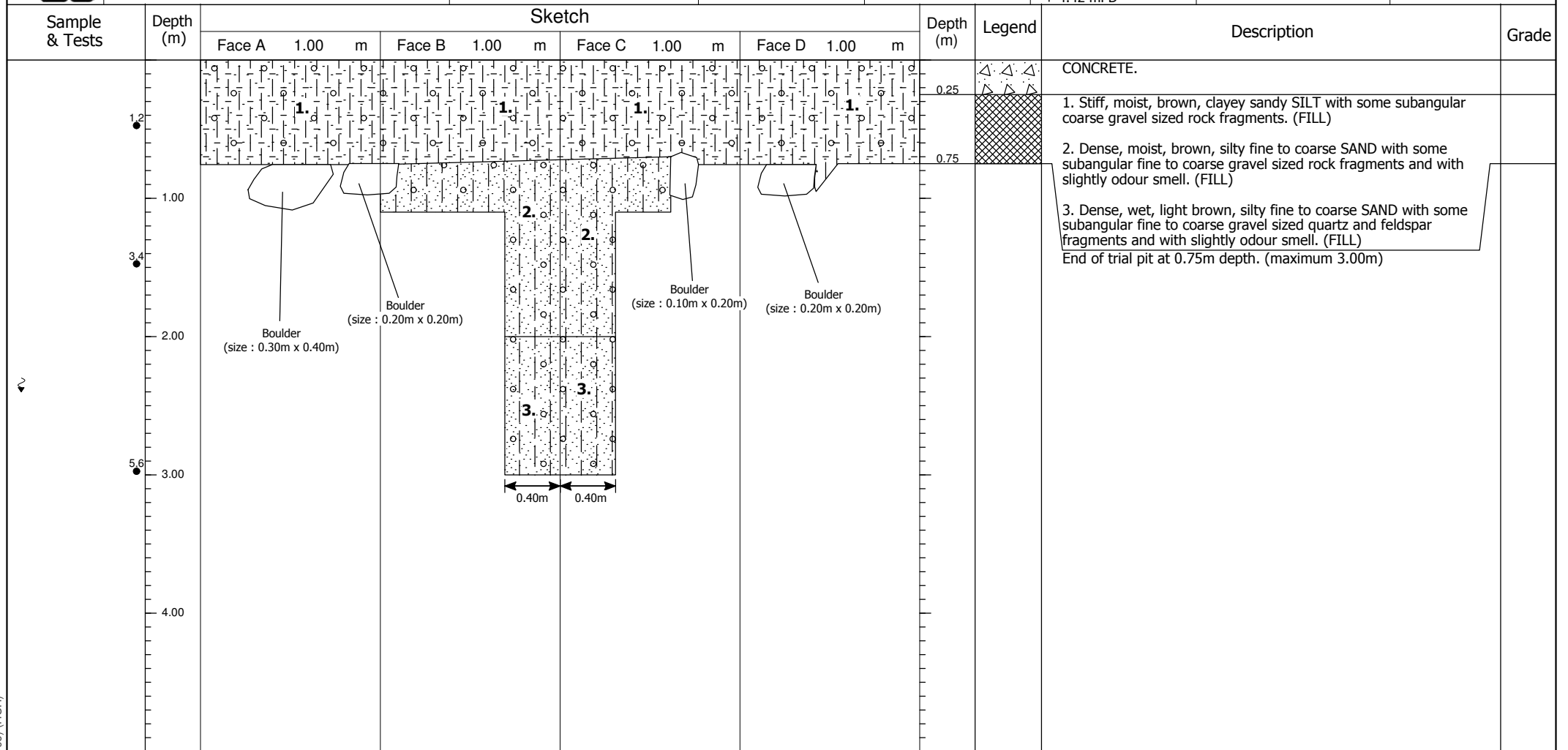
Excavation Dates:
30/06/2009 to 03/07/2009
Backfill Dates:

Trial Pit No.
2209/SCL/ETT165

TRIAL PIT RECORD

Contract No. : NEX/2209

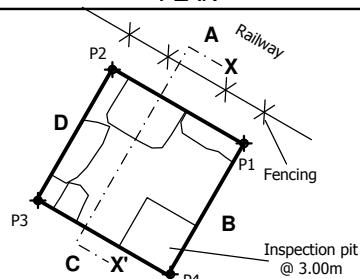
Job No. : J3251



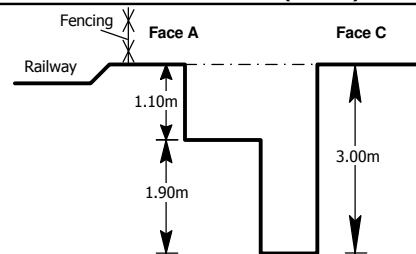
SYMBOL

- Small disturbed sample
- ⬆ Large disturbed sample
- ▬ Undisturbed vertical sample
- ▬ Undisturbed horizontal sample
- ◻ Block sample
- ⊥ In-situ density test
- ▲ Water sample
- ↘ Water seepage
- ↖ N - Schmidt Hammer Test

PLAN



SECTION (X - X')



REMARKS

1. No shoring.
2. Seepage observed at 2.40m depth.
3. Inspection pit (0.40m x 0.40m) was dug to 3.00m below ground level.
4. Small disturbed samples were taken at 0.50m, 1.50m and 3.00m depths.

Co-ordinates :

- P1 : 818399.54 N 836883.72 E G.L. 4.41 m.P.D.
- P2 : 818400.21 N 836883.06 E G.L. 4.41 m.P.D.
- P3 : 818399.50 N 836882.31 E G.L. 4.42 m.P.D.
- P4 : 818398.77 N 836882.99 E G.L. 4.42 m.P.D.

Site ID 2-06
(2209/SCL/ETT102)



Gammon Construction Limited
Ground Engineering & Substructure Department

Project : Ground Investigation (Land) for Shatin to Central Link

Logged by : W K SIU
Date logged : 09/06/2009
Checked by : P O POON
Date checked : 10/06/2009

Co-ordinates :
E 836867.21
N 818395.13
Ground Level :
+ 3.91 mPD

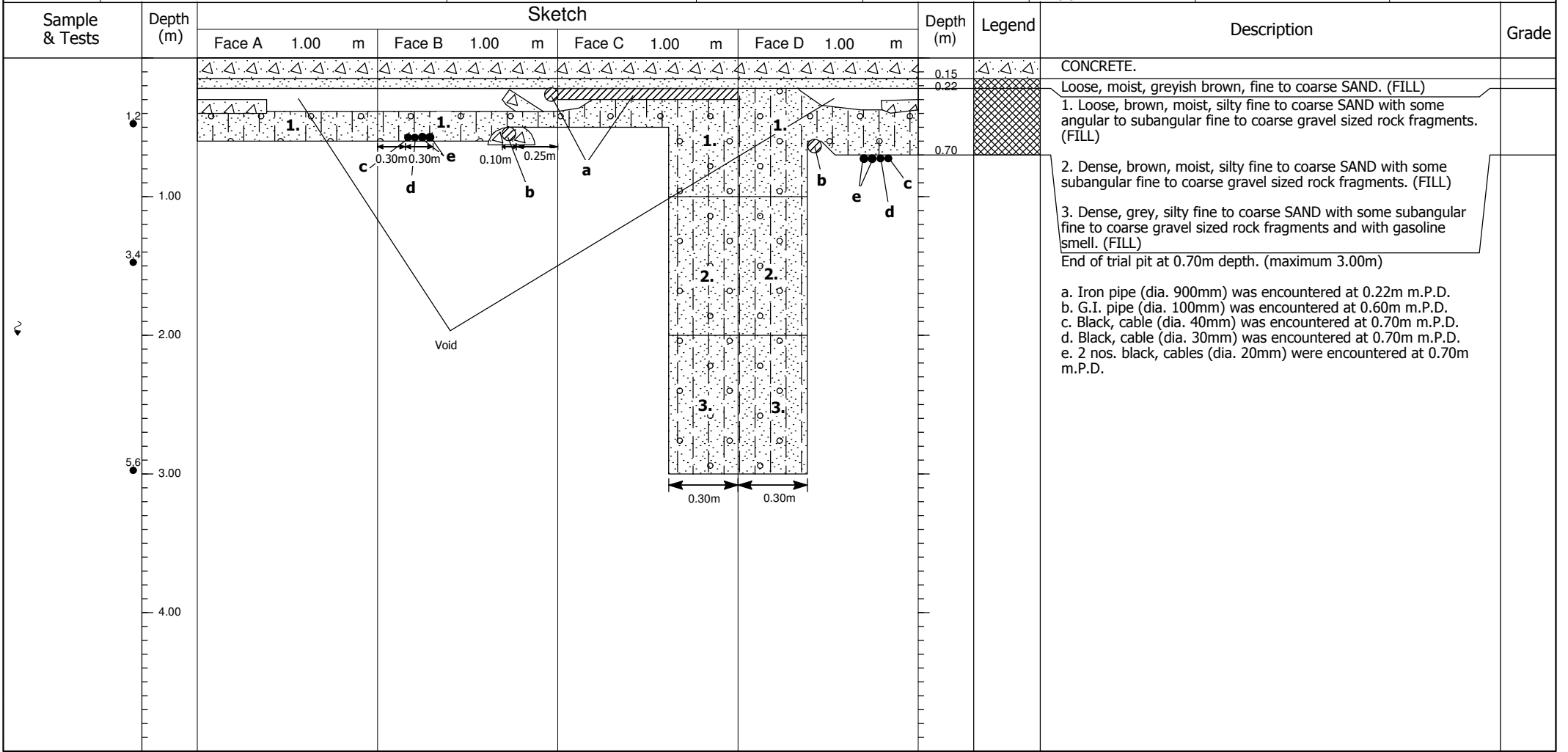
Excavation Dates:
06/06/2009 to 08/06/2009
Backfill Dates:

Trial Pit No.
2209/SCL/ETT102

TRIAL PIT RECORD

Contract No. : NEX/2209

Job No. : J3251



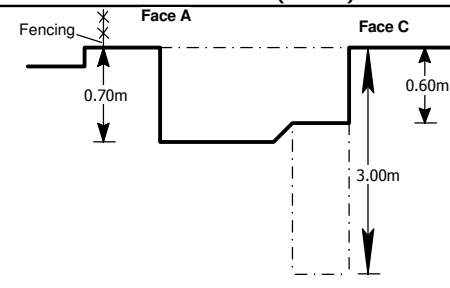
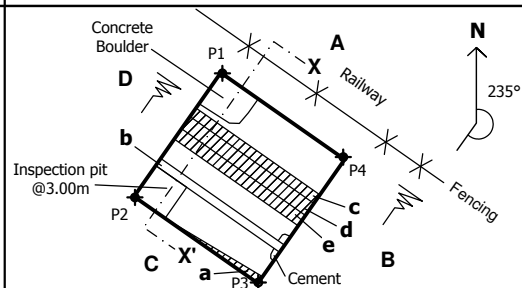
SYMBOL

PLAN

SECTION (X - X')

REMARKS

- Small disturbed sample
- ⬆ Large disturbed sample
- ▬ Undisturbed vertical sample
- ▬ Undisturbed horizontal sample
- ◻ Block sample
- ⊥ In-situ density test
- ▲ Water sample
- ↘ Water seepage
- ↙ N - Schmidt Hammer Test



1. No shoring.
2. Water level at 2.00m depth.
3. Inspection pit (0.30m x 0.30m) was dug to 3.00m below ground level.
4. Small disturbed samples were taken at 0.50m (2 nos.), 1.50m (2 nos.) and 3.00m (2 nos.) depths.

Co-ordinates :

- P 1 : 818395.63 N 836867.85 E G.L. 3.94 m.P.D.
- P 2 : 818395.28 N 836866.94 E G.L. 3.92 m.P.D.
- P 3 : 818394.32 N 836867.30 E G.L. 3.92 m.P.D.
- P 4 : 818394.66 N 836868.25 E G.L. 3.94 m.P.D.

Site ID 2-07
(2209/SCL/EDH244)



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH244

SHEET **2** of **5**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836851.31
N 818388.31

DATE from 25/06/2009 **to** 06/07/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.21 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|------------------------|---------|------|----------------|---------------|-----------|--------|-------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | | | | 100 | | | | 39 bls | 15 | U76 | 10.00 | -5.79 | 10.00 | | | As sheet 1 of 5. |
| | | | | | | | | 2.1 2.2,2.2 N=8 | 16 | U100 | 10.40 10.45 | | | | | |
| | | | | 100 | | | | | 17 | U76 | 10.85 10.90 | | | | | |
| | | | | | | | | | 18 | U76 | 12.00 | -7.79 | 12.00 | | | Yellowish brown, slightly silty fine to coarse SAND with some subangular fine gravel sized rock fragments. (ALLUVIUM) |
| | | | | | | | | | 19 | U100 | 12.40 12.45 | | | | | |
| | | | | 100 | | | | | 20 | U76 | 13.00 | -8.79 | 13.00 | | | Yellowish brown, slightly silty fine to coarse SAND with some subangular fine gravel. (ALLUVIUM) |
| | | | | | | | | | 21 | U100 | 13.40 13.45 | -9.24 | 13.45 | | | Medium dense, light grey, fine to coarse SAND with occasional broken shell fragments. (ALLUVIUM) |
| | | | | | | | | 3.4 4,3,4,4 N=15 | 22 | U76 | 13.85 13.90 | | | | | |
| | | 2.21m at 18:00 | | | | | | | 23 | U76 | 15.00 | -10.79 | 15.00 | | | Light greyish white, slight silty slightly clayey fine to coarse SAND with some subangular fine gravel sized rock fragments. (ALLUVIUM) |
| | | 2.44m at 08:00 | | 100 | | | | | 24 | U76 | 15.40 15.45 | | | | | |
| | | | | | | | | | 25 | U100 | 16.00 | -11.79 | 16.00 | | | Medium dense, yellowish brown and red, dappled light yellowish brown, slightly silty fine to coarse SAND with some subangular fine gravel sized rock fragments. (ALLUVIUM) |
| | | | | 100 | | | | | 26 | U76 | 16.40 16.45 | | | | | |
| | | | | | | | | 3.4 4,4,5,7 N=20 | 27 | U100 | 16.85 16.90 | | | | | |
| | | | | | | | | | 28 | U76 | 18.00 | -13.79 | 18.00 | | | Firm, reddish brown, dappled yellowish brown and light grey, silty CLAY with much subangular fine gravel sized rock fragments. (ALLUVIUM) |
| | | | | 100 | | | | | 29 | U76 | 18.40 18.45 | | | | | |
| | | | | | | | | | 30 | U100 | 19.00 | | | | | |
| | | | | 100 | | | | | 31 | U76 | 19.40 19.45 | | | | | |
| | | | | | | | | 3.4 5,5,6,8 N=24 | 32 | U100 | 19.80 19.85 | | | | | |
| | | | | | | | | | 33 | U76 | 20.00 | -15.79 | 20.00 | | | |

t:\ginw\library\1july2009.gib\drillhole (1 feb 09) (H-UH)

- Small disturbed sample
- Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- ▩ Piston sample
- ▲ Water sample
- Piezometer / standpipe tip
- ↓ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED **W K SIU**
DATE **07/07/2009**
CHECKED **P O POON**
DATE **08/07/2009**

REMARKS

REVISED



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH244

SHEET **3** of **5**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

| | | |
|-----------------------|----------------------------|------------------------------------|
| METHOD Rotary | CO-ORDINATES | PROJECT No. J3251 |
| MACHINE & No. 20-109 | E 836851.31 N 818388.31 | DATE from 25/06/2009 to 06/07/2009 |
| FLUSHING MEDIUM WATER | ORIENTATION Vertical | GROUND LEVEL + 4.21 mPD |

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|---------|---------|------|--------|---------------|-----------|--------|-------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | | | | | | | | | | | -15.79 | 20.00 | | | | As sheet 2 of 5. |
| | | 2.20m at 18:00 | | 100 | | | | 124 bls | 36 | U | 21.00 | | | | | |
| | | | | | | | | | 37 | U | 21.40 | | | | | |
| | | | | | | | | | 38 | U | 22.00 | | | | | |
| | | | | | | | | | 39 | U | 22.40 | | | | | |
| | | | | | | | | | 40 | U | 22.45 | | | | | |
| | | | | | | | | | 41 | U | 22.85 | | | | | |
| | | | | | | | | | 42 | U | 24.00 | -19.79 | 24.00 | | | |
| | | 2.36m at 08:00 | | 100 | | | | 56 bls | 43 | U | 24.40 | | | | | Firm, reddish brown, mottled white and yellow, clayey SILT with some subangular fine gravel sized rock fragments. (ALLUVIUM) |
| | | | | | | | | | 44 | U | 24.45 | | | | | |
| | | | | | | | | | 45 | U | 25.00 | -20.79 | 25.00 | V | | Extremely weak, reddish brown, mottled white and light grey, completely decomposed GRANITE. (Firm, sandy SILT with some subangular fine gravel sized rock fragments) |
| | | 2.14m at 18:00 | | 100 | | | | | 46 | U | 25.40 | | | | | |
| | | 2.42m at 08:00 | | | | | | | 47 | U | 25.45 | | | | | |
| | | | | | | | | | 48 | U | 25.50 | | | | | |
| | | | | | | | | | 49 | U | 25.90 | | | | | |
| | | | | | | | | | 50 | U | 25.95 | | | | | |
| | | | | | | | | | 51 | U | 27.00 | | | | | |
| | | | | | | | | | 52 | U | 27.40 | | | | | |
| | | | | | | | | | 53 | U | 27.45 | | | | | |
| | | | | | | | | | 54 | U | 28.00 | | | | | |
| | | | | | | | | | 55 | U | 28.40 | | | | | |
| | | | | | | | | | 56 | U | 28.45 | | | | | |
| | | | | | | | | | 57 | U | 28.85 | | | | | |
| | | | | | | | | | 58 | U | 28.90 | | | | | |
| | | | | | | | | | 59 | U | | | | | | |
| | | | | | | | | | 60 | U | | | | | | |
| | | | | | | | | | 61 | U | | | | | | |
| | | | | | | | | | 62 | U | | | | | | |
| | | | | | | | | | 63 | U | | | | | | |
| | | | | | | | | | 64 | U | | | | | | |
| | | | | | | | | | 65 | U | | | | | | |
| | | | | | | | | | 66 | U | | | | | | |
| | | | | | | | | | 67 | U | | | | | | |
| | | | | | | | | | 68 | U | | | | | | |
| | | | | | | | | | 69 | U | | | | | | |
| | | | | | | | | | 70 | U | | | | | | |
| | | | | | | | | | 71 | U | | | | | | |
| | | | | | | | | | 72 | U | | | | | | |
| | | | | | | | | | 73 | U | | | | | | |
| | | | | | | | | | 74 | U | | | | | | |
| | | | | | | | | | 75 | U | | | | | | |
| | | | | | | | | | 76 | U | | | | | | |
| | | | | | | | | | 77 | U | | | | | | |
| | | | | | | | | | 78 | U | | | | | | |
| | | | | | | | | | 79 | U | | | | | | |
| | | | | | | | | | 80 | U | | | | | | |
| | | | | | | | | | 81 | U | | | | | | |
| | | | | | | | | | 82 | U | | | | | | |
| | | | | | | | | | 83 | U | | | | | | |
| | | | | | | | | | 84 | U | | | | | | |
| | | | | | | | | | 85 | U | | | | | | |
| | | | | | | | | | 86 | U | | | | | | |
| | | | | | | | | | 87 | U | | | | | | |
| | | | | | | | | | 88 | U | | | | | | |
| | | | | | | | | | 89 | U | | | | | | |
| | | | | | | | | | 90 | U | | | | | | |
| | | | | | | | | | 91 | U | | | | | | |
| | | | | | | | | | 92 | U | | | | | | |
| | | | | | | | | | 93 | U | | | | | | |
| | | | | | | | | | 94 | U | | | | | | |
| | | | | | | | | | 95 | U | | | | | | |
| | | | | | | | | | 96 | U | | | | | | |
| | | | | | | | | | 97 | U | | | | | | |
| | | | | | | | | | 98 | U | | | | | | |
| | | | | | | | | | 99 | U | | | | | | |
| | | | | | | | | | 100 | U | | | | | | |

| | | |
|--|---|--|
| <ul style="list-style-type: none"> ● Small disturbed sample ○ Large disturbed sample ▨ SPT liner sample ▩ U76 undisturbed sample ▩ U100 undisturbed sample ▩ Mazier sample ▩ Piston sample ▲ Water sample □ Piezometer / standpipe tip ↓ Standard penetration test ⊥ Water absorption (Packer) test ⊥ Permeability test ⊥ Impression packer test ∇ In-situ vane shear test | <p>LOGGED W K SIU</p> <p>DATE 07/07/2009</p> <p>CHECKED P O POON</p> <p>DATE 08/07/2009</p> | <p>REMARKS</p> <p style="text-align: center; font-size: 2em; font-weight: bold;">REVISED</p> |
|--|---|--|

t:\gintw\library\1july2009_gib\drillhole (1 feb 09) (H-UH)



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH244

SHEET **4** of **5**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836851.31
N 818388.31

DATE from 25/06/2009 **to** 06/07/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.21 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|---------------------------------------|---------|------|-----------------|---------------|-----------|--------|-------|---|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | PX 31.55 HX | | | 100 | | | | 4.4 5.4,4.6 N=19 | 54 | U76 | 30.00 | -25.79 | 30.00 | | V | As sheet 3 of 5. |
| | | | | 100 | | | | 3.5 8,12,15,17 N=52 | 55 | U76 | 31.00 | | | | | |
| | | | | 100 | | | | 24.26 39.51,10/5mm 100bls/155mm | 56 | U76 | 31.10 | | | | | |
| | | | | 100 | | | | 35.15 45.55/5mm 100bls/80mm | 57 | U76 | 31.50 31.55 | | | | | |
| | | 2.26m at 18:00 | | 100 | | | | 32.18 48.52/75mm 100bls/150mm | 58 | U76 | 32.00 | -27.79 | 32.00 | | V | Extremely weak, pink, mottled white and reddish brown, completely decomposed GRANITE. (Silty fine to coarse SAND with some subangular fine gravel sized rock fragments) |
| | | 2.28m at 08:00 | | 100 | | | | | 59 | U76 | 33.00 | | | | | |
| | | | | 98 | | | | | 60 | U76 | 33.10 | | | | | |
| | | | | 90 | | | | | 61 | U76 | 33.50 33.55 | | | | | |
| | | | | 90 | | | | | 62 | U76 | 34.00 | | | | | |
| | | | | 90 | | | | | 63 | U76 | 35.00 35.10 | | | | | |
| | | | | 90 | | | | | 64 | U76 | 35.35 35.405 | | | | | |
| | | | | 90 | | | | | 65 | U76 | 36.00 | | | | | |
| | | | | 90 | | | | | 66 | U76 | 37.00 37.10 | | | | | |
| | | | | 90 | | | | | 67 | U76 | 37.28 37.33 | | | | | |
| | | | | 90 | | | | | 68 | U76 | 38.00 | -33.79 | 38.00 | | V | Very weak, yellowish brown, completely decomposed GRANITE. (Silty fine to coarse SAND subangular fine gravel sized rock fragments) |
| | | | | 90 | | | | | 69 | U76 | 39.00 39.10 | | | | | |
| | | | | 90 | | | | | 70 | U76 | 39.35 39.40 | | | | | |

LOGGED **W K SIU**
DATE **07/07/2009**
CHECKED **P O POON**
DATE **08/07/2009**

REMARKS

REVISED



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH244

SHEET **5** of **5**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836851.31
N 818388.31

DATE from 25/06/2009 **to** 06/07/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.21 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|-------|---------|------|-------|---------------|-----------|--------|--------|---|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | HX 40.25 | | | 100 | 99 | 99 | 4.2 | | | | | -35.79 | 40.00 | | | As sheet 4 of 5. |
| | | | | 100 | | | | | | | | -36.04 | 40.25 | + | V | |
| | | | | 100 | | | | | | | | -36.53 | 40.74 | + | III/II | Moderately strong to strong, pink, mottled light grey, dappled yellowish brown, moderately to slightly decomposed medium grained GRANITE. Joints are medium to closely spaced, smooth and rough planar, tight to extremely narrow, iron and manganese stained and clean, dipping subhorizontal and 20°-30°. 40.74 - 40.94m: Moderately strong, moderately decomposed. 41.15 - 41.27m: Moderately strong, moderately decomposed. 41.50 - 41.80m: Moderately strong, moderately decomposed. |
| | | | | 100 | | | | | | | | -36.73 | 40.94 | + | III | |
| | | | | 100 | | | | | | | | -36.94 | 41.15 | + | III/II | |
| | | | | 100 | | | | | | | | -37.06 | 41.27 | + | III | |
| | | | | 100 | | | | | | | | -37.29 | 41.50 | + | III/II | |
| | | | | 96 | 86 | 43 | 8.5 | | | | | -37.59 | 41.80 | + | III | |
| | | | | 100 | | | | | | | | -38.41 | 42.62 | + | III | 42.62 - 42.99m: Moderately strong, moderately decomposed. |
| | | 2.18m at 18:00 | | 100 | 87 | 81 | 3.8 | | | | | -38.78 | 42.99 | + | III/II | |
| | | 2.38m at 08:00 | | 100 | | | | | | | | -39.94 | 44.15 | + | III | 44.15 - 44.43m: Moderately strong, moderately decomposed. |
| | | | | 100 | | | | | | | | -40.22 | 44.43 | + | III/II | |
| | | | | 100 | 98 | 90 | | | | | | -41.34 | 45.55 | + | | End of hole at 45.55m depth. |
| | | 18:00 | | 100 | | | | | | | | -45.55 | 45.55 | + | | |

LOGGED **W K SIU**
DATE **07/07/2009**
CHECKED **P O POON**
DATE **08/07/2009**

REVISED

t:\gintw\library\1july2009.gib\drillhole (1 feb 09) (H-UH)

- Small disturbed sample
- ⬆ Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- ▩ U100 undisturbed sample
- ▩ Mazier sample
- ▩ Piston sample
- ▲ Water sample
- Piezometer / standpipe tip
- ⬇ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

Site ID 2-09
(2209/SCL/EDH231)



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH231

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

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836810.43
N 817977.08

DATE from 31/03/2009 **to** 08/04/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.23 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|-------------------------|---------|-------|-------------------------|-----------|--------|-------|---|
| | | | | | | | | | No. | Type | | | | | |
| | | | | | | | | | | | | | | | As sheet 1 of 3. |
| | | | | 90 | | | | 27 bls | 13 | U76 | 10.50 | -6.27 | 10.50 | | Firm, brownish grey, sandy clayey SILT with some shell fragments. (MARINE DEPOSIT) |
| | | | | | | | | 5,4 3,2,2,1 N=8 | 14 | U76 | 10.90 10.95 11.00 | -6.77 | 11.00 | | Loose, greyish brown and brown, silty fine to coarse SAND with some subangular fine gravel sized rock fragments and some shell fragments. (MARINE DEPOSIT) |
| | | | | | | | | 27 bls | 16 | U76 | 12.00 | -7.77 | 12.00 | | Grey, clayey silty fine to medium SAND with much shell fragments. (MARINE DEPOSIT) |
| | | | | | | | | | 17 | U76 | 12.40 12.45 | | | | |
| | | | | 90 | | | | 122 bls | 18 | U76 | 13.50 | -9.27 | 13.50 | | Extremely weak, orangish brown, completely decomposed GRANITE. (Silty fine to medium SAND with occasional subangular fine gravel sized quartz fragments) |
| | | | | | | | | 3,4 4,5,7,12 N=28 | 19 | U76 | 13.90 13.95 14.00 | | | | |
| | | | | | | | | 124 bls | 20 | U76 | 14.40 14.45 | | | | |
| | | | | 95 | | | | | 21 | U76 | 15.00 | | | | |
| | | | | | | | | | 22 | U76 | 15.40 15.45 15.50 | -11.27 | 15.50 | | Moderately strong, light grey, mottled pink, spotted black, moderately decomposed porphyritic fine grained GRANITE. Joints are medium spaced, rough planar and undulating, extremely narrow, kaolin and chlorite coated, dipping 30°-40° and 50°-60°. 16.13 - 16.21m: Moderately weak, moderately decomposed. |
| | | | | 100 | 97 | 93 | 4.4 | | | T2101 | | -11.90 | 16.13 | | |
| | | | | | | | | | | T2101 | | -11.98 | 16.21 | | |
| | | | | 100 | 91 | 83 | | | | T2101 | | 16.76 | | | |
| | | | | | | | | | | T2101 | | -13.34 | 17.57 | | 17.57 - 18.43m: Orangish pink. |
| | | | | | | | | | | T2101 | | 17.97 | | | |
| | | | | 100 | 95 | 80 | | | | T2101 | | -14.20 | 18.43 | | |
| | | | | | | | | | | T2101 | | 19.50 | | | |
| | | | | 100 | 98 | 73 | | | | T2101 | | -15.43 | 19.66 | | 19.66 - 19.74m: PEGMATITE. |
| | | | | | | | | | | T2101 | | -15.54 | 19.74 | | |
| | | | | | | | | | | T2101 | | -15.77 | 20.00 | | |

t:\gin\w\library\1july2009.gib\drillhole (1 feb 09) (Hung Horn)

- Small disturbed sample
- Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- ▧ U100 undisturbed sample
- ▦ Mazier sample
- ▤ Piston sample
- ▲ Water sample
- ◻ Piezometer / standpipe tip
- ↓ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED **W K SIU**

DATE **09/04/2009**

CHECKED **P O POON**

DATE **14/04/2009**

REMARKS

Site ID L17

**(2209/SCL/ETT106; 2209/SCL/ETT068;
2209/SCL/EDH256 and 2209/SCL/EDH257(P))**



Gammon Construction Limited
Ground Engineering & Substructure Department

Project : Ground Investigation (Land) for Shatin to Central Link

Logged by : W K SIU
Date logged : 18/07/2009
Checked by : P O POON
Date checked : 20/07/2009

Co-ordinates :
E 836710.06
N 817916.85
Ground Level :
+ 4.84 mPD

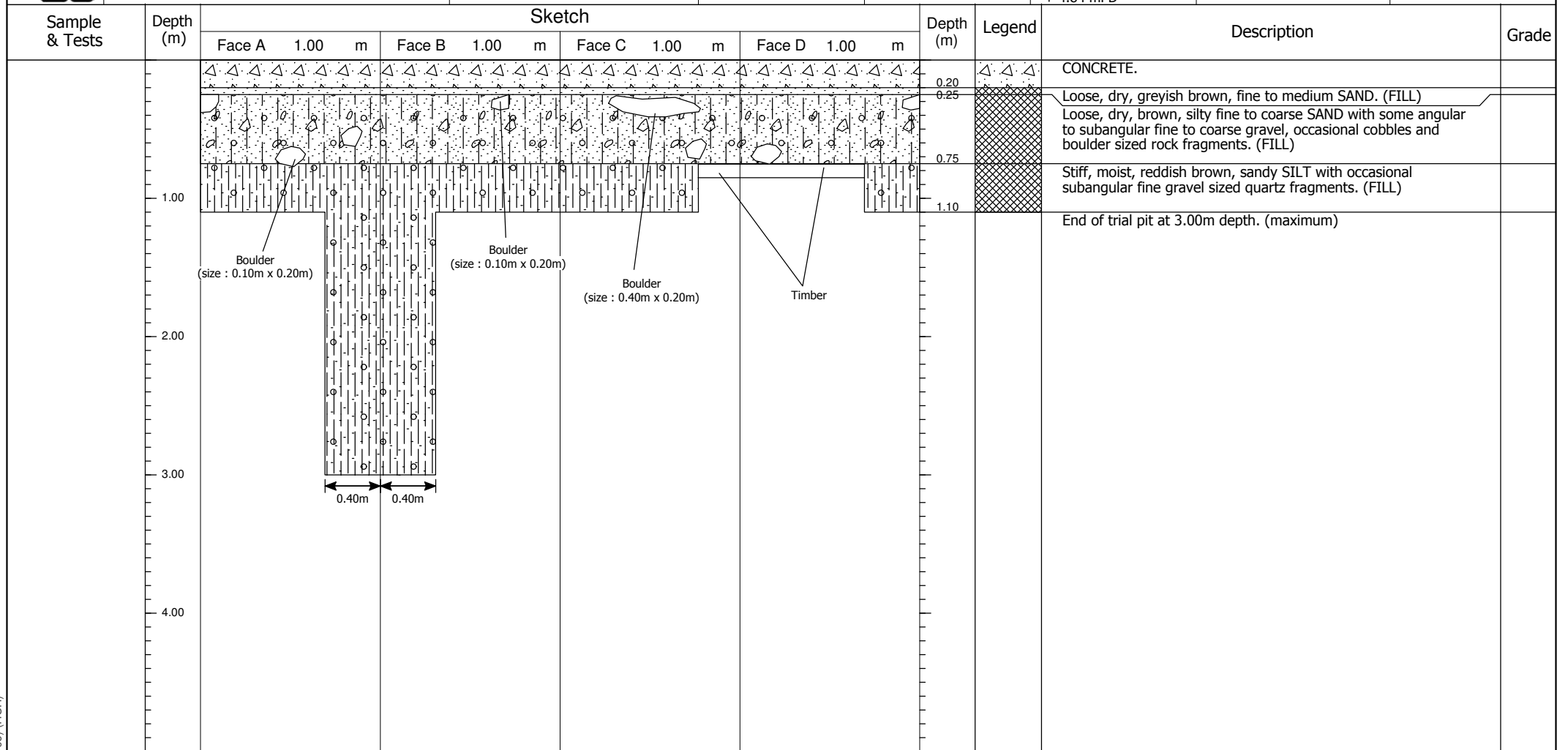
Excavation Dates:
15/07/2009 to 17/07/2009
Backfill Dates:

Trial Pit No.
2209/SCL/ETT106

TRIAL PIT RECORD

Contract No. : NEX/2209

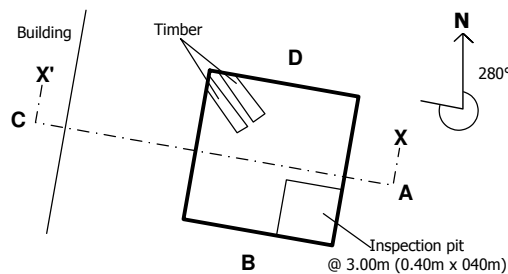
Job No.: J3251



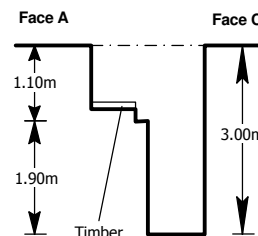
SYMBOL

- Small disturbed sample
- ⬆ Large disturbed sample
- ▬ Undisturbed vertical sample
- ▬ Undisturbed horizontal sample
- ◻ Block sample
- ⊥ In-situ density test
- ▲ Water sample
- ↘ Water seepage
- ▼ N - Schmidt Hammer Test

PLAN



SECTION (X - X')



REMARKS

1. No shoring.
 2. No seepage observed.
 3. Inspection pit (0.40m x 0.40m) was dug to 3.00m below ground level.
- Co-ordinates:
 P1 : 817916.85 N 836710.06 E G.L. 4.84 m.P.D.
 P1 : 817917.79 N 836710.10 E G.L. 4.84 m.P.D.
 P1 : 817917.84 N 836709.13 E G.L. 4.84 m.P.D.
 P1 : 817916.87 N 836709.07 E G.L. 4.84 m.P.D.



