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Drainage Services Department

Agreement No. CE 3/2015 (DS)

Yuen Long Effluent Polishing Plant – Investigation, Design and Construction

Contamination Assessment Plan (Final)

(Ref: CAP-04)

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1. INTRODUCTION

1.1 Background

- 1.1.1 The existing Yuen Long Sewage Treatment Works (YLSTW), was commissioned in 1984 with a design capacity of 70,000 m³/d at average dry weather flow (ADWF), provides secondary level treatment to sewage collected from Yuen Long area such as Wang Chau, Yuen Long Industrial Estate, the Yuen Long Town and Kam Tin.
- 1.1.2 In 2013, Drainage Services Department (DSD) has commissioned the Agreement No. SP06/2013 “Effluent Polishing Scheme at Yuen Long Sewage Treatment Works – Treatment Process Study” (hereinafter refer to as “Treatment Process Study”) to review the sewage flow projection and treatment process for upgrading YLSTW. The design capacity was expected to be fully committed based on the flow projection derived from the village sewerage programme and latest planning data under Treatment Process Study.
- 1.1.3 There is a need for the upgrade of YLSTW into Yuen Long Effluent Polishing Plant (YLEPP) in order to cope with the forecast increase in sewage flow upon completion of sewerage under interfacing projects, extension of village sewerage in area as planned by Environmental Protection Department (EPD), as well as the proposed housing developments in the region.
- 1.1.4 In May 2016, DSD has commissioned AECOM Asia Co Ltd. to undertake “Agreement No. CE3/2015(DS) Yuen Long Effluent Polishing Plant - Investigation, Design and Construction Works” (the Assignment) to upgrade the YLSTW to YLEPP and cater for the future needs. The location of the proposed YLEPP is shown in **Drawing No. 60505476/CAP/711**.
- 1.1.5 A Project Profile (No. PP-458/2012)¹ was submitted to the Environmental Protection Department (EPD) on 27 February 2012 for application for an Environmental Impact Assessment (EIA) Study Brief under section 5(1)(a) of the EIAO and the EIA Study Brief No. ESB-241/2012 for the Project was issued on 5 April 2012 under the EIAO.
- 1.1.6 Subsequent to the issue of the on-going EIA study, additional scope including effluent reuse system for non-potable use and organic waste co-digestion are proposed under the Assignment. A revised Project Profile, entitled “Yuen Long Effluent Polishing Plant”, was submitted on 9 Oct 2018 (No. PP-3570/2018) and a revised EIA Study Brief No. ESB-309/2018 was issued on 14 November 2018 under the EIAO.
- 1.1.7 The Project is classified as a Designated Project (DP) under
- Item F.1, Part I of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) - Sewage treatment works with an installed capacity of more than 15,000 m³/day
 - Item F.4, Part of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) - an activity for reuse of treated sewage effluent from a treatment plant
 - Item G.4, Part I of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) - A waste disposal facility (excluding any refuse collection point), or waste disposal activity, for (a) refuse; or (b) chemical, industrial or special wastes

1 The Project “Yuen Long Effluent Polishing Plant” is formerly known as “Effluent Polishing Scheme at Yuen Long Sewage Treatment Works” in Project Profile (No. [PP-458/2012](#)) dated 27 Feb 2012.

1.1.8 An EIA study is needed to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and related activities that take place concurrently. One of the major task of the Assignment is to conduct EIA Study in accordance with the EIA Study Brief.

1.2 Purpose of the Report

1.2.1 Based on the EIA Study Brief (No. ESB-309/2018), an assessment on the potential land contamination issues within the Project Area for development works is required.

1.2.2 This Contamination Assessment Plan (CAP) is prepared for the EIA study. The purposes of this CAP are to present the findings of the site appraisal on the past and present potentially contaminative land uses / activities and to propose sampling and testing plan for the subsequent site investigation (SI) works in order to assess the presence, nature and extent of any contamination within the Project Area.