Gammon Construction Limited
Ground Engineering & Substructure Department

Project : Ground Investigation (Land) for Shatin to Central Link

Logged by : W K SIU
Date logged : 09/07/2009
Checked by : P O POON
Date checked : 09/07/2009

Co-ordinates :
E 836732.49
N 817957.03
Ground Level :
+ 4.19 mPD

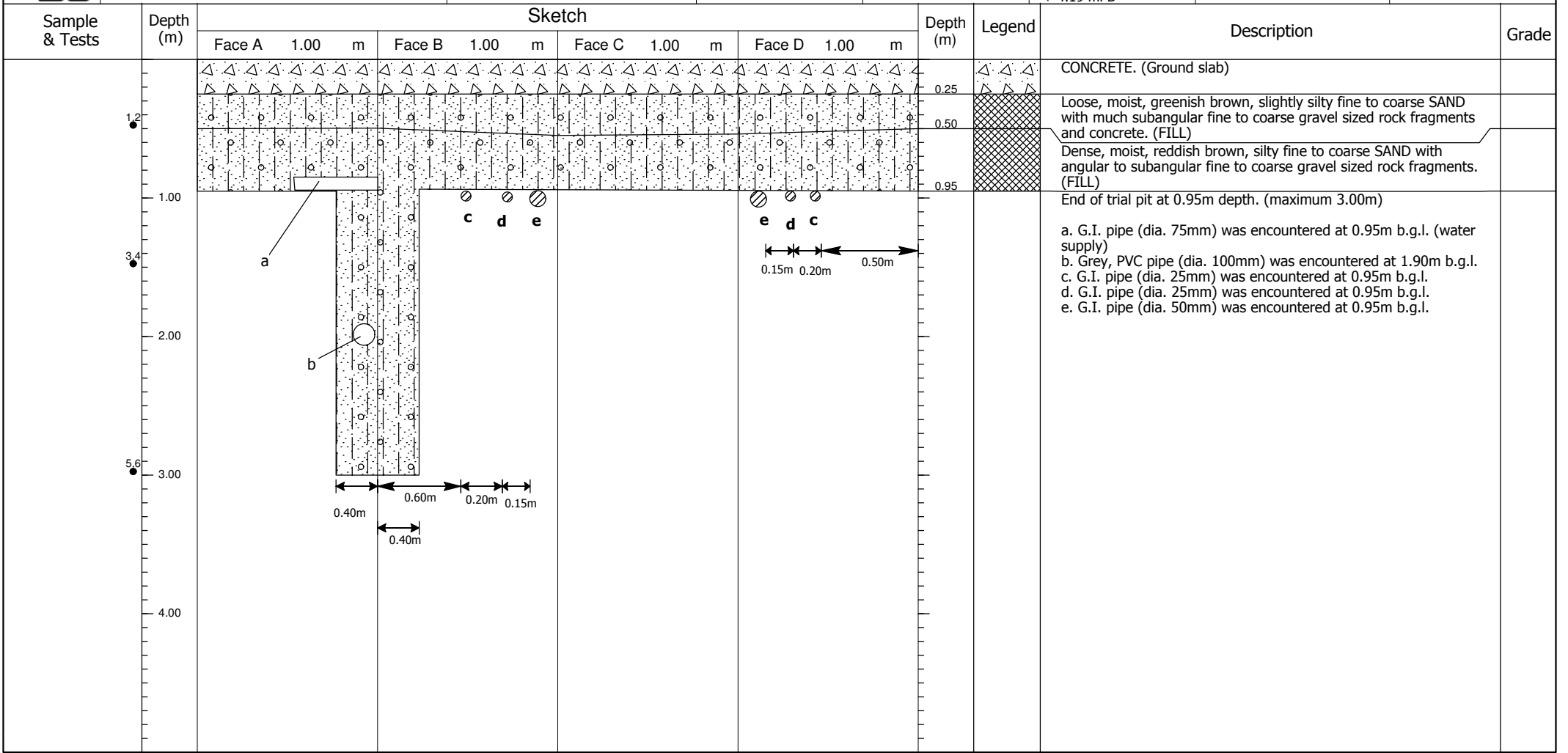
Excavation Dates:
07/07/2009 to 09/07/2009
Backfill Dates:
10/07/2009

Trial Pit No.
2209/SCL/ETT068

TRIAL PIT RECORD

Contract No. : NEX/2209

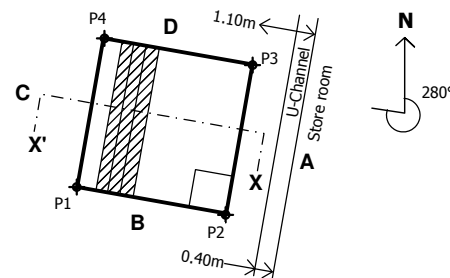
Job No.: J3251



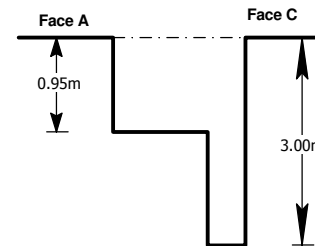
SYMBOL

- Small disturbed sample
- ⬆ Large disturbed sample
- ▬ Undisturbed vertical sample
- ▬ Undisturbed horizontal sample
- ◻ Block sample
- ┌ In-situ density test
- ▲ Water sample
- ↘ Water seepage
- ▼ N - Schmidt Hammer Test

PLAN



SECTION (X - X')



REMARKS

1. No shoring.
2. No seepage observed.
3. Inspection pit (0.40m x 0.40m) was dug to 3.00m below ground level.
4. Small disturbed samples were taken at 0.50m (2 nos.), 1.50m (2 nos.) and 3.00m (2 nos.) depths.

Co-ordinates :

- P1 : 817956.98 N 836731.63 E G.L. 4.46 m.P.D.
- P2 : 817956.88 N 836732.62 E G.L. 4.46 m.P.D.
- P3 : 817957.94 N 836732.75 E G.L. 4.44 m.P.D.
- P4 : 817958.01 N 836731.72 E G.L. 4.44 m.P.D.



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH256

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

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836711.21
N 817926.48

DATE from 15/07/2009 **to** 21/07/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.75 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|---|---------------------------------|------------------------------|---|----------------|------------------|----------------|---|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | | | | 80 | | | | 121 bls 5.7 9,11,13,17 N=50 | 15 16 17 18 | U100 U100 U100 U100 | 10.00 10.40 10.45 10.85 10.90 | | | | V | Extremely weak, pinkish brown, mottled light grey, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with some angular to subangular fine gravel sized rock fragments) |
| | | | | 70 | | | | Oil stain - N Odour - N Sheen - N | 185 bls 20 | U100 | 12.00 12.40 12.45 | | | | | |
| | | | | 45 | | | | 28.22/70mm 56.44/5mm 100bls/80mm | 200 bls 21 22 23 24 | U100 U100 U100 U100 | 13.00 13.16 13.21 13.45 13.675 13.72 | -8.25 | 13.00 | | V | Extremely weak, grey, mottled pink and white, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with some subangular to angular fine gravel sized rock fragments) |
| | | | | 0 | | | | Oil stain - N Odour - N Sheen - N | 200 bls 25 | U100 | 15.00 15.08 15.13 | | | | | |
| | | 2.24m at 18:00 | | 0 | | | | | 200 bls 26 | U100 | 16.00 16.035 16.035 16.085 | | | | | |
| | PX 16.53 HX | 2.34m at 08:00 | | 0 | | | | 38.12/1mm 100/4mm 100bls/4mm | 27 | U100 | 16.45 16.48 16.53 | | | | | |
| | | | | 31 | 31 | 18 | 10.7 | | | | | 17.10 | -12.35 | 17.10 | III | Moderately strong, pink, mottled white and yellow, moderately decomposed medium grained GRANITE. Joints are closely spaced, rough planar, very narrow, clean, dipping subhorizontal. |
| | | | | 0 | | | N.R. | | | | | -12.63 | 17.38 | V | 17.38 - 18.00m: No recovery. Inferred as completely decomposed GRANITE. | |
| | | 2.21m at 18:00 | | 0 | | | | | | | | 18.00 | -13.25 | 18.00 | IV | Weak, pink, mottled white, highly decomposed GRANITE. (Subangular fine to medium GRAVEL sized rock fragments) |
| | HX 18.60 | 2.46m at 08:00 | | 50 | 12 | 0 | >20 | | | | | 18.50 18.60 | -13.85 -14.00 | 18.60 18.75 | IV/III | Moderately weak, pinkish brown, mottled white, highly to moderately decomposed GRANITE. Joints are closely to very closely spaced, rough planar, very narrow to narrow, kaolin coated and clean, dipping subhorizontal and 70°-80°. 18.60 - 18.75m: Very closely spaced joints. 19.00 - 19.37m: No recovery. Inferred as |
| | | | | 72 | 31 | 29 | 9.1 | | | | | | -14.25 -14.62 | 19.00 19.37 | V | |
| | | | | | | | | | | | | 19.50 | -15.17 | 19.92 20.00 | IV/III | |

LOGGED **W K SIU**
DATE **22/07/2009**
CHECKED **P O POON**
DATE **23/07/2009**

REMARKS

REVISED

t:\gintw\library\1july2009.gib\drillhole (1 feb 09) (H-UH)



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH257P

SHEET 1 of 3

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836737.00
N 817918.06

DATE from 07/07/2009 **to** 11/07/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.71 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|---------|------------------------|------|-------|---------------|-----------|--------|-------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| 07/07/2009 | PX | 08:00 | | | | | | | | | | | | | | Greenish grey, and light grey, fine to coarse SAND with much angular fine to coarse gravel sized concrete fragments. (FILL) |
| | | | | | | | | | | | | | | | | Greyish brown, silty fine to coarse SAND with much subangular fine to coarse gravel and silt pellet. (FILL) |
| | | | | | | | | | | | | | | | | Reddish brown, fine to coarse SAND with some subangular fine to coarse gravel sized silty pellet. (FILL) |
| | | | | | | | | | | | | | | | | Medium dense, brown and dark brown, silty fine to coarse SAND with some subangular fine gravel sized concrete and rock fragments. (FILL) |
| 07/07/2009 | | Dry at 18:00 | | | | | | | | | | | | | | |
| 08/07/2009 | | 2.36m at 08:00 | | 95 | | | | 25 bls | | | | | | | | Oil stain - N Odour - N Sheen - N |
| | | | | | | | | | | | | | | | | |
| | | | | 95 | | | | 27 bls | | | | | | | | |
| | | | | | | | | | 3,3 4,4,4,5 N=17 | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | 65 | | | | 150 bls | | | | | | | | Oil stain - N Odour - N Sheen - N |
| | | | | 75 | | | | | | | | | | | | |
| 08/07/2009 | | 2.24m at 18:00 | | | | | | | | | | | | | | |
| 09/07/2009 | | 2.40m at 08:00 | | 0 | | | | 50 bls | | | | | | | | |
| | | | | | | | | | 6,6 4,4,5,5 N=18 | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | 95 | | | | 52 bls | | | | | | | | Oil stain - N Odour - N Sheen - N |
| | | | | | | | | | | | | | | | | |

LOGGED **W K SIU**
DATE **13/07/2009**
CHECKED **P O POON**
DATE **14/07/2009**

REMARKS

1. Inspection pit was dug to 3.00m depth.
2. Ground gas measurement was carried out at 2.00m depth. (CO 0ppm, H2S 0ppm, LEL 0%, Oxy 20.90%)
3. Constant head tests was carried out at 4.50m-6.00m depth.
4. Standpipe was installed at 8.00m depth.
5. Water sample was taken at 6.00m depth.

REVISED

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Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH257P

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

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836737.00
N 817918.06

DATE from 07/07/2009 **to** 11/07/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.71 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|--|------------------|-----------------------|-----------------------|--------|----------------|---|----------------------|--|-------|---------------|-----------|--------|---|-------------|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | | | 95 | | | | | 195 bls 12.13 13.15,14,15 N=57 | 13 14 15 16 | 10.00 10.40 10.45 10.85 10.90 | -5.29 | 10.00 | | V | Extremely weak, pink, mottled light grey, white and black, completely decomposed GRANITE. (Silty fine to coarse SAND with some subangular fine gravel sized rock fragments) | |
| | | | 70 | | | | | Oil stain - N Odour - N Sheen - N | 17 18 | 12.00 12.375 12.425 | | | | | | |
| | | | 0 | | | | | 200 bls | 19 20 | 13.00 13.31 13.36 13.45 | | -8.74 | 13.45 | V/IV | Very weak, pink, mottled light grey, white and green, completely decomposed GRANITE. (Silty sandy subangular fine GRAVEL sized rock fragments) | |
| | | | 0 | | | | | Oil stain - N Odour - N Sheen - N | 22 | 15.00 15.215 15.265 | | | | | | |
| | | | 0 | | | | | 200 bls | 23 24 | 16.00 16.195 16.245 16.45 16.705 16.755 | | | | | | |
| | | | 0 | | | | | 23.26 36.43,21/5mm 100bls/155mm | 25 | 17.20 18.00 18.205 18.255 | | | | | | |
| | | 2.26m at 09:07/2009 2.38m at 10:07/2009 | 0 | | | | | Oil stain - N Odour - N Sheen - N | 26 27 | 19.00 19.11 19.16 19.45 19.553 19.603 | | -14.29 | 19.00 | IV | Weak, pinkish brown, mottled light grey, highly decomposed medium grained GRANITE. (Angular fine to medium GRAVEL sized rock fragments) | |
| | | | 0 | | | | | 50/75mm 70.30/3mm 100bls/78mm | | | | -15.29 | 20.00 | | | |

t:\gin\w\library\1july2009.gib\drillhole (1 feb 09) (H-UH)

- Small disturbed sample
- ▬ Large disturbed sample
- ▬ SPT liner sample
- ▬ U76 undisturbed sample
- ▬ U100 undisturbed sample
- ▬ Mazier sample
- ▬ Piston sample
- ▲ Water sample
- Piezometer / standpipe tip
- ↓ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED **W K SIU**
DATE **13/07/2009**
CHECKED **P O POON**
DATE **14/07/2009**

REMARKS

REVISED



Gammon Construction Limited
Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH257P

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

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

| | | |
|-----------------------|----------------------------|------------------------------------|
| METHOD Rotary | CO-ORDINATES | PROJECT No. J3251 |
| MACHINE & No. 20-109 | E 836737.00 N 817918.06 | DATE from 07/07/2009 to 11/07/2009 |
| FLUSHING MEDIUM WATER | ORIENTATION Vertical | GROUND LEVEL + 4.71 mPD |

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|-------|---------|-------|-------|---------------|-----------|--------|--------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | PX 20.71 HX | | | | | | | | | | | | | | IV | As sheet 2 of 3. |
| | | 2.18m at 18:00 | | 100 | 29 | 15 | 15.4 | | | | 20.71 | -16.00 | 20.71 | | III | Moderately strong, brown, mottled light grey, white and greenish brown, moderately to highly decomposed medium grained GRANITE. Joints are medium to closely spaced, rough planar and undulating, extremely narrow, iron stained, kaolin coated and clean, dipping 20°-30° and 50°-60°. 20.71 - 21.10m: Subvertical joint. 21.10 - 21.50m: Very closely spaced joints. 21.85 - 22.58m: Subvertical joint. |
| | | 2.34m at 08:00 | | 97 | 80 | 51 | 5.7 | | | T2101 | 20.71 | -16.39 | 21.10 | | | |
| | | | | | | | >20 | | | | 21.60 | -16.79 | 21.50 | | | |
| | | | | | | | 5.7 | | | T2101 | 21.60 | -17.14 | 21.85 | | | |
| | HX 22.76 | | | 100 | 100 | 100 | 1.3 | | | | 22.76 | -17.87 | 22.58 | | III/II | 22.58 - 22.68m: Non intact. Moderately strong to strong, pinkish brown, mottled light grey, white and greenish brown, moderately to slightly decomposed medium grained GRANITE. Joints are widely spaced, rough undulating, tight, clean, dipping subhorizontal. |
| | | | | | | | NI | | | | 22.76 | -17.97 | 22.68 | | | |
| | | | | 100 | 96 | 87 | | | | | 24.25 | | | | | 25.07 - 25.17m: Very closely spaced joints. |
| | | | | | | | >20 | | | T2101 | 24.25 | -20.36 | 25.07 | | | |
| | | | | | | | 5.5 | | | | 25.81 | -20.46 | 25.17 | | | |
| | | | | 100 | 97 | 85 | | | | | 25.81 | -20.60 | 25.31 | | II | Strong, light grey spotted white and black, slightly decomposed GRANITE. Joints are medium spaced, locally very closely spaced, rough undulating, tight, iron stained, clean, dipping subhorizontal, 10°-20° and 70°-80°. |
| | | | | | | | | | | | 25.81 | | | | | |
| | | | | 100 | 86 | 82 | | | | | 27.15 | -22.11 | 26.82 | | | 26.82 - 27.00m: PEGMATITE vein. |
| | | | | | | | | | | | 27.15 | -22.29 | 27.00 | | | 27.20 - 27.50m: PEGMATITE vein. |
| | | | | | | | | | | T2101 | 27.15 | -22.49 | 27.20 | | | |
| | | 2.26m at 18:00 | | | | | | | | | 27.15 | -22.79 | 27.50 | | | |
| | | | | | | | | | | | 28.10 | -23.39 | 28.10 | | | End of hole at 28.10m depth. |

| | | |
|--|---|---|
| <ul style="list-style-type: none"> ● Small disturbed sample ▲ Water sample ⬇ Large disturbed sample ⬇ Piezometer / standpipe tip ⬇ SPT liner sample ⬇ Standard penetration test ▨ U76 undisturbed sample ⬇ Water absorption (Packer) test ▨ U100 undisturbed sample ⬇ Permeability test ▨ Mazier sample ⬇ Impression packer test ▨ Piston sample ⬇ In-situ vane shear test | <p>LOGGED W K SIU</p> <p>DATE 13/07/2009</p> <p>CHECKED P O POON</p> <p>DATE 14/07/2009</p> | <p>REMARKS</p> <p align="center" style="font-size: 2em;">REVISED</p> |
|--|---|---|

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Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH229P

SHEET 1 of 4

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836788.17
N 817875.41

DATE from 04/06/2009 **to** 10/06/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.18 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|----------------------|-------------------|-----------------|------------------|-----------------------|---|--------|----------------|--------|---------|------|----------------------|---------------|-----------|--------|-------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| Cloudy 04/06/2009 | PX | 08:00 | | | | | | | | | | | | | | Dark brown and brown, silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments. (FILL) |
| | | | | | Oil stain - N Odour - N Sheen - N | | | | A | • | 0.45 0.50 | 3.68 | 0.50 | | | Brown, silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments. (FILL) |
| | | | | | | | | | B | • | 0.95 1.00 | | | | | |
| | | | | | Oil stain - N Odour - N Sheen - N | | | | C | • | 1.45 1.50 | | | | | |
| | | | | | | | | | D | • | 1.95 2.00 | | | | | |
| | | | | | | | | | E | • | 2.45 2.50 | | | | | |
| | | Dry at 18:00 | | | | | | | F | • | 2.95 3.00 | 1.18 | 3.00 | | | |
| Cloudy 04/06/2009 | | 2.20m at 08:00 | | 85 | Oil stain - N Odour - N Sheen - N | | | 21 bls | 1 | ■ | 3.40 3.45 | | | | | Brown, very silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments. (FILL) |
| Fine 05/06/2009 | | | | 85 | | | | 19 bls | 3 | ■ | 4.00 | | | | | |
| | | | | | | | | | 4 | ■ | 4.40 4.45 4.50 | -0.32 | 4.50 | | | Soft to firm, brown, sandy SILT. (FILL) |
| | | | | | | | | | 5 | • | 4.90 4.95 | | | | | |
| | | | | 100 | Oil stain - N Odour - N Sheen - N | | | 41 bls | 6 | ■ | 5.90 6.00 | -1.82 | 6.00 | | | Brown, slightly silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments. (FILL) |
| | | | | 85 | | | | 41 bls | 8 | ■ | 6.40 6.45 | | | | | |
| | | | | | | | | | 9 | ■ | 7.40 7.45 7.50 | -2.82 | 7.00 | | | Firm, brown, sandy SILT. (FILL) |
| | | | | | | | | | 10 | • | 7.90 7.95 | | | | | |
| | | 1.96m at 18:00 | | 80 | Oil stain - N Odour - N Sheen - N | | | 75 bls | 11 | ■ | 9.00 | -4.82 | 9.00 | | V | Extremely weak, pink, spotted white, completely decomposed GRANITE. (Firm, sandy SILT with some subangular fine gravel sized quartz fragments) |
| Fine 05/06/2009 | | 2.32m at 08:00 | | | | | | | 12 | ■ | 9.40 9.45 | | | | | |
| Cloudy 08/06/2009 | | | | | | | | | | | | | | | | |

- Small disturbed sample
- Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- U100 undisturbed sample
- ▨ Mazier sample
- ▩ Piston sample
- ▲ Water sample
- Piezometer / standpipe tip
- ↓ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED W K SIU
DATE 11/06/2009
CHECKED P O POON
DATE 12/06/2009

REMARKS
1. Inspection pit was dug to 3.00m depth.
2. Ground gas measurement was carried out at 2.00m depth. (CO 0ppm, H2S 0ppm, LEL 0%, Oxy 20.90%)
3. Constant head permeability permeability tests were carried out at 6.00m-7.50mm and 14.00m-15.50m depths.
4. Packer (Water Absorption) test was carried out at 20.00m-25.00m depth.
(to be continued...)



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH229P

SHEET **3** of **4**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836788.17
N 817875.41

DATE from 04/06/2009 **to** 10/06/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.18 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|--|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|--------|---------|-------|-------|---------------|-----------|--------|-------|------------------|
| | | | | | | | | | No. | Type | Depth | | | | | |
| Cloudy 09/06/2009 Cloudy 10/06/2009 | HX 20.45 | 2.48m at 18:00 | 100 | 97 | 56 | 11 | 2.4 | | T2101 | | | -15.82 | 20.00 | | III | As sheet 2 of 4. |
| | | | | 98 | 73 | 16 | 13.0 | | T2101 | | | 20.45 | | | | |
| | | | | >20 | | | | | T2101 | | | -16.97 | 21.15 | | | |
| | | | | 13.3 | | | | | T2101 | | | 21.30 | | | | |
| | | | | >20 | 54 | 54 | 4.2 | | T2101 | | | -17.62 | 21.80 | | | |
| | | | | 4.2 | | | | | T2101 | | | 22.51 | | | | |
| | | | | >20 | | | | | T2101 | | | -18.37 | 22.55 | | | |
| | | | | 2.3 | 100 | 100 | 89 | | 5.8 | T2101 | | | 23.91 | | | |
| | | | | 11.0 | | | | | T2101 | | | 23.91 | | | | |
| | | | | 3.5 | 100 | 89 | 77 | | | T2101 | | | 25.40 | | | |
| 1.3 | | | | | T2101 | | | 26.90 | | | | | | | | |
| | | | | | T2101 | | | 27.56 | | | | | | | | |
| | | | | | T2101 | | | -23.88 | 28.06 | | | | | | | |
| | | | | | T2101 | | | 29.05 | | | | | | | | |
| | | | | | T2101 | | | -25.82 | 30.00 | | | | | | | |

- Small disturbed sample
- Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- ▧ U100 undisturbed sample
- ▦ Mazier sample
- ▤ Piston sample
- ▲ Water sample
- ◻ Piezometer / standpipe tip
- ⊥ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED W K SIU

DATE 11/06/2009

CHECKED P O POON

DATE 12/06/2009

REMARKS

t:\gin\w\library\1july2009.gib\drillhole (1 Feb 09) (Hung Horn)



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH229P

SHEET **4** of **4**

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

| | | |
|-----------------------|--|------------------------------------|
| METHOD Rotary | CO-ORDINATES E 836788.17 N 817875.41 | PROJECT No. J3251 |
| MACHINE & No. 20-109 | | DATE from 04/06/2009 to 10/06/2009 |
| FLUSHING MEDIUM WATER | ORIENTATION Vertical | GROUND LEVEL + 4.18 mPD |

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|----------------------|-------------------|-----------------|------------------|-----------------------|-----------------------|--------|----------------|-------|---------|------|--------|---------------|-----------|--------|-------|------------------------------|
| | | | | | | | | | No. | Type | Depth | | | | | |
| Cloudy 10/06/2009 | | 2.10m at 18:00 | | 97 | 97 | 97 | | | | | -25.82 | 30.00 | + | + | III | As sheet 3 of 4. |
| | | | | | | | | | | | -26.14 | 30.32 | + | + | | End of hole at 30.32m depth. |
| | | | | | | | | | | | -40.00 | | | | | |

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| | | |
|---|---|---|
| <ul style="list-style-type: none"> ● Small disturbed sample ○ Large disturbed sample ▨ SPT liner sample ▩ U76 undisturbed sample ■ U100 undisturbed sample ▨ Mazier sample ▩ Piston sample | <ul style="list-style-type: none"> ▲ Water sample □ Piezometer / standpipe tip ↓ Standard penetration test ⊥ Water absorption (Packer) test ⊥ Permeability test ⊥ Impression packer test ∇ In-situ vane shear test | <p>LOGGED W K SIU</p> <p>DATE 11/06/2009</p> <p>CHECKED P O POON</p> <p>DATE 12/06/2009</p> |
| REMARKS | | |

Site ID 3-02

(2209/SCL/EDH229(P) and 2209/SCL/EDH124(P))



Gammon Construction Limited

Ground Engineering & Substructure Department

HOLE No.
2209/SCL/EDH124

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

DRILLHOLE RECORD

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary

CO-ORDINATES

PROJECT No. J3251

MACHINE & No. 20-109

E 836810.60
N 817937.70

DATE from 06/05/2009 **to** 08/05/2009

FLUSHING MEDIUM WATER

ORIENTATION Vertical

GROUND LEVEL + 4.05 mPD

| Drilling Progress | Casing depth/size | Water Depth (m) | Water Recovery % | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | | | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------|-------------------|----------------------|------------------|-----------------------|-----------------------|--------|----------------|-------|---------|-------------------------|----------------|----------------|-----------|--------|-------|--|
| | | | | | | | | | No. | Type | Depth | | | | | |
| | | | | | | | | | | | | | | | | As sheet 1 of 2. |
| 08/05/2009 Fine | PX 10.80 | 2.58m at 18:00 | | 38 | | | | | | 10.40 T2101 10.80 | -6.35 -6.75 | 10.40 10.80 | | | | Light grey, subangular coarse GRAVEL and COBBLES sized rock and concrete fragments. (FILL) End of hole at 10.80m depth. |
| | | | | | | | | | | | | | | | | |

t:\ginhw\library\1july2008_gibdrillhole (1 feb 09) (Hung Horn)

- Small disturbed sample
- Large disturbed sample
- ▨ SPT liner sample
- ▩ U76 undisturbed sample
- U100 undisturbed sample
- ▧ Mazier sample
- ▨ Piston sample
- ▲ Water sample
- Piezometer / standpipe tip
- ↓ Standard penetration test
- ⊥ Water absorption (Packer) test
- ⊥ Permeability test
- ⊥ Impression packer test
- ∇ In-situ vane shear test

LOGGED W K SIU
DATE 09/05/2009
CHECKED P O POON
DATE 11/05/2009

REMARKS

PRELIMINARY

Soil Profile Logs under Post-Stage 1 SI

Site ID 2-02

(11202/SCL/EDH136)

REVISED

PRELIMINARY



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH136

SHEET **1** OF **2**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0113**

E 836778.96

DATE FROM **31/05/2010** TO **08/06/2010**

N 817985.86

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+3.50 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------------|------------------|-------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|---|
| 31/05/2010 | SX | 08:00 | | | | | | | +3.50 | 0.00 | | | |
| | | | | | | | | 1 ● | | 0.50 | | | Brown, silty fine to coarse SAND with some subangular fine to coarse gravel sized moderately decomposed granite fragments and occasional concrete. (FILL) |
| | | | | | | | | 2 ● | +2.50 | 1.00 | | | Brown, silty fine to coarse SAND with occasional subangular fine to coarse gravel sized moderately decomposed granite fragments. (FILL) |
| | | | | | | | | 3 ● | | 1.50 | | | |
| | | | | | | | | 4 ● | | 2.00 | | | |
| | | | | | | | | 5 ● | | 2.50 | | | |
| 31/05/2010 04/06/2010 | SX 3.00 PX | 18:00 2.00m at 08:00 | 91 | | | | 96 bls | 6 ● | +0.50 | 3.00 | | | Brown, silty fine to coarse SAND with occasional subangular fine gravel sized moderately decomposed granite fragments. (FILL) |
| 04/08/2010 07/08/2010 | | 2.09m at 08:00 | | | | | | 7 ● | | 3.45 | | | |
| | | | | | | | | 8 ● | | | | | |
| | | | 98 | | | | 83 bls | 9 ▲ | | 6.00 | | | |
| | | | | | | | | 10 ● | | 6.45 | | | |
| | | | | | | | | | | | | | |
| | | | 96 | | | | 31 bls | 11 ● | -5.50 | 9.00 | | | Greenish grey, silty fine to coarse SAND with occasional shell fragments. (FILL) |
| | | | | | | | | 12 ● | | 9.45 | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬇️ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇️ STANDARD PENETRATION TEST
- ▨ U100 UNDISTURBED SAMPLE
- ⬇️ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⬇️ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ⬇️ IN-SITU VANE SHEAR TEST
- ⬇️ PACKER TEST

LOGGED **Tony Poon**

DATE **09/06/2010**

CHECKED **James Lu**

DATE **10/06/2010**

REMARKS

- Gas detection was carried.
- Water sample (2L) was taken at a depth of 6.00m.
- Jar samples were taken at the depths of 0.50m, 1.50m and 3.00m.



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH136

SHEET **2** OF **2**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0113**

E 836778.96

DATE FROM **31/05/2010** TO **08/06/2010**

N 817985.86

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+3.50 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------------|-------------|------------------------|-----------------------|-----------------------|--------|--------------------|---------|---------|---------------|-----------|--------|-------|--|
| | PX | | | | | | | | | 10.00 | | | See sheet 1 of 2 for details. |
| | | | 100 | | | | 196 bls | 13 | -8.50 | 12.00 | | V | Extremely weak, light brownish yellow striped black spotted grey and white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| | | | 100 | | | | 121 bls | 14 | | 12.45 | | V | |
| | | 2.11m at 18:00 | 100 | | | | | 15 | -11.50 | 15.00 | | V | Extremely weak, light brownish pink spotted brown, grey and white, completely decomposed, medium grained GRANITE. (Slightly silty fine to coarse SAND) |
| 07/06/2010 08/06/2010 | | 2.31m at 08:00 | | | | | | 16 | | 15.45 | | V | |
| | PX 17.88 | | 100 | 95 | 95 | >20 10.0 0.0 | | | -14.38 | 17.88 | | III | Moderately strong, pinkish brown mottled brown spotted grey, black and white, moderately decomposed, medium grained GRANITE. Joints are medium spaced, locally very closely spaced, rough planar, very narrow, iron oxide stained, dipping at 0° to 10°. |
| | | | | | | | | | -14.79 | 18.29 | | II | |
| 08/06/2010 | | 2.15m at 13:00 | | | | | | | -15.43 | 18.93 | | | |
| | | | | | | | | | | | | | Strong, pink spotted grey, green and black, slightly decomposed, slightly chloritized, medium grained GRANITE. No joint. Hole completed at 18.93m. |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬆ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇ STANDARD PENETRATION TEST
- ▨ U100 UNDISTURBED SAMPLE
- ⬇ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⬇ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ⬇ IN-SITU VANE SHEAR TEST
- ⬇ PACKER TEST


LOGGED **Tony Poon**
 DATE **09/06/2010**
 CHECKED **James Lu**
 DATE **10/06/2010**

REMARKS

Site ID 2-04, 2-06, and 2-07

**(11202/SCL/EDH138; 11202/SCL/EDH139;
11202/SCL/EDH140; 11202/SCL/EDH141;
11202/SCL/EDH142; 11202/SCL/EDH143;
11202/SCL/EDH144)**

PRELIMINARY

|  | | GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD. GROUND INVESTIGATION DEPARTMENT | | | | HOLE NO. 11202/SCL/EDH138 | | | | | | | |
|--|------------------|---|--|-----------------------|--|-------------------------------------|--------|----------------|---------------|-----------|-----------------------|-------|---|
| | | | | | | SHEET 1 OF 3 | | | | | | | |
| DRILLHOLE RECORD | | | | | | CONTRACT NO. 11202 | | | | | | | |
| PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link | | | | | | | | | | | | | |
| METHOD Rotary Cored | | | CO-ORDINATES E 836867.98 N 818332.14 | | JOB NO. GCE1001SI | | | | | | | | |
| MACHINE & NO. 20-0092 | | | | | DATE FROM 19/06/2010 TO 08/07/2010 | | | | | | | | |
| FLUSHING MEDIUM Water | | | ORIENTATION Vertical | | GROUND LEVEL +4.44 mPD | | | | | | | | |
| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
| 19/06/2010 | SX | 08:00 | | | | | | INSPECTION PIT | +4.44 | 0.00 | [Cross-hatch pattern] | | Light brown, slightly silty fine to coarse SAND with much subangular fine to coarse gravel of moderately decomposed granite fragments. Contains some concrete fragments. (FILL) |
| | | | | | | | | 1 | | 0.50 | | | Brown spotted black, silty fine to coarse SAND. Contains occasional bitumen fragments. (FILL) |
| | | | | | | | | 2 | +3.44 | 1.00 | | | Contains occasional bitumen fragments. (FILL) |
| | | | | | | | | 3 | | 1.50 | | | |
| | | | | | | | | 4 | +2.44 | 2.00 | | | Light brown, angular fine to coarse GRAVEL sized moderately decomposed granite in sandy matrix. Contains occasional concrete fragments. (FILL) |
| | | | | | | | | 5 | +1.94 | 2.50 | | | Light brown, angular fine to coarse GRAVEL sized moderately decomposed granite in sandy matrix. Contains occasional concrete fragments. (FILL) |
| 31/08/2010 26/08/2010 | | 18:00 Dry at 08:00 | 100 | | | | 21 bls | 6 | +1.44 | 3.00 | | | Light orangish brown, slightly clayey silty fine to coarse SAND. Contains occasional concrete fragments. (FILL) |
| | | | | | | | | 7 | | 3.45 | | | Dark grey, slightly clayey fine to coarse SAND. (FILL) |
| | | | | | | | | 8 | | | | | |
| 6/28/08/2010 05/07/2010 | SX 6.00 PX | 2.15m at 18:00 2.21m at 08:00 | 100 | | | | 25 bls | 9 | -1.56 | 6.00 | | | Light orangish brown, silty fine to coarse SAND. Contains occasional wood and shell fragments. (FILL) |
| | | | | | | | | 10 | | 6.45 | | | Light orangish brown, silty fine to coarse SAND. Contains occasional wood and shell fragments. (FILL) |
| | | | | | | | | 11 | -4.56 | 9.00 | | | Soft, greenish grey mottled dark grey, slightly sandy SILT. Contains occasional shell fragments. (FILL) |
| | | | 100 | | | | 42 bls | 12 | | 9.45 | | | Soft, greenish grey mottled dark grey, slightly sandy SILT. Contains occasional shell fragments. (FILL) |
| | | | | | | | | 12 | | | | | Soft, greenish grey mottled dark grey, slightly sandy SILT. Contains occasional shell fragments. (FILL) |

- SMALL DISTURBED SAMPLE
- ▲ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- ▩ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ↓ STANDARD PENETRATION TEST
- ┆ PERMEABILITY TEST
- ▨ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ┆ PACKER TEST

LOGGED **Tony Poon**

DATE **09/07/2010**

CHECKED **James Lu**

DATE **10/07/2010**

REMARKS

1. Water sample was taken at a depth of 6.00m.
2. Gas detection was carried.



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH138

SHEET **2** OF **3**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836867.98

DATE FROM **19/06/2010** TO **08/07/2010**

N 818332.14

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.44** mPD

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|---------|---------------|-----------|--------|-------|--|
| | PX | | | | | | | | | 10.00 | | | See sheet 1 of 3 for details. |
| 11 | | | | | | | | | | | | | |
| 12 | | | 100 | | | | 117 bls | 13 | -7.56 | 12.00 | | | Light greenish grey, slightly silty fine to coarse SAND. Contains occasional shell fragments. (FILL) |
| | | | | | | | | 14 | | 12.45 | | | |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | 2.20m at 18:00 | 100 | | | | 164 bls | 15 | -10.56 | 15.00 | | | Light brown, fine to coarse SAND. (ALLUVIUM) |
| 16 | | 2.17m at 08:00 | | | | | | 16 | | 15.45 | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | 100 | | | | 83 bls | 17 | -13.56 | 18.00 | | | Light grey, clayey silty fine to coarse SAND. (ALLUVIUM) |
| 19 | | | | | | | | 18 | | 18.45 | | | |
| 20 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬆️ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇️ STANDARD PENETRATION TEST
- ▩ U100 UNDISTURBED SAMPLE
- ⬇️ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⬇️ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ∇ IN-SITU VANE SHEAR TEST
- ⬇️ PACKER TEST

LOGGED Tony Poon
 DATE 09/07/2010
 CHECKED James Lu
 DATE 10/07/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH138

SHEET **3** OF **3**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836867.98

DATE FROM **19/06/2010** TO **08/07/2010**

N 818332.14

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.44** mPD


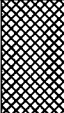
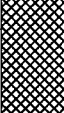
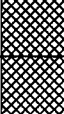
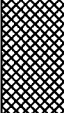
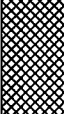

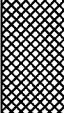
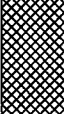
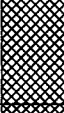
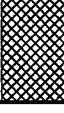
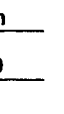
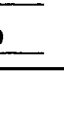
| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-----------|--|
| 20 | PX | | | | | | | | | 20.00 | | | See sheet 2 of 3 for details. |
| 21 | | | 100 | | | | 33 bis | 19 | -16.56 | 21.00 | | | Light yellow spotted grey and white, clayey silty fine to coarse SAND. (ALLUVIUM) |
| 22 | | | | | | | | 20 | | 21.45 | | | |
| 23 | | | | | | | | | | | | | Extremely weak, reddish pink spotted grey and white, completely decomposed, medium grained GRANITE. (Clayey silty fine to coarse SAND) |
| 24 | | | 100 | | | | 40 bis | 21 | -19.56 | 24.00 | | V | |
| 25 | | | | | | | | 22 | | 24.45 | | | |
| 26 | PX | 2.18m at 18:00 | | | | | | | | | | | |
| 27 | PX | 2.19m at 08:00 | 100 | 100 | 99 | 1.1 | | | -21.92 | 26.36 | | III II | Strong, pink spotted grey, black and white, slightly decomposed, medium grained GRANITE. Joints are widely spaced, rough planar, extremely narrow, iron oxide stained, dipping at 0° to 10°. |
| 28 | | 18:00 | | | | | | | -22.86 | 27.30 | | | From 26.36m to 26.42m: Moderately strong, brown, moderately decomposed (60mm thick). Hole completed at 27.30m. |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬆️ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇️ STANDARD PENETRATION TEST
- ▩ U100 UNDISTURBED SAMPLE
- ⬇️ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- II IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- V IN-SITU VANE SHEAR TEST
- I PACKER TEST

LOGGED Tony Poon
 DATE 09/07/2010
 CHECKED James Lu
 DATE 10/07/2010

REMARKS

PRELIMINARY

|  | | GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD. GROUND INVESTIGATION DEPARTMENT | | | | HOLE NO. 11202/SCL/EDH139 | | | | | | | |
|--|-------------|---|--|-----------------------|-------------------------------|--|-------|--|---------------|-----------|---|-------|---|
| | | | | | | SHEET 1 OF 5 | | | | | | | |
| DRILLHOLE RECORD | | | | | | CONTRACT NO. 11202 | | | | | | | |
| PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link | | | | | | | | | | | | | |
| METHOD Rotary Cored | | | CO-ORDINATES E 836869.68 N 818340.35 | | JOB NO. GCE1001SI | | | | | | | | |
| MACHINE & NO. 20-0104 | | | | | | DATE FROM 15/06/2010 TO 06/07/2010 | | | | | | | |
| FLUSHING MEDIUM Water | | | ORIENTATION Vertical | | GROUND LEVEL +4.45 mPD | | | | | | | | |
| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
| 15/06/2010 | SX | 08:00 | | | | | | 1 ● | +4.45 | 0.00 |  | | Light grey, slightly silty fine to coarse SAND with much subangular fine to coarse gravel sized moderately decomposed granite. Contains occasional concrete fragments. (FILL) |
| 2 | | | | | | | 2 ● | +3.45 | 1.00 | 0.50 |  | | Brownish grey, silty fine to coarse SAND with occasional subangular fine gravel sized moderately decomposed granite. (FILL) |
| 3 | | | | | | | 3 ● | | | 1.50 |  | | Brown mottled light brown, clayey silty fine to coarse SAND. Contains occasional concrete fragments. (FILL) |
| 4 | | | | | | | 4 ● | +2.45 | 2.00 | 2.00 |  | | Greyish brown mottled brown, slightly clayey silty fine to coarse SAND. Contains some concrete fragments. (FILL) |
| 5 | | | | | | | 5 ● | +1.95 | 2.50 | 2.50 |  | | Greyish brown mottled brown, slightly clayey silty fine to coarse SAND. Contains some concrete fragments. (FILL) |
| 6 | | 18:00 Dry at 08:00 | 100 | | | | 6 ● | | | 3.00 |  | | Black mottled grey, slightly silty fine to coarse SAND. Contains occasional concrete fragments. (FILL) |
| 7 | | | | | | | 7 ● | | | 3.45 |  | | Black mottled grey, slightly silty fine to coarse SAND. Contains occasional concrete fragments. (FILL) |
| 8 | | | | | | | 8 ● | | | 6.00 |  | | Black mottled grey, slightly silty fine to coarse SAND. Contains occasional concrete fragments. (FILL) |
| 9 | SX 6.00 | 2.16m at 18:00 | 100 | | | | 9 ▲ | -1.55 | 6.00 | 6.00 |  | | Dark grey, clayey silty fine to coarse SAND. Contains some concrete and shell fragments. (FILL) |
| 10 | PX | 2.18m at 08:00 | 100 | | | | 10 ● | | | 6.45 |  | | Dark grey, clayey silty fine to coarse SAND. Contains some concrete and shell fragments. (FILL) |
| 11 | | | 100 | | | | 11 ● | -4.55 | 9.00 | 9.00 |  | | Dark grey, clayey silty fine to coarse SAND. Contains some concrete and shell fragments. (FILL) |
| 12 | | | | | | | 12 ● | | | 9.45 |  | | Dark grey, clayey silty fine to coarse SAND. Contains some concrete and shell fragments. (FILL) |
| LOGGED Tony Poon DATE 07/07/2010 CHECKED James Lu DATE 08/07/2010 | | | | | | | | REMARKS 1. Water sample was taken at a depth of 6.00m. 2. Gas detection was carried. | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ▲ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ▨ STANDARD PENETRATION TEST
- ▨ U100 UNDISTURBED SAMPLE
- ▨ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ▨ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ▨ IN-SITU VANE SHEAR TEST
- ▨ PACKER TEST



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH139

SHEET **2** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

E 836869.68

MACHINE & NO. **20-0104**

N 818340.35

DATE FROM **15/06/2010** TO **06/07/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.45 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| | PX | | | | | | | | | 10.00 | | | See sheet 1 of 5 for details. |
| 11 | | | | | | | | | | | | | |
| 12 | | | 98 | | | | 41 bls | 13 | -7.55 | 12.00 | | | Grey, slightly silty fine to coarse SAND. (ALLUVIUM) |
| 13 | | | | | | | | 14 | | 12.45 | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | 2.16m at 18:00 | 93 | | | | 42 bls | 15 | -10.55 | 15.00 | | | Light grey, fine to coarse SAND. Contains occasional shell fragments. (ALLUVIUM) |
| 16 | | 2.21m at 08:00 | | | | | | 16 | | 15.45 | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | 100 | | | | 47 bls | 17 | -13.55 | 18.00 | | | Light brown mottled white, very clayey silty fine to coarse SAND. (ALLUVIUM) |
| 19 | | | | | | | | 18 | | 18.45 | | | |
| 20 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬇️ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇️ STANDARD PENETRATION TEST
- ▨ U100 UNDISTURBED SAMPLE
- ⬇️ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⬇️ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ⬇️ IN-SITU VANE SHEAR TEST
- ⬇️ PACKER TEST

LOGGED **Tony Poon**
 DATE **07/07/2010**
 CHECKED **James Lu**
 DATE **08/07/2010**

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH139

SHEET **3** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

E 836869.68

MACHINE & NO. **20-0104**

N 818340.35

DATE FROM **15/06/2010** TO **06/07/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.45 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|----------|---------------|----------------|--------|-------|--|
| 20 | PX | | | | | | | | | 20.00 | | | See sheet 2 of 5 for details. |
| 21 | | | 100 | | | | 56 bls | 19 20 | -16.55 | 21.00 21.45 | | | Brownish orange mottled reddish pink and yellowish brown, clayey silty fine to coarse SAND. (ALLUVIUM) |
| 22 | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | |
| 24 | | | 100 | | | | 92 bls | 21 22 | -19.55 | 24.00 24.45 | | V | Extremely weak, light yellowish brown spotted dark reddish brown, grey and white, completely decomposed, medium grained GRANITE. (Slightly clayey silty fine to coarse SAND) |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | 2.20m at 18:00 | 100 | | | | 91 bls | 23 24 | -22.55 | 27.00 27.45 | | V | Extremely weak, pink spotted dark red, grey and white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| 28 | | 2.16m at 08:00 | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | -25.55 | 30.00 | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ◄ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ▨ STANDARD PENETRATION TEST
- ▨ U100 UNDISTURBED SAMPLE
- ▨ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ▨ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ▨ IN-SITU VANE SHEAR TEST
- ▨ PACKER TEST

LOGGED Tony Poon
 DATE 07/07/2010
 CHECKED James Lu
 DATE 08/07/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH139

SHEET **4** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES
E 836869.68
N 818340.35

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0104**

DATE FROM **15/06/2010** TO **06/07/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.45 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|---------|---------------|-----------|-----------|-------|--|
| 30 | PX | 2.14m at 18:00 | 100 | | | | 131 bls | 25 | | 30.00 | [Pattern] | V | Extremely weak, pink spotted black and white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| 31 | | 2.20m at 08:00 | | | | | | 26 | | 30.45 | | | |
| 32 | | | | | | | | | | | | | |
| 33 | | | 100 | | | | 137 bls | 27 | -28.55 | 33.00 | [Pattern] | V | Extremely weak, yellowish brown spotted black and white, completely decomposed, medium grained GRANITE. (Slightly silty fine to coarse SAND) |
| 34 | | | | | | | | 28 | | 33.45 | | | |
| 35 | | | | | | | | | | | | | |
| 36 | | | 100 | | | | 152 bls | 29 | | 36.00 | [Pattern] | | |
| 37 | | | | | | | | 30 | | 36.45 | | | |
| 38 | | | | | | | | | | | | | |
| 39 | PX 38.72 | | 100 | 87 | 87 | NH 2.0 | | | -34.27 | 38.72 | [Pattern] | III | Moderately strong, light brownish pink mottled brown spotted grey, black and white, moderately decomposed, medium grained GRANITE. Joints are medium spaced, locally very closely spaced, rough planar, extremely narrow, iron oxide stained, dipping at 0° to 10°. From 38.89m to 39.16m: Strong, pink, slightly |
| 40 | | 2.22m at 18:00 | | | | >20 5.3 | | | | | [Pattern] | II | |
| | | | | | | | | | -35.06 | 39.51 | [Pattern] | III | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬆ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇ STANDARD PENETRATION TEST
- U100 UNDISTURBED SAMPLE
- ⊥ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⊥ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ∇ IN-SITU VANE SHEAR TEST
- ⬆ PACKER TEST

LOGGED Tony Poon
 DATE 07/07/2010
 CHECKED James Lu
 DATE 08/07/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH139

SHEET **5** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

E 836869.68

MACHINE & NO. **20-0104**

N 818340.35

DATE FROM **15/06/2010** TO **06/07/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**


GROUND LEVEL **+4.45 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|-------|---------|---------------|-----------|--------|-------|--|
| 40 | | | | | | | | | | 40.00 | | | decomposed. Hole completed at 39.51m. |
| 41 | | | | | | | | | | | | | |
| 42 | | | | | | | | | | | | | |
| 43 | | | | | | | | | | | | | |
| 44 | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | |
| 46 | | | | | | | | | | | | | |
| 47 | | | | | | | | | | | | | |
| 48 | | | | | | | | | | | | | |
| 49 | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ◄ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- ▨ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- △ STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 07/07/2010
 CHECKED James Lu
 DATE 08/07/2010

REMARKS

|  | | GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD. GROUND INVESTIGATION DEPARTMENT | | | | HOLE NO. 11202/SCL/EDH140 | | | | | | | |
|--|-------------|---|--|-----------------------|-------------------------------|--|-------|----------------|---------------|-----------|-----------------------|-------|--|
| | | | | | | SHEET 1 OF 5 | | | | | | | |
| DRILLHOLE RECORD | | | | | | CONTRACT NO. 11202 | | | | | | | |
| PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link | | | | | | | | | | | | | |
| METHOD Rotary Cored | | | CO-ORDINATES E 836844.75 N 818408.40 | | JOB NO. GCE1001SI | | | | | | | | |
| MACHINE & NO. 20-0095 | | | | | | DATE FROM 03/06/2010 TO 19/06/2010 | | | | | | | |
| FLUSHING MEDIUM Water | | | ORIENTATION Vertical | | GROUND LEVEL +4.35 mPD | | | | | | | | |
| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
| 03/06/2010 | SX | 08:00 | | | | | | INSPECTION PIT | +4.35 | 0.00 | [Cross-hatch pattern] | | Light grey, angular coarse GRAVEL sized concrete fragments. (FILL) |
| 1 | | | | | | | | 1 | +3.85 | 0.50 | [Cross-hatch pattern] | | Light pinkish brown, silty fine to coarse SAND with occasional angular fine gravel sized rock and concrete fragments. (FILL) |
| 2 | | | | | | | | 2 | | 1.00 | [Cross-hatch pattern] | | |
| 3 | | | | | | | | 3 | | 1.50 | [Cross-hatch pattern] | | |
| 4 | | | | | | | | 4 | | 2.00 | [Cross-hatch pattern] | | |
| 5 | | | | | | | | 5 | | 2.50 | [Cross-hatch pattern] | | |
| 6 | | | | | | | | 6 | | 3.00 | [Cross-hatch pattern] | | |
| 7 | | | | | | | | 7 | | 3.45 | [Cross-hatch pattern] | | |
| 8 | | | | | | | | 8 | | 3.45 | [Cross-hatch pattern] | | |
| 9 | | | | | | | | 9 | | 6.00 | [Cross-hatch pattern] | | |
| 10 | | | | | | | | 10 | | 6.45 | [Cross-hatch pattern] | | Dark grey mottled light brown, slightly sandy SILT. (FILL) |
| 11 | | | | | | | | 11 | | 9.00 | [Cross-hatch pattern] | | |
| 12 | | | | | | | | 12 | | 9.45 | [Cross-hatch pattern] | | Grey, slightly silty fine to coarse SAND with some shell fragments. (FILL) |
| 13 | | | | | | | | 13 | | 9.45 | [Cross-hatch pattern] | | |
| 14 | | | | | | | | 14 | | 9.45 | [Cross-hatch pattern] | | |
| 15 | | | | | | | | 15 | | 9.45 | [Cross-hatch pattern] | | |
| 16 | | | | | | | | 16 | | 9.45 | [Cross-hatch pattern] | | |
| 17 | | | | | | | | 17 | | 9.45 | [Cross-hatch pattern] | | |
| 18 | | | | | | | | 18 | | 9.45 | [Cross-hatch pattern] | | |
| 19 | | | | | | | | 19 | | 9.45 | [Cross-hatch pattern] | | |
| 20 | | | | | | | | 20 | | 9.45 | [Cross-hatch pattern] | | |
| 21 | | | | | | | | 21 | | 9.45 | [Cross-hatch pattern] | | |
| 22 | | | | | | | | 22 | | 9.45 | [Cross-hatch pattern] | | |
| 23 | | | | | | | | 23 | | 9.45 | [Cross-hatch pattern] | | |
| 24 | | | | | | | | 24 | | 9.45 | [Cross-hatch pattern] | | |
| 25 | | | | | | | | 25 | | 9.45 | [Cross-hatch pattern] | | |
| 26 | | | | | | | | 26 | | 9.45 | [Cross-hatch pattern] | | |
| 27 | | | | | | | | 27 | | 9.45 | [Cross-hatch pattern] | | |
| 28 | | | | | | | | 28 | | 9.45 | [Cross-hatch pattern] | | |
| 29 | | | | | | | | 29 | | 9.45 | [Cross-hatch pattern] | | |
| 30 | | | | | | | | 30 | | 9.45 | [Cross-hatch pattern] | | |
| 31 | | | | | | | | 31 | | 9.45 | [Cross-hatch pattern] | | |
| 32 | | | | | | | | 32 | | 9.45 | [Cross-hatch pattern] | | |
| 33 | | | | | | | | 33 | | 9.45 | [Cross-hatch pattern] | | |
| 34 | | | | | | | | 34 | | 9.45 | [Cross-hatch pattern] | | |
| 35 | | | | | | | | 35 | | 9.45 | [Cross-hatch pattern] | | |
| 36 | | | | | | | | 36 | | 9.45 | [Cross-hatch pattern] | | |
| 37 | | | | | | | | 37 | | 9.45 | [Cross-hatch pattern] | | |
| 38 | | | | | | | | 38 | | 9.45 | [Cross-hatch pattern] | | |
| 39 | | | | | | | | 39 | | 9.45 | [Cross-hatch pattern] | | |
| 40 | | | | | | | | 40 | | 9.45 | [Cross-hatch pattern] | | |
| 41 | | | | | | | | 41 | | 9.45 | [Cross-hatch pattern] | | |
| 42 | | | | | | | | 42 | | 9.45 | [Cross-hatch pattern] | | |
| 43 | | | | | | | | 43 | | 9.45 | [Cross-hatch pattern] | | |
| 44 | | | | | | | | 44 | | 9.45 | [Cross-hatch pattern] | | |
| 45 | | | | | | | | 45 | | 9.45 | [Cross-hatch pattern] | | |
| 46 | | | | | | | | 46 | | 9.45 | [Cross-hatch pattern] | | |
| 47 | | | | | | | | 47 | | 9.45 | [Cross-hatch pattern] | | |
| 48 | | | | | | | | 48 | | 9.45 | [Cross-hatch pattern] | | |
| 49 | | | | | | | | 49 | | 9.45 | [Cross-hatch pattern] | | |
| 50 | | | | | | | | 50 | | 9.45 | [Cross-hatch pattern] | | |
| 51 | | | | | | | | 51 | | 9.45 | [Cross-hatch pattern] | | |
| 52 | | | | | | | | 52 | | 9.45 | [Cross-hatch pattern] | | |
| 53 | | | | | | | | 53 | | 9.45 | [Cross-hatch pattern] | | |
| 54 | | | | | | | | 54 | | 9.45 | [Cross-hatch pattern] | | |
| 55 | | | | | | | | 55 | | 9.45 | [Cross-hatch pattern] | | |
| 56 | | | | | | | | 56 | | 9.45 | [Cross-hatch pattern] | | |
| 57 | | | | | | | | 57 | | 9.45 | [Cross-hatch pattern] | | |
| 58 | | | | | | | | 58 | | 9.45 | [Cross-hatch pattern] | | |
| 59 | | | | | | | | 59 | | 9.45 | [Cross-hatch pattern] | | |
| 60 | | | | | | | | 60 | | 9.45 | [Cross-hatch pattern] | | |
| 61 | | | | | | | | 61 | | 9.45 | [Cross-hatch pattern] | | |
| 62 | | | | | | | | 62 | | 9.45 | [Cross-hatch pattern] | | |
| 63 | | | | | | | | 63 | | 9.45 | [Cross-hatch pattern] | | |
| 64 | | | | | | | | 64 | | 9.45 | [Cross-hatch pattern] | | |
| 65 | | | | | | | | 65 | | 9.45 | [Cross-hatch pattern] | | |
| 66 | | | | | | | | 66 | | 9.45 | [Cross-hatch pattern] | | |
| | | | | | | | | | | | | | |



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH140

SHEET **2** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

E 836844.75

MACHINE & NO. **20-0095**

N 818408.40

DATE FROM **03/06/2010** TO **19/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.35 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| | PX | | | | | | | | | 10.00 | | | See sheet 1 of 5 for details. |
| | | 2.30m at 18:00 | 100 | | | | 44 bls | 13 | -7.65 | 12.00 | | | Yellowish brown, silty fine to coarse SAND. (ALLUVIUM) |
| | | 2.43m at 08:00 | | | | | | 14 | | 12.45 | | | |
| | | | 100 | | | | 92 bls | 15 | -10.65 | 15.00 | | | White, slightly clayey silty fine to coarse SAND. (ALLUVIUM) |
| | | | | | | | | 16 | | 15.45 | | | |
| | | | 100 | | | | 79 bls | 17 | -13.65 | 18.00 | | | Stiff, reddish pink mottled red, sandy SILT. (ALLUVIUM) |
| | | | | | | | | 18 | | 18.45 | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ◄ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ▩ STANDARD PENETRATION TEST
- ▩ U100 UNDISTURBED SAMPLE
- ▩ PERMEABILITY TEST
- ▩ MAZIER SAMPLE
- ▩ IMPRESSION PACKER TEST
- ▩ PISTON SAMPLE
- ▩ IN-SITU VANE SHEAR TEST
- ▩ PACKER TEST

LOGGED Tony Poon
 DATE 21/06/2010
 CHECKED James Lu
 DATE 22/06/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH140

SHEET **3** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES
E 836844.75
N 818408.40

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0095**

DATE FROM **03/06/2010** TO **19/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.35** mPD

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| 20 | PX | | | | | | | | | 20.00 | | | See sheet 2 of 5 for details. |
| 21 | | | 100 | | | | 20 bls | 19 | -16.65 | 21.00 | | | Stiff, light orangish brown mottled light red, sandy SILT. (ALLUVIUM) |
| | | | | | | | | 20 | | 21.45 | | | |
| 24 | | 2.41m at 18:00 | 100 | | | | 50 bls | 21 | | 24.00 | | | |
| | | 2.35m at 08:00 | | | | | | 22 | | 24.45 | | | |
| 27 | | | 100 | | | | 82 bls | 23 | -22.65 | 27.00 | | V | Extremely weak, pinkish red mottled white and spotted grey, completely decomposed, medium grained GRANITE. (Slightly clayey silty fine to coarse SAND) |
| | | | | | | | | 24 | | 27.45 | | | |
| 30 | | | | | | | | | -25.65 | 30.00 | | | |

- SMALL DISTURBED SAMPLE
- ⬆️ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- ▩ U100 UNDISTURBED SAMPLE
- ▧ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- △ STANDPIPE
- ⬇️ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⬇️ PACKER TEST

LOGGED Tony Poon
 DATE 21/06/2010
 CHECKED James Lu
 DATE 22/06/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH140

SHEET **4** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001S1**

MACHINE & NO. **20-0095**

E 836844.75

DATE FROM **03/06/2010** TO **19/06/2010**

N 818408.40

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.35** mPD

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|----------|---------------|----------------|--------|-------|---|
| 30 | PX | | 100 | | | | 95 bls | 25 26 | | 30.00 30.45 | | V | Extremely weak, light orangish pink spotted grey, brown and white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| 31 | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | |
| 33 | | | 100 | | | | 170 bls | 27 28 | -28.65 | 33.00 33.45 | | V | Extremely weak, light pink mottled black and white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| 34 | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | |
| 36 | | 2.32m at 18:00 | 100 | | | | 200 bls | 29 30 | -31.65 | 36.00 36.45 | | V | Extremely weak, light orangish pink mottled grey and red spotted white, completely decomposed, medium grained GRANITE. (Slightly silty fine to coarse SAND) |
| 37 | | 2.27m at 08:00 | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | |
| 39 | | | 100 | | | | 200 bls | 31 32 | -34.65 | 39.00 39.34 | | V | Extremely weak, light orangish brown spotted grey and black, completely decomposed, medium grained GRANITE. (Slightly silty fine to coarse SAND) |
| 40 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬇️ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇️ STANDARD PENETRATION TEST
- ▩ U100 UNDISTURBED SAMPLE
- ⬇️ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⬇️ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ⬇️ IN-SITU VANE SHEAR TEST
- ⬇️ PACKER TEST

LOGGED **Tony Poon**

DATE **21/06/2010**

CHECKED **James Lu**

DATE **22/06/2010**

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH140

SHEET **5** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO.

GCE1001SI

E 836844.75

MACHINE & NO. **20-0095**

N 818408.40

DATE FROM **03/06/2010** TO **19/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.35 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|-------|---------|---------------|-----------|--------|-------|---|
| 40 | PX 40.20 | 2.25m at 18:00 | 96 | 41 | 35 | 6.9 | | T2101 | -35.85 | 40.20 | + | III | See sheet 4 of 5 for details. |
| 41 | | | | | | 15.0 | | | | | + | IV | Moderately strong, orangish pink mottled brown spotted grey and green, moderately decomposed, slightly chloritized medium grained GRANITE. Joints are closely to very closely spaced, rough planar and rough undulating, extremely narrow to very narrow, iron oxide stained, dipping at 10° to 20° and 30° to 40°. From 40.69m to 41.00m: Weak, orangish brown, highly decomposed. |
| 42 | | | | | | >20 | | | -36.65 | 41.00 | + | | Hole completed at 41.00m. |
| 43 | | | | | | | | | | | | | |
| 44 | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | |
| 46 | | | | | | | | | | | | | |
| 47 | | | | | | | | | | | | | |
| 48 | | | | | | | | | | | | | |
| 49 | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ⬇️ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- ▩ U100 UNDISTURBED SAMPLE
- ▧ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- ⬆️ STANDPIPE
- ⬇️ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⬇️ PACKER TEST

LOGGED Tony Poon

DATE 21/06/2010

CHECKED James Lu

DATE 22/06/2010

REMARKS

REVISED

PRELIMINARY



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD. GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH14

SHEET **1** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0095**

E 836855.61

DATE FROM **24/05/2010** TO **09/06/2010**

N 818420.81

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.19 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|-------|---------|---------------|-----------|--------|-------|--|
| 24/05/2010 | SX | 08:00 | | | | | | | +4.19 | 0.00 | | | Brown, silty fine to coarse SAND with some subangular fine to coarse gravel sized slightly decomposed granite fragments with occasional concrete fragments. (FILL) |
| 24/05/2010 | | | | | | | | 1 ● | | 0.50 | | | |
| 24/05/2010 | | | | | | | | 2 ● | | 1.00 | | | |
| 24/05/2010 | | | | | | | | 3 ● | | 1.50 | | | |
| 24/05/2010 | | | | | | | | 4 ● | | 2.00 | | | |
| 24/05/2010 | | | | | | | | 5 ● | | 2.50 | | | |
| 24/05/2010 | | | | | | | | 6 ● | | 3.00 | | | |
| 24/05/2010 | | | | | | | | 7 ● | +1.19 | 3.00 | | | Light brown, silty fine to coarse SAND. (FILL) |
| 24/05/2010 | | | | | | | | 8 ● | | 3.45 | | | |
| 24/05/2010 | | | | | | | | 9 ▲ | -1.81 | 6.00 | | | Brown spotted pink, grey, black and white, COBBLE with much angular coarse gravel sized moderately to highly decomposed granite fragments. (FILL) |
| 24/05/2010 | | | | | | | | 10 ● | | 6.45 | | | |
| 24/05/2010 | | | | | | | | 11 ● | -4.81 | 9.00 | | | Soft, dark grey mottled greenish grey, sandy SILT/CLAY with occasional angular medium gravel sized moderately decomposed granite and much shell fragments. (FILL) |
| 24/05/2010 | | | | | | | | 12 ● | | 9.45 | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬇️ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- ▨ SPT LINER SAMPLE
- ▨ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ▨ STANDARD PENETRATION TEST
- ▨ U100 UNDISTURBED SAMPLE
- ▨ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ▨ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ▨ IN-SITU VANE SHEAR TEST
- ▨ PACKER TEST

LOGGED **Tony Poon**

DATE **10/06/2010**

CHECKED **James Lu**

DATE **11/06/2010**

REMARKS

1. Gas detection was carried.
2. Water sample was taken at a depth of 6.00m.
3. Jar samples were taken at the depths of 0.50m, 1.50m and 3.00m.



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH141

SHEET **2** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0095**

E 836855.61

DATE FROM **24/05/2010** TO **09/06/2010**

N 818420.81

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.19** mPD

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| 10 | SX | | | | | | | | | 10.00 | | | See sheet 1 of 5 for details. |
| 11 | | | | | | | | | | | | | |
| 12 | | 2.36m at 18:00 | 100 | | | | 38 bls | 13 | -7.81 | 12.00 | | | |
| 13 | | 2.54m at 08:00 | | | | | | 14 | | 12.45 | | | Light grey, slightly silty fine to coarse SAND with some subangular fine quartz gravel. (ALLUVIUM) |
| 14 | | | | | | | | | | | | | |
| 15 | SX 15.00 PX | | 100 | | | | 68 bls | 15 | -10.81 | 15.00 | | V | |
| 16 | | | | | | | | 16 | | 15.45 | | | Extremely weak, reddish orange mottled red and light yellowish brown, completely decomposed, medium grained GRANITE. (Very clayey silty fine to coarse SAND) |
| 17 | | | | | | | | | | | | | |
| 18 | | | 100 | | | | 28 bls | 17 | | 18.00 | | | |
| 19 | | | | | | | | 18 | | 18.45 | | | |
| 20 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ⬇ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- ▨ U100 UNDISTURBED SAMPLE
- ▩ MAZIER SAMPLE
- ▧ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- ⊞ STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED **Tony Poon**

DATE **10/06/2010**

CHECKED **James Lu**

DATE **11/06/2010**

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH141

SHEET **3** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0095**

E 836855.61

DATE FROM **24/05/2010** TO **09/06/2010**

N 818420.81

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.19 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| 20 | PX | | | | | | | | | 20.00 | | | See sheet 2 of 5 for details. |
| 21 | | 2.51m at 18:00 | 100 | | | | 40 bls | 19 | -16.81 | 21.00 | | V | Extremely weak, light reddish pink mottled red and white, completely decomposed, medium grained GRANITE. (Clayey silty fine to coarse SAND) |
| 22 | | 2.30m at 08:00 | | | | | | 20 | | 21.45 | | | |
| 23 | | | | | | | | | | | | | |
| 24 | | | 100 | | | | 30 bls | 21 | | 24.00 | | | |
| 25 | | | | | | | | 22 | | 24.45 | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | 100 | | | | 35 bls | 23 | -22.81 | 27.00 | | V | Extremely weak, light orangish pink mottled red and light yellowish brown, completely decomposed, medium grained GRANITE. (Clayey silty fine to coarse SAND) |
| 28 | | | | | | | | 24 | | 27.45 | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | -25.81 | 30.00 | | | |

- SMALL DISTURBED SAMPLE
- ◄ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- ▨ U100 UNDISTURBED SAMPLE
- ▩ MAZIER SAMPLE
- ▧ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- ◻ STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 10/06/2010
 CHECKED James Lu
 DATE 11/06/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH141

SHEET **4** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0095**

E 836855.61

DATE FROM **24/05/2010** TO **09/06/2010**

N 818420.81

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.19 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|---|--|
| 30 02/06/2010 03/06/2010 | PX | 2.32m at 18:00 | 100 | | | | 66 bls | 25 | | 30.00 | | V | Extremely weak, light brownish pink mottled brown spotted grey and white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| | | 2.40m at 08:00 | | | | | | 26 | | 30.45 | | | |
| 31 | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | |
| 33 | | | 100 | | | 200 bls | | 27 | | 33.00 | | | |
| | | | | | | | | 28 | | 33.45 | | | |
| 34 | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | |
| 36 03/06/2010 04/06/2010 | | 2.39m at 18:00 | 100 | | | 200 bls | | 29 | | 36.00 | | | |
| | | 2.48m at 08:00 | | | | | | 30 | | 36.45 | | | |
| 37 | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | |
| 39 04/06/2010 08/06/2010 | | 2.45m at 18:00 | 56 | | | 200 bls | | 31 | -34.81 | 39.00 | V | Extremely weak, brown, completely decomposed, medium grained GRANITE. (Fine to coarse SAND) | |
| | | 2.38m at 08:00 | | | | | | 32 | | 39.26 | | | |
| 40 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ◄ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- ▨ U100 UNDISTURBED SAMPLE
- ▩ MAZIER SAMPLE
- ▧ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED **Tony Poon**

DATE **10/06/2010**

CHECKED **James Lu**

DATE **11/06/2010**

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH14

SHEET **5** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0095**

E 836855.61

N 818420.81

DATE FROM **24/05/2010** TO **09/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.19 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|----------------------------------|-----------------------|-----------------------|--------|----------------|---------|----------|---------------|-----------|--------|-------|--|
| 46 | PX | | | | | | | | | 46.00 | | | See sheet 4 of 5 for details. |
| 41 | | | | | | | | | | | | | |
| 42 | | | 89 | | | | 200 bls | 33 34 | -37.81 | 42.00 | | V | Extremely weak, brown spotted grey and pink, completely decomposed, medium grained GRANITE. (Slightly silty fine to coarse SAND) |
| 43 | | | | | | | | | | | | | |
| 44 | | | | | | | | | | | | | |
| 45 | PX 44.67 | 2.36m at 18:00 | 93 | 86 | 44 | 20 | | T2101 | -40.48 | 44.67 | | III | Moderately strong, light pinkish brown mottled brown spotted grey, black and light yellowish brown, moderately decomposed, medium grained GRANITE. Joints are closely spaced, locally very closely spaced, rough planar and rough undulating, extremely narrow to very narrow, iron oxide stained, dipping at 0° to 10° and 50° to 60°. From 44.67m to 44.75m: Moderately weak to moderately strong, moderately decomposed and highly fractured. Hole completed at 45.47m. |
| 46 | | 2.33m at 08:00 2.34m at 18:00 | | | | | | | -41.28 | 45.47 | | | |
| 47 | | | | | | | | | | | | | |
| 48 | | | | | | | | | | | | | |
| 49 | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ◕ LARGE DISTURBED SAMPLE
- ◻ SPT LINER SAMPLE
- ◼ U76 UNDISTURBED SAMPLE
- ◼ U100 UNDISTURBED SAMPLE
- ◼ MAZIER SAMPLE
- ◼ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- ◻ STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 10/06/2010
 CHECKED James Lu
 DATE 11/06/2010

REMARKS

PRELIMINARY

| | | |
|---|---|-------------------------------------|
|  | GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD. GROUND INVESTIGATION DEPARTMENT | HOLE NO. 11202/SCL/EDH142 |
| | | SHEET 1 OF 1 |

| | |
|-------------------------|--------------------|
| DRILLHOLE RECORD | CONTRACT NO. 11202 |
|-------------------------|--------------------|

| |
|--|
| PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link |
|--|

| | | |
|----------------------------|--|--------------------------|
| METHOD Rotary Cored | CO-ORDINATES E 836888.11 N 818350.03 | JOB NO. GCE1001SI |
|----------------------------|--|--------------------------|

| | |
|------------------------------|--|
| MACHINE & NO. 20-0103 | DATE FROM 26/05/2010 TO 29/05/2010 |
|------------------------------|--|

| | | |
|------------------------------|-----------------------------|-------------------------------|
| FLUSHING MEDIUM Water | ORIENTATION Vertical | GROUND LEVEL +3.89 mPD |
|------------------------------|-----------------------------|-------------------------------|

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|-------|----------------|---------------|-----------|--------|-------|---|
| 26/05/2010 | SX | 08:00 | | | | | | | +3.89 | 0.00 | | | Light grey, angular fine to coarse GRAVEL sized concrete fragments. (FILL) |
| | | | | | | | | INSPECTION PIT | | | | | Brown, slightly silty fine to coarse SAND with some angular to subangular fine to coarse gravel sized moderately decomposed granite fragments. Contains occasional concrete fragments. (FILL) |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 28/05/2010 | SX | Dry at 18:00 | | | | | | | +1.39 | 2.50 | | | Light grey, angular to subangular fine to coarse GRAVEL sized slightly to moderately decomposed granite. Contains occasional concrete fragments. (FILL) |
| 29/05/2010 | | Dry 18:00 | 100 | | | | | | +1.09 | 2.80 | | | Light grey, CONCRETE. (FILL) |
| 29/05/2010 | | 08:00 | | | | | | | +0.76 | 3.13 | | | Hole completed at 3.13m. |

| | | |
|--|--|---------|
| <ul style="list-style-type: none"> ● SMALL DISTURBED SAMPLE ▲ LARGE DISTURBED SAMPLE □ SPT LINER SAMPLE ▨ U76 UNDISTURBED SAMPLE ■ U100 UNDISTURBED SAMPLE ▩ MAZIER SAMPLE ▤ PISTON SAMPLE △ WATER SAMPLE ▲ PIEZOMETER TIP □ STANDPIPE ↓ STANDARD PENETRATION TEST ┆ PERMEABILITY TEST ▯ IMPRESSION PACKER TEST ∇ IN-SITU VANE SHEAR TEST ⊥ PACKER TEST | LOGGED <u>Tony Poon</u> DATE <u>31/05/2010</u> CHECKED <u>James Lu</u> DATE <u>01/06/2010</u> | REMARKS |
|--|--|---------|



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH143

SHEET **1** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836888.58

DATE FROM **02/06/2010** TO **21/06/2010**

N 818328.63

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.07 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|----------------------------|------------------|----------------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| 02/06/2010 | SX | 08:00 | | | | | | | +4.07 | 0.00 | | | Grey, angular medium to coarse GRAVEL sized moderately decomposed granite fragments. Contains some concrete fragments. (FILL) |
| | | | | | | | | 1 ● | +3.57 | 0.50 | | | Brown, silty fine to coarse SAND with occasional subangular fine to coarse gravel sized moderately decomposed granite fragments. Contains occasional concrete fragments. (FILL) |
| | | | | | | | | 2 ● | | 1.00 | | | |
| | | | | | | | | 3 ● | +2.57 | 1.50 | | | Dark grey, slightly silty fine to coarse SAND with some subangular fine to coarse gravel sized moderately decomposed granite fragments. Contains some concrete fragments. (FILL) |
| | | | | | | | | 4 ● | | 2.00 | | | |
| | | | | | | | | 5 ● | +1.57 | 2.50 | | | Brown, silty fine to coarse SAND. (FILL) |
| 30/06/2010 14/06/2010 | | 18:00 Dry at 08:00 | 100 | | | | 23 bls | 6 ● | +1.07 | 3.00 | | | |
| | | | | | | | | 7 ● | | 3.45 | | | Orangish brown, clayey silty fine to coarse SAND. (FILL) |
| | | | | | | | | 8 ● | | | | | |
| 6/14/06/2010 15/06/2010 | SX 6.00 PX | 2.43m at 18:00 2.45m at 08:00 | 100 | | | | 12 bls | 9 ▲ | | 6.00 | | | |
| | | | | | | | | 10 ● | | 6.45 | | | |
| | | | | | | | | | | | | | |
| | | | 100 | | | | 36 bls | 11 ● | -4.93 | 9.00 | | | Greenish grey mottled light brown and dark grey, clayey silty fine to coarse SAND. (FILL) |
| | | | | | | | | 12 ● | | 9.45 | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ▲ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ▨ STANDARD PENETRATION TEST
- ▨ U100 UNDISTURBED SAMPLE
- ▨ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ▨ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ▨ IN-SITU VANE SHEAR TEST
- ▨ PACKER TEST

LOGGED **Tony Poon**

DATE **22/06/2010**

CHECKED **James Lu**

DATE **23/06/2010**

REMARKS
1. Water sample (2L) was taken at a depth of 6.00m.
2. Gas detection was carried.