1.3 Environmental Guidelines, Standards and Criteria

1.3.1 This CAP is prepared with reference to the following EPD issued guidelines:

(a) Guidance Note for Contaminated Land Assessment and Remediation (Guidance Note)

The Guidance Note sets out the requirements for proper assessment and management of potentially contaminated sites such as oil installations (e.g. oil depots, petrol filling stations), gas works, power plants, shipyards/boatyards, chemical manufacturing/processing plants, steel mills/metal workshops, car repairing/dismantling workshops and scrap yards. In addition, this Guidance Note provides guidelines on how site assessments should be conducted and analysed and suggests practical remedial measures that can be adopted for the cleanup of contaminated sites.

(b) Practice Guide for Investigation and Remediation of Contaminated Land (Practice Guide)

This Practice Guide outlines typical investigation methods and remediation strategies for the range of potential contaminants typically encountered in Hong Kong.

(c) Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (Guidance Manual)

The Guidance Manual introduces the risk based approach in land contamination assessment and present instructions for comparison of soil and groundwater data to the Risk-Based Remediation Goals (RBRGs) for 54 chemicals of concern commonly found in Hong Kong. The RBRGs were derived to suit Hong Kong conditions by following the international practice of adopting a risk-based methodology for contaminated land assessment and remediation and were designed to protect the health of people who could potentially be exposed to land impacted by chemicals under four broad post restoration land use categories. The RBRGs also serve as the remediation targets if remediation is necessary.

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

1.4 Structure of this Report

1.4.1 Apart from this introductory section, the other sections of the CAP are as follows:

Section 2 - presents the findings of the site appraisal;

Section 3 - proposes the sampling and testing plan for subsequent SI works;

Section 4 - discusses the analytical testing requirements for the subsequent SI works;

Section 5 - evaluates the potential land contamination impact and the possible remediation measures;

Section 6 - presents the way forward and tentative schedule for the follow-up works;
and

Section 7 - presents the conclusion.

2. SITE APPRAISAL

2.1 General

2.1.1 The proposed YLEPP covers the entire existing YLSTW situated at the northwest of New Territories and covers a total area of approximately 7.8 hectares. As illustrated in **Drawing No. 60505476/CAP/711**, the existing YLSTW is located on a flat terrain and is bounded by fish ponds and wetlands to the north, a drainage nullah and Yuen Long Industrial Estate to the south, the Shan Pui River and Nam Sang Wai wetland area to the east and fish ponds and village houses to the west. Based on the latest engineering design, the proposed YLEPP under the Project involves demolition of the existing YLSTW facilities and soil excavation for the construction of the new plant.

2.1.2 The layout of the existing YLSTW is shown in **Drawing No. 60505476/CAP/712**. The major facilities / areas within the Project Area are listed below.

- Primary Sedimentation Tanks and associated Distribution Chambers;
- Aeration Tanks;
- Final Settling Tanks and associated Distribution Chambers;
- Sludge Holding Tanks and Sludge Digestion Tanks;
- Consolidation Tanks;
- Digested Sludge Conditioning Tanks;
- Gas Holders
- Waste Gas Burner;
- Emergency By-pass Chamber;
- Detritors and Bar Screen Chamber;
- Surplus Activated Sludge (SAS) Thickener House;
- Dangerous Goods (DG) Store;
- Sludge Dewatering House;
- Water Heater House;
- Methane Compressor House;
- Waste Storage Area;
- Wash Water Pumping Station;
- Auxiliary Pumping Station;
- Blower House;
- Return Activated Sludge (RAS) Screw Pump Pumping Station;
- Transformer House 'A';
- Transformer House 'B' and 'C';
- Mechanical Workshop;
- Main Storeroom and Workshops;
- Central Control Room;

- Screening Press House
- Screw Pump Pumping Station;
- Administration Building; and
- Staff Changing Room.

2.2 Review of Historical Land Uses

2.2.1 A review of aerial photographs has been undertaken to evaluate the likelihood of potential contamination associated with past land uses within the Project Area. The development history of the YLSTW Site and the list of aerial photographs reviewed is summarised in **Table 2.1** below. The selected aerial photographs are provided in **Appendix 2.1**.