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH143

SHEET **2** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836888.58

DATE FROM **02/06/2010** TO **21/06/2010**

N 818328.63

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.07 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| | PX | | | | | | | | | 10.00 | | | See sheet 1 of 5 for details. |
| 11 | | | | | | | | | | | | | |
| 12 | | | 100 | | | | 36 bls | 13 | -7.93 | 12.00 | | | Light grey, slightly silty fine to coarse SAND. (ALLUVIUM) |
| 13 | | | | | | | | 14 | | 12.45 | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | 2.42m at 18:00 | 100 | | | | 73 bls | 15 | -10.93 | 15.00 | | | Light yellowish brown, slightly silty fine to coarse SAND. (ALLUVIUM) |
| 15/08/2010 17/08/2010 | | 2.33m at 08:00 | | | | | | 16 | | 15.45 | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | 100 | | | | 29 bls | 17 | -13.93 | 18.00 | | | Orangish brown mottled red and light yellowish brown, clayey silty fine to coarse SAND. (ALLUVIUM) |
| 19 | | | | | | | | 18 | | 18.45 | | | |
| 20 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- ▨ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- △ STANDPIPE
- ↓ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED **Tony Poon**
 DATE **22/06/2010**
 CHECKED **James Lu**
 DATE **23/06/2010**

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH143

SHEET **3** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836888.58

DATE FROM **02/06/2010** TO **21/06/2010**

N 818328.63

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.07** mPD

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|--------|---------|---------------|-----------|--------|-------|---|
| | PX | | | | | | | | | 20.00 | | | See sheet 2 of 5 for details. |
| 21 | | | 100 | | | | 28 bls | 19 | -16.93 | 21.00 | | V | Extremely weak, light reddish pink mottled red and white, completely decomposed, medium grained GRANITE. (Clayey silty fine to coarse SAND) |
| | | | | | | | | 20 | | 21.45 | | | |
| 24 | | | 100 | | | | 48 bls | 21 | | 24.00 | | | |
| | | | | | | | | 22 | | 24.45 | | | |
| 27 | | 2.30m at 18:00 | 100 | | | | 62 bls | 23 | | 27.00 | | | |
| 17/06/2010 18/06/2010 | | 2.36m at 08:00 | | | | | | 24 | | 27.45 | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | 30.00 | | | |

- SMALL DISTURBED SAMPLE
- ▲ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- ▩ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ↓ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 22/06/2010
 CHECKED James Lu
 DATE 23/06/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH143

SHEET **4** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES
E 836888.58
N 818328.63

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

DATE FROM **02/06/2010** TO **21/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.07 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|---------|---------------|-----------|--------|-------|---|
| 30 | PX | | 100 | | | | 112 bls | 25 | | 30.00 | | | See sheet 3 of 5 for details. |
| | | | | | | | | 26 | | 30.45 | | | |
| 31 | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | |
| 33 | | | 100 | | | | 200 bls | 27 | -28.93 | 33.00 | | V | Extremely weak, light brownish pink mottled grey and white, completely decomposed, medium grained GRANITE. (Slightly silty fine to coarse SAND) |
| | | | | | | | | 28 | | 33.45 | | | |
| 34 | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | |
| 36 | | 2.35m at 18:00 | | | | | 200 bls | 29 | -31.93 | 36.00 | | V | Extremely weak, pinkish grey spotted grey and white, completely decomposed, medium grained GRANITE. (Fine to coarse SAND with occasional fine gravel) |
| | | 2.25m at 08:00 | 0 | | | | | | | 36.08 | | | |
| 37 | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | |
| 39 | | 2.25m at 18:00 | | | | | 200 bls | 30 | | 39.00 | | | |
| | | 2.39m at 08:00 | 0 | | | | | | | 39.16 | | | |
| 40 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- ▩ MAZIER SAMPLE
- ▤ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 22/06/2010
 CHECKED James Lu
 DATE 23/06/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH143

SHEET **5** OF **5**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES
E 836888.58
N 818328.63

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

DATE FROM **02/06/2010** TO **21/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.07** mPD

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|---------|---------------|-----------|--------|-------|---|
| 4.1 | PX | | | | | | | | | 40.00 | | | See sheet 4 of 5 for details. |
| 4.2 | PX 42.44 | | 0 | | | | 200 bls | 31 ● | -37.93 | 42.00 | | IV | Weak, pink spotted grey and white, highly decomposed, medium grained GRANITE. (COBBLE) |
| 4.3 | | 2.37m at 18:00 | 85 | 85 | 43 | 3.8 | | T2101 | -38.37 | 42.44 | | III | Moderately strong, light brownish pink spotted dark brown, grey and white, moderately decomposed, medium grained GRANITE. Joints are medium to closely spaced, rough planar, very narrow, clean and iron oxide stained, dipping at 0° to 10°. |
| 4.4 | | | | | | N.R. | | | -38.97 | 43.04 | | III | From 42.70m to 42.80m: No core recovered, assumed to be completely decomposed granite. Hole completed at 43.04m. |
| 4.5 | | | | | | | | | | | | | |
| 4.6 | | | | | | | | | | | | | |
| 4.7 | | | | | | | | | | | | | |
| 4.8 | | | | | | | | | | | | | |
| 4.9 | | | | | | | | | | | | | |
| 5.0 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ↕ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ↓ STANDARD PENETRATION TEST
- U100 UNDISTURBED SAMPLE
- ┄ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ▨ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 22/06/2010
 CHECKED James Lu
 DATE 23/06/2010

REMARKS

REVISED

PRELIMINARY



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD. GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH144

SHEET **1** OF **4**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836872.78

DATE FROM **29/05/2010** TO **08/06/2010**

N 818319.26

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.32 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|---------------------------|-------------|--------------------------------|-----------------------|-----------------------|--------|----------------|--------|----------------|---------------|-----------|--------|-------|---|
| 29/05/2010 | SX | 08:00 | | | | | | | +4.32 | 0.00 | △ | | Concrete slab. |
| | | | | | | | | INSPECTION PIT | +3.82 | 0.50 | △ | | Brown, silty fine to coarse SAND with occasional subangular fine to medium gravel sized moderately decomposed granite fragments and occasional concrete fragments. (FILL) |
| | | | | | | | | | | 1.00 | | | |
| | | | | | | | | | | 1.50 | | | |
| | | | | | | | | | | 2.00 | | | |
| | | | | | | | | | | 2.50 | | | |
| 329/05/2010 02/06/2010 | SX PX | Dry at 18:00 2.29m at 08:00 | 100 | | | | 22 bts | | | 3.00 | | | |
| 02/06/2010 03/06/2010 | | 2.33m at 08:00 | | | | | | | | 3.45 | | | |
| | | | | | | | | | | 6.00 | | | |
| | | | 100 | | | | 16 bts | | | 6.45 | | | |
| | | | | | | | | | | 9.00 | | | |
| | | | 100 | | | | 9 bts | | -4.68 | 9.45 | | | Dark greenish grey, clayey silty fine to coarse SAND with occasional shell fragments. (MARINE DEPOSIT) |

- SMALL DISTURBED SAMPLE
- ▲ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- ▨ U100 UNDISTURBED SAMPLE
- ▩ MAZIER SAMPLE
- ▧ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED **Tony Poon**

DATE **09/06/2010**

CHECKED **James Lu**

DATE **10/06/2010**

REMARKS

1. Gas detection was carried.
2. Water sample (2L) was taken at a depth of 6.00m.
3. Jar samples were taken at the depths of 0.50m, 1.50m and 3.00m.



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH144

SHEET **2** OF **4**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836872.78

DATE FROM **29/05/2010** TO **08/06/2010**

N 818319.26

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.32 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|----------|---------------|----------------|--------|-------|--|
| | PX | | | | | | | | | 10.00 | | | See sheet 1 of 4 for details. |
| | | | | | | | 54 bls | 13 14 | | 12.00 12.45 | | | |
| | | 2.35m at 18:00 | 100 | | | | 129 bls | 15 16 | -10.68 | 15.00 15.45 | | | Light brown, fine to coarse SAND with some subangular fine quartz gravel. (ALLUVIUM) |
| | | 2.04m at 08:00 | | | | | | | | | | | |
| | | | 100 | | | | 72 bls | 17 18 | -13.68 | 18.00 18.45 | | | Yellowish brown, slightly silty fine to coarse SAND. (ALLUVIUM) |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬆ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- STANDPIPE
- U76 UNDISTURBED SAMPLE
- ⬆ STANDARD PENETRATION TEST
- U100 UNDISTURBED SAMPLE
- ⊥ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⊥ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED **Tony Poon**
 DATE **09/06/2010**
 CHECKED **James Lu**
 DATE **10/06/2010**

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH144

SHEET **3** OF **4**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836872.78

DATE FROM **29/05/2010** TO **08/06/2010**

N 818319.26

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.32 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|--|-----------------------|-----------------------|--------|----------------|---------|----------|---------------|----------------|--------|-------|---|
| 20 | PX | | | | | | | | | 20.00 | | | See sheet 2 of 4 for details. |
| 21 | | 2.12m at 18:00 04/06/2010 05/06/2010 | 100 | | | | 52 bls | 19 20 | -16.68 | 21.00 21.45 | | | Orangish pink mottled red and grey spotted white, very clayey silty fine to coarse SAND. (ALLUVIUM) |
| 22 | | 2.22m at 08:00 | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | |
| 24 | | 2.25m at 18:00 05/06/2010 07/06/2010 | 100 | | | | 84 bls | 21 22 | -19.68 | 24.00 24.45 | | | Light orangish pink mottled light brown, silty fine to coarse SAND with some subangular fine quartz gravel. (ALLUVIUM) |
| 25 | | 2.22m at 08:00 | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | 100 | | | | 200 bls | 23 24 | -22.68 | 27.00 27.45 | | V | Extremely weak, reddish pink mottled white and spotted grey, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | 30.00 | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⇕ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- △ STANDPIPE
- U76 UNDISTURBED SAMPLE
- ↓ STANDARD PENETRATION TEST
- U100 UNDISTURBED SAMPLE
- ⊥ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⊥ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ∇ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 09/06/2010
 CHECKED James Lu
 DATE 10/06/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH144

SHEET **4** OF **4**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0092**

E 836872.78

DATE FROM **29/05/2010** TO **08/06/2010**

N 818319.26

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.32 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|---------|---------------|-----------|--------|-------|--|
| 30 | PX | | 100 | | | | 200 bls | 25 | | 30.00 | | | See sheet 3 of 4 for details. |
| 31 | | | | | | | | 26 | | 30.45 | | | |
| 32 | | | | | | | | | | | | | |
| 33 | | | 100 | | | | 200 bls | 27 | -28.68 | 33.00 | | V | Extremely weak, yellowish brown mottled white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND) |
| 34 | | | | | | | | 28 | | 33.45 | | | |
| 35 | PX | 2.25m at 18:00 | | | | | | | -30.89 | 35.21 | | | Strong, pink spotted grey, black and white, slightly decomposed, medium grained GRANITE. Joints are widely spaced, rough undulating, extremely narrow, iron oxide stained, dipping at 0° to 10°. |
| 36 | | 2.17m at 08:00 | 98 | 98 | 93 | 0.8 | | | | | | II | |
| 37 | | 2.04m at 13:00 | | | | | | | -32.09 | 36.41 | | | |
| 38 | | | | | | | | | | | | | Hole completed at 36.41m. |
| 39 | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ⬆️ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- ▩ U100 UNDISTURBED SAMPLE
- ▧ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- II IMPRESSION PACKER TEST
- V IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 09/06/2010
 CHECKED James Lu
 DATE 10/06/2010

REMARKS

Site ID 2-08

**(11202/SCL/ETP027; 11202/SCL/ETP012;
11202/SCL/ETP042; 11202/SCL/ETP043;
11202/SCL/ETP044)**


PRELIMINARY

| Samples & Test | Depth (m) | Sketch | Depth (m) | Legend | Description | Grade | |
|----------------|-----------|----------------|----------------|----------------|---|--|--|
| | 0.5 | | 0.25 | | Loose, dry, sandy angular coarse GRAVEL sized slightly decomposed granite. (RAIL BED) | | |
| | 0.5 | | 0.5 | | Dense, moist, brown mottled light brown, silty fine to coarse SAND with some subangular fine gravel sized moderately decomposed granite fragments. Contains occasional concrete fragments. (FILL) | | |
| | 1.0 | | 1.0 | | | | |
| | 1.5 | | 1.5 | | | | |
| | 2.0 | | 2.0 | | | | |
| | 2.5 | | 2.5 | | | | |
| | 3.0 | | 3.0 | 3.0 | | Trial pit was terminated at the depth of 3.00m. | |
| | 3.5 | | | 3.5 | | Notes : | |
| | 4.0 | | | 4.0 | | 1. Small disturbed samples were taken at the depths of 0.50m, 1.50m and 3.00m. | |
| | 4.5 | | | 4.5 | | 2. Gas detection was carried out. | |
| | 5.0 | | 5.0 | | | | |
| | 5.5 | | 5.5 | | | | |
| | 6.0 | | 6.0 | | | | |
| | | FACE A: 0.50 m | FACE B: 0.60 m | FACE C: 0.50 m | FACE D: 0.60 m | | |

| | | | | | | |
|--|---|--|--|--|-------------------------|--|
| SYMBOLS ↓ Small Disturbed Sample ↑ Large Disturbed Sample Undisturbed Vertical Sample — Undisturbed Horizontal Sample ■ Block Sample □ Insitu Density Test ▲ Water Sample ↓ Water Seepage | REMARKS Ground Water Plant Used Hand dug Shoring No Stability Stable Depth at pit centre 3.00m Others Water Seepage at 1.95m | PLAN (not to scale) | Contract No. : 11202 | PROJECT | | |
| | | | Job No. : GCE1001SI | Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link | | |
| | | | Co-ordinates : E 836839.45 N 818354.63 | Sheet 1 of 1 | TRIAL PIT NO. | |
| | | | Ground Level : 4.22 mPD | Date excavated 18/03/2010 to 18/03/2010 | 11202/SCL/ETP027 | |
| | | | Logged by : Tony Poon | Date Reinstated to | | |
| Date logged : 19/03/2010 | | GEOTECHNICS & CONCRETE ENGG. (HONG KONG) LIMITED GROUND INVESTIGATION DEPARTMENT | | | | |
| Checked by : James Lu | | | | | | |
| Date Checked : 20/03/2010 | | | | | | |

REVISED

PRELIMINARY

|  | | GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD. GROUND INVESTIGATION DEPARTMENT | | | HOLE NO. 11202/SCL/EDH012(P) | | | | | | | | |
|--|------------------|---|--|-----------------------|--|----------------|--------|--|---------------|---|--------|-------|--|
| | | | | | SHEET 1 OF 4 | | | | | | | | |
| DRILLHOLE RECORD | | | | | CONTRACT NO. 11202 | | | | | | | | |
| PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link | | | | | | | | | | | | | |
| METHOD Rotary Cored | | | CO-ORDINATES E 836803.07 N 818182.61 | | JOB NO. GCE1001SI | | | | | | | | |
| MACHINE & NO. 20-0104 | | | | | DATE FROM 02/06/2010 TO 10/06/2010 | | | | | | | | |
| FLUSHING MEDIUM Water | | | ORIENTATION Vertical | | GROUND LEVEL +4.36 mPD | | | | | | | | |
| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
| 02/06/2010 | SX | 08:00 | | | | | | | +4.36 | 0.00 | | | |
| 1 | | | | | | | | 1 | | 0.50 | | | Grey, angular to subangular fine to coarse GRAVEL with occasional cobble sized moderately decomposed granite fragments, occasional concrete and brick fragments. (FILL) |
| 2 | | | | | | | | 2 | +3.36 | 1.00 | | | Brown, silty fine to coarse SAND with some subangular fine to coarse gravel sized moderately decomposed granite fragments and occasional concrete fragments. (FILL) |
| 3 | | | | | | | | 3 | | 1.50 | | | |
| 4 | | | | | | | | 4 | | 2.00 | | | |
| 5 | | | | | | | | 5 | | 2.50 | | | |
| 302/08/2010 04/08/2010 | | Dry at 18:00 | | | | | 43 bls | 6 | +1.36 | 3.00 | | | Light brown, clayey silty fine to coarse SAND with occasional concrete fragments. (FILL) |
| 6 | | | | | | | | 7 | | 3.45 | | | |
| 604/06/2010 07/06/2010 | SX 6.45 PX | 2.16m at 18:00 | 100 | | | | 95 bls | 9 | -1.64 | 6.00 | | | Brown, slightly silty fine to coarse SAND with some subangular to subrounded fine to coarse gravel sized moderately decomposed granite fragments and occasional concrete fragments. (FILL) |
| 7 | | 2.18m at 08:00 | 98 | | | | | 10 | | 6.45 | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | 2.22m at 18:00 | 96 | | | | 61 bls | 11 | | 9.00 | | | |
| 10 | | 2.27m at 08:00 | | | | | | 12 | | 9.45 | | | |
| <ul style="list-style-type: none"> ● SMALL DISTURBED SAMPLE ◄ LARGE DISTURBED SAMPLE □ SPT LINER SAMPLE ▨ U76 UNDISTURBED SAMPLE ■ U100 UNDISTURBED SAMPLE ▩ MAZIER SAMPLE ▧ PISTON SAMPLE △ WATER SAMPLE ▲ PIEZOMETER TIP □ STANDPIPE ⊥ STANDARD PENETRATION TEST ⊥ PERMEABILITY TEST ⊥ IMPRESSION PACKER TEST ∨ IN-SITU VANE SHEAR TEST ⊥ PACKER TEST | | | | | | | | LOGGED Tony Poon DATE 11/06/2010 CHECKED James Lu DATE 12/06/2010 | | REMARKS 1. Packer test was carried out from the depths of 32.50m to 37.39m. 2. Acoustic televiewer survey were carried out from the depths of 28.80m to 37.20m. 3. Piezometer tips were installed at the depths of 12.50m and 28.30m. 4. Gas detection was carried. 5. Water sample (2L) was taken at a depth of 6.00m. | | | |



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH012(P)

SHEET **2** OF **4**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES
E 836803.07
N 818182.61

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0104**

DATE FROM **02/06/2010** TO **10/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.36 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|---------|---------------|-----------|--------|-------|--|
| | PX | | | | | | | | | | | | See sheet 1 of 4 for details. |
| 11 | | | | | | | | | | | | | |
| 12 | | | 100 | | | | 25 bis | 13 | -7.64 | 12.00 | | | Greenish grey, slightly silty fine to coarse SAND with occasional shell fragments. (FILL) |
| 13 | | | | | | | | 14 | | 12.45 | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | 100 | | | | 70 bis | 15 | -10.64 | 15.00 | | | Light yellowish brown mottled light orangish brown, slightly silty fine to coarse SAND with some subangular fine quartz gravel. (ALLUVIUM) |
| 16 | | | | | | | | 16 | | 15.45 | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | 90 | | | | 142 bis | 17 | -13.64 | 18.00 | | | Light grey, silty fine to coarse SAND with some subangular fine quartz gravel. (ALLUVIUM) |
| 19 | | | | | | | | 18 | | 18.45 | | | |
| 20 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ◄ LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- ▨ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ↓ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 11/06/2010
 CHECKED James Lu
 DATE 12/06/2010

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH012(P)

SHEET **3** OF **4**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD **Rotary Cored**

CO-ORDINATES
E 836803.07
N 818182.61

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0104**

DATE FROM **02/06/2010** TO **10/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.36 mPD**

| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|---------|---------|---------------|-----------|--------|-------|--|
| 20 | PX | | | | | | | | | 20.80 | | | See sheet 2 of 4 for details. |
| 21 | | | 100 | | | | 47 bls | 19 | -16.64 | 21.00 | | | Light brownish yellow, very clayey silty fine to coarse SAND. (ALLUVIUM) |
| | | | | | | | | 20 | | 21.45 | | | |
| 22 | | | | | | | | | | | | | Light grey, silty fine to coarse SAND with much angular fine quartz gravel. (ALLUVIUM) |
| 23 | | | 100 | | | | 49 bls | 21 | -19.64 | 24.00 | | | |
| 24 | | | | | | | | 22 | | 24.45 | | | |
| 25 | | | | | | | | | | | | | Very weak to weak, orangish brown spotted grey, highly decomposed, medium grained GRANITE. (Angular fine to medium GRAVEL in sandy matrix) |
| 26 | | | 100 | | | | 200 bls | 23 | -22.64 | 27.00 | | IV | |
| 27 | | | | | | | | 24 | | 27.27 | | | |
| 28 | | | | | | | | | | | | | Moderately strong, orangish pink spotted grey and black, striped green and white, moderately decomposed, slightly chloritized medium grained GRANITE. Joints are medium spaced, rough planar and smooth planar, extremely narrow to very narrow, iron oxide stained and chlorite coated, dipping at |
| 29 | PX | 2.20m at 18:00 | 100 | 100 | 2.1 | | | | -24.44 | 28.80 | | III | |
| 30 | | 2.16m at 08:00 | | | | | | T2101 | | | | | |

- SMALL DISTURBED SAMPLE
- ◻ LARGE DISTURBED SAMPLE
- ◻ SPT LINER SAMPLE
- ▨ U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- ▨ MAZIER SAMPLE
- ▨ PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- ⊥ STANDARD PENETRATION TEST
- ⊥ PERMEABILITY TEST
- ⊥ IMPRESSION PACKER TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED **Tony Poon**
 DATE **11/06/2010**
 CHECKED **James Lu**
 DATE **12/06/2010**

REMARKS



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO.
11202/SCL/EDH012(P)

SHEET **4** OF **4**

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**

METHOD **Rotary Cored**

CO-ORDINATES
E 836803.07
N 818182.61

JOB NO. **GCE1001SI**

MACHINE & NO. **20-0104**

DATE FROM **02/06/2010** TO **10/06/2010**

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL **+4.36** mPD

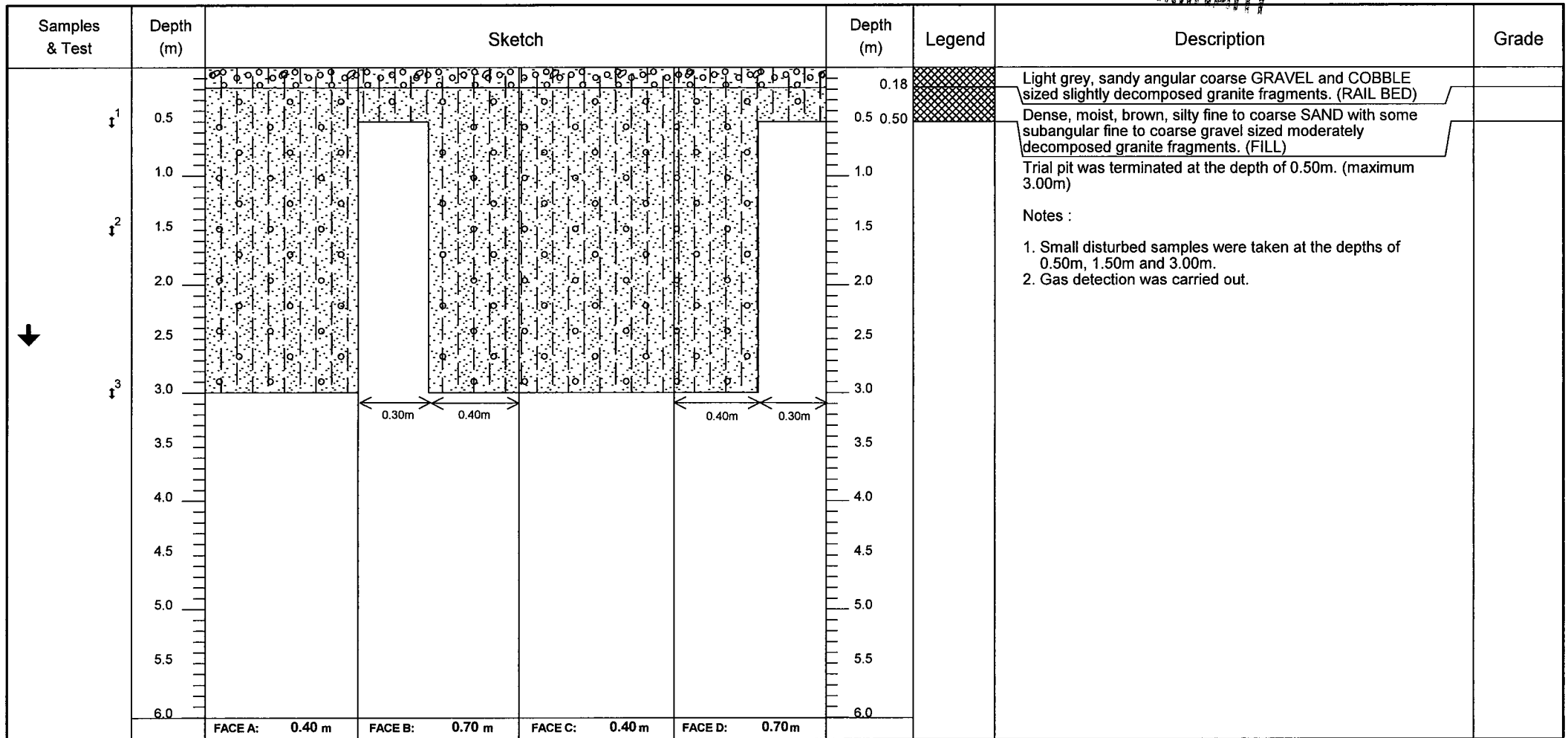
| Drilling Progress | Casing size | Water level (m) & Time | Total core Recovery % | Solid core Recovery % | R.Q.D. | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|------------------------|-----------------------|-----------------------|--------|----------------|-------|---------|---------------|-----------|--------|-------|---|
| 30 | | | 100 | 100 | 100 | | | T2101 | | 30.00 | + | | 0° to 10° and 80° to 90°. From 29.84m to 30.72m: QUARTZ vein (5mm to 15mm thick), dipping at 80° to 90°. |
| 31 | | | | | | 3.7 | | T2101 | -26.83 | 31.19 | + | III | Moderately strong, pinkish red mottled brown spotted grey, black and white, moderately decomposed, fine grained GRANITE. Joints are medium spaced, locally widely and closely spaced, smooth planar, slickensided planar and rough undulating, tight to extremely narrow, iron oxide stained, calcite and chlorite coated, dipping at 0° to 10°, 40° to 50°, 50° to 60° and 80° to 90°. |
| 32 | | | 100 | 100 | 96 | 6.7 1.4 | | T2101 | | 31.68 | + | | From 31.68m to 31.95m: Orangish red mottled green, slightly chloritized GRANITE. From 32.15m to 32.39m: Orangish red striped green, slightly chloritized GRANITE. |
| 33 | | | 100 | 100 | 93 | 46.7 3.4 | | T2101 | | 33.13 | + | | |
| 34 | | 2.58m at 18:00 | | | | 2.1 | | T2101 | | | + | | |
| 09/06/2010 | | 2.20m at 08:00 | 96 | 95 | 82 | 11.1 3.3 | | T2101 | | 34.33 | + | | |
| 10/06/2010 | | | | | | | | T2101 | | | + | | From 34.72m to 35.06m: Orangish red mottled green and white, slightly chloritized PEGMATITE. |
| 35 | | | | | | 10.5 | | T2101 | | | + | | |
| 36 | | | 100 | 100 | 64 | | | T2101 | | 35.87 | + | | From 35.76m to 35.82m: Reddish pink mottled white, PEGMATITE. From 36.21m to 36.52m: Grey mottled reddish pink and white, medium to coarse grained GRANITE. |
| 37 | | 18:00 | | | | | | T2101 | | | + | | |
| 10/06/2010 | | | | | | | | | -33.03 | 37.39 | + | | From 37.25m to 37.30m: Red mottled white, medium to coarse grained GRANITE. Hole completed at 37.39m. |
| 38 | | | | | | | | | | | | | |
| 39 | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | |

- SMALL DISTURBED SAMPLE
- ▲ WATER SAMPLE
- ⬆️ LARGE DISTURBED SAMPLE
- ▲ PIEZOMETER TIP
- SPT LINER SAMPLE
- STANDPIPE
- ▨ U76 UNDISTURBED SAMPLE
- ⬇️ STANDARD PENETRATION TEST
- U100 UNDISTURBED SAMPLE
- ⊥ PERMEABILITY TEST
- ▨ MAZIER SAMPLE
- ⊥ IMPRESSION PACKER TEST
- ▨ PISTON SAMPLE
- ∇ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED Tony Poon
 DATE 11/06/2010
 CHECKED James Lu
 DATE 12/06/2010

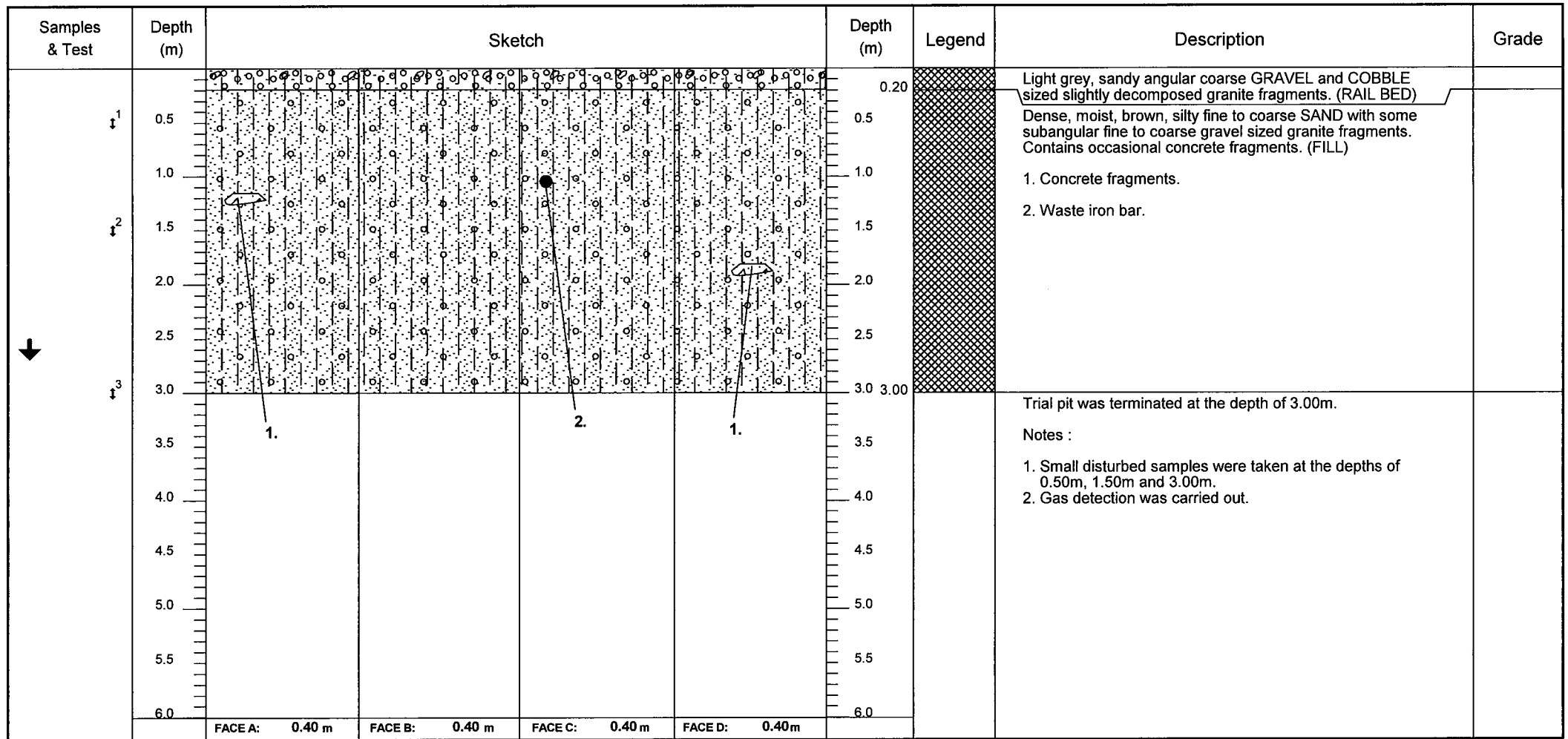
REMARKS

PRELIMINARY



| | | | | |
|--|---|--|--|---|
| SYMBOLS ↓ Small Disturbed Sample ↑ Large Disturbed Sample Undisturbed Vertical Sample — Undisturbed Horizontal Sample ■ Block Sample □ Insitu Density Test ▲ Water Sample ↓ Water Seepage | REMARKS Ground Water Plant Used Hand dug Shoring No Stability Stable Depth at pit centre 3.00m Others Water Seepage at 2.58m | PLAN (not to scale) | Contract No. : 11202 | PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link Sheet 1 of 1 TRIAL PIT NO. 11202/SCL/ETP042 |
| | | | Job No. : GCE1001SI | |
| | | | Co-ordinates : E 836810.98 N 818006.38 | |
| | | | Ground Level : 4.19 mPD | |
| | | | Logged by : Tony Poon | |
| Date logged : 12/03/2010 | Date excavated 10/03/2010 to 11/03/2010 | | | |
| Checked by : James Lu | Date Reinstated to | | | |
| Date Checked : 13/03/2010 | | GEOTECHNICS & CONCRETE ENGG. (HONG KONG) LIMITED GROUND INVESTIGATION DEPARTMENT | | |

PRELIMINARY



| | | | | | | | |
|--|---|-----------------------------------|--|--|--|-------------------------|--|
| SYMBOLS Small Disturbed Sample Large Disturbed Sample Undisturbed Vertical Sample Undisturbed Horizontal Sample Block Sample Insitu Density Test Water Sample Water Seepage | REMARKS Ground Water Plant Used Hand dug Shoring No Stability Stable Depth at pit centre 3.00m Others Water Seepage at 2.70m | PLAN (not to scale) | Contract No. : 11202 | | PROJECT | | |
| | | | Job No. : GCE1001SI | | Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link | | |
| | | | Co-ordinates : E 836805.41 N 818091.11 | | Sheet 1 of 1 | TRIAL PIT NO. | |
| | | | Ground Level : 4.18 mPD | | Date excavated 10/03/2010 to 11/03/2010 | 11202/SCL/ETP043 | |
| | | | Logged by : Tony Poon | | Date Reinstated to | | |
| Date logged : 12/03/2010 | | | | GEOTECHNICS & CONCRETE ENGG. (HONG KONG) LIMITED GROUND INVESTIGATION DEPARTMENT | | | |
| Checked by : James Lu | | | | | | | |
| Date Checked : 13/03/2010 | | | | | | | |

PRELIMINARY

| Samples & Test | Depth (m) | Sketch | Depth (m) | Legend | Description | Grade |
|----------------|-----------|----------------|----------------|----------------|---|-------|
| | 0.20 | | 0.20 | | Loose, dry, greyish brown mottled grey, sandy angular coarse GRAVEL and COBBLE sized slightly decomposed granite. (RAIL RED) | |
| t ¹ | 0.5 | | 0.50 | | Dense, moist, brown, silty fine to coarse SAND with occasional subangular fine to coarse gravel sized slightly decomposed granite. (FILL) | |
| t ² | 1.0 | | 1.0 | | Dense, moist, greyish brown, silty fine to coarse SAND with occasional subangular fine to coarse gravel sized slightly decomposed granite. (FILL) | |
| | 3.0 | | 3.00 | | Trial pit was terminated at the depth of 3.00m. | |
| | 3.5 | | 3.5 | | Notes : | |
| | 4.0 | | 4.0 | | 1. Small disturbed samples were taken at the depths of 0.50m, 1.50m and 3.00m. | |
| | 4.5 | | 4.5 | | 2. Gas detection was carried out. | |
| | 5.0 | | 5.0 | | | |
| | 5.5 | | 5.5 | | | |
| | 6.0 | | 6.0 | | | |
| | | FACE A: 0.50 m | FACE B: 0.60 m | FACE C: 0.50 m | FACE D: 0.60 m | |

| SYMBOLS | REMARKS | PLAN | Contract No. : 11202 | | PROJECT | |
|---------|---------|------|--|--|-----------------------|---------------------|
| | | | <ul style="list-style-type: none"> ↓ Small Disturbed Sample ↑ Large Disturbed Sample ⊥ Undisturbed Vertical Sample — Undisturbed Horizontal Sample ■ Block Sample ⌊ Insitu Density Test ▲ Water Sample ↓ Water Seepage | <ul style="list-style-type: none"> Ground Water Plant Used Hand dug Shoring No Stability Stable Depth at pit centre 3.00m Others Water Seepage at 2.15m | <p>(not to scale)</p> | Job No. : GCE1001SI |
| | | | Co-ordinates : E 836838.91 N 818277.13 | Sheet 1 of 1 | TRIAL PIT NO. | |
| | | | Ground Level : 4.18 mPD | Date excavated 18/03/2010 to 18/03/2010 | 11202/SCL/ETP044 | |
| | | | Logged by : Tony Poon | Date Reinstated to | | |
| | | | Date logged : 19/03/2010 | | | |
| | | | Checked by : James Lu | | | |
| | | | Date Checked : 20/03/2010 | | | |
| | | | | GEOTECHNICS & CONCRETE ENGG. (HONG KONG) LIMITED GROUND INVESTIGATION DEPARTMENT | | |

Soil Profile Logs under Stage 2 SI

Site ID 1-22

(11203/SCL/EB118 to 11203/SCL/EB123)



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB118**

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

PROJECT Stage II Further Ground Investigation for Shatin to Central Link

| | | |
|-----------------------------|--|---|
| METHOD | CO-ORDINATES E 836699.64 N 818714.86 | WORKS ORDER NO. D-463 |
| MACHINE N/A | | DATE 16.12.2010 to 16.12.2010 |
| FLUSHING MEDIUM NONE | ORIENTATION VERTICAL | GROUND LEVEL +12.86 mPD |

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description | |
|-------------------|-------------|---------------------------------|------|------|------|----------------|----------|----------|---------------|-----------|--------|-------|---|--|
| 16.12.2010 | | | | | | | | 1 # 0.45 | +12.86 | 0.00 | | | Loose, yellowish brown spotted white, clayey silty fine to coarse SAND with some subangular fine gravel sized quartz and rock fragments. (FILL) | |
| 1 | | | | | | | 2 # 0.95 | | | | | | | |
| | | | | | | | 3 # 1.45 | | | | | | | |
| 2 | | | | | | | 4 # 1.95 | | | | | | | |
| | | | | | | | 5 # 2.45 | | | | | | | |
| 16.12.2010 | | | | | | | 6 # 2.95 | +9.86 | 3.00 | | | | | |
| 4 | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |

- ± SMALL DISTURBED SAMPLE
- ↑ LARGE DISTURBED SAMPLE
- ▨ U76 SAMPLE
- ▩ PISTON SAMPLE (76mm)
- ▧ MAZIER SAMPLE
- SPT LINER SAMPLE
- ▲ WATER SAMPLE
- U100 SAMPLE
- ↓ STANDARD PENETRATION TEST
- ✓ IN-SITU VANE SHEAR TEST
- ⊖ PACKER TEST
- ⊕ PERMEABILITY TEST
- ⊖ PRESSUREMETER TEST
- ⊕ BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang
 DATE 18.12.2010
 CHECKED C. Lun
 DATE 20.12.2010

REMARKS
 1. An inspection pit was excavated to 3.00m deep by hand tools.
 2. Soil samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m for environmental testing.



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB119**

SHEET 1 of 1

PROJECT Stage II Further Ground Investigation for Shatin to Central Link

METHOD ROTARY

CO-ORDINATES

WORKS ORDER NO. D-463

MACHINE 2724

E 836762.46
N 818714.41

DATE 25.11.2010 to 30.11.2010

FLUSHING MEDIUM NONE

ORIENTATION VERTICAL

GROUND LEVEL +4.98 mPD

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|---------------------------------|------|------|------|----------------|-------------|----------|---------------|-----------|--------|--|---|
| 25.11.2010 | SW | | | | | | | 1 H 0.45 | +4.98 | 0.00 | | | Soft, light brown and light yellow, clayey sandy SILT with some angular to subangular fine to coarse gravel. (FILL) |
| 1 | | | | | | | 2 H 0.95 | | | | | | |
| 2 | | | | | | | 3 H 1.45 | | | | | | |
| 4 | | | | | | | 4 H 1.95 | | | | | | |
| 5 | | | | | | | 5 H 2.45 | +2.53 | 2.45 | | | | |
| 25.11.2010 | SW | | | | | | | 6 H 2.95 | | | | Soft, yellow to light brown mottled red, sandy CLAY/SILT with some subangular fine gravel. (FILL) | |
| 29.11.2010 | PW | 3.00m | | | | | 7 H 3.00 | +1.98 | 3.00 | | | | |
| 4 | | | 100 | | | | 8 H 3.45 | | | | | | |
| 5 | PW | 4.50m | | | | | | | | | | Light greenish grey, subangular COBBLE sized rock fragments. (FILL) | |
| 5 | HW | | 83 | | | | T2-101 4.77 | +0.27 | 4.71 | | | | |
| 29.11.2010 | | | | | | | | | | | | Medium dense, light greenish grey, slightly clayey silty fine to coarse SAND with some subangular fine gravel of quartz. (ALLUVIUM?) | |
| 30.11.2010 | | | | | | | 9 H 6.00 | | | | | | |
| 30.11.2010 | HW | 6.50m | | | | | | | | | | End of hole at 6.50 m. | |
| 7 | | | | | | | 10 H 6.45 | -1.52 | 6.50 | | | | |

- ↓ SMALL DISTURBED SAMPLE
- ↑ LARGE DISTURBED SAMPLE
- U76 SAMPLE
- PISTON SAMPLE (76mm)
- MAZIER SAMPLE
- SPT LINER SAMPLE
- WATER SAMPLE
- U100 SAMPLE
- ↓ STANDARD PENETRATION TEST
- ∨ IN-SITU VANE SHEAR TEST
- PACKER TEST
- PERMEABILITY TEST
- PRESSUREMETER TEST
- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang
 DATE 21.12.2010
 CHECKED C. Lun
 DATE 14.01.2011

REMARKS
 1. An inspection pit was excavated to 3.00m deep by hand tools.
 2. Drilling without water flushing was carried out from 3.00m to 6.50m.
 3. Soil samples taken by U76 sampler were removed from the sampler tubes for environmental testing.



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB120**

SHEET **1** of **3**

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **SD32**

E 836754.58
N 818763.39

DATE **18.11.2010** to **24.11.2010**

FLUSHING MEDIUM **WATER**

ORIENTATION **VERTICAL**

GROUND LEVEL **+12.09 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description | |
|-------------------|-------------|---------------------------------|------|------|------|----------------|----------|------------|---------------|-----------|--------|-------|--|--|
| 18.11.2010 | SW | | | | | | | 1 H 0.45 | +12.09 | 0.00 | | | Loose, yellowish brown spotted yellow, clayey silty fine to coarse SAND with some subangular fine gravel sized quartz and rock fragments. (FILL) | |
| 1 | | | | | | | 2 H 0.95 | | | | | | | |
| | | | | | | | 3 H 1.45 | | | | | | | |
| 2 | | | | | | | 4 H 1.95 | +10.09 | 2.00 | | | | | Loose, reddish brown spotted yellow, clayey silty fine to coarse SAND with some subangular fine gravel sized quartz and rock fragments. (FILL) |
| | | | | | | | 5 H 2.45 | | | | | | | |
| 3 | | | 100 | | | | B=21 | 6 H 2.95 | | | | | Angular to subangular, yellowish brown spotted pink and black, COBBLE sized granite fragment. (FILL) Wash boring, assumed to be FILL. | |
| 18.11.2010 | | | | | | | | 7 H 3.00 | | | | | | |
| 19.11.2010 | | 2.80 at 0800 | 100 | | | | | 8 H 3.55 | +8.59 | 3.50 | | | No recovery, assumed to be FILL. | |
| 4 | | | | | | | 9 H 3.60 | +8.49 | 3.60 | | | | | |
| 5 | | | | | | | | | | | | | Stiff, light yellowish brown spotted white and pink, silty sandy CLAY with some subangular fine gravel sized quartz and rock fragments. (FILL) | |
| 6 | SW 6.10m PW | | 0 | | | | B=89 | 10 H 6.10 | +5.99 | 6.10 | | | | |
| 7 | | | 0 | | | | B=126 | 11 H 6.55 | | | | | Angular to subangular, yellowish brown spotted pink and black, fine to coarse GRAVEL and COBBLE sized rock fragments. (FILL) Wash boring, assumed to be FILL. | |
| | | | | | | | | 12 H 6.60 | | | | | | |
| 8 | | | 100 | | | | B=50 | 13 H 7.05 | +4.79 | 7.30 | | | Stiff, yellowish brown spotted white and pink, silty sandy CLAY with some subangular fine gravel sized quartz and rock fragments. (FILL) | |
| | | | | | | | | 14 H 7.30 | | | | | | |
| 9 | | | 67 | | | | | 15 H 7.75 | +4.09 | 8.00 | | | Medium dense, light greenish grey and grey. | |
| | | | | | | | | T-120 8.00 | +3.79 | 8.30 | | | | |
| 10 | | | 100 | | | | B=26 | 16 H 8.00 | +3.09 | 9.00 | | | Medium dense, light greenish grey and grey. | |
| | | | | | | | | 17 H 8.30 | | | | | | |
| | | | | | | | B=25 | 18 H 9.00 | +2.29 | 9.80 | | | Medium dense, light greenish grey and grey. | |
| | | | | | | | | 19 H 9.45 | | | | | | |
| | | | 3.40 | | | | | 20 H 9.80 | | | | | | |

- ⇄ SMALL DISTURBED SAMPLE
- ↑ LARGE DISTURBED SAMPLE
- U76 SAMPLE
- PISTON SAMPLE (76mm)
- MAZIER SAMPLE
- SPT LINER SAMPLE
- WATER SAMPLE
- U100 SAMPLE
- ↓ STANDARD PENETRATION TEST
- ∨ IN-SITU VANE SHEAR TEST
- PACKER TEST
- PERMEABILITY TEST
- PRESSUREMETER TEST
- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang
 DATE 30.11.2010
 CHECKED C. Lun
 DATE 03.12.2010

REMARKS
 1. An inspection pit was excavated to 3.00m deep by hand tools.
 2. Water sample was taken at 15.50m.
 3. Soil samples taken by U76 sampler were removed from the sampler tubes for environmental testing.



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB120**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **SD32**









E 836754.58
N 818763.39




DATE **18.11.2010** to **24.11.2010**

FLUSHING MEDIUM **WATER**

ORIENTATION **VERTICAL**

GROUND LEVEL **+12.09 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------------|--------------|---------------------------------|------|------|------|----------------|-------|--|---------------|-----------|---|-------|---|
| 19.11.2010 20.11.2010 | | at 1200 | 100 | | | | | 16  10.25 | | |  | | slightly clayey silty fine to coarse SAND with some subangular fine to medium gravel. (FILL) |
| 11 | | 9.15 at 0800 | | | | | | | | | | | |
| 12 | | | 100 | | | | B-31 | 17  12.00 | +0.09 | 12.00 | | | Light greenish grey spotted white, clayey silty fine SAND with some angular to subangular fine gravel sized quartz fragments and some shell fragments. (FILL) |
| 13 | | | | | | | | 18  12.45 | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | PW 15.00m HW | 9.16 at 1800 | 100 | | | | B-34 | 19  15.00 | -2.91 | 15.00 | | V | Extremely weak, pink spotted white, completely decomposed medium grained GRANITE. (Stiff, slightly sandy clayey SILT with some angular fine gravel) |
| 20.11.2010 23.11.2010 | | 9.13 at 0800 | | | | | | 20  15.45 | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | 100 | | | | B-66 | 21  18.00 | -5.91 | 18.00 | | V | Extremely weak, yellowish red mottled brown, completely decomposed medium grained GRANITE. (Fine to coarse SAND with some angular fine to medium gravel) |
| 19 | | | | | | | | 22  18.25 | | | | | |
| 20 | | | | | | | | | -7.91 | 20.00 | | | |

- ↑ SMALL DISTURBED SAMPLE
- ↓ STANDARD PENETRATION TEST
- ↑ LARGE DISTURBED SAMPLE
- ∨ IN-SITU VANE SHEAR TEST
-  U76 SAMPLE
- ⊖ PACKER TEST
-  PISTON SAMPLE (76mm)
- ⊖ PERMEABILITY TEST
-  MAZIER SAMPLE
- ⊖ PRESSUREMETER TEST
- SPT LINER SAMPLE
- ⊖ BOREHOLE TELEVIEWER
- ▲ WATER SAMPLE
- ⊖ PIEZOMETER TIP
- U100 SAMPLE
- STANDPIPE TIP

LOGGED L. Zhang

DATE 30.11.2010

CHECKED C. Lun

DATE 03.12.2010

REMARKS



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB120**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

| | | |
|------------------------------|--|---|
| METHOD ROTARY | CO-ORDINATES E 836754.58 N 818763.39 | WORKS ORDER NO. D-463 |
| MACHINE SD32 | | DATE 18.11.2010 to 24.11.2010 |
| FLUSHING MEDIUM WATER | ORIENTATION VERTICAL | GROUND LEVEL +12.09 mPD |

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|--------------|---------------------------------|------|------|------|----------------|--------|---------|---------------|-----------|--------|-------|--|
| 21 | HW 21.00m | | | | | | B=73 | 23 | 21.00 | -8.91 | 21.00 | V | As sheet 2 of 3. |
| 22 | | 9.04 at 0800 | 100 | | | | | 24 | 21.25 | | | V | Extremely weak, red mottled brown, completely decomposed medium grained GRANITE. (Stiff, clayey sandy SILT with some angular fine to medium gravel) |
| 24 | | | 80 | 60 | 47 | 1.3 | T2-101 | 23.90 | -11.81 | 23.90 | + | III | Moderately strong, yellowish brown spotted white and black, moderately decomposed medium grained GRANITE. |
| 25 | | | 100 | 100 | 100 | 0.0 | T2-101 | 24.90 | -12.81 | 24.90 | + | III | Joint set 1: Joints are medium spaced, rough planar, very narrow, iron and manganese oxide stained, kaolin coated (<1mm), dipping at 65° to 75°. |
| 26 | | 9.25 at 1300 | | | | | | | -13.84 | 25.93 | + | II | Joint set 2: from 24.11m to 24.62m: Joints are closely to medium spaced, rough planar, extremely narrow to very narrow, iron and manganese oxide stained, dipping at 10° to 20°. |
| 27 | | | | | | | | | | | | | 24.52m to 24.62m: Extremely weak to weak, pink mottled brown spotted white, completely to highly decomposed medium grained GRANITE. (Sandy fine to coarse GRAVEL sized granite fragments) |
| 28 | | | | | | | | | | | | | 24.62m to 24.82m: No recovery, assumed to be completely decomposed GRANITE. Strong, light greyish pink spotted grey and white, slightly decomposed medium grained GRANITE, without joint. |
| 29 | | | | | | | | | | | | | End of hole at 25.93 m. |

- ⇓ SMALL DISTURBED SAMPLE
- ⇑ LARGE DISTURBED SAMPLE
- ▨ U76 SAMPLE
- ▨ PISTON SAMPLE (76mm)
- ▨ MAZIER SAMPLE
- SPT LINER SAMPLE
- ▲ WATER SAMPLE
- U100 SAMPLE
- ↓ STANDARD PENETRATION TEST
- ∨ IN-SITU VANE SHEAR TEST
- PACKER TEST
- PERMEABILITY TEST
- PRESSUREMETER TEST
- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang

DATE 30.11.2010

CHECKED C. Lun

DATE 03.12.2010

REMARKS



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB121**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD

CO-ORDINATES

WORKS ORDER NO. **D-463**

**E 836720.38
N 818757.59**

DATE **18.12.2010** to **18.12.2010**

MACHINE **N/A**

FLUSHING MEDIUM **NONE**

ORIENTATION **VERTICAL**

GROUND LEVEL **+6.51 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description | |
|-------------------|-------------|---------------------------------|------|------|------|----------------|----------|----------|---------------|-----------|--------|-------|---|--|
| 18.12.2010 | | | | | | | | 1 H 0.45 | +6.51 | 0.00 | | | Loose, dark brown spotted yellow, clayey silty fine to coarse SAND with some subangular fine gravel sized quartz and rock fragments. (FILL) | |
| 1 | | | | | | | 2 H 0.95 | | | | | | | |
| | | | | | | | 3 H 1.45 | | | | | | | |
| 2 | | | | | | | 4 H 1.95 | | | | | | | |
| | | | | | | | 5 H 2.45 | | | | | | | |
| 18.12.2010 | | | | | | | 6 H 2.95 | +3.51 | 3.00 | | | | | |
| 4 | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |

- ± SMALL DISTURBED SAMPLE
- ↓ LARGE DISTURBED SAMPLE
- U76 SAMPLE
- PISTON SAMPLE (76mm)
- MAZIER SAMPLE
- SPT LINER SAMPLE
- WATER SAMPLE
- U100 SAMPLE
- ↓ STANDARD PENETRATION TEST
- ∨ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST
- ⊥ PERMEABILITY TEST
- ⊥ PRESSUREMETER TEST
- ⊥ BOREHOLE TELEVIEWER
- ⊥ PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang
 DATE 21.12.2010
 CHECKED C. Lun
 DATE 23.12.2010

REMARKS
 1. An inspection pit was excavated to 3.00m deep by hand tools.
 2. Soil samples were taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m for environmental testing.



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB122**

SHEET **1** of **3**

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **2724**

**E 836678.71
N 818798.80**

DATE **06.12.2010** to **16.12.2010**

FLUSHING MEDIUM **WATER**

ORIENTATION **VERTICAL**

GROUND LEVEL **+8.36 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|---------------------------------|------|------|------|----------------|----------|----------|---------------|-----------|--------|--|--|
| 06.12.2010 | SW | | | | | | | 1 H 0.45 | +8.36 | 0.00 | | | Loose, reddish brown and dark brown, silty fine to medium, occasional coarse SAND with some subangular fine to coarse gravel. (FILL) |
| 1 | | | | | | | 2 H 0.95 | | | | | | |
| 2 | | | | | | | 3 H 1.45 | | | | | | |
| 4 | | | | | | | 4 H 1.95 | | | | | | |
| 5 | | | | | | | 5 H 2.45 | | | | | | |
| 06.12.2010 | SW | Dry at 1800 | | | | | | 6 2.95 | +5.36 | 3.00 | | Very dense, yellowish brown, clayey silty fine to medium SAND with some subangular fine to occasional medium gravel. (FILL) | |
| 06.12.2010 | HW | Dry at 0800 | 100 | | | | 7 3.45 | | | | | | |
| 11.12.2010 | | | | | | B=34 | | | | | | | |
| 4 | | | 100 | | | | | | +4.29 | 4.07 | | Grey to light grey, angular to subangular COBBLE and BOULDER, occasional coarse gravel sized granite and tuff fragments. (FILL) | |
| 5 | | | | | | | | | +3.89 | 4.47 | | | |
| 11.12.2010 | | 4.35 at 1800 | | | | | | | | | | Dry drilling. | |
| 13.12.2010 | | 5.25 at 0800 | 100 | | | | | | | | | | |
| 7 | | | | | | | | 8 6.00 | +2.36 | 6.00 | | Dense, light brown, clayey silty fine to medium, occasional coarse SAND with occasional subangular fine gravel. (ALLUVIUM?) | |
| 8 | | | | | | | | | | | | | |
| 9 | | | 100 | | | | | 9 9.00 | -0.64 | 9.00 | | Stiff, brownish yellow, silty very sandy CLAY with some angular fine to medium, occasional coarse gravel sized granite fragments. (RESIDUAL SOIL?) | |
| 10 | | | | | | | | | | | | | |

- ⬆ SMALL DISTURBED SAMPLE
- ⬆ LARGE DISTURBED SAMPLE
- ⬆ U76 SAMPLE
- ⬆ PISTON SAMPLE (76mm)
- ⬆ MAZIER SAMPLE
- ⬆ SPT LINER SAMPLE
- ⬆ WATER SAMPLE
- ⬆ U100 SAMPLE
- ⬆ STANDARD PENETRATION TEST
- ⬆ IN-SITU VANE SHEAR TEST
- ⬆ PACKER TEST
- ⬆ PERMEABILITY TEST
- ⬆ PRESSUREMETER TEST
- ⬆ BOREHOLE TELEVIEWER
- ⬆ PIEZOMETER TIP
- ⬆ STANDPIPE TIP

LOGGED L. Zhang
 DATE 21.12.2010
 CHECKED C. Lun
 DATE 05.01.2011

REMARKS
 1. An inspection pit was excavated to 3.00m deep by hand tools.
 2. Drilling without water flushing was carried out from 3.00m to 6.50m.
 3. Soil samples taken by U76 sampler were removed from the sampler tubes for environmental testing.
 4. Water sample was taken at 12.50m.



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB122**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **2724**

**E 836678.71
N 818798.80**

DATE **06.12.2010** to **16.12.2010**

FLUSHING MEDIUM **WATER**

ORIENTATION **VERTICAL**

GROUND LEVEL **+8.36 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|---------------------------------|------|------|------|------------------------|-------|---------|---------------|-----------|--------|-------|---|
| 11 | | | | | | | | | | | | VI? | As sheet 1 of 3. |
| 12 | | 4.26 at 1800 | 100 | | | | B=129 | 10 | 12.00 | -3.64 | 12.00 | V | Extremely weak, light reddish brown spotted white and black, completely decomposed medium grained GRANITE. (Slightly clayey silty fine to medium SAND with some angular fine gravel sized quartz and granite fragments) |
| 13 | | 5.10 at 0800 | | | | | | | 12.45 | | | | |
| 14 | | 4.95 at 1800 | | | | | | | | | | | Moderately weak to moderately strong, pink mottled brown spotted white and grey, microfractured, moderately decomposed medium grained GRANITE. (CORESTONE) Joints are closely to medium spaced, rough planar and stepped, very narrow, manganese oxide stained, dipping at 20° to 30°. |
| 15 | | 5.14 at 0800 | 71 | 55 | 45 | 3.0 NA 8.3 NR | B=137 | T2-101 | 14.90 | -6.54 | 14.90 | III | |
| 16 | | | 100 | | | | | | 15.23 | | | V | |
| 17 | | | | | | | | | 15.33 | | | V | 15.23m to 15.33m: Extremely weak to weak and completely to highly decomposed. (Angular, sandy fine to coarse GRAVEL sized granite fragments) |
| 18 | | | | | | | | | 15.57 | | | V | 15.57m to 15.90m: No recovery, assumed to be completely decomposed GRANITE. |
| 19 | | 3.95 at 1800 | | | | | | | 15.90 | -7.54 | 15.90 | V | Extremely weak, light grey mottled yellowish brown, completely decomposed medium grained GRANITE. (Slightly clayey silty fine to medium SAND with some angular fine gravel sized quartz and granite fragments) |
| 20 | | 5.21 at 0800 | 36 | 16 | 0 | NI NR 9.5 NR | | T2-101 | 18.87 | -10.51 | 18.87 | IV | Weak, yellowish brown mottled white spotted pink and black, highly decomposed medium grained GRANITE. (Angular, medium to coarse GRAVEL sized granite fragments) |
| | | | 31 | 31 | 31 | | | T2-101 | 19.32 | -10.89 | 19.25 | III | 18.96m to 19.25m: No recovery, assumed to be completely decomposed GRANITE. |
| | | | | | | | | T2-101 | 19.77 | -11.41 | 19.77 | V | |
| | | | | | | | | T2-101 | 19.97 | | 20.00 | II | |

- ⬆ SMALL DISTURBED SAMPLE
- ⬇ LARGE DISTURBED SAMPLE
- ▨ U76 SAMPLE
- ▨ PISTON SAMPLE (76mm)
- ▨ MAZIER SAMPLE
- SPT LINER SAMPLE
- ▲ WATER SAMPLE
- U100 SAMPLE
- ⬇ STANDARD PENETRATION TEST
- ✓ IN-SITU VANE SHEAR TEST
- PACKER TEST
- PERMEABILITY TEST
- PRESSUREMETER TEST
- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang
 DATE 21.12.2010
 CHECKED C. Lun
 DATE 05.01.2011

REMARKS



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB122**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **2724**

**E 836678.71
N 818798.80**

DATE **06.12.2010** to **16.12.2010**

FLUSHING MEDIUM **WATER**

ORIENTATION **VERTICAL**

GROUND LEVEL **+8.36 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|---------------------------------|------|------|------|----------------|-------|---------|---------------|-----------|--------|-------|---|
| 16 21 2010 | | 4.90 at 1800 | 100 | 100 | 100 | 3.1 | | T2-101 | -12.71 | -21.07 | +++++ | II | <p>completely decomposed GRANITE.</p> <p>Moderately strong, pinkish grey mottled yellowish brown spotted white, moderately decomposed medium grained GRANITE. (CORESTONE)</p> <p>Joints forming the top and base of corestone are closely spaced, rough planar, very narrow, iron oxide stained, kaolin coated (<1mm), dipping at 0° to 10°.</p> <p>19.46m to 19.77m: No recovery, assumed to be completely decomposed GRANITE.</p> <p>Strong, light greyish pink spotted black, slightly decomposed medium grained GRANITE.</p> <p>Joint set 1: Joints are closely to medium spaced, rough planar, extremely narrow to very narrow, iron and manganese oxide stained, kaolin coated (<1mm), dipping at 0° to 10°.</p> <p>End of hole at 21.07 m.</p> |
| 22 | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |

- ⇕ SMALL DISTURBED SAMPLE
- ⇓ LARGE DISTURBED SAMPLE
- ▨ U76 SAMPLE
- ▨ PISTON SAMPLE (76mm)
- ▨ MAZIER SAMPLE
- SPT LINER SAMPLE
- ▲ WATER SAMPLE
- U100 SAMPLE
- ↓ STANDARD PENETRATION TEST
- ∨ IN-SITU VANE SHEAR TEST
- PACKER TEST
- PERMEABILITY TEST
- PRESSUREMETER TEST
- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang

DATE 21.12.2010

CHECKED C. Lun

DATE 05.01.2011

REMARKS



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB123**

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

PROJECT Stage II Further Ground Investigation for Shatin to Central Link

METHOD ROTARY

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE SD18

E 836639.40
N 818786.76

DATE **18.12.2010** to **23.12.2010**

FLUSHING MEDIUM WATER

ORIENTATION VERTICAL

GROUND LEVEL **+12.49 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|---------------------------------|------|------|------|----------------|-------|----------------------|---------------|-----------|--------|-------|--|
| 11 | | | | | | | | | | | | VI | As sheet 1 of 3. |
| 12 | | | 100 | | | | B=59 | 13 12.00 14 12.45 | +0.49 | 12.00 | | V | Extremely weak, light yellow to pink spotted white, completely decomposed medium grained GRANITE. (Clayey silty fine SAND with some angular fine gravel of quartz) |
| 15 | | | 100 | | | | B=106 | 15 15.00 16 15.45 | | | | | |
| 18 | | 7.88 at 1800 | 100 | | | | B=150 | 17 18.00 18 18.15 | -5.51 | 18.00 | | IV | Very weak, pink mottled brown, highly decomposed medium grained GRANITE. (Angular, slightly sandy fine to medium, occasional coarse GRAVEL sized quartz and granite fragments) |
| 19 | | 8.80 at 0800 | | | | | | | | | | | |
| 20 | | | | | | | | | -7.51 | 20.00 | | | |

- ⇩ SMALL DISTURBED SAMPLE
- ⇩ LARGE DISTURBED SAMPLE
- U76 SAMPLE
- PISTON SAMPLE (76mm)
- MAZIER SAMPLE
- SPT LINER SAMPLE
- WATER SAMPLE
- U100 SAMPLE
- STANDARD PENETRATION TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST
- PERMEABILITY TEST
- PRESSUREMETER TEST
- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED L. Zhang
 DATE 14.01.2011
 CHECKED C. Lun
 DATE 15.01.2011

REMARKS



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB123**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **SD18**

**E 836639.40
N 818786.76**

DATE **18.12.2010** to **23.12.2010**

FLUSHING MEDIUM **WATER**

ORIENTATION **VERTICAL**

GROUND LEVEL **+12.49 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|-------------------|-------------|---------------------------------|------|------|------|----------------|-------|--------------------------|---------------|-----------|--------|-------|---|
| 21 | | | 100 | | | | B=280 | 19 21.00 20 21.15 | | | | IV | As sheet 2 of 3. |
| 22 | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | |
| 24 | | | 100 | | | | B=345 | 21 24.00 22 24.15 | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | 100 | | | | B=352 | 23 27.00 24 27.15 | -14.51 | 27.00 | | IV | Weak, light greenish grey mottled brown, highly decomposed medium grained GRANITE. (Angular, fine to coarse GRAVEL sized quartz and granite fragments) |
| 28 | | HW 28.34m | | | | | | | | | | | |
| 29 | | 8.62 at 1800 | 100 | 72 | 72 | 2.9 | | T2-101 28.34 28.87 | -15.85 | 28.34 | + | III | Moderately strong, pink mottled brown spotted white and green, moderately decomposed, altered, medium to coarse grained GRANITE. Joint set 1: Joints are medium spaced, rough planar and stepped, iron oxide stained, chlorite coated (<1mm), dipping subvertically. |
| 23.12.2010 | | | 100 | 100 | 100 | 0.0 | | T2-101 29.02 | | 29.02 | + | | |
| 30 | | | | | | | | | -17.01 | 29.50 | + | | End of hole at 29.50 m. |

- ⬆ SMALL DISTURBED SAMPLE
- ⬇ LARGE DISTURBED SAMPLE
- ▨ U76 SAMPLE
- ▩ PISTON SAMPLE (76mm)
- ▧ MAZIER SAMPLE
- SPT LINER SAMPLE
- ▲ WATER SAMPLE
- U100 SAMPLE
- ↓ STANDARD PENETRATION TEST
- ∇ IN-SITU VANE SHEAR TEST
- ⊙ PACKER TEST
- ⊖ PERMEABILITY TEST
- ⊕ PRESSUREMETER TEST
- ⊘ BOREHOLE TELEVIEWER
- ⊙ PIEZOMETER TIP
- ⊘ STANDPIPE TIP

LOGGED L. Zhang
 DATE 14.01.2011
 CHECKED C. Lun
 DATE 15.01.2011

REMARKS

Site ID 2-05

(11203/SCL/EB140 and 11203/SCL/EB141)



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB140**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

| | | |
|-----------------------------|--|---|
| METHOD ROTARY | CO-ORDINATES E 836884.25 N 818397.89 | WORKS ORDER NO. D-463 |
| MACHINE SD29 | | DATE 20.10.2010 to 20.10.2010 |
| FLUSHING MEDIUM NONE | ORIENTATION VERTICAL | GROUND LEVEL +4.42 mPD |

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|---|-------------|---------------------------------|------|------|------|----------------|----------|----------|---------------|-----------|--------|--|--|
| 1 2 3 4 5 6 7 8 9 10 | | | | | | | | 1 H 0.45 | +4.42 | 0.00 | | | Loose, grey to reddish grey, fine to coarse SAND with some subangular fine to coarse gravel. (FILL) |
| | | | | | | | 2 H 0.95 | +3.92 | 0.50 | | | Loose, reddish brown, fine to coarse SAND with some subangular fine to coarse gravel. (FILL) | |
| | | | | | | | | 3 H 1.45 | | | | | |
| | | | | | | | | 4 H 1.95 | | | | | |
| | | | | | | | | 5 H 2.45 | | | | | |
| | | | | 100 | | | B=16 | 7 3.00 | +1.42 | 3.00 | | | Loose to medium dense, light greenish grey, clayey silty fine to coarse SAND with some subangular fine and occasional medium to coarse gravel of moderately strong to strong granite fragments. (FILL) |
| | | | | | | | | 8 3.45 | | | | | |
| | | | | | | | B=6 | 9 5.00 | | | | | |
| | | | | 100 | | | | 10 5.45 | | | | | |
| | | | | | | | B=27 | 11 6.00 | | | | | |
| | | | | 100 | | | | 12 6.45 | -2.08 | 6.50 | | | End of hole at 6.50 m. |

| | | | |
|--|--|--|--|
| <ul style="list-style-type: none"> ⇕ SMALL DISTURBED SAMPLE ⇑ LARGE DISTURBED SAMPLE U76 SAMPLE PISTON SAMPLE (76mm) MAZIER SAMPLE SPT LINER SAMPLE WATER SAMPLE U100 SAMPLE | <ul style="list-style-type: none"> ↓ STANDARD PENETRATION TEST ∇ IN-SITU VANE SHEAR TEST ○ PACKER TEST ○ PERMEABILITY TEST ○ PRESSUREMETER TEST ○ BOREHOLE TELEVIEWER ○ PIEZOMETER TIP □ STANDPIPE TIP | <p>LOGGED <u>L. Zhang</u></p> <p>DATE <u>25.10.2010</u></p> <p>CHECKED <u>C. Lun</u></p> <p>DATE <u>26.10.2010</u></p> | <p>REMARKS</p> <ol style="list-style-type: none"> 1. An inspection pit was excavated to 2.50m deep by hand tools. 2. Water sample was taken at 6.50m. 3. Soil samples taken by U76 sampler were removed from the sampler tubes for environmental testing. |
|--|--|--|--|



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB141**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **SD29**

E 836901.58
N 818384.08

DATE **21.10.2010** to **22.10.2010**

FLUSHING MEDIUM **NONE**

ORIENTATION **VERTICAL**

GROUND LEVEL **+4.15 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description |
|--------------------------|-------------|---------------------------------|------|------|------|----------------|----------|-----------|---------------|-----------|-------------------------|-------|---|
| 21.10.2010 | | | | | | | | 1 = 0.45 | +4.15 | 0.00 | [Cross-hatched pattern] | | Loose, light reddish brown, clayey silty fine to coarse SAND with some fine to coarse gravel of strong rock fragment and occasional red brick fragments. (FILL) |
| 1 | | | | | | | 2 = 0.95 | | | | | | |
| | | | 100 | | | | 3 = 1.45 | +2.65 | 1.50 | | | | |
| 2 | | | | | | | T-120 | | +2.25 | 1.90 | [Cross-hatched pattern] | | Light grey, subangular COBBLE with occasional coarse gravel of concrete fragment and occasional strong granite fragments. (FILL) Light grey and yellowish red, slightly sandy subangular fine to coarse GRAVEL with occasional cobble of strong granite and concrete fragments and with occasional brick fragments. (FILL) |
| | | | | | | | 4 = 3.00 | | | | | | |
| 3 | | | | | | | B=32 | 5 = 3.95 | +0.15 | 4.00 | [Cross-hatched pattern] | | No recovery, assumed to be FILL. |
| 4 | | | 0 | | | | B=30 | 6 = 4.45 | -0.35 | 4.50 | | | |
| | | | 0 | | | | B=29 | 7 = 4.95 | -0.85 | 5.00 | | | |
| 5 | | | | | | | B=13 | 8 = 5.45 | | | [Cross-hatched pattern] | | Medium dense, brownish grey, very clayey silty fine to coarse SAND with occasional subangular fine gravel of rock fragments. (FILL) |
| | | | 100 | | | | B=9 | 9 = 6.00 | | | | | |
| 6 | | | | | | | | 10 = 6.45 | | | [Cross-hatched pattern] | | Loose to medium dense, light brown, clayey silty fine to coarse SAND with some subangular fine gravel of rock fragments. (FILL) |
| 7 | | | 100 | | | | B=20 | 11 = 6.45 | -2.35 | 6.50 | | | |
| 21.10.2010 22.10.2010 | | | | | | | | 12 = 6.45 | -2.35 | 6.50 | | | End of hole at 6.50 m. |

- ⊥ SMALL DISTURBED SAMPLE
- ⬇ LARGE DISTURBED SAMPLE
- ▨ U76 SAMPLE
- ▩ PISTON SAMPLE (76mm)
- ▨ MAZIER SAMPLE
- SPT LINER SAMPLE
- ▲ WATER SAMPLE
- U100 SAMPLE
- ⬇ STANDARD PENETRATION TEST
- ∇ IN-SITU VANE SHEAR TEST
- ⊖ PACKER TEST
- ⊖ PERMEABILITY TEST
- ⊖ PRESSUREMETER TEST
- ⊖ BOREHOLE TELEVIEWER
- ⊖ PIEZOMETER TIP
- ⊖ STANDPIPE TIP

LOGGED L. Zhang
 DATE 25.10.2010
 CHECKED C. Lun
 DATE 26.10.2010

REMARKS
 1. An inspection pit was excavated to 1.50m deep by hand tools.
 2. Water sample was taken at 6.50m.
 3. Soil samples taken by U76 sampler were removed from the sampler tubes for environmental testing.