Table 2.1 Aerial Photographs Reviewed

Year	Figure No. in Appendix 2.1	Site Description
1963	Figure 1	The entire Project site was occupied by fish ponds and the Shan Pui River.
1974	Figure 2	No significant land use changes were noted on site.
1982	Figure 3	Construction works for the existing YLSTW were observed on reclaimed land.
1993	Figure 4	The construction of all the key facilities for the existing YLSTW were completed. A temporary construction works area comprising some temporary structures was observed in the southeast of the site.
1998	Figure 5	A few temporary structures in the southeast of the site were removed and became vacant vegetated land. No other changes were noted on site.
2008	Figure 6	The present layout of the existing YLSTW was observed. All temporary structures in the southeastern corner of the site were cleared and the area had become vacant vegetated land. The existing Waste Storage Area, Dangerous Goods Store, Main Storeroom and Workshops within the YLSTW were observed.
2015	Figure 7	No significant changes were noted on site.

2.2.2 According to DSD's information, the YLSTW was developed in two stages. Stage I was commissioned in 1984 and Stage II was commissioned in 1992. Based on the review of aerial photographs, other than the YLSTW, no historical potentially contaminating activities were identified.

2.3 Site Geology

2.3.1 According to the 1:20,000 Geological Map Sheet 2 (San Tin) and 6 (Yuen Long), the existing YLSTW is generally underlain by Fill, followed by superficial deposits comprising marine mud formed during the Holocene period of the Quaternary era and Alluvium formed during the Pleistocene period of the Quaternary era. The underlying bedrock comprises of Metasiltstone, Metasandstone and Marble.

2.3.2 Based on the relevant ground investigation (GI) report, the existing YLSTW was

underlain by Fill comprising concrete pavement over sandy silt, sandy clayey silt, silty sand, gravel and cobbles of 4.5m thickness. Beneath the Fill was a layer of Marine Deposit comprising silty clay with shell fragments of 4.1m thickness, followed by Alluvium comprising variable silt, sand and gravel of 12m thickness.

- 2.3.3 Saprolite derived from the *in situ* weathering of Metasiltstone and Metasandstone comprising slightly sandy, clayey silt with gravel and sand with gravel of 9.1m thickness was encountered beneath the Alluvium. The Saprolite was further underlain by Variably Decomposed Rock comprising cavity or completely to slightly decomposed Metasandstone and Marble of 5.75m thickness. The underlying Rock was moderately decomposed Marble or Metasiltstone, and the strength of the Rock was moderately weak to strong. The penetrated thickness of the Rock was 4.97m at termination elevation of +35.81 mPD.

2.4 Acquisition of Information from Government Departments

- 2.4.1 The Environmental Protection Department (EPD) and Fire Services Department (FSD) have been contacted for (i) records of any spillage / leakages of chemicals and chemical waste, (ii) records of Dangerous Goods (DG), (iii) records of Chemical Waste Producer(s) (CWP) and (iv) records of reported fire incidents within the Project Area. EPD and FSD's replies on the request have been received and attached in **Appendix 2.2**. The information is summarised below.

Environmental Protection Department

- 2.4.2 Based on the replies given by EPD on 5 September 2016, EPD has no chemical spillage / leakage records within the Project Area in the past three years. Further to the EPD's replies, visit to EPD's Southorn Centre Office was undertaken on 8 September 2016 to review the available CWP records. A CWP record was identified within the YLSTW site.
- 2.4.3 Details of the record within the YLSTW were not available for inspection in EPD's Office. Instead, a copy of the CWP record was obtained from DSD on 3 March 2017 for the YLSTW and details are summarised in **Table 2.2**. According to information provided by site representative from DSD, electrical cleaning solvents are no longer use on site.

Table 2.2 Summary of CWPs within the Project Area

CWPs (CWP No.)	Status	Type of Chemical Wastes	Year of Application
Director of Drainage Services (0014-528-Y2330-01)	Active	<ul style="list-style-type: none"> - Spent lubricating oil; - Spent ultra-violet lamp; - Spent electrical cleaning solvent; - Spent diesel oil; - Spent battery; - Spent chemical absorbent; and - Spent fluorescent lamp 	1996

Fire Services Department

- 2.4.4 Based on the reply from FSD on 8 September 2016, no records of DG license, fire incidents or incidents of spillage / leakage of DGs were found within the Project Area.