Site ID 2-04, 2-06, and 2-07

(11203/SCL/EB146)



DRILLHOLE RECORD

CONTRACT NO. 11203

HOLE NO. **11203/SCL/EB146**

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

PROJECT **Stage II Further Ground Investigation for Shatin to Central Link**

METHOD **ROTARY**

CO-ORDINATES

WORKS ORDER NO. **D-463**

MACHINE **SD2**

E 836896.61
N 818348.41

DATE **17.11.2010** to **17.11.2010**

FLUSHING MEDIUM **NONE**

ORIENTATION **VERTICAL**

GROUND LEVEL **+3.90 mPD**

| Drilling Progress | Casing Size | Water Level (m) Shift Start/End | TCR% | SCR% | RQD% | Fracture Index | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade | Description | |
|-------------------|----------------|---------------------------------|------|------|------|----------------|-------------------------------|---------|---------------|-----------|-----------------------|-------|---|--|
| 17.11.2010 | SW | | | | | | | 1 0.45 | +3.90 | 0.00 | [Cross-hatch pattern] | | Loose, reddish brown to greyish brown, fine to coarse SAND with some subangular fine to coarse gravel. (FILL) | |
| 1 | | | | | | | 2 0.95 | | | | | | | |
| | | | | | | | 3 1.45 | +2.40 | 1.50 | | | | | |
| 2 | | | | | | | | 4 1.95 | | | [Cross-hatch pattern] | | Loose, greyish brown, clayey silty fine to coarse SAND with some subangular fine to coarse gravel of rock fragments and with occasional steel fragments. (FILL) | |
| | | | | | | | 5 2.45 | | | | | | | |
| 3 | SW 3.00m PW | | 0 | | | | B=10 6 3.00 | +0.90 | 3.00 | | | | | Loose to medium dense, reddish brown to grey, clayey silty fine to coarse SAND with some subangular fine to coarse gravel of rock and wood fragments. (FILL) |
| 4 | | | 0 | | | | B=8 7 3.45 3.50 3.95 | | | | [Cross-hatch pattern] | | Dry drilling, assumed to be FILL. | |
| 5 | | | | | | | | | | | | | | |
| 6 | | | | | | | B=15 8 6.00 | -2.10 | 6.00 | | | | | Medium dense, greenish grey, clayey silty fine to coarse SAND with some subangular fine gravel. (FILL) |
| 7 | | | | | | | | | | | [Cross-hatch pattern] | | Dry drilling, assumed to be FILL. | |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | B=23 9 9.00 | -5.10 | 9.00 | | | | | Medium dense, reddish yellow, clayey silty fine to coarse SAND with some angular to subangular fine gravel. (FILL) |
| 17.11.2010 | PW 9.50m | 2.00 at 1800 | 0 | | | | | | | | [Cross-hatch pattern] | | End of hole at 9.50 m. | |
| 10 | | | | | | | | | | | | | | |

- ⬆ SMALL DISTURBED SAMPLE
- ⬆ LARGE DISTURBED SAMPLE
- ▨ U76 SAMPLE
- ▨ PISTON SAMPLE (76mm)
- ▨ MAZIER SAMPLE
- ▨ SPT LINER SAMPLE
- ▲ WATER SAMPLE
- U100 SAMPLE
- ⬇ STANDARD PENETRATION TEST
- ▼ IN-SITU VANE SHEAR TEST
- ⊖ PACKER TEST
- ⊖ PERMEABILITY TEST
- ⊖ PRESSUREMETER TEST
- ⊖ BOREHOLE TELEVIEWER
- ⊖ PIEZOMETER TIP
- ⊖ STANDPIPE TIP

LOGGED L. Zhang
 DATE 22.11.2010
 CHECKED C. Lun
 DATE 01.12.2010

REMARKS
 1. An inspection pit was excavated to 2.50m deep by hand tools.
 2. Soil samples taken by U76 sampler were removed from the sampler tubes for environmental testing.
 3. Water sample was taken at 9.50m.

Appendix C

**Analytical Laboratory Testing Results for Soil and
Groundwater Samples and Standard Form 3.2 – 3.5**

Summary Report of Soil and Groundwater Samples
(Stage-1 SI)

Groundwater Sample Analysis under RBRG Industrial Limits

| Site ID | Sampling Locations | Sampling Date | Parameters** | Metals | | TPH | | | | | | | | | | VOCs | | | | | | | | | | SVOCs | | | | | | | | | | | |
|---------|--------------------|---------------|--------------|------------------------------|---------|----------|-----------|---------|---------|--------------|---------------------|--------------|--------------|---------|----------|------------------|--------------------|-----------------|-------------------|------------|----------------------|--------------------------------|---------------|------------------|----------------|----------|--------------|------------|--------------|----------|----------|---------------------------------|-------------------------|----------|----------|----------|----------|
| | | | | Mercury | C6 - C8 | C9 - C16 | C17 - C35 | Benzene | Toluene | Ethylbenzene | meta- & para-Xylene | ortho-Xylene | Total Xylene | Styrene | Acetone | 2-Butanone (MEK) | Methylene chloride | Trichloroethene | Tetrachloroethene | Chloroform | Bromodichloromethane | Methyl tert-Butyl Ether (MTBE) | 1-Naphthalene | 2-Acenaphthylene | 1-Acenaphthene | Fluorene | Phenanthrene | Anthracene | Fluoranthene | Pyrene | Chrysene | Benzo(b) & Benzo(k)fluoranthene | Hexachlorobenzene (HCB) | | | | |
| | | | | Reporting Limit (µg/L) | 20 | 500 | 500 | 5 | 5 | 5 | 10 | 5 | 15 | 5 | 50 | 50 | 224000 | 14200 | 2950 | 11300 | 26200 | 1810000 | 862000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 |
| | | | | RBRG Industrial Limit (µg/L) | 6790 | 1150000 | 9980000 | 178000 | 54000 | 10000000 | 10000000 | NA | NA | 1570000 | 10000000 | 10000000 | 10000000 | 224000 | 14200 | 2950 | 11300 | 26200 | 1810000 | 862000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 | 10000000 |
| | | | Unit | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | | |
| 1-10 | 2209/SCL/EDH249(P) | 16-Apr-09 | Pass | - | - | - | - | <5 | <5 | <5 | <10 | <5 | <15 | <5 | <50 | <50 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | |
| 2-07 | 2209/SCL/EDH244 | 30-Jun-09 | Pass | - | <20 | <500 | <500 | <5 | <5 | <5 | <10 | <5 | <15 | <5 | <50 | <50 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | |
| 2-09 | 2209/SCL/EDH231 | 6-Apr-09 | Pass | - | 30 | <500 | <500 | <5 | 30 | <5 | <10 | <5 | <15 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | |
| L17 | 2209/SCL/EDH257(P) | 9-Jul-09 | Pass | <0.1 | <20 | <500 | <500 | <5 | <5 | <5 | <10 | <5 | <15 | <5 | <50 | <50 | <5 | <5 | 19 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | |
| | 2209/SCL/EDH256 | 17-Jul-09 | Pass | <0.1 | <20 | <500 | <500 | <5 | <5 | <5 | <10 | <5 | <15 | <5 | <50 | <50 | <5 | <5 | 26 | 5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | |
| 3-02 | 2209/SCL/EDH229(P) | 8-Jun-09 | Pass | - | <20 | <500 | <500 | <5 | <5 | <5 | <10 | <5 | <15 | - | - | - | - | - | - | - | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | | |

Note:
 ** indicates that the actual reporting limit of mercury for groundwater samples, which is lower than the proposed 0.5 µg/L in the CAP, is accredited under HOKLAS.
 *** indicates that the the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies
 NA= Not Applicable
 Bold and shaded indicates exceedance of the RBRG Level
 Underline indicates exceedance of the soil saturation limit
 Full analytical results should be referred to laboratory reports

Summary Report of Soil and Groundwater Samples
(Post-Stage 1 SI)

Summary Report of Soil and Groundwater Samples
(Stage 2 SI)

Standard Form 3.2 – 3.5 under Stage 1 and Post-Stage 1

Standard Form 3.2 – Soil Data Summary and Comparison to RBRGs and Csat

| Chemical | Frequency of Detection (x/y) | Range of Detected Concentration | Range of Method Reporting Limit | Analytical Method | Relevant Land Use Categories | Most Stringent RBRG(s) (mg/kg) | Csat (mg/kg) | Maximum Detected Concentration Exceeds (check if applicable) | | | |
|--|------------------------------|---------------------------------|---------------------------------|-------------------|------------------------------|--------------------------------|--------------|--|------|----|----|
| | | | | | | | | RBRG | Csat | | |
| Volatile Organic Chemicals* | | | | | | | | | | | |
| Acetone | 0/111 | <5 | 5 | USEPA 8260 | Industrial | 10000 | *** | NA | NA | | |
| Benzene | 0/179 | <0.5 | 0.5 | | | 9.21 | 336 | NA | NA | | |
| Bromodichloromethane | 0/111 | <0.5 | 0.5 | | | 2.85 | 1030 | NA | NA | | |
| 2-Butanone | 0/111 | <5 | 5 | | | 10000 | *** | NA | NA | | |
| Chloroform | 0/111 | <0.5 | 0.5 | | | 1.54 | 1100 | NA | NA | | |
| Ethylbenzene | 0/179 | <0.5 | 0.5 | | | 8240 | 138 | NA | NA | | |
| Methyl tert-Butyl Ether | 0/111 | <0.5 | 0.5 | | | 70.1 | 2380 | NA | NA | | |
| Methylene Chloride | 0/111 | <0.5 | 0.5 | | | 13.9 | 921 | NA | NA | | |
| Styrene | 0/111 | <0.5 | 0.5 | | | 10000 | 497 | NA | NA | | |
| Tetrachloroethene | 0/111 | <0.5 | 0.5 | | | 0.777 | 97.1 | NA | NA | | |
| Toluene | 0/179 | <0.5 | 0.5 | | | 10000 | 235 | NA | NA | | |
| Trichloroethene | 0/111 | <0.5 | 0.5 | | | 5.68 | 488 | NA | NA | | |
| Xylenes (Total) | 0/179 | <2 | 2 | | | 1230 | 150 | NA | NA | | |
| Semi-Volatile Organic Chemicals | | | | | | | | | | | |
| Acenaphthene | 0/113 | <0.5 | 0.5 | USEPA 8270 | Industrial | 10000 | 60.2 | NA | NA | | |
| Acenaphthylene | 0/179 | <0.5 | 0.5 | | | 10000 | 19.8 | NA | NA | | |
| Anthracene | 0/179 | <0.5 | 0.5 | | | 10000 | 2.56 | NA | NA | | |
| Benzo(a)anthracene | 0/179 | <0.5 | 0.5 | | | 91.8 | NA | NA | NA | | |
| Benzo(a)pyrene | 0/179 | <0.5 | 0.5 | | | 9.18 | NA | NA | NA | | |
| Benzo(b) & Benzo(k) fluoranthene | 0/179 | <1.0 | 1.0 | | | 17.8 | NA | NA | NA | | |
| Benzo(g,h,i)perylene | 0/141 | <5.0 | 5.0 | | | 10000 | NA | NA | NA | | |
| bis-(2-Ethylhexyl)phthalate | 0/179 | <5.0 | 5.0 | | | 91.8 | NA | NA | NA | | |
| Chrysene | 0/179 | <0.5 | 0.5 | | | 1140 | NA | NA | NA | | |
| Dibenzo(a,h)anthracene | 0/179 | <0.5 | 0.5 | | | 9.18 | NA | NA | NA | | |
| Fluoranthene | 1/179 | ≤0.8 | 0.5 | | | 10000 | NA | NA | NA | | |
| Fluorene | 0/179 | <0.5 | 0.5 | | | 10000 | 54.7 | NA | NA | | |
| Hexachlorobenzene | 0/141 | <0.2 | 0.2 | | | 0.582 | NA | NA | NA | | |
| Indeno(1,2,3-cd)pyrene | 0/179 | <0.5 | 0.5 | | | 91.8 | NA | NA | NA | | |
| Naphthalene | 0/179 | <0.5 | 0.5 | | | 453 | 125 | NA | NA | | |
| Phenanthrene | 0/179 | <0.5 | 0.5 | | | 10000 | 28 | NA | NA | | |
| Phenol | 0/141 | <0.5 | 0.5 | | | 10000 | 7260 | NA | NA | | |
| Pyrene | 1/179 | ≤0.8 | 0.5 | | | 10000 | NA | NA | NA | | |
| Metals** | | | | | | | | | | | |
| Antimony | 0/18 | <1 | 1 | | | USEPA 6020 | Industrial | 261 | NA | NA | NA |
| Arsenic | 17/18 | ≤12 | 1 | 196 | NA | | | NA | NA | | |
| Barium | 18/18 | 4.8-142 | 0.5 | 10000 | NA | | | NA | NA | | |
| Cadmium | 4/18 | ≤0.7 | 0.2 | 653 | NA | | | NA | NA | | |
| Chromium III | 90/101 | ≤24.9 | 0.5 | 10000 | NA | | | NA | NA | | |
| Chromium VI | 0/101 | <0.5 | 0.5 | 1960 | NA | | | NA | NA | | |
| Cobalt | 15/18 | ≤4.6 | 0.5 | 10000 | NA | | | NA | NA | | |
| Copper | 90/101 | ≤138 | 1 | 10000 | NA | | | NA | NA | | |
| Lead | 178/179 | ≤531 | 1 | 2290 | NA | | | NA | NA | | |
| Manganese | 18/18 | 66.4-2770 | 0.5 | 10000 | NA | | | NA | NA | | |
| Mercury | 7/18 | ≤0.73 | 0.05 | APHA 3112 Hg: B | 38.4 | | | NA | NA | NA | |
| Molybdenum | 17/18 | ≤38 | 1 | 3260 | NA | | | NA | NA | | |
| Nickel | 11/18 | ≤9 | 1 | 10000 | NA | | | NA | NA | | |
| Tin | 18/18 | 0.7-5.2 | 0.5 | 10000 | NA | | | NA | NA | | |
| Zinc | 28/28 | 2.7-202 | 1 | 10000 | NA | NA | NA | | | | |
| Petroleum Carbon Ranges | | | | | | | | | | | |
| C6 - C8 | 0/169 | <5 | 5 | USEPA 8015 | Industrial | 10000 | 1000 | NA | NA | | |
| C9 - C16 | 1/169 | <200 | ≤2610 | | | 10000 | 3000 | NA | NA | | |
| C17 - C35 | 2/169 | <500 | ≤2960 | | | 10000 | 5000 | NA | NA | | |
| PCBs | | | | | | | | | | | |
| PCBs | -- | -- | -- | USEPA 8070 | Industrial | 0.748 | NA | NA | NA | | |
| Other Inorganic Compounds | | | | | | | | | | | |
| Cyanide, free | 0/10 | <1 | 1 | APHA 4500 CN | Industrial | 10000 | NA | NA | NA | | |

Note:

*The actual reporting limits for benzene, toluene, ethylbenzene, and xylenes under Post-Stage 1 SI are lower than the proposed limits in the approved Supplementary CAP, and are accredited

**The actual reporting limits of barium, cobalt, manganese, and tin are lower than the proposed limits in the approved CAP, and are accredited under HOKLAS.

*** indicates that the Csat value exceeds the 'ceiling limit' therefore the RBRG applies

NIL= Maximum concentration detected is below the respective RBRG or solubility limit

NA= Not Applicable

Standard Form 3.3 – Groundwater Data Summary and Comparison to RBRGs and Solubility Limit

| Chemical | Frequency of detection (x/y) | Range of Detected Concentration (µg/L) | Range of Method Reporting Limit (µg/L)** | Analytical Method | Relevant Land Use Categories | Most Stringent RBRG(s) (µg/kg) | Solubility Limit (µg/L) | Maximum Detected Concentration Exceeds (check if applicable) | |
|--|------------------------------|--|--|-------------------|------------------------------|--------------------------------|-------------------------|--|------------|
| | | | | | | | | RBRG | Solubility |
| Volatile Organic Chemicals* | | | | | | | | | |
| Acetone | 0/9 | <50 | 50 | USEPA 8260 | Industrial | 10000000 | *** | NA | NA |
| Benzene | 0/14 | <5 | 5 | | | 54000 | 1750000 | NA | NA |
| Bromodichloromethane | 2/9 | ≤5 | 5 | | | 26200 | 6740000 | NA | NA |
| 2-Butanone | 0/9 | <50 | 50 | | | 10000000 | *** | NA | NA |
| Chloroform | 9/9 | 6-26 | 5 | | | 11300 | 7920000 | NA | NA |
| Ethylbenzene | 0/14 | <5 | 5 | | | 10000000 | 169000 | NA | NA |
| Methyl tert-Butyl Ether | 0/10 | <5 | 5 | | | 1810000 | *** | NA | NA |
| Methylene Chloride | 0/9 | <50 | 50 | | | 224000 | *** | NA | NA |
| Styrene | 0/9 | <5 | 5 | | | 10000000 | 310000 | NA | NA |
| Tetrachloroethene | 0/9 | <5 | 5 | | | 2950 | 200000 | NA | NA |
| Toluene | 1/14 | 30 | 2 | | | 10000000 | 526000 | NA | NA |
| Trichloroethene | 0/9 | <5 | 5 | | | 14200 | 1100000 | NA | NA |
| Xylenes (Total) | 0/14 | <15 | 15 | 1570000 | 175000 | NA | NA | | |
| Semi-Volatile Organic Chemicals | | | | | | | | | |
| Acenaphthene | 0/14 | <2 | 2 | USEPA 8270 | Industrial | 10000000 | 4240 | NA | NA |
| Acenaphthylene | 0/14 | <2 | 2 | | | 10000000 | 3930 | NA | NA |
| Anthracene | 0/14 | <2 | 2 | | | 10000000 | 43.4 | NA | NA |
| Benzo(b) & Benzo(k) fluoranthene | 0/14 | <4 | 4 | | | 7530 | 1.5 | NA | NA |
| Chrysene | 0/14 | <2 | 2 | | | 812000 | 1.6 | NA | NA |
| Fluoranthene | 0/14 | <2 | 2 | | | 10000000 | 206 | NA | NA |
| Fluorene | 0/14 | <2 | 2 | | | 10000000 | 1980 | NA | NA |
| Hexachlorobenzene | 0/11 | <4 | 4 | | | 695 | 6200 | NA | NA |
| Naphthalene | 0/13 | <2 | 2 | | | 862000 | 31000 | NA | NA |
| Phenanthrene | 0/14 | <2 | 2 | | | 10000000 | 1000 | NA | NA |
| Pyrene | 0/14 | <2 | 2 | | | 10000000 | 135 | NA | NA |
| Metals** | | | | | | | | | |
| Mercury | 0/2 | <0.1 | 0.1 | APHA 3112 Hg: | Industrial | 6790 | NA | NA | NA |
| Petroleum Carbon Ranges | | | | | | | | | |
| C6 - C8 | 1/13 | ≤30 | 20 | USEPA 8015 | Industrial | 1150000 | 5230 | NA | NA |
| C9 - C16 | 0/13 | <500 | 500 | | | 9980000 | 2800 | NA | NA |
| C17 - C35 | 0/13 | <500 | 500 | | | 178000 | 2800 | NA | NA |
| PCBs | | | | | | | | | |
| PCBs | -- | -- | -- | USEPA 8070 | Industrial | 5110 | NA | NA | NA |

Note:

* The actual reporting limits for benzene, toluene, ethylbenzene, and xylenes under Post-Stage 1 SI are lower than the proposed limits in the approved Supplementary CAP, and are accredited under HOKLAS.

** indicates that the actual reporting limit of mercury for groundwater samples, which is lower than the proposed 0.5 µg/L in the CAP, is accredited under HOKLAS.

*** indicates that the Csat value exceeds the 'ceiling limit' therefore the RBRG applies

NIL= Maximum concentration detected is below the respective RBRG or solubility limit

NA= Not Applicable

Standard Form 3.4 – Soil Sample Concentrations and Exceedances of RBRGs and Csat

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|--|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Volatile Organic Chemicals | | | | | | |
| Acetone | NA | NA | ND | NIL | NIL | NA |
| Benzene | NA | NA | ND | NIL | NIL | NA |
| Bromodichloromethane | NA | NA | ND | NIL | NIL | NA |
| 2-Butanone | NA | NA | ND | NIL | NIL | NA |
| Chloroform | NA | NA | ND | NIL | NIL | NA |
| Ethylbenzene | NA | NA | ND | NIL | NIL | NA |
| Methyl tert-Butyl Ether | NA | NA | ND | NIL | NIL | NA |
| Methylene Chloride | NA | NA | ND | NIL | NIL | NA |
| Styrene | NA | NA | ND | NIL | NIL | NA |
| Tetrachloroethene | NA | NA | ND | NIL | NIL | NA |
| Toluene | NA | NA | ND | NIL | NIL | NA |
| Trichloroethene | NA | NA | ND | NIL | NIL | NA |
| Xylenes (Total) | NA | NA | ND | NIL | NIL | NA |
| Semi-Volatile Organic Chemicals | | | | | | |
| Acenaphthene | NA | NA | ND | NIL | NIL | NA |
| Acenaphthylene | NA | NA | ND | NIL | NIL | NA |
| Anthracene | NA | NA | ND | NIL | NIL | NA |
| Benzo(a)anthracene | NA | NA | ND | NIL | NIL | NA |
| Benzo(a)pyrene | NA | NA | ND | NIL | NIL | NA |
| Benzo(b) & Benzo(k) fluoranthene | NA | NA | ND | NIL | NIL | NA |
| Benzo(g,h,i)perylene | NA | NA | ND | NIL | NIL | NA |
| bis-(2-Ethylhexyl)phthalate | NA | NA | ND | NIL | NIL | NA |
| Chrysene | NA | NA | ND | NIL | NIL | NA |
| Dibenzo(a,h)anthracene | NA | NA | ND | NIL | NIL | NA |
| Fluoranthene | 2209/SCL/EDH229(P) | 6.00-6.45 | ND | NIL | NIL | NA |
| Fluorene | NA | NA | ND | NIL | NIL | NA |
| Hexachlorobenzene | NA | NA | ND | NIL | NIL | NA |
| Indeno(1,2,3-cd)pyrene | NA | NA | ND | NIL | NIL | NA |
| Naphthalene | NA | NA | ND | NIL | NIL | NA |
| Phenanthrene | NA | NA | ND | NIL | NIL | NA |
| Phenol | NA | NA | ND | NIL | NIL | NA |
| Pyrene | 2209/SCL/EDH229(P) | 6.00-6.45 | ND | NIL | NIL | NA |
| Metals | | | | | | |
| Antimony | NA | NA | ND | NIL | NIL | NA |
| Arsenic | 2209/SCL/ETT106 | 0.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 3.00 | 2 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 0.50 | 1 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 3 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 12 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 12.00-12.45 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 3 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 2 | NIL | NIL | NA |
| 2209/SCL/EDH257(P) | 9.00-9.45 | 4 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | 12.00-12.45 | 1 | NIL | NIL | NA | |
| Barium | 2209/SCL/ETT106 | 0.50 | 18.7 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 59.6 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 3.00 | 25.7 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 0.50 | 20.9 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 17.6 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 17.6 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 23.9 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 30.1 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 15.2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 10.8 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 9.9 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 12.00-12.45 | 4.8 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 142 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 38.8 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 142 | NIL | NIL | NA |
| 2209/SCL/EDH257(P) | 6.00-6.45 | 49.8 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | 9.00-9.45 | 79.2 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | 12.00-12.45 | 23.9 | NIL | NIL | NA | |
| Cadmium | 2209/SCL/ETT068 | 0.50 | 0.7 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 0.2 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 0.3 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 0.2 | NIL | NIL | NA |
| Manganese | 2209/SCL/ETT106 | 0.50 | 312 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 282 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 3.00 | 384 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 0.50 | 2770 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 753 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 996 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 235 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 254 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 148 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 82.3 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 66.4 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 12.00-12.45 | 180 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 915 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 484 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 1300 | NIL | NIL | NA |
| 2209/SCL/EDH257(P) | 6.00-6.45 | 634 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | 9.00-9.45 | 255 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | 12.00-12.45 | 313 | NIL | NIL | NA | |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|--------------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Mercury | 2209/SCL/ETT068 | 0.50 | 0.07 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 0.07 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 0.42 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 0.06 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 0.06 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 0.2 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 0.73 | NIL | NIL | NA |
| Molybdenum | 2209/SCL/ETT106 | 0.50 | 3 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 3 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 3.00 | 3 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 0.50 | 38 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 3 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 3 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 3 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 6 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 7 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 22 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 1 | NIL | NIL | NA |
| 2209/SCL/EDH257(P) | 9.00-9.45 | 1 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | 12.00-12.45 | 1 | NIL | NIL | NA | |
| Nickel | 2209/SCL/ETT106 | 0.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 3.00 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 9 | NIL | NIL | NA |
| Tin | 2209/SCL/ETT106 | 0.50 | 2.6 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 2.1 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 3.00 | 2.8 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 0.50 | 3.9 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 3.2 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 4.0 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 2.2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 2.3 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 0.7 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 1.5 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 12.00-12.45 | 0.8 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 4 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 2.7 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 2.3 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 3.2 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 5.2 | NIL | NIL | NA |
| 2209/SCL/EDH257(P) | 12.00-12.45 | 1 | NIL | NIL | NA | |
| Chromium III | 2209/SCL/ETT106 | 0.50 | 1.4 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 1.3 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 1.5 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 2.6 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 2.2 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 1.4 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 3.2 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 2.1 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 2.6 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 17.7 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 12.00-12.45 | 1.2 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 0.50 | 3.7 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 1.50 | 5.9 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 3.00 | 2.6 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 6.00-6.45 | 2.2 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 9.00-9.45 | 16.0 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 12.00-12.45 | 5.8 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 15.00-15.45 | 4.8 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 18.00-18.45 | 7.5 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 21.00-21.45 | 12.1 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 24.00-24.45 | 5.2 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 0.50 | 3.2 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 1.50 | 2.6 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 3.00 | 2.2 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 6.00-6.45 | 24.9 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 9.00-9.45 | 23.4 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 12.00-12.45 | 6.3 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 15.00-15.45 | 1.7 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 18.00-18.45 | 12.3 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 21.00-21.45 | 6.0 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 24.00-24.45 | 3.8 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 27.00-27.45 | 3.2 | NIL | NIL | NA |
| 11202/SCL/EDH139 | 30.00-30.45 | 1.0 | NIL | NIL | NA | |
| 11202/SCL/EDH139 | 36.00-36.45 | 2.4 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 0.50 | 1.5 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 1.50 | 1.9 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 3.00 | 4.1 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 6.00-6.45 | 7.7 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 9.00-9.45 | 7.5 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 12.00-12.45 | 3.5 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 15.00-15.45 | 6.7 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 18.00-18.45 | 7.2 | NIL | NIL | NA | |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) | |
|-----------------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|----|
| | Sampling Locations | Sample Depth (m, bgs) | | | | | |
| Chromium III (cont'd) | 11202/SCL/EDH140 | 21.00-21.45 | 2.6 | NIL | NIL | NA | |
| | 11202/SCL/EDH140 | 24.00-24.45 | 1.5 | NIL | NIL | NA | |
| | 11202/SCL/EDH140 | 27.00-27.45 | 0.6 | NIL | NIL | NA | |
| | 11202/SCL/EDH140 | 33.00-33.45 | 1.0 | NIL | NIL | NA | |
| | 11202/SCL/EDH140 | 36.00-36.45 | 2.1 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 0.50 | 3.9 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 1.50 | 5.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 6.00-6.45 | 2.0 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 9.00-9.45 | 15.4 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 12.00-12.45 | 6.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 15.00-15.45 | 14.6 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 18.00-18.45 | 5.6 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 24.00-24.45 | 1.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 27.00-27.45 | 1.6 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 30.00-30.45 | 1.7 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 33.00-33.45 | 1.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 36.00-36.45 | 1.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH141 | 39.00-39.45 | 0.7 | NIL | NIL | NA | |
| | 11202/SCL/EDH142 | 0.50 | 6.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH142 | 1.50 | 6.0 | NIL | NIL | NA | |
| | 11202/SCL/EDH142 | 3.00 | 4.9 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 0.50 | 3.0 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 1.50 | 5.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 3.00 | 2.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 6.00-6.45 | 3.3 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 9.00-9.45 | 2.3 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 12.00-12.45 | 5.1 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 15.00-15.45 | 3.9 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 18.00-18.45 | 5.1 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 21.00-21.45 | 2.4 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 24.00-24.45 | 2.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 27.00-27.45 | 1.9 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 30.00-30.45 | 2.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH143 | 33.00-33.45 | 2.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 0.50 | 2.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 1.50 | 1.9 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 3.00 | 2.7 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 6.00-6.45 | 2.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 9.00-9.45 | 11.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 12.00-12.45 | 22.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 15.00-15.45 | 16.3 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 18.00-18.45 | 7.3 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 21.00-21.45 | 3.7 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 24.00-24.45 | 1.5 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 27.00-27.45 | 0.8 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 30.00-30.45 | 1.2 | NIL | NIL | NA | |
| | 11202/SCL/EDH144 | 33.00-33.45 | 2.4 | NIL | NIL | NA | |
| | Chromium VI | NA | NA | NA | NIL | NIL | NA |
| Cobalt | 2209/SCL/ETT106 | 0.50 | 1.7 | NIL | NIL | NA | |
| | 2209/SCL/ETT106 | 1.50 | 2.3 | NIL | NIL | NA | |
| | 2209/SCL/ETT106 | 3.00 | 1.9 | NIL | NIL | NA | |
| | 2209/SCL/EDH256 | 0.50 | 2.9 | NIL | NIL | NA | |
| | 2209/SCL/EDH256 | 1.50 | 2.7 | NIL | NIL | NA | |
| | 2209/SCL/EDH256 | 3.00-3.45 | 1.3 | NIL | NIL | NA | |
| | 2209/SCL/EDH256 | 6.00-6.45 | 1.4 | NIL | NIL | NA | |
| | 2209/SCL/EDH256 | 9.00-9.45 | 1 | NIL | NIL | NA | |
| | 2209/SCL/EDH256 | 12.00-12.45 | 0.9 | NIL | NIL | NA | |
| | 2209/SCL/EDH257(P) | 0.50 | 1.8 | NIL | NIL | NA | |
| | 2209/SCL/EDH257(P) | 1.50 | 1.7 | NIL | NIL | NA | |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 1.9 | NIL | NIL | NA | |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 3.6 | NIL | NIL | NA | |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 4.6 | NIL | NIL | NA | |
| | 2209/SCL/EDH257(P) | 12.00-12.45 | 3.2 | NIL | NIL | NA | |
| | Copper | 2209/SCL/ETT106 | 0.50 | 5 | NIL | NIL | NA |
| | | 2209/SCL/ETT106 | 1.50 | 4 | NIL | NIL | NA |
| | | 2209/SCL/ETT106 | 3.00 | 4 | NIL | NIL | NA |
| 2209/SCL/ETT068 | | 0.50 | 3 | NIL | NIL | NA | |
| 2209/SCL/ETT068 | | 3.00 | 1 | NIL | NIL | NA | |
| 2209/SCL/EDH256 | | 0.50 | 3 | NIL | NIL | NA | |
| 2209/SCL/EDH256 | | 1.50 | 4 | NIL | NIL | NA | |
| 2209/SCL/EDH256 | | 3.00-3.45 | 4 | NIL | NIL | NA | |
| 2209/SCL/EDH256 | | 6.00-6.45 | 12 | NIL | NIL | NA | |
| 2209/SCL/EDH256 | | 9.00-9.45 | 22 | NIL | NIL | NA | |
| 2209/SCL/EDH256 | | 12.00-12.45 | 1 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | | 0.50 | 1 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | | 1.50 | 1 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | | 6.00-6.45 | 4 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | | 9.00-9.45 | 26 | NIL | NIL | NA | |
| 2209/SCL/EDH257(P) | | 12.00-12.45 | 3 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 0.50 | 6 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 1.50 | 16 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 3.00 | 2 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 6.00-6.45 | 9 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 9.00-9.45 | 5 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 12.00-12.45 | 2 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 15.00-15.45 | 4 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 18.00-18.45 | 1 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 21.00-21.45 | 3 | NIL | NIL | NA | |
| 11202/SCL/EDH138 | | 24.00-24.45 | 6 | NIL | NIL | NA | |
| 11202/SCL/EDH139 | | 0.50 | 5 | NIL | NIL | NA | |
| 11202/SCL/EDH139 | | 1.50 | 5 | NIL | NIL | NA | |
| 11202/SCL/EDH139 | | 3.00 | 1 | NIL | NIL | NA | |
| 11202/SCL/EDH139 | | 6.00-6.45 | 30 | NIL | NIL | NA | |
| 11202/SCL/EDH139 | 9.00-9.45 | 138 | NIL | NIL | NA | | |
| 11202/SCL/EDH139 | 12.00-12.45 | 3 | NIL | NIL | NA | | |
| 11202/SCL/EDH139 | 15.00-15.45 | 1 | NIL | NIL | NA | | |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|------------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Copper (cont'd) | 11202/SCL/EDH139 | 18.00-18.45 | 3 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 21.00-21.45 | 6 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 24.00-24.45 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 27.00-27.45 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 30.00-30.45 | 7 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 33.00-33.45 | 3 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 36.00-36.45 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 1.50 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 3.00 | 10 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 6.00-6.45 | 21 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 9.00-9.45 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 12.00-12.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 15.00-15.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 18.00-18.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 21.00-21.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 24.00-24.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 30.00-30.45 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 33.00-33.45 | 3 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 0.50 | 9 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 1.50 | 12 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 6.00-6.45 | 11 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 9.00-9.45 | 45 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 12.00-12.45 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 15.00-15.45 | 6 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 18.00-18.45 | 5 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 24.00-24.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 27.00-27.45 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 33.00-33.45 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 39.00-39.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 42.00-42.45 | 7 | NIL | NIL | NA |
| | 11202/SCL/EDH142 | 0.50 | 12 | NIL | NIL | NA |
| | 11202/SCL/EDH142 | 1.50 | 11 | NIL | NIL | NA |
| | 11202/SCL/EDH142 | 3.00 | 9 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 0.50 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 1.50 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 6.00-6.45 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 9.00-9.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 12.00-12.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 18.00-18.45 | 3 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 21.00-21.45 | 3 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 24.00-24.45 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 27.00-27.45 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 30.00-30.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 33.00-33.45 | 3 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 0.50 | 9 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 1.50 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 3.00 | 2 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 6.00-6.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 9.00-9.45 | 20 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 12.00-12.45 | 21 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 15.00-15.45 | 12 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 18.00-18.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 21.00-21.45 | 1 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 24.00-24.45 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 27.00-27.45 | 3 | NIL | NIL | NA |
| | 11202/SCL/EDH144 | 30.00-30.45 | 2 | NIL | NIL | NA |
| 11202/SCL/EDH144 | 33.00-33.45 | 2 | NIL | NIL | NA | |
| Lead | 2209/SCL/ETT103 | 0.50 | 82 | NIL | NIL | NA |
| | 2209/SCL/ETT103 | 1.50 | 108 | NIL | NIL | NA |
| | 2209/SCL/ETT103 | 3.00 | 144 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 0.50 | 67 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 1.50 | 195 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 3.00-3.45 | 88 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 6.00-6.45 | 117 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 9.00-9.45 | 9 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 12.00-12.45 | 5 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 15.00-15.45 | 2 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 18.00-18.45 | 8 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 21.00-21.45 | 7 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 24.00-24.45 | 12 | NIL | NIL | NA |
| | 2209/SCL/ETT165 | 0.50 | 29 | NIL | NIL | NA |
| | 2209/SCL/ETT165 | 1.50 | 20 | NIL | NIL | NA |
| | 2209/SCL/ETT165 | 3.00 | 12 | NIL | NIL | NA |
| | 2209/SCL/ETT102 | 0.50 | 27 | NIL | NIL | NA |
| | 2209/SCL/ETT102 | 1.50 | 19 | NIL | NIL | NA |
| | 2209/SCL/ETT102 | 3.00 | 18 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 0.50 | 46 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 1.50 | 47 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 3.00-3.45 | 51 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 6.00-6.45 | 16 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 9.00-9.45 | 5 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 12.00-12.45 | 5 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 15.00-15.45 | 12 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 18.00-18.45 | 12 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 21.00-21.45 | 14 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 24.00-24.45 | 7 | NIL | NIL | NA |
| | 2209/SCL/EDH244 | 27.00-27.45 | 45 | NIL | NIL | NA |
| | 2209/SCL/EDH231 | 0.50 | 35 | NIL | NIL | NA |
| | 2209/SCL/EDH231 | 1.50 | 51 | NIL | NIL | NA |
| | 2209/SCL/EDH231 | 3.00-3.45 | 39 | NIL | NIL | NA |
| | 2209/SCL/EDH231 | 6.00-6.45 | 58 | NIL | NIL | NA |
| | 2209/SCL/EDH231 | 9.00-9.45 | 71 | NIL | NIL | NA |
| | 2209/SCL/EDH231 | 12.00-12.45 | 11 | NIL | NIL | NA |
| | 2209/SCL/EDH231 | 15.00-15.45 | 9 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 0.50 | 99 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 123 | NIL | NIL | NA |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|------------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Lead (cont'd) | 2209/SCL/ETT106 | 3.00 | 107 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 0.50 | 28 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 28 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 27 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 74 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 78 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 50 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 81 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 113 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 12.00-12.45 | 10 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 12 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 30 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 23 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 36 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 87 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 12.00-12.45 | 26 | NIL | NIL | NA |
| | 2209/SCL/EDH229(P) | 0.50 | 13 | NIL | NIL | NA |
| | 2209/SCL/EDH229(P) | 1.50 | 32 | NIL | NIL | NA |
| | 2209/SCL/EDH229(P) | 3.00-3.45 | 20 | NIL | NIL | NA |
| | 2209/SCL/EDH229(P) | 6.00-6.45 | 77 | NIL | NIL | NA |
| | 2209/SCL/EDH229(P) | 9.00-9.45 | 11 | NIL | NIL | NA |
| | 2209/SCL/EDH229(P) | 12.00-12.45 | 12 | NIL | NIL | NA |
| | 2209/SCL/EDH124(P) | 0.50 | 54 | NIL | NIL | NA |
| | 2209/SCL/EDH124(P) | 1.50 | 79 | NIL | NIL | NA |
| | 2209/SCL/EDH124(P) | 3.00-3.45 | 50 | NIL | NIL | NA |
| | 2209/SCL/EDH124(P) | 6.00-6.45 | 15 | NIL | NIL | NA |
| | 2209/SCL/EDH124(P) | 9.00-9.45 | 14 | NIL | NIL | NA |
| | 11202/SCL/EDH136 | 0.50 | 36 | NIL | NIL | NA |
| | 11202/SCL/EDH136 | 1.50 | 39 | NIL | NIL | NA |
| | 11202/SCL/EDH136 | 3.00 | 68 | NIL | NIL | NA |
| | 11202/SCL/EDH136 | 6.00-6.45 | 48 | NIL | NIL | NA |
| | 11202/SCL/EDH136 | 9.00-9.45 | 21 | NIL | NIL | NA |
| | 11202/SCL/EDH136 | 12.00-12.45 | 18 | NIL | NIL | NA |
| | 11202/SCL/EDH136 | 15.00-15.45 | 22 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 0.50 | 22 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 1.50 | 341 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 3.00 | 37 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 6.00-6.45 | 42 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 9.00-9.45 | 18 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 12.00-12.45 | 7 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 15.00-15.45 | 53 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 18.00-18.45 | 5 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 21.00-21.45 | 6 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 24.00-24.45 | 9 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 0.50 | 57 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 1.50 | 26 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 3.00 | 20 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 6.00-6.45 | 82 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 9.00-9.45 | 180 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 12.00-12.45 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 18.00-18.45 | 8 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 21.00-21.45 | 11 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 24.00-24.45 | 10 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 27.00-27.45 | 14 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 30.00-30.45 | 49 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 33.00-33.45 | 15 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 36.00-36.45 | 13 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 0.50 | 41 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 1.50 | 74 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 3.00 | 69 | NIL | NIL | NA |
| 11202/SCL/EDH140 | 6.00-6.45 | 87 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 9.00-9.45 | 6 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 12.00-12.45 | 4 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 15.00-15.45 | 9 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 18.00-18.45 | 2 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 21.00-21.45 | 5 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 24.00-24.45 | 8 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 27.00-27.45 | 29 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 30.00-30.45 | 8 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 33.00-33.45 | 6 | NIL | NIL | NA | |
| 11202/SCL/EDH140 | 36.00-36.45 | 6 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 0.50 | 26 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 1.50 | 31 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 3.00 | 16 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 6.00-6.45 | 93 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 9.00-9.45 | 53 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 12.00-12.45 | 5 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 15.00-15.45 | 13 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 18.00-18.45 | 18 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 21.00-21.45 | 60 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 24.00-24.45 | 21 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 27.00-27.45 | 34 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 30.00-30.45 | 132 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 33.00-33.45 | 228 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 36.00-36.45 | 8 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 39.00-39.45 | 4 | NIL | NIL | NA | |
| 11202/SCL/EDH141 | 42.00-42.45 | 4 | NIL | NIL | NA | |
| 11202/SCL/EDH142 | 0.50 | 42 | NIL | NIL | NA | |
| 11202/SCL/EDH142 | 1.50 | 39 | NIL | NIL | NA | |
| 11202/SCL/EDH142 | 3.00 | 38 | NIL | NIL | NA | |
| 11202/SCL/EDH143 | 0.50 | 25 | NIL | NIL | NA | |
| 11202/SCL/EDH143 | 1.50 | 28 | NIL | NIL | NA | |
| 11202/SCL/EDH143 | 3.00 | 19 | NIL | NIL | NA | |
| 11202/SCL/EDH012 | 12.00-12.45 | 18 | NIL | NIL | NA | |
| 11202/SCL/EDH012 | 15.00-15.45 | 88 | NIL | NIL | NA | |
| 11202/SCL/EDH012 | 18.00-18.45 | 10 | NIL | NIL | NA | |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|---------------------------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Lead (cont'd) | 11202/SCL/EDH012 | 21.00-21.45 | 9 | NIL | NIL | NA |
| | 11202/SCL/EDH012 | 24.00-24.45 | 4 | NIL | NIL | NA |
| | 11202/SCL/EDH012 | 27.00-27.45 | 7 | NIL | NIL | NA |
| | 11202/SCL/ETP027 | 0.50 | 25 | NIL | NIL | NA |
| | 11202/SCL/ETP027 | 1.50 | 14 | NIL | NIL | NA |
| | 11202/SCL/ETP027 | 3.00 | 12 | NIL | NIL | NA |
| | 11202/SCL/ETP042 | 0.50 | 51 | NIL | NIL | NA |
| | 11202/SCL/ETP042 | 1.50 | 42 | NIL | NIL | NA |
| | 11202/SCL/ETP042 | 3.00 | 49 | NIL | NIL | NA |
| | 11202/SCL/ETP043 | 0.50 | 42 | NIL | NIL | NA |
| | 11202/SCL/ETP043 | 1.50 | 44 | NIL | NIL | NA |
| | 11202/SCL/ETP043 | 3.00 | 56 | NIL | NIL | NA |
| | 11202/SCL/ETP044 | 0.50 | 16 | NIL | NIL | NA |
| | 11202/SCL/ETP044 | 1.50 | 11 | NIL | NIL | NA |
| | 11202/SCL/ETP044 | 3.00 | 35 | NIL | NIL | NA |
| Zinc | 2209/SCL/EDH249(P) | 0.50 | 16 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 1.50 | 67 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 3.00-3.45 | 21 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 6.00-6.45 | 190 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 9.00-9.45 | 22 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 12.00-12.45 | 31 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 15.00-15.45 | 67 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 18.00-18.45 | 190 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 21.00-21.45 | 95 | NIL | NIL | NA |
| | 2209/SCL/EDH249(P) | 24.00-24.45 | 48 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 0.50 | 27 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 1.50 | 26 | NIL | NIL | NA |
| | 2209/SCL/ETT106 | 3.00 | 27 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 0.50 | 56 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 1.50 | 36 | NIL | NIL | NA |
| | 2209/SCL/ETT068 | 3.00 | 54 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 0.50 | 22 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 1.50 | 2.7 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 3.00-3.45 | 43 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 6.00-6.45 | 155 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 9.00-9.45 | 131 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 12.00-12.45 | 202 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 0.50 | 50 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 1.50 | 25 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 3.00-3.45 | 48 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 6.00-6.45 | 175 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 9.00-9.45 | 126 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 12.00-12.45 | 80 | NIL | NIL | NA |
| Petroleum Carbon Ranges | | | | | | |
| C6 - C8 | NA | NA | ND | NIL | NIL | NA |
| C9 - C16 | 2209/SCL/ETT102 | 3.00 | 2610 | NIL | NIL | NA |
| C17 - C35 | 2209/SCL/ETT165 | 0.50 | 2960 | NIL | NIL | NA |
| | 2209/SCL/ETT102 | 3.00 | 2880 | NIL | NIL | NA |
| PCBs | | | | | | |
| PCBs | NA | NA | ND | NA | NA | NA |
| Other Inorganic Compound | | | | | | |
| Cyanide, free | NA | NA | ND | NA | NA | NA |