2.4.5 However, as reported by DSD, a copy of a memo for the existing DG Store at YLSTW was issued by the FSD on 7 April 2004. According to the memo, an inspection was conducted by FSD in March 2004 and FSD has approved the existing DG Store being put in use for the storage of the following DGs. The FSD memo is provided in **Appendix 2.2**.

- Light Diesel: 200 litres
- Thinner: 40 Litres
- Paint: 200 litres
- Unleaded Gasoline: 36 litres

2.5 Site Reconnaissance

2.5.1 Site walkovers were conducted on 22 July 2016, 8 March 2017 and 22 May 2017 to investigate any contaminative issues associated with current land uses and activities within the Project Area. Questionnaire was conducted with available site representatives and the site walkover checklist is provided in **Appendix 2.3**.

2.5.2 As observed during the site walkover and in the reviewed aerial photographs, approximately 60% of the Project Area is covered by buildings and facilities whereas the remaining areas are covered by access roads, car parking areas and vegetation. No land contamination issues were identified in the remaining areas. Except for the landscaped areas, all facilities and buildings, car parking areas and access roads were paved with intact concrete in good condition and no stressed vegetation were observed during the site walkover. In addition, as reported by DSD's site representatives, there have been no records of chemical spillage / leakage incidents within the existing YLSTW. The site is considered orderly and well managed.

2.5.3 Based on the site condition and nature of sewage treatment operations, widespread contamination is not envisaged across the Project Area. The potential land contamination issues are therefore likely to be restricted within the facilities / areas that handle hazardous substances / chemical wastes.

2.5.4 Site appraisal findings of the major facilities and areas within the existing YLSTW listed in Section 2.1.2, including the necessity for site investigation (SI) works, are detailed in **Table 2.3**. The photographic records, including the site layout plans, are shown in **Drawing Nos. 60505476/CAP/713-726**.

Chemicals of Concern

2.5.5 Based on site observations and information provided by the EPD, FSD and DSD (refer to **Section 2.4** for details), the following DGs, chemicals and chemical wastes were being handled within the existing YLSTW:-

- Diesel oil;
- Thinners;
- Paints;
- Motor spirit;
- Gasoline;
- Lubricating oil;
- Hydraulic oil;
- Transformer oil;
- Spent Batteries;

- Spent chemical absorbent / oil contaminated materials;
- Spent electrical cleaning solvent;
- Spent Ultra-violet (UV) lamp and florescent lamp;
- Ferric chloride (iron (III) chloride); and
- Polyelectrolyte (Polymer)

2.5.6 Of the above chemicals, ferric chloride solutions and polyelectrolytes are commonly used as flocculants and coagulants in sewage treatment which are not considered as potentially land contaminating.

2.5.7 Diesel, motor spirit and gasoline are commonly known as land contaminant and are used primarily for power generation. The relevant chemicals of concern (COCs) include lead, BTEX (benzene, toluene, ethylbenzene, and total xylenes), polyaromatic hydrocarbons (PAHs) and petroleum carbon ranges (PCRs).

2.5.8 Metals, such as lead, can be commonly found in batteries and are considered to be the COCs for batteries. In addition, mercury is typically contained in spent UV and florescent lamps which is potentially land contaminating and is therefore considered as the COCs for spent UV and florescent lamps.

2.5.9 Other chemicals including paints, thinners, chemical absorbent / oil contaminated materials, electrical cleaning solvent, lubricating oil, transformer oil and hydraulic oil, the COCs are metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) (including PAHs), PCRs and polychlorinated biphenyl (PCBs).

Table 2.3 Site Appraisal Findings of the Major Facilities and Areas within the Project Area

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
Dangerous Goods (DG) Store (15m ²)	<ul style="list-style-type: none"> - The floor of the DG Store is concrete paved which was noted to be in good condition with no signs of oil stains observed. - Chemicals observed include motor spirit, gasoline and diesel stored in drums on plastic pallet, paints and thinners stored in metal containers on shelves. All containers and the plastic pallet were observed to be in good condition. - No records of spillage or leakage of dangerous goods / chemicals were reported by FSD / EPD. 	Drawing No. 60505476/CAP/713	Although the DG Store is concrete paved with no oil stains observed, considering the DG Store has been in use for at least 10 years, any accidental spillage or leakage of chemicals / dangerous goods may result in potential land contamination.	Yes
Sludge Dewatering House (1088m ²)	<ul style="list-style-type: none"> - The Sludge Dewatering House is a 2-storey building with a basement floor. The internal floors were paved with concrete in good condition with no oil stains observed. - The ground floor of the Sludge Dewatering House is largely comprised of 3 areas: 1) the Chemical Store and Handling Area located in the northern portion which mainly consists of sludge dewatering facilities including 2 polymer mixing tanks and 2 ferric chloride underground storage tanks; 2) the Sludge Feed Pump Room located in the central portion which consists of 5 sets of sludge feed pumps and an air compressor; and 3) the Sludge Loading Area and a General Store located in the southern portion of the building. - The basement floor (area of approx. 332m²) located underneath the Chemical Handling Area and Sludge Feed Pump Room at 4.5m below ground level (bgl) is the Chemical Transfer Pump Room, which houses 5 sets of sludge pumps (Sludge Pump No.1: area of approx. 1.5m²; Sludge Pump No.2-3: area of approx. 5m²; Sludge Pump No.4-5: area of approx. 2.5m²), 2 sets of ferric chloride circulation pumps and 2 sets of ferric chloride dosing pumps (area of approx. 6m²), 6 sets of polymer dosing pumps (Polymer Dosing Pump No.1-4: area of approx. 9m²; Polymer Dosing Pump No. 5-6: area of approx. 10m²) and 3 air compressors (area of approx. 6m²). All pumps and compressors were situated on concrete plinths in good condition and no oil stains were observed on the concrete paved floors of the basement. - According to the site representatives, lubricating oil is required for operation and maintenance of all pumps and compressors. 	Drawing No. 60505476/CAP/714 (Ground floor) and 60505476/CAP/726 (Basement)	Considering the Sludge Dewatering House has been operating for at least 30 years, there could be potential land contamination impact due to possible spillage / leakage of lubricating oil during maintenance and servicing of the pumps and compressors situated on the basement floor.	Yes

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
Methane Compressor House (109m ²)	<ul style="list-style-type: none"> - The Methane Compressor House is a 2-storey building with a basement floor at 4.2m bgl. The ground floor is paved with concrete in good condition and the basement is covered with aluminium open mesh flooring. - There were 2 oil drums (each of approx. 208L capacity) stored on plastic pallet and a flammable storage cabinet stored with grease on the ground floor of the Methane Compressor House. No oil stains were observed on the concrete paved floor in the vicinity of the storage. As the basement floor is below the ground floor, it is not expected that the oil drums storage and flammable storage cabinet on the ground floor would cause any land contamination. - The basement floor is the pipe gallery for gas, sludge, hot water and biogas pipes. No usage or storage of oils and chemicals were observed at the basement floor. 	Photo No. 686, 687, 688, 360 and 988 in Drawing No. 60505476/CAP/715	No land contamination impact is anticipated as no land contamination issues were identified in the basement level of the Methane Compressor House.	No
Water Heater House (110m ²)	<ul style="list-style-type: none"> - The Water Heater House is a 2-storey building with a basement floor at 3.4m bgl. The ground floor is paved with concrete in good condition and the basement is covered with aluminium open mesh flooring. - There are 2 gas fired condensing boilers with an electric water heater located on the ground floor of the Water Heater House. According to site representatives, neither fuel nor lubricants are required for the operation and maintenance of the boilers and water heater. - The basement floor of the Water Heater House houses 2 sets of submersible drainage pumps, 2 sets of sludge transfer pumps on concrete plinths and the pipe gallery for gas, sludge, hot water and biogas pipes. No storage of oils / chemicals were observed in the basement. - The submersible pumps were situated within a wet well of approx. 6m bgl and the sludge transfer pumps were situated on concrete plinths above the wet well. According to the site representatives, all pumps were repaired and maintained off site when required and no leakage of lubricant was reported. 	Photo No. 561, 703, 356 and 972 in Drawing No. 60505476/CAP/715	The submersible pumps located underground were situated within a wet well covered in water and the sludge transfer pumps located on the basement floor were situated on concrete plinths above the wet well. All pumps were not maintained / repaired on site with no leakage of lubricant reported. In addition, no storage of oils / chemicals were identified in the basement. Land contamination impact is therefore not anticipated within the Water Heater House.	No

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
Waste Storage Area (144m ²)	<ul style="list-style-type: none"> - The Waste Storage Area is comprised of the Waste Steel Storage Area, Chemical Waste Storage Area, Waste Paper Storage, Spent Oil Storage Area and Lubrication Oil Storage Area (under a metal roof). - The entire Waste Storage Area is located on a concrete slab of approx. 0.1m thick and the floors are paved with concrete noted to be in good condition. - Metal scraps such as machinery parts were stored temporarily in the Waste Steel Storage Area (an open storage area of approx. 48m²) until collection by waste contractor. - The Chemical Waste Storage Area (approx. 24m²) included the storage of spent oil contaminated materials, spent paint containers and spent lighting tubes in plastic bins, and spent batteries directly on the concrete paved floor. Evidence of oil stains / chemical spillages were observed on the concrete paved floors of the Chemical Waste Storage Area. - Waste paper and plastic bottles were stored in the Waste Paper Storage (approx. 24m²) awaiting to be collected for recycling. No storage of oils / chemicals were identified and no oil stains were observed on the concrete paved floor in the area. As reported by DSD's site representatives, no storage of waste other than waste paper and plastic bottles have been carried out within the Waste Paper Storage. - The Lubrication Oil Storage Area (approx. 24m²) included the storage of hydraulic oil (stored in metal drums directly on the concrete floor) and lubrication oil (stored in metal containers within wooden cupboards and plastic containers on plastic pallet). The oil containers, wooden cupboards and the plastic pallet were observed to be in good condition. Evidence of oil stains were observed on the concrete paved floor of the Lubrication Oil Storage Area. - Spent lubricating oil and diesel oil drums were mostly stored directly on the concrete floor of the Spent Oil Storage Area (approx. 24m²). A few spent lubricating oil drums were stored on plastic pallet and spent oil containers were stored within wooden and plastic cupboards in the area. Oil stains were observed on the concrete paved floor of the Spent Oil Storage Area. - All chemical wastes and spent oils were stored temporarily in the respective waste storage area until collection by registered chemical waste collector. 	Drawing No. 60505476/CAP/716	There could be potential land contamination impact associated with the storage of spent oils, chemical wastes and metal wastes in the Spent Oil Storage Area, Lubrication Oil Storage Area, Chemical Waste Storage Area and Waste Steel Storage Area.	Yes