Note:
NA= Not Applicable
ND= Not Detectable
NIL= Maximum concentration detected is below the respective RBRG or Csat
* = Confirmatory tests would be carried out to further confirm size of the affected area

Standard Form 3.5 – Groundwater Sample Concentrations and Exceedances of RBRGs and Solubility Limits

| Chemical | Sampling Locations | Concentration (µg/L) | Check if RBRG Exceeded | Check if Solubility Limit Exceeded | Approximate Size of Affected Area (m ²) |
|--|--------------------|----------------------|------------------------|------------------------------------|---|
| Volatile Organic Chemicals | | | | | |
| Acetone | NA | ND | NIL | NIL | NA |
| Benzene | NA | ND | NIL | NIL | NA |
| Bromodichloromethane | 2209/SCL/EDH249(P) | 5 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 5 | NIL | NIL | NA |
| 2-Butanone | NA | ND | NIL | NIL | NA |
| Chloroform | 2209/SCL/EDH249(P) | 17 | NIL | NIL | NA |
| | 2209/SCL/EDH257(P) | 19 | NIL | NIL | NA |
| | 2209/SCL/EDH256 | 26 | NIL | NIL | NA |
| | 11202/SCL/EDH138 | 21 | NIL | NIL | NA |
| | 11202/SCL/EDH139 | 20 | NIL | NIL | NA |
| | 11202/SCL/EDH140 | 6 | NIL | NIL | NA |
| | 11202/SCL/EDH141 | 16 | NIL | NIL | NA |
| | 11202/SCL/EDH143 | 16 | NIL | NIL | NA |
| 11202/SCL/EDH144 | 16 | NIL | NIL | NA | |
| Ethylbenzene | NA | ND | NIL | NIL | NA |
| Methyl tert-Butyl Ether | NA | ND | NIL | NIL | NA |
| Methylene Chloride | NA | ND | NIL | NIL | NA |
| Styrene | NA | ND | NIL | NIL | NA |
| Tetrachloroethene | NA | ND | NIL | NIL | NA |
| Toluene | 2209/SCL/EDH231 | 30 | NIL | NIL | NA |
| Trichloroethene | NA | ND | NIL | NIL | NA |
| Xylenes (Total) | NA | ND | NIL | NIL | NA |
| Semi-Volatile Organic Chemicals | | | | | |
| Acenaphthene | NA | ND | NIL | NIL | NA |
| Acenaphthylene | NA | ND | NIL | NIL | NA |
| Anthracene | NA | ND | NIL | NIL | NA |
| Benzo(b) & Benzo(k) fluoranthene | NA | ND | NIL | NIL | NA |
| Chrysene | NA | ND | NIL | NIL | NA |
| Fluoranthene | NA | ND | NIL | NIL | NA |
| Fluorene | NA | ND | NIL | NIL | NA |
| Hexachlorobenzene | NA | ND | NIL | NIL | NA |
| Naphthalene | NA | ND | NIL | NIL | NA |
| Metals | | | | | |
| Mercury | NA | ND | NA | NA | NA |
| Petroleum Carbon Ranges | | | | | |
| C6 - C8 | 2209/SCL/EDH231 | 30 | NIL | NIL | NA |
| C9 - C16 | NA | ND | NIL | NIL | NA |
| C17 - C35 | NA | ND | NIL | NIL | NA |

Note:
 NIL= Maximum concentration detected is below the respective RBRG or solubility limit
 NA= Not Applicable
 ND= Not Detectable

Standard Form 3.2 – 3.5 under Stage 2

Standard Form 3.2 – Soil Data Summary and Comparison to RBRGs and Csat

| Chemical | Frequency of Detection (x/y) | Range of Detected Concentration | Range of Method Reporting Limit | Analytical Method | Relevant Land Use Categories | Most Stringent RBRG(s) (mg/kg) | Csat (mg/kg) | Maximum Detected Concentration Exceeds (check if applicable) | | | |
|--|------------------------------|---------------------------------|---------------------------------|-------------------|------------------------------|--------------------------------|--------------|--|------|----|----|
| | | | | | | | | RBRG | Csat | | |
| Volatile Organic Chemicals* | | | | | | | | | | | |
| Acetone | 0/5 | <5 | 5 | USEPA 8260 | Industrial | 10000 | *** | NA | NA | | |
| Benzene | 0/52 | <0.5 | 0.5 | | | 9.21 | 336 | NA | NA | | |
| Bromodichloromethane | 0/42 | <0.5 | 0.5 | | | 2.85 | 1030 | NA | NA | | |
| 2-Butanone | 0/42 | <5 | 5 | | | 10000 | *** | NA | NA | | |
| Chloroform | 0/42 | <0.5 | 0.5 | | | 1.54 | 1100 | NA | NA | | |
| Ethylbenzene | 0/52 | <0.5 | 0.5 | | | 8240 | 138 | NA | NA | | |
| Methyl tert-Butyl Ether | 0/5 | <0.5 | 0.5 | | | 70.1 | 2380 | NA | NA | | |
| Methylene Chloride | 0/5 | <2.5 | 2.5 | | | 13.9 | 921 | NA | NA | | |
| Styrene | 0/42 | <0.5 | 0.5 | | | 10000 | 497 | NA | NA | | |
| Tetrachloroethene | 0/42 | <0.5 | 0.5 | | | 0.777 | 97.1 | NA | NA | | |
| Toluene | 0/52 | <0.5 | 0.5 | | | 10000 | 235 | NA | NA | | |
| Trichloroethene | 0/42 | <0.5 | 0.5 | | | 5.68 | 488 | NA | NA | | |
| Xylenes (Total) | 0/52 | <1.5 | 1.5 | | | 1230 | 150 | NA | NA | | |
| Semi-Volatile Organic Chemicals | | | | | | | | | | | |
| Acenaphthene | 0/52 | <0.5 | 0.5 | USEPA 8270 | Industrial | 10000 | 60.2 | NA | NA | | |
| Acenaphthylene | 0/52 | <0.5 | 0.5 | | | 10000 | 19.8 | NA | NA | | |
| Anthracene | 0/52 | <0.5 | 0.5 | | | 10000 | 2.56 | NA | NA | | |
| Benzo(a)anthracene | 0/52 | <0.5 | 0.5 | | | 91.8 | NA | NA | NA | | |
| Benzo(a)pyrene | 0/52 | <0.5 | 0.5 | | | 9.18 | NA | NA | NA | | |
| Benzo(b) & Benzo(k) fluoranthene | 0/52 | <1.0 | 1.0 | | | 17.8 | NA | NA | NA | | |
| Benzo(g,h,i)perylene | 0/52 | <5.0 | 5.0 | | | 10000 | NA | NA | NA | | |
| bis-(2-Ethylhexyl)phthalate | 0/42 | <5.0 | 5.0 | | | 91.8 | NA | NA | NA | | |
| Chrysene | 0/42 | <0.5 | 0.5 | | | 1140 | NA | NA | NA | | |
| Dibenzo(a,h)anthracene | 0/52 | <0.5 | 0.5 | | | 9.18 | NA | NA | NA | | |
| Fluoranthene | 0/52 | <0.5 | 0.5 | | | 10000 | NA | NA | NA | | |
| Fluorene | 1/52 | 0.627 | 0.5 | | | 10000 | 54.7 | NA | NA | | |
| Hexachlorobenzene | 0/42 | <0.2 | 0.2 | | | 0.582 | NA | NA | NA | | |
| Indeno(1,2,3-cd)pyrene | 0/52 | <0.5 | 0.5 | | | 91.8 | NA | NA | NA | | |
| Naphthalene | 0/52 | <0.5 | 0.5 | | | 453 | 125 | NA | NA | | |
| Phenanthrene | 1/52 | 2.03 | 0.5 | | | 10000 | 28 | NA | NA | | |
| Phenol | 0/42 | <0.5 | 0.5 | | | 10000 | 7260 | NA | NA | | |
| Pyrene | 0/52 | <0.5 | 0.5 | | | 10000 | NA | NA | NA | | |
| Metals** | | | | | | | | | | | |
| Antimony | 3/37 | 1-5 | 1 | | | USEPA 6020 | Industrial | 261 | NA | NA | NA |
| Arsenic | 35/37 | 1-14 | 1 | 196 | NA | | | NA | NA | | |
| Barium | 37/37 | 4-161 | 1 | 10000 | NA | | | NA | NA | | |
| Cadmium | 0/37 | <0.2 | 0.2 | 653 | NA | | | NA | NA | | |
| Cobalt | 24/37 | 1-24 | 1 | 10000 | NA | | | NA | NA | | |
| Copper | 40/42 | 1-26 | 1 | 10000 | NA | | | NA | NA | | |
| Lead | 52/52 | 6-160 | 1 | 2290 | NA | | | NA | NA | | |
| Manganese | 37/37 | 19-1510 | 1 | 10000 | NA | | | NA | NA | | |
| Molybdenum | 32/37 | 1-8 | 1 | 3260 | NA | | | NA | NA | | |
| Nickel | 26/37 | 1-9 | 1 | 10000 | NA | | | NA | NA | | |
| Tin | 22/37 | 1-9 | 1 | 10000 | NA | | | NA | NA | | |
| Zinc | 37/37 | 6-108 | 1 | 10000 | NA | | | NA | NA | | |
| Chromium III | 41/42 | 0.7-30.8 | 0.5 | 10000 | NA | | | NA | NA | | |
| Chromium VI | 0/42 | <0.5 | 0.5 | 1960 | NA | | | NA | NA | | |
| Mercury | 7/37 | 0.05-2.3 | 0.05 | APHA 3112 Hg: B | 38.4 | | | NA | NA | | |
| Petroleum Carbon Ranges | | | | | | | | | | | |
| C6 - C8 | 1/52 | 7 | 5 | USEPA 8015 | Industrial | 10000 | 1000 | NA | NA | | |
| C9 - C16 | 2/52 | 203-1840 | 200 | | | 10000 | 3000 | NA | NA | | |
| C17 - C35 | 2/52 | 1480-2330 | 500 | | | 10000 | 5000 | NA | NA | | |

Note:

*The actual reporting limit for methylene chloride is lower than the proposed limit in the CAP, and is accredited under HOKLAS.

*** indicates that the Csat value exceeds the 'ceiling limit' therefore the RBRG applies

NIL= Maximum concentration detected is below the respective RBRG or solubility limit

NA= Not Applicable

| Chemical | Frequency of detection (x/y) | Range of Detected Concentration (µg/L) | Range of Method Reporting Limit (µg/L)** | Analytical Method | Relevant Land Use Categories | Most Stringent RBRG(s) (µg/kg) | Solubility Limit (µg/L) | Maximum Detected Concentration Exceeds (check if applicable) | |
|--|------------------------------|--|--|-------------------|------------------------------|--------------------------------|-------------------------|--|------------|
| | | | | | | | | RBRG | Solubility |
| Volatile Organic Chemicals | | | | | | | | | |
| Acetone | 0/1 | <50 | 50 | USEPA 8260 | Industrial | 10000000 | *** | NA | NA |
| Benzene | 0/6 | <5 | 5 | | | 54000 | 1750000 | NA | NA |
| Bromodichloromethane | 0/4 | <5 | 5 | | | 26200 | 6740000 | NA | NA |
| 2-Butanone | 4/4 | 180-30800 | 50 | | | 10000000 | *** | NA | NA |
| Chloroform | 2/4 | 9-17 | 5 | | | 11300 | 7920000 | NA | NA |
| Ethylbenzene | 0/6 | <5 | 5 | | | 10000000 | 169000 | NA | NA |
| Methyl tert-Butyl Ether | 0/1 | <5 | 5 | | | 1810000 | *** | NA | NA |
| Methylene Chloride | 0/1 | <50 | 50 | | | 224000 | *** | NA | NA |
| Styrene | 0/4 | <5 | 5 | | | 10000000 | 310000 | NA | NA |
| Tetrachloroethene | 0/4 | <5 | 5 | | | 2950 | 200000 | NA | NA |
| Toluene | 1/6 | 35 | 5 | | | 10000000 | 526000 | NA | NA |
| Trichloroethene | 0/4 | <5 | 5 | | | 14200 | 1100000 | NA | NA |
| Xylenes (Total) | 0/6 | <15 | 15 | 1570000 | 175000 | NA | NA | | |
| Semi-Volatile Organic Chemicals** | | | | | | | | | |
| Acenaphthene | 0/6 | <2 | 2 | USEPA 8270 | Industrial | 10000000 | 4240 | NA | NA |
| Acenaphthylene | 0/6 | <2 | 2 | | | 10000000 | 3930 | NA | NA |
| Anthracene | 0/6 | <2 | 2 | | | 10000000 | 43.4 | NA | NA |
| Benzo(b) & Benzo(k) fluoranthene | 0/6 | <4 | 4 | | | 7530 | 1.5 | NA | NA |
| Chrysene | 0/6 | <2 | 2 | | | 812000 | 1.6 | NA | NA |
| Fluoranthene | 0/6 | <2 | 2 | | | 10000000 | 206 | NA | NA |
| Fluorene | 0/6 | <2 | 2 | | | 10000000 | 1980 | NA | NA |
| Hexachlorobenzene | 0/4 | <4 | 4 | | | 695 | 6200 | NA | NA |
| Naphthalene | 0/6 | <2 | 2 | | | 862000 | 31000 | NA | NA |
| Phenanthrene | 0/6 | <2 | 2 | | | 10000000 | 1000 | NA | NA |
| Pyrene | 0/6 | <2 | 2 | | | 10000000 | 135 | NA | NA |
| Metals | | | | | | | | | |
| Mercury | 0/3 | <0.5 | 0.5 | APHA 3112 Hg: | Industrial | 6790 | NA | NA | NA |
| Petroleum Carbon Ranges | | | | | | | | | |
| C6 - C8 | 0/6 | <20 | 20 | USEPA 8015 | Industrial | 1150000 | 5230 | NA | NA |
| C9 - C16 | 0/6 | <500 | 500 | | | 9980000 | 2800 | NA | NA |
| C17 - C35 | 2/6 | 500-1700 | 500 | | | 178000 | 2800 | NA | NA |

Note:

** indicates that the proposed reporting limits of chrysene and Benzo(b) & Benzo(k)fluoranthene for groundwater samples are different among the CAPs, but all are accredited under HOKLAS. The larger reporting limits are shown here.

*** indicates that the Csat value exceeds the 'ceiling limit' therefore the RBRG applies

NIL= Maximum concentration detected is below the respective RBRG or solubility limit

NA= Not Applicable

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|----------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| | 11203/SCL/EB122 | 3.00-3.45 | 21 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 6.00-6.45 | 9 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 9.00-9.45 | 20 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 12.00-12.45 | 145 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 15.90-16.35 | 13 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 0.50 | 47 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 1.50 | 43 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 3.00-3.45 | 46 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 6.00-6.45 | 16 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 9.00-9.45 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 12.00-12.45 | 22 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 15.00-15.45 | 10 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 18.00-18.15 | 10 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 21.00-21.15 | 15 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 24.00-24.15 | 17 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 27.00-27.15 | 4 | NIL | NIL | NA |
| Cadmium | NA | NA | ND | NIL | NIL | NA |
| | 11203/SCL/EB118 | 0.50 | 8 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 1.50 | 6 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 3.00-3.45 | 6 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 0.50 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 1.50 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 0.50 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 1.50 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 7.30-7.75 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 9.80-10.25 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 12.00-12.45 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 15.00-15.45 | 1 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 21.00-21.25 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 0.50 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 1.50 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 3.00-3.45 | 1 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 0.50 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 1.50 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 3.00-3.45 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 12.00-12.45 | 19 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 15.90-16.35 | 24 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 0.50 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 1.50 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 3.00-3.45 | 7 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 6.00-6.45 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 0.50 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 1.50 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 3.00-3.45 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 0.50 | 6 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 1.50 | 9 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 3.00-3.45 | 12 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 6.00-6.45 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 0.50 | 7 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 1.50 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 3.00-3.45 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 7.30-7.75 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 9.80-10.25 | 10 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 12.00-12.45 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 15.00-15.45 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 18.00-18.25 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 21.00-21.25 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 0.50 | 8 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 1.50 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 3.00-3.45 | 12 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 0.50 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 1.50 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 3.00-3.45 | 11 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 6.00-6.45 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 9.00-9.45 | 7 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 12.00-12.45 | 6 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 15.90-16.35 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 0.50 | 8 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 1.50 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 3.00-3.45 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 6.00-6.45 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 9.00-9.45 | 10 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 12.00-12.45 | 12 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 15.00-15.45 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 18.00-18.15 | 4 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 24.00-24.15 | 1 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 0.50 | 16 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 1.50 | 19 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 3.50-3.95 | 24 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 6.00-6.45 | 2 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 9.00-9.45 | 26 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 0.50 | 72 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 1.50 | 53 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 3.00-3.45 | 51 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 0.50 | 49 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 1.50 | 69 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 3.00-3.45 | 27 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 6.00-6.45 | 5 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 0.50 | 52 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 1.50 | 117 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 3.00-3.45 | 51 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 7.30-7.75 | 31 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 9.80-10.25 | 109 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 12.00-12.45 | 69 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 15.00-15.45 | 52 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 18.00-18.25 | 6 | NIL | NIL | NA |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|-----------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Lead | 11203/SCL/EB120 | 21.00-21.25 | 8 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 0.50 | 59 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 1.50 | 82 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 3.00-3.45 | 95 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 0.50 | 45 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 1.50 | 83 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 3.00-3.45 | 43 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 6.00-6.45 | 14 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 9.00-9.45 | 16 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 12.00-12.45 | 13 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 15.90-16.35 | 21 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 0.50 | 104 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 1.50 | 52 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 3.00-3.45 | 83 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 6.00-6.45 | 66 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 9.00-9.45 | 20 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 12.00-12.45 | 160 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 15.00-15.45 | 24 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 18.00-18.15 | 7 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 21.00-21.15 | 20 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 24.00-24.15 | 6 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 27.00-27.15 | 15 | NIL | NIL | NA |
| | 11203/SCL/EB140 | 0.50 | 31 | NIL | NIL | NA |
| | 11203/SCL/EB140 | 1.50 | 16 | NIL | NIL | NA |
| | 11203/SCL/EB140 | 3.00-3.45 | 13 | NIL | NIL | NA |
| | 11203/SCL/EB140 | 5.00-5.45 | 11 | NIL | NIL | NA |
| | 11203/SCL/EB140 | 6.00-6.45 | 13 | NIL | NIL | NA |
| | 11203/SCL/EB141 | 0.50 | 39 | NIL | NIL | NA |
| | 11203/SCL/EB141 | 1.50 | 32 | NIL | NIL | NA |
| | 11203/SCL/EB141 | 4.50-4.95 | 21 | NIL | NIL | NA |
| | 11203/SCL/EB141 | 5.00-5.45 | 17 | NIL | NIL | NA |
| | 11203/SCL/EB141 | 6.00-6.45 | 32 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 0.50 | 26 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 1.50 | 32 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 3.50-3.95 | 16 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 6.00-6.45 | 27 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 9.00-9.45 | 16 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 0.50 | 640 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 1.50 | 528 | NIL | NIL | NA |
| 11203/SCL/EB118 | 3.00-3.45 | 542 | NIL | NIL | NA | |
| 11203/SCL/EB119 | 0.50 | 482 | NIL | NIL | NA | |
| 11203/SCL/EB119 | 1.50 | 378 | NIL | NIL | NA | |
| 11203/SCL/EB119 | 3.00-3.45 | 51 | NIL | NIL | NA | |
| 11203/SCL/EB119 | 6.00-6.45 | 33 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 0.50 | 387 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 1.50 | 766 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 3.00-3.45 | 94 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 7.30-7.75 | 114 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 9.80-10.25 | 294 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 12.00-12.45 | 90 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 15.00-15.45 | 587 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 18.00-18.25 | 222 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 21.00-21.25 | 1510 | NIL | NIL | NA | |
| 11203/SCL/EB121 | 0.50 | 365 | NIL | NIL | NA | |
| 11203/SCL/EB121 | 1.50 | 333 | NIL | NIL | NA | |
| 11203/SCL/EB121 | 3.00-3.45 | 161 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 0.50 | 519 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 1.50 | 422 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 3.00-3.45 | 129 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 6.00-6.45 | 22 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 9.00-9.45 | 19 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 12.00-12.45 | 1120 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 15.90-16.35 | 187 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 0.50 | 460 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 1.50 | 331 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 3.00-3.45 | 409 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 6.00-6.45 | 112 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 9.00-9.45 | 35 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 12.00-12.45 | 62 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 15.00-15.45 | 59 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 18.00-18.15 | 170 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 21.00-21.15 | 130 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 24.00-24.15 | 117 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 27.00-27.15 | 40 | NIL | NIL | NA | |
| 11203/SCL/EB119 | 0.50 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB119 | 1.50 | 4 | NIL | NIL | NA | |
| 11203/SCL/EB119 | 3.00-3.45 | 4 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 0.50 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 1.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 3.00-3.45 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 7.30-7.75 | 4 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 9.80-10.25 | 4 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 12.00-12.45 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 15.00-15.45 | 4 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 18.00-18.25 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB120 | 21.00-21.25 | 4 | NIL | NIL | NA | |
| 11203/SCL/EB121 | 0.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB121 | 1.50 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB121 | 3.00-3.45 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 0.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 1.50 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 3.00-3.45 | 6 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 6.00-6.45 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 9.00-9.45 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 12.00-12.45 | 8 | NIL | NIL | NA | |
| 11203/SCL/EB122 | 15.90-16.35 | 1 | NIL | NIL | NA | |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) | |
|-----------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|----|
| | Sampling Locations | Sample Depth (m, bgs) | | | | | |
| | 11203/SCL/EB123 | 0.50 | 4 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 1.50 | 4 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 3.00-3.45 | 2 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 6.00-6.45 | 2 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 9.00-9.45 | 5 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 12.00-12.45 | 3 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 15.00-15.45 | 2 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 18.00-18.15 | 1 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 21.00-21.15 | 1 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 24.00-24.15 | 1 | NIL | NIL | NA | |
| | Nickel | 11203/SCL/EB118 | 1.50 | 1 | NIL | NIL | NA |
| | | 11203/SCL/EB118 | 3.00-3.45 | 1 | NIL | NIL | NA |
| 11203/SCL/EB119 | | 0.50 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB119 | | 1.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB119 | | 3.00-3.45 | 9 | NIL | NIL | NA | |
| 11203/SCL/EB119 | | 6.00-6.45 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 0.50 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 1.50 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 3.00-3.45 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 7.30-7.75 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 9.80-10.25 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 12.00-12.45 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB121 | | 0.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB121 | | 1.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB121 | | 3.00-3.45 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 0.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 1.50 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 3.00-3.45 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 6.00-6.45 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 9.00-9.45 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 15.90-16.35 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 0.50 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 1.50 | 1 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 3.00-3.45 | 3 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 9.00-9.45 | 2 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 12.00-12.45 | 3 | NIL | NIL | NA | |
| Tin | | 11203/SCL/EB118 | 0.50 | 3 | NIL | NIL | NA |
| | | 11203/SCL/EB118 | 1.50 | 5 | NIL | NIL | NA |
| | | 11203/SCL/EB118 | 3.00-3.45 | 6 | NIL | NIL | NA |
| | | 11203/SCL/EB119 | 0.50 | 3 | NIL | NIL | NA |
| | | 11203/SCL/EB119 | 1.50 | 2 | NIL | NIL | NA |
| | | 11203/SCL/EB119 | 3.00-3.45 | 1 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 0.50 | 5 | NIL | NIL | NA | |
| | 11203/SCL/EB120 | 1.50 | 3 | NIL | NIL | NA | |
| | 11203/SCL/EB120 | 3.00-3.45 | 2 | NIL | NIL | NA | |
| | 11203/SCL/EB120 | 9.80-10.25 | 9 | NIL | NIL | NA | |
| | 11203/SCL/EB120 | 18.00-18.25 | 2 | NIL | NIL | NA | |
| | 11203/SCL/EB121 | 0.50 | 3 | NIL | NIL | NA | |
| | 11203/SCL/EB121 | 1.50 | 3 | NIL | NIL | NA | |
| | 11203/SCL/EB121 | 3.00-3.45 | 4 | NIL | NIL | NA | |
| | 11203/SCL/EB122 | 0.50 | 8 | NIL | NIL | NA | |
| | 11203/SCL/EB122 | 1.50 | 4 | NIL | NIL | NA | |
| | 11203/SCL/EB122 | 3.00-3.45 | 2 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 0.50 | 3 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 1.50 | 3 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 3.00-3.45 | 3 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 6.00-6.45 | 2 | NIL | NIL | NA | |
| | 11203/SCL/EB123 | 18.00-18.15 | 1 | NIL | NIL | NA | |
| | Zinc | 11203/SCL/EB118 | 0.50 | 52 | NIL | NIL | NA |
| | | 11203/SCL/EB118 | 1.50 | 39 | NIL | NIL | NA |
| | | 11203/SCL/EB118 | 3.00-3.45 | 50 | NIL | NIL | NA |
| | | 11203/SCL/EB119 | 0.50 | 49 | NIL | NIL | NA |
| | | 11203/SCL/EB119 | 1.50 | 46 | NIL | NIL | NA |
| | | 11203/SCL/EB119 | 3.00-3.45 | 11 | NIL | NIL | NA |
| 11203/SCL/EB119 | | 6.00-6.45 | 7 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 0.50 | 46 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 1.50 | 32 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 3.00-3.45 | 18 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 7.30-7.75 | 11 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 9.80-10.25 | 108 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 12.00-12.45 | 14 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 15.00-15.45 | 13 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 18.00-18.25 | 17 | NIL | NIL | NA | |
| 11203/SCL/EB120 | | 21.00-21.25 | 11 | NIL | NIL | NA | |
| 11203/SCL/EB121 | | 0.50 | 34 | NIL | NIL | NA | |
| 11203/SCL/EB121 | | 1.50 | 24 | NIL | NIL | NA | |
| 11203/SCL/EB121 | | 3.00-3.45 | 46 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 0.50 | 53 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 1.50 | 38 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 3.00-3.45 | 26 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 6.00-6.45 | 6 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 9.00-9.45 | 7 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 12.00-12.45 | 11 | NIL | NIL | NA | |
| 11203/SCL/EB122 | | 15.90-16.35 | 65 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 0.50 | 43 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 1.50 | 27 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 3.00-3.45 | 44 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 6.00-6.45 | 15 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 9.00-9.45 | 11 | NIL | NIL | NA | |
| 11203/SCL/EB123 | | 12.00-12.45 | 11 | NIL | NIL | NA | |
| 11203/SCL/EB123 | 15.00-15.45 | 7 | NIL | NIL | NA | | |
| 11203/SCL/EB123 | 18.00-18.15 | 11 | NIL | NIL | NA | | |
| 11203/SCL/EB123 | 21.00-21.15 | 10 | NIL | NIL | NA | | |
| 11203/SCL/EB123 | 24.00-24.15 | 6 | NIL | NIL | NA | | |
| 11203/SCL/EB123 | 27.00-27.15 | 26 | NIL | NIL | NA | | |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|--------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Mercury | 11203/SCL/EB119 | 1.50 | 0.09 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 9.80-10.25 | 2.3 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 0.50 | 0.07 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 3.00-3.45 | 0.15 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 3.00-3.45 | 0.08 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 6.00-6.45 | 0.08 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 9.00-9.45 | 0.05 | NIL | NIL | NA |
| Chromium III | 11203/SCL/EB118 | 0.50 | 1.5 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 1.50 | 1.4 | NIL | NIL | NA |
| | 11203/SCL/EB118 | 3.00-3.45 | 1.8 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 0.50 | 2.3 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 1.50 | 3.4 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 3.00-3.45 | 18.9 | NIL | NIL | NA |
| | 11203/SCL/EB119 | 6.00-6.45 | 4.4 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 0.50 | 1.8 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 1.50 | 1.2 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 3.00-3.45 | 4.8 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 7.30-7.75 | 3.4 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 9.80-10.25 | 2.3 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 12.00-12.45 | 2.5 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 15.00-15.45 | 1.3 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 18.00-18.25 | 0.6 | NIL | NIL | NA |
| | 11203/SCL/EB120 | 21.00-21.25 | 0.9 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 0.50 | 3 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 1.50 | 2.6 | NIL | NIL | NA |
| | 11203/SCL/EB121 | 3.00-3.45 | 2.8 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 0.50 | 1.8 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 1.50 | 1.4 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 3.00-3.45 | 19.2 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 6.00-6.45 | 3.5 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 9.00-9.45 | 2.5 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 12.00-12.45 | 1.2 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 15.90-16.35 | 4.4 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 0.50 | 2.2 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 1.50 | 1.2 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 3.00-3.45 | 4.2 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 6.00-6.45 | 1.8 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 9.00-9.45 | 5.7 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 12.00-12.45 | 2.5 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 15.00-15.45 | 1.2 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 18.00-18.15 | 1.1 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 21.00-21.15 | 0.8 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 27.00-27.15 | 0.7 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 0.50 | 13.1 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 1.50 | 7.7 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 3.50-3.95 | 30.8 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 6.00-6.45 | 3.4 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 9.00-9.45 | 25.4 | NIL | NIL | NA |