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
SAS Thickener House (975m ²)	<ul style="list-style-type: none"> - There are 2 ferric chloride storage tanks situated within the dosing facility located outside the SAS Thickener House. - The SAS Thickener House is a single-storey building. All internal floors are paved with concrete in good condition. - The ground floor of the SAS Thickener House is comprised of a Chemical Store Room for the storage of coagulant mixers and coagulants, equipment stores, 2 abandoned sludge thickeners (area of approx. 70m²) and 2 chemical mixing tanks situated on concrete plinths. According to the site representative, lubricants were used for the operation of the sludge thickeners. - There are 2 abandoned S.A.S. pumps (area of approx. 2.3m²) and 4 sets of thickened sludge pumps (area of approx. 13.2m²) located at 1.8m bgl and 6.6m bgl respectively. The pumps were situated on concrete plinths observed to be in good condition with no oil stains observed on the concrete paved floor in the vicinity of the pumps. - Lubricating oil is typically required for the operation and maintenance of the sludge pumps. 	Drawing No. 60505476/CAP/717	Considering the SAS Thickener House has been operating for at least 30 years, there could be potential land contamination impact due to possible spillage / leakage of lubricating oil / lubricants during maintenance and servicing of the sludge pumps and the sludge thickeners.	Yes
Wash Water Pumping Station (126m ²)	<ul style="list-style-type: none"> - The Wash Water Pumping Station is located on a concrete slab of approximately 0.1m thick with all internal concrete / metal floors observed to be in good condition. - There are 3 wash water pumps (area of approx. 6.7m²) located on concrete plinths in the northwest of the pumping station with no signs of oil stains / spillages observed. - Lubricating oil is typically required for the operation and maintenance of the wash water pumps. - 2 air compressors were located on a concrete slab (area of approx. 0.75m²) in the southwest of the pumping station. The concrete slab was observed to be in good condition with no signs of oil stains observed. Lubricating oil is required for their operation and maintenance. 	Photo 696, 697 and 698 in Drawing No. 60505476/CAP/718	Considering the Wash Water Pumping Station has been operating for at least 30 years, there could be potential land contamination impact due to possible spillage / leakage of lubricating oil during maintenance and servicing of the wash water pumps and air compressors.	Yes
Auxiliary Pumping Station (59m ²)	<ul style="list-style-type: none"> - The Auxiliary Pumping Station is located on a concrete slab of approximately 0.1m thick and all internal concrete / metal floors were in good condition with no oil stains observed. - There are 3 submersible drainage pumps located underneath the aluminium open mesh flooring in the centre of the Auxiliary Pumping Station within a wet well at 5m bgl. - Lubricating oil is typically required for the operation and maintenance of the submersible drainage pumps. - According to the site representatives, all submersible pumps were repaired and maintained off site when required and no leakage of lubricant was reported. 	Photo 589 and 706 in Drawing No. 60505476/CAP/718	The submersible pumps located underground were situated within a wet well covered in water and were not maintained / repaired on site with no leakage of lubricant reported. In addition, no storage of fuels and chemicals were identified. No land contamination impact is therefore anticipated at the Auxiliary Pumping Station.	No

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
Blower House (602m ²)	<ul style="list-style-type: none"> - The Blower House is a single-storey building with a basement. - The ground floor of the Blower House consists of 5 sets of air blowers. According to the site representative, lubricating oil is currently used for operating the air blowers. As the basement floor is below the ground floor, it is not expected that the operation of the blowers would cause any land contamination. - The basement floor (at approx.3.7m bgl) houses the air main, air ducts, blower inlet and outlet and is paved with intact concrete with no oil stains observed. No storage of oils or chemicals were observed in the basement. 	Photo No. 749, 993, 999 and 711 in Drawing No. 60505476/CAP/719	No land contamination impact is anticipated as no land contamination issues were identified on the basement floor of the Blower House.	No
RAS Screw Pump Pumping Station (207m ²)	<ul style="list-style-type: none"> - The RAS Screw Pump Pumping Station is concrete paved and houses 4 RAS screw pumps located on a raised concrete slab at 1m above ground level. Each pump was situated on a concrete plinth of approximately 0.3m thick and was connected to a water transfer pipe down to approx. 5.3m bgl. - Lubricating oil is typically required for the operation and maintenance of the RAS screw pumps. - The concrete plinths and concrete paved floors were observed to be in good condition with no oil stains observed. 	Photo No. 688 and 716 in Drawing No. 60505476/CAP/719	Although lubricating oil is typically required for the operation and maintenance of the RAS screw pumps, the pumps were situated on concrete of 1.3m above ground level and no leakage of lubricating oil was reported, hence the usage / handling of lubricating oil is unlikely to cause any land contamination issues. Land contamination impact is therefore not anticipated for the RAS Screw Pump Pumping Station.	No
Transformer House 'A' (70m ²)	<ul style="list-style-type: none"> - Transformer House A is concrete paved and comprised of 1) the Transformer House which houses the switch gears in the eastern portion and a transformer (No.D1) in the centre of the building; and 2) the Main Inlet Works Switchroom located in the western portion of the building. - The Transformer No.D1 containing transformer oil is situated on a concrete foundation (area of approx. 2m²) which was observed to be in good condition with no oil stains observed. 	Photo No. 735, 654 and 732 in Drawing No. 60505476/CAP/720	As transformer oil is required for the operation of the transformer, there could be potential land contamination impact arising from possible leakage / spillage of transformer oil during oil replacement in Transformer House 'A'.	Yes
Transformer Houses 'B' and 'C' (25m ²)	<ul style="list-style-type: none"> - Transformer Houses 'B' and 'C' are concrete paved, housing a transformer each (No. D2 and D3 respectively) containing transformer oil. Each transformer was situated on a raised concrete foundation of approx. 1.1m thick with an area of approx.2m². - All internal concrete paved floors and foundations were noted to be in good conditions with no signs of oil stains / spillages observed. 	Photo No. 713, 746 and 720 in Drawing No. 60505476/CAP/720	As transformer oil is required for the operation of the 2 transformers, there could be potential land contamination impact arising from possible leakage / spillage of transformer oil during oil replacement in Transformer Houses 'B' and 'C'.	Yes

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
Mechanical Workshop (246m ²)	<ul style="list-style-type: none"> - The Mechanical Workshop is a 2-storey building comprised of the Maintenance and Workshop Area (90m²) in the south, equipment stores in the centre and offices in the north of the building. - All internal floors are concrete paved and with no oil stains observed. - Repair and maintenance of pumps, valves and other light machineries take place in the Maintenance and Workshop Area. - Typical maintenance may include greasing and lubrication involving lubrication oil. - No usage or storage of oils / chemicals were observed in the equipment stores and offices. 	Photo No. 632, 263, 652, 281 and 047 in Drawing No. 60505476/CAP/721	<ul style="list-style-type: none"> - There could be potential land contamination impact arising from possible leakage / spillage of lubricating oil during maintenance and servicing activities in the Maintenance and Workshop Area. - No land contamination impact is anticipated in the equipment stores and offices as no land contamination issues were identified. 	Yes
Main Storeroom and Workshops (528m ²)	<ul style="list-style-type: none"> - The workshops (area of approx. 273m²) are concrete paved and comprised of a welding workshop, an electrical workshop and a maintenance / storage area. - Repair and maintenance of pumps, valves and other light machineries take place in the workshops. - Chemicals observed include paints in metal containers on shelves, gasoline in drums and lubricants in plastic containers stored directly on the concrete floor, lubricating oil and grease stored in the 2 flammable storage cabinets located in the southeast of the workshop. - The concrete paved ground of the workshops were noted to be in good condition with no oil stains observed. - Equipment and machinery parts are stored in the Main Storeroom in the north of the building. No chemical / oil storage was observed in the Main Storeroom. The ground was paved with intact concrete observed to be in good condition with no signs of oil stains / chemical spillages. - As confirmed by DSD's site representatives, the Main Storeroom has only been used as storage of equipment and machinery parts. No potentially contaminating activities (e.g. handling and storage of chemical / oil / wastes) were reportedly carried out within the storeroom. 	Photo No. 642, 902, 350, 635, 327, 322, 287, 300, 302 and 639 in Drawing No. 60505476/CAP/721	<ul style="list-style-type: none"> - There could be potential land contamination impact from the storage, possible spillage / leakage of oils in the workshops. - No land contamination impact is anticipated in the Main Storeroom as no land contamination issues were identified. 	Yes
Screening Press House (119m ²)	<ul style="list-style-type: none"> - There are 2 screening presses (No. 1 and 2) situated on concrete plinths (area of approx.0.8m² each) provided with a 0.45m deep sump and a control panel in the Screening Press House. - The internal floors are paved with concrete in good condition with no oil stains observed. - According to the site representative, hydraulic oil is required for the operation of the screening presses and are refilled <i>in situ</i> on a needed basis. 	Photo No. 670, 919, 925 and 928 in Drawing No. 60505476/CAP/722	Considering the Screening Press House has been operating for at least 30 years, there could be land contamination impact arising from possible leakage / spillage of hydraulic oil during maintenance and servicing of the 2 screening presses.	Yes

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
Central Control Room, Screw Pump Pumping Station and Emergency Bypass Chamber	<ul style="list-style-type: none"> - The Central Control Room is located on the first floor of the building (approx. 3.4m above ground level) which houses control panels only with no chemical / oil