| Chemical | List Samples | | Concentration (mg/kg) | Check if RBRG Exceeded | Check if Csat Exceeded | Approximate Size of Affected Area* (m ²) |
|--------------------------------|--------------------|-----------------------|-----------------------|------------------------|------------------------|--|
| | Sampling Locations | Sample Depth (m, bgs) | | | | |
| Chromium VI | NA | NA | NA | NIL | NIL | NA |
| Petroleum Carbon Ranges | | | | | | |
| C6 - C8 | 11203/SCL/EB140 | 3.00-3.45 | 7 | NIL | NIL | NA |
| C9 - C16 | 11203/SCL/EB122 | 6.00-6.45 | 203 | NIL | NIL | NA |
| | 11203/SCL/EB140 | 3.00-3.45 | 1840 | NIL | NIL | NA |
| C17 - C35 | 11203/SCL/EB140 | 0.50 | 2330 | NIL | NIL | NA |
| | 11203/SCL/EB140 | 3.00-3.45 | 1480 | NIL | NIL | NA |

Note:
NA= Not Applicable
ND= Not Detectable
NIL= Maximum concentration detected is below the respective RBRG or Csat
* = Confirmatory tests would be carried out to further confirm size of the affected area

Standard Form 3.5 – Groundwater Sample Concentrations and Exceedances of RBRGs and Solubility Limits

| Chemical | List Samples | Concentration (µg/L) | Check if RBRG Exceeded | Check if Solubility Limit Exceeded | Approximate Size of Affected Area (m ²) |
|--|--------------------|-------------------------|---------------------------|---------------------------------------|---|
| | Sampling Locations | | | | |
| Volatile Organic Chemicals | | | | | |
| Acetone | NA | ND | NIL | NIL | NA |
| Benzene | NA | ND | NIL | NIL | NA |
| Bromodichloromethane | NA | ND | NIL | NIL | NA |
| | NA | ND | NIL | NIL | NA |
| 2-Butanone | 11203/SCL/EB120 | 2990 | NIL | NIL | NA |
| | 11203/SCL/EB122 | 180 | NIL | NIL | NA |
| | 11203/SCL/EB123 | 30800 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 1210 | NIL | NIL | NA |
| Chloroform | 11203/SCL/EB120 | 9 | NIL | NIL | NA |
| | 11203/SCL/EB146 | 17 | NIL | NIL | NA |
| Ethylbenzene | NA | ND | NIL | NIL | NA |
| Methyl tert-Butyl Ether | NA | ND | NIL | NIL | NA |
| Methylene Chloride | NA | ND | NIL | NIL | NA |
| Styrene | NA | ND | NIL | NIL | NA |
| Tetrachloroethene | NA | ND | NIL | NIL | NA |
| Toluene | 11203/SCL/EB122 | 35 | NIL | NIL | NA |
| Trichloroethene | NA | ND | NIL | NIL | NA |
| Xylenes (Total) | NA | ND | NIL | NIL | NA |
| Semi-Volatile Organic Chemicals | | | | | |
| Acenaphthene | NA | ND | NIL | NIL | NA |
| Acenaphthylene | NA | ND | NIL | NIL | NA |
| Anthracene | NA | ND | NIL | NIL | NA |
| Benzo(b) & Benzo(k) fluoranthene | NA | ND | NIL | NIL | NA |
| Chrysene | NA | ND | NIL | NIL | NA |
| Fluoranthene | NA | ND | NIL | NIL | NA |
| Fluorene | NA | ND | NIL | NIL | NA |
| Hexachlorobenzene | NA | ND | NIL | NIL | NA |
| Naphthalene | NA | ND | NIL | NIL | NA |
| Phenanthrene | NA | ND | NIL | NIL | NA |
| Pyrene | NA | ND | NIL | NIL | NA |
| Metals | | | | | |
| Mercury | NA | ND | NIL | NIL | NA |
| Petroleum Carbon Ranges | | | | | |
| C6 - C8 | NA | ND | NIL | NIL | NA |
| C9 - C16 | NA | ND | NIL | NIL | NA |
| | 11203/SCL/EB122 | 500 | NIL | NIL | NA |
| C17 - C35 | 11203/SCL/EB123 | 1700 | NIL | NIL | NA |

Note:

NIL= Maximum concentration detected is below the respective RBRG or solubility limit

NA= Not Applicable

ND= Not Detectable

Appendix D

**SI Details on Site L17
(Extracted from Section 12 Land Contamination Assessment
of SCL – NEX/2206 EIA Study for Tai Wai to Hung Hom
Section)**

12 Land Contamination Assessment

12.1 Introduction

This chapter presents the findings of the land contamination assessment of the impacts from the SCL – Tai Wai to Hung Hom Section (SCL (TAW-HUH)) during the construction phase.

A Contamination Assessment Plan (CAP) has been prepared to set out the requirements for a contamination evaluation of the SCL (TAW-HUH) and works areas, and endorsed by EPD in August 2009. With the subsequent change of design information, a revised CAP has been re-submitted in November 2010 and endorsed by EPD on 10 December 2010. Subsequently, the project boundary, at grade works sites and off site works areas have been updated. A supplementary CAP has been submitted to EPD on 21 January 2011 to reflect the latest changes of the project. The final endorsed CAP and Supplementary CAP to be approved by EPD are attached in **Appendix 12.1**.

A total of 5 trial trenches and 24 drillholes were excavated and drilled for soil and groundwater sampling at 10 identified potentially contaminated sites in accordance with the endorsed CAP and supplementary CAP to be approved by EPD. So far, a total of 201 soil samples and 22 groundwater samples were collected. All soil and groundwater samples were analysed by a HOKLAS accredited laboratory for all parameters listed in the endorsed CAP and Supplementary CAP to be approved by EPD.

Available testing results of soil samples indicate that all soil samples are below the value of Risk Base Remediation Goal (RBRG) for industrial purpose, except 1 soil sample collected from 2209/SCL/EDH127 at site L4 (former Tai Hom Village), of which the PCBs concentration exceeded the respective RBRG. Details of the soil remediation method and the disposal criteria of the contaminated soils are described in **Section 12.11**.

Available testing results of groundwater sample at this stage indicate that none of the groundwater samples exceed the RBRGs levels for industrial purpose.

Contamination Assessment Report (CAR) and Remediation Action Plan (RAP) have been prepared to summarise the entire contamination assessment programme, investigation procedures and methodologies, the analytical results of soil and groundwater samples, the scope of any remedial work required, and the particular health and safety requirement that may be required during the works. The CAR and RAP have been endorsed by EPD on 22 Dec 2009. A supplementary CAR has been prepared to reflect the latest changes of the project. The endorsed CAR and RAP and Supplementary CAR are attached in **Appendix 12.2**.

12.2 Legislation and Standards

Legislation and non-statutory guidance for carrying out the land contamination assessment is provided in the following:

- Technical Memorandum on Environmental Impact Assessment Process (TM-EIA);
- 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 (RBRGs) for Contaminated Land Management, EPD.

12.3 Background Information

The assessment is carried out by reviewing the relevant historical information such as site geological information, ground conditions, aerial photos and site inspection.

All collected information and inspection findings have been reviewed and sampling locations have been selected for evaluating the potential of contamination that might be encountered during the construction period.

12.3.1 Ground Conditions

The Geological profile of the alignment is shown in Contamination Assessment Plan (CAP) in **Appendix 12.1**. The approximate ground levels of the potentially contaminated sites are summarised in **Table 12.1**.

Table 12.1: Approximate ground levels of potentially contaminated sites

| Site ID | Location | Approximate ground levels (Elevation in mPD) |
|---------|---|--|
| L1 | NT South Animal Centre | 15 |
| L2 | Shatin Water Treatment Works | 25 |
| L3 | Towngas Offtake Station opposite Hin Keng Estate | 30 |
| L4 | Former Tai Hom Village ⁽¹⁾ | 10 |
| L5 | Former Kai Tak Airport | 5 |
| L13 | Former petrol station adjacent to Chatham Road North | 10 |
| L14 | Kerosene Store along Chung Hau Street | 30 |
| L15 | Shell Petrol Station along Ma Tau Wai Road | 12 |
| L16 | Caltex Petrol Station along Ma Tau Wai Road | 12 |
| L17 | International Mail Centre | 4 |
| L18 | Ex-KCRC Depot | 4 |
| SM-1 | Fuel/Oil Filling Station inside Shek Mun WSD's works area | 6 |

The materials encountered during the site investigations consists of fill, fill derived from marine deposit, alluvium, residual soil and decomposed granite. The strata of the drillholes/ trial trench are summarised in endorsed CAR and Supplementary CAR.

12.3.2 Historical Information

A selection of historical aerial photos and maps has been collated and reviewed. Historical aerial photographs along SCL (TAW-HUH) and the coastline for the year between 1963 and 2008, the historical maps of 1947 and 1964 for Kowloon Peninsula and reclamation history plan are given in the CAP in **Appendix 12.1**. The current and historical contamination concerns along the SCL (TAW-HUH) have been identified.

Historical landuses along SCL (TAW-HUH) is summarized in **Table 12.2**.

Table 12.2: Historical landuses along SCL

| Year | Ho Man Tin / Hung Hom | To Kwa Wan / Ma Tau Wai | Kai Tak | Diamond Hill | Hin Keng / Tai Wai |
|------|--|--|---|--------------|--------------------|
| 1947 | Factory buildings along Whampoa dockyards; Whampoa Dockyards in operation; KCR in operation. | Residential building existed along Ma Tau Chung Road and Ma Tau Wai Road | Reclamation of Kai Tak Airport completed. | | |

| Year | Ho Man Tin / Hung Hom | To Kwa Wan / Ma Tau Wai | Kai Tak | Diamond Hill | Hin Keng / Tai Wai |
|------|--|--|--|--|--|
| 1963 | Reclamation of Hung Hom Bay; construction of Valley Road Estate, Hong Chong Road in progress. | | Kai Tak Airport in operation. Reclamation of Kai Tak runway completed. | Squatter areas including Tai Hom Tsuen and Diamond Hill. | Construction of Shatin Water Treatment Works in progress. Agricultural and small village houses at Hin Keng and Tai Wai areas. |
| 1973 | Reclamation of Hung Hom Bay, construction of Valley Road Estate, Hong Chong Road completed. Hung Hom Railway Terminus in operation. | | Reclamation of Kowloon Bay in progress. | Construction of Upper Wong Tai Sin Estate, Widening and Extension of Lung Cheong Road in progress. Squatter areas at Chuk Yuen and Tsz Wan Shan. | Construction of Shatin Water Treatment Works completed |
| 1982 | Hung Hom Bay Centre and Whampoa Estate developed. International Mail Centre and Hong Kong Coliseum in operation. | To Kwa Wan Government Office was under construction. | Reclamation of Kowloon Bay completed. | Construction of Upper Wong Tai Sin Estate, Lung Cheong Road completed. Squatter areas at Chuk Yuen and Tsz Wan Shan cleared. | Agricultural fields cleared in Tai Wai and Hin Keng. Foundation works for housing estates in progress. |
| 1993 | Whampoa Dockyard ceased operation. Reclamation of Hung Hom Bay in progress. Chatham Road North, and Hung Hom developed as residential areas. | To Kwa Wan Government Office was erected. | | Developed as residential area. Construction of Tate's Cairn Tunnel in progress. | Tai Wai and Hin Keng developed as residential area. Tai Wai Depot used as recreational uses. |
| 2000 | Reclamation of Hung Hom Bay completed. | | Kai Tak Airport ceased operation. | Kowloon Wall City demolished. Demolishing of Tai Hom Village in progress. | |
| 2008 | Developed as residential and commercial areas. | | Kai Tak Airport ceased operation. | Developed as residential areas. Tai Hom Village demolished. | Developed as residential areas. MTR Tai Wai Depot developed. |

12.3.2.1 Year 1947

The Kowloon Canton Railway (KCR) was in operation with Tsim Sha Tsui the Railway Terminus. Hong Kong & Whampoa Docks was in operation to the south of Baker Road. Hung Hom Bay and To Kwa Wan Island had not been reclaimed. Residential buildings had erected along Ma Tau Chung Road and Ma Tau Wai Road.

Land reclamation for Kai Tak Airport was completed and Kai Tak Airport runway had not been reclaimed. Areas to the north of Kowloon City comprised mainly small farms, agricultural fields and hilly terrain.

12.3.2.2 Year 1963

Land Reclamation of To Kwa Wan Island was completed while reclamation of Hung Hom Bay, Kowloon Bay was in progress. Construction of Valley Road Estate, Hong Chong Road, Fat Kwong Street and excavation along hillside was in progress. Ma Tau Wai Estate and Ma Tau Wai Road Playground was previously an open car parking space and the secondary schools along Ma Tau Wai Road had not been built. Residential developments were developed to the south of Chatham Road North.

Reclamation of Kai Tak runway and construction of Wong Tai Sin Estate were completed. Tai Hom Tsuen and areas to the north of Lung Cheung Road comprised mainly agricultural fields and squatter houses and hilly terrain. Lung Cheong Road terminated at Chuk Yuen and widening of Lung Cheong Road was not started. The Tate's Cairn Tunnel had not been constructed.

Construction of Shatin Water Treatment Works was in progress. Hin Keng and Tai Wai Area comprised agricultural fields and small village houses.

12.3.2.3 Year 1973

The KCR Railway Terminus was relocated to Hung Hom. The Hong Kong Polytechnic was in operation. Both International Mail Centre and Hong Kong Coliseum were used as open storage areas.

Reclamation of both Hung Hom Bay and Kowloon Bay were completed. Construction of Valley Road Estate, Hong Chong Road, Fat Kwong Street were completed and in operation. Construction of Fat Kwong Street Garden and Oi Man Estate was still in progress. Ma Tau Wai Estate was well established and Ma Tau Wai Road Playground had built. Residential buildings along Ma Tau Wai Road remained unchanged.

Widening works and extension of Lung Cheong Road to the north of Tai Hom Village was in progress. Construction of Upper Wong Tai Sin Estate was in progress. Chuk Yuen and Tsz Wan Shan was undeveloped hilly squatter area along the hillside. The Tate's Cairn Tunnel had not been constructed.

The western side of Tai Hom Village was cleared for the construction of residential buildings (Fung Tak Estate) and extension of Lung Cheong Road. Tai Hom Tsuen comprised mainly squatter houses.

Construction of Shatin Water Treatment Works was completed. Hin Keng and Tai Wai comprised agricultural fields and small village houses.

12.3.2.4 Year 1982

Construction works of Fat Kwong Street Garden and Oi Man Estate was completed. To Kwa Wan Government Office was under construction. Residential developments including Wyler Gardens were fully developed at the south of Chatham Road North. Hung Hom Bay Centre and Whampoa Estate were developed. The International Mail Centre and Hong Kong Coliseum were in operation.

Construction of Upper Wong Tai Sin Estate was completed. Widening and Extension works of Lung Cheung Road was completed. The construction of Tate's Cairn Tunnel and Fung Tak Road were in progress. Squatters along hillside of Chuk Yuen and Tsz Wan Shan had been removed and excavation works of Kowloon Hills was in progress. Tai Hom Village comprised mainly squatter houses.

The agricultural fields in Tai Wai and Hin Keng were removed and foundation works for housing estates was in progress.

12.3.2.5 Year 1993

Reclamation of Hung Hom Bay was in progress. Residential buildings remained unchanged and To Kwa Wan Government Office was erected. High rise buildings developed along both

sides of Chatham Road North. Whampoa Garden was in place. Whampoa Dockyards was transformed into residential developments.

High-rise residential building developed at Chuk Yuen and Tsz Wan Shan. Construction of Tate's Cairn Tunnel was completed and in operation. Construction of Lung Poon Court, Fung Tak Estate, Plaza Hollywood, Galaxia, Bel Air Heights and Chi Lin Nunnery were in progress. Diamond Hill had developed into residential area. Tai Hom Village comprised mainly squatter houses.

Tai Wai and Hin Keng had developed into a new town. Hin Keng Estate, Carado Garden, Hin Keng Playground were in place. Tai Wai Depot was used as School of Motoring, bicycle park, and football court.

12.3.2.6 Year 2000

Land reclamation of Hung Hom Bay was completed. Majestic Park along Ma Tau Wai Road was under construction and residential developments had been erected along Chatham Road North. Hung Hom was developed into a residential area.

Kai Tak Airport was closed and parts of the administration buildings were demolished. Diamond Hill had developed into residential area. Kowloon Wall City was demolished and developed into Kowloon Wall City Park.

Construction of Plaza Hollywood, Galaxia, Bel Air Heights and Chi Lin Nunnery were completed. The demolition of Tai Hom Village was in progress with the southern part of the village cleared.

Hin Keng Estate, Carado Garden, Hin Keng Playground were in place. Tai Wai Depot was used as School of Motoring, bicycle park, and football court.

12.3.2.7 Existing landuse

The majority of the existing landuse along the alignment and stations are mainly commercial, residential and community facilities.

Tai Hom Village has been cleared and Kai Tak Airport closed. The MTR Tai Wai depot has been developed and construction of residential development on top is in progress.

12.4 Site Inspection

Site surveys were conducted on 1 November 2008, 8 and 10 December 2008 to confirm findings of desktop study and to identify any other land uses along the alignment which may have the potential for causing soil and groundwater contamination. Additional surveys have also been conducted for the off-site temporary works sites and works areas in September 2009, October 2009, February 2010 and August 2010. Possible contaminants were identified in accordance with Annex B of EPD's *Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repairing/Dismantling Workshops*.

Tai Hom Village has been cleared and closed for public. Kai Tak Airport is no longer in use. A kerosene store is located at the slope between Chung Hau Street and Chatham Road North.

Two petrol stations have been identified along and in the vicinity of SCL:

- Caltex Petrol Station along Ma Tau Wai Road, and
- Shell Petrol Station along Ma Tau Wai Road.

A WSD' works area used for storage of construction materials has been identified at Shek Mun off-site works area. Unpaved fuel filling station was identified inside the works area and heavy oil stains on unpaved ground surface was observed.

In the vicinity of the identified potential contaminated sites, there are residential and commercial buildings.

12.5 Future Landuse and Activities

The RBRGs have categorised four different post-restoration land uses, namely Urban Residential, Rural Residential, Industrial and Public Parks, to reflect the actual settings which people could be exposed to contaminated soil or groundwater. Definition of post-restoration land uses are given in EPD's *Guidance Note for Contaminated Land Assessment and Remediation and RBRGs Guidance Manual*.

The future land use of SCL (TAW-HUH) including the tunnels, station, ventilation buildings and plant room etc would be classified as "Railway" and classified as 'Industrial" under RBRGs landuse category. Corresponding RBRGs landuse for other associated facilities are also identified and given in **Table 12.3**.

Table 12.3: Post-restoration land use and RBRGs land use

| Landuse | Corresponding RBRGs Landuse |
|--------------------|------------------------------------|
| Railway | Industrial |
| Open Space | Public Park |
| Pedestrian Walkway | Lower of Industrial or Public Park |
| Road | Lower of Industrial or Public Park |

12.6 Potentially Contaminated Sites

Potentially contaminated sites along SCL (TAW-HUH) have been identified based on historical maps, selected aerial photos, information collected during site survey. Potentially contaminated landuses along the SCL (TAW-HUH) are chemical/ oil storage, fuelling area/ fuel storage, vehicle repair, airport, reclaimed area and gas works. Locations of these potentially contaminated sites are summarised in **Table 12.4**. Current conditions of these potentially contaminated are shown in CAP in **Appendix 12.1**.

Table 12.4: Potentially contaminated landuse

| Site ID | Location | Landuse | Potentially sources of contamination | SI Requirement | Remarks |
|---------|--|---|---|----------------|---|
| L1 | NT South Animal Centre | Store room for chemical | Possible spillage/ leakage of chemicals | Yes | |
| L2 | Shatin Water Treatment Works | Chemical/ Oil storage | Possible spillage/ leakage of chemicals from sewage works or discharge of contaminated wastewater | No | Low potential for migration of contaminants with large separation |
| L3 | Towngas Offtake Station opposite Hin Keng Estate | Oil storage | Possible leakage of gaseous fuels from towngas pipeline and offtake station. | Yes | |
| L4 | Former Tai Hom Village | Fuelling area/ Fuel storage | Potential for contamination from historical land uses such as metal workshops, car repair yards, dye works and plastics company | Yes | |
| L5 | Former Kai Tak Airport | Fuelling area/ Fuel storage, vehicle repair, airport, | Historical spillage/ Leakage of aviation fuel | No | Site clean up by CEDD (former TDD) |

| Site ID | Location | Landuse | Potentially sources of contamination | SI Requirement | Remarks |
|---------|---|---|---|----------------|---------|
| | | reclaimed area | | | |
| L13 | Former petrol station adjacent to Chatham Road North | Fuelling area/ Fuelling storage | Potential for contamination from past activities | Yes | |
| L14 | Kerosene Store along Chung Hau Street | Oil storage | Potential spillage/ Leakage of fuel | Yes | |
| L15 | Shell Petrol Station along Ma Tau Wai Road | Fuelling area/ Fuel storage, vehicle repair | Possible spillage/ Leakage of fuel | Yes | |
| L16 | Caltex Petrol Station along Ma Tau Wai Road | Fuelling area/ Fuel storage, vehicle repair | Possible spillage/ Leakage of fuel | Yes | |
| L17 | International Mail Centre | Fuelling area/ Carpark/ Storage area | Possible spillage/ Leakage of fuel | Yes | |
| L18 | Ex-KCRC Depot | Existing Chatham Road North | Possible accumulation of spillage/ leakage of fuel within the boundary of KCRC Depot in the past. | Yes | |
| SM-1 | Fuel/Oil Filling Station inside Shek Mun WSD's works area | Fuelling area/ Fuelling storage | Possible spillage/ Leakage of fuel | Yes | |

12.7 Contamination Assessment Plan and Supplementary Contamination Assessment Plan

The CAP and Supplementary CAP have specified the requirements on the following aspects:

- Sampling locations
- Depth of sampling points
- Sampling methodology for soil and groundwater
- Sample size and handling criteria
- Analytical parameters & methodology
- Quality control

The draft CAP was submitted to EPD in February 2009 for endorsement. The CAP was endorsed in August 2009. Owing to the subsequent change of design information, a revised CAP has been re-submitted in November 2009 and re-endorsed by EPD on 10 December 2009. A supplementary CAP has been submitted to EPD on 21 January 2011 to reflect the latest changes of the project. The final endorsed CAP and Supplementary CAP to be approved by EPD are shown in **Appendix 12.1**.

12.8 Site Investigation

Site investigation (SI) works were commenced in February 2009 and completed in November 2010, and carried out by the GI Contractor. A total of 5 trial trenches and 24 drillholes were excavated and drilled for soil and groundwater sampling in accordance with the endorsed CAP for SCL (TAW-HUH) and the supplementary CAP. The exact locations

and depths for sampling are determined by the on-site Contamination Specialist to suit condition and constraints during the investigation. All soil and groundwater samples were analysed by a HOKLAS accredited laboratory for all parameters listed in the CAP and Supplementary CAP. A CAR and RAP has been prepared to summarise the entire contamination assessment programme, investigation procedures and methodologies, the analytical results of soil and groundwater samples, the scope of any remedial work required, and the particular health and safety requirement that may be required during the works. The revised CAR and RAP have been endorsed by EPD on 22 December 2009. A supplementary CAR has also been prepared to reflect the latest changes of the project (**Appendix 12.2**).

12.9 Assessment Criteria

The results of soil and groundwater analysis were compared to RBRGs for Industrial Purpose as given in *Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management, EPD*, which have been adopted as the land contamination assessment criteria in HKSAR since December 2007.

12.10 Interpretation of Results

201 soil samples have been collected from 24 drillholes and 5 trial trenches.

Available results indicate that all collected soil samples are below the value of RBRGs for industrial purpose, except 1 soil sample collected from 2209/SCL/EDH127, of which the PCBs concentration exceeded the respective RBRG. The analytical results exceeding the RBRGs are given in **Table 12.5**. The location of borehole with contamination is shown in **Figure 12.1.1**.

Table 12.5: Summary of soil samples exceeding RBRGs for "Industrial" category

| Site ID | Drillhole reference | Depth | Contaminant | Concentration (mg/kg dry soil) | RBRGs (mg/kg dry soil) |
|-----------------------------|---------------------|-------|-------------|--------------------------------|------------------------|
| L4 (Former Tai Hom Village) | 2209/SCL/EDH127 | 0.5m | PCBs | 1.3 | 0.748 |

The nature and distribution of the contaminated soil samples indicate that contamination is present at discrete hotspot. The finding is supported by the pattern of landuse on this site, which involved a historical metal workshop at former Tai Hom Village. Analytical results suggest that contamination is not spatially continuous, and is generally limited in depth.

However, it is Government policy that soils containing contaminants in exceedance of the RBRGs should be remediated. Details of the soil remediation method and the disposal criteria of the contaminated soils are described in **Section 12.11**.

Groundwater samples were taken from 22 drillholes. The groundwater level of drillhole 2209/SCL/EDH118 at Site L14 (Kerosene Store along Chung Hau Street) was below rock-head level and therefore no groundwater sample was collected. Groundwater table was not encountered in those five 3m-depth trial trenches, hence no groundwater sample was collected. Available results at this stage indicate that none of the groundwater samples exceed the RBRGs levels for industrial purpose.

12.11 Soil Remediation and Disposal

A summary of evaluation of soil remediation options is given below.

- Only a small quantity of 39m³ of soil (0.0 - 1.0m below ground level) has been contaminated by PCBs at drillhole 2209/SCL/EDH127 of Site L4 - former Tai Hom Village (see **Figure 12.1.1**);

- Remediation options including solidification and stabilisation, soil-washing, physical separation and excavation and landfill disposal (i.e. considered as the last resort), have been investigated with respect to their associated advantages and disadvantages;
- Landfill disposal has been recommended, and the contaminated soil has been tested to be acceptable for landfill disposal in accordance with the TCLP testing (see **Table 12.6**); and
- Specifications for the remedial works (including disposal methodology, requirements for compliance testing, and the need for protective and safety measures) will be given in the endorsed CAR which is attached in **Appendix 12.2**.

Details of various soil remediation options had been given in the endorsed CAR attached in **Appendix 12.2**.

Table 12.6: TCLP testing results for 2209/SCL/EDH127 at 0.5m

| Parameters | TCLP testing results (ppm) | TCLP limit (ppm) |
|------------|----------------------------|------------------|
| Cadmium | <0.2 | 10 |
| Chromium | <1 | 50 |
| Copper | <1 | 250 |
| Nickel | <1 | 250 |
| Lead | <1 | 50 |
| Zinc | 5 | 250 |
| Mercury | <0.2 | 1 |
| Tin | <1 | 250 |
| Silver | <1 | 50 |
| Antimony | <1 | 150 |
| Arsenic | <1 | 50 |
| Beryllium | <1 | 10 |
| Thallium | <1 | 50 |
| Vanadium | <1 | 250 |
| Selenium | <0.2 | 1 |
| Barium | <1 | 1000 |

12.12 Recommendations

The remediation area for contaminated soil should be clearly marked out on site and excavated to an extent of 3.5m radius from the sample location. Excavation should be undertaken by dedicated earth-moving plant.

The excavated contaminated soils should not be stockpiled on site, but should immediately be loaded onto trucks and taken to the chosen landfill site. All trucks carrying contaminated material should be adequately covered by sheets to prevent dispersion of contamination.

Although the contaminated soils is situated above the groundwater table, due to the fluctuation of the groundwater table, the remediation contractor should pay attention to the selection of suitable groundwater lowering schemes and discharge points if the contaminated soils is situated below the groundwater table during the excavation. The remediation contractor should also obtain a valid Water Pollution Control Ordinance (WPCO) discharge licence from EPD where applicable.

The remediation programme should be supervised by the on-site Decontamination Specialist (to be appointed by the Contractor) with at least 7 years experience in

contamination assessment or decontamination. All relevant method statements prepared by the remediation contractor should be reviewed and approved by the Decontamination Specialist before proceeding with the works.

- A confirmatory testing will be carried out following excavation at each location, in order to confirm that all contaminated material has been removed.
- Following completion of excavation to the specified depth, at least one sample from the base of the excavation and three samples evenly distributed along the boundary of the excavation shall be taken for carrying out the compliance testing. The compliance testing requirements are shown in **Table 12.7**.

Table 12.7: Requirements for compliance testing

| Locations | Testing Requirement | Acceptance Criteria |
|-----------------|---------------------|-----------------------------|
| 2209/SCL/EDH127 | PCBs | RBRGs (Industrial category) |

- If the results of analysis are less than the RBRGs (Industrial category) of PCBs, no further excavation will be required.
- If the analysis indicates continued presence of contamination, the excavation shall be extended a further 0.5m depth or 1m wide with material disposed of as described above, and a further sample taken for compliance testing. The process of excavation, sampling and compliance testing should continue until all contaminated material is removed. The excavated hole should then be backfilled by using suitable clean fill material.
- Prior to the commencement of proposed construction works, a Remediation Report (RR) should be prepared and submitted to EPD to demonstrate that the decontamination work is adequate and is carried out in accordance with the endorsed CAR and RAP. Information such as soil treatment/disposal records (including trip tickets), confirmatory sampling results, photographs, etc should be included in the RR. No construction works shall be carried out at the contaminated area prior to the endorsement of RR given by EPD.

12.13 Contamination Assessment for HOM and Hung Hom Freight Terminal

The contamination assessments for HOM and Hung Hom Freight Terminal (HFT) have been conducted by the EIA Consultants responsible for the Kwun Tong Line Extension and SCL – Mong Kok to Hung Hom Section (SCL (MKK-HUH)) respectively. The CAP and CAR of SCL (MKK-HUH) are given in **Appendix 12.3** while the CAP and CAR for Kwun Tong Line Extension can be referred to the approved EIA Report under EIAO website. (ref.: http://www.epd.gov.hk/eia/register/report/eiareport/eia_1842010/EIA/html/EIA_index.htm)

As stipulated in the aforementioned CARs, no soil and groundwater contamination was detected in both HOM and HFT. Nevertheless, due to the site access problem, Stage 2 SI is required at HFT once the site is resumed and handed over to the Project Proponent. Following the completion of SI and lab testing works of this site, supplementary CAR(s) and RAP(s) (if contamination is confirmed) shall be prepared and submitted to EPD for agreement under SCL (MKK-HUH). Supplementary RR(s) shall also be prepared and submitted to EPD for endorsement prior to the commencement of any construction/development works within the contaminated area, if identified.

12.14 Conclusion

A land contamination assessment has been conducted for the project. Historical information such as site geological information, ground condition, aerial photos has been reviewed.

A total of 5 trial trenches and 24 drillholes were excavated and drilled for soil and groundwater sampling at 10 identified potentially contaminated sites in accordance with the

endorsed CAP and supplementary CAP. A total of 201 soil samples and 22 groundwater samples were collected. The testing results indicate that only one soil sample (i.e. 2209/SCL/EDH127 at former Tai Hom Village) needs to be remediated. A total volume of 39m³ (i.e. 0.0m – 1.0m with a 7m diameter) is recommended to be disposed of at the landfill after consideration of other remediation options. The remediation action plan and specification for remediation works have been detailed in the CAR and RAP in **Appendix 12.2**.

The soil re-sampling and analysis of cyanide (free) at Site L1 was supposed to be carried out with SI at Site L3. However, the re-sampling at Site L1 is still unable to carry out during the course of this EIA study due to site access problem. The re-sampling would be conducted after the site is resumed and handed over to the Project Proponent. Following the completion of re-sampling and lab testing works of this site, a second Supplementary CAR and Supplementary RAP (if contamination is confirmed) shall be prepared and submitted to EPD for agreement. Supplementary Remediation Report (RR) shall also be prepared and submitted to EPD for endorsement prior to the commencement of any construction/ development works at Site L1, if contamination is identified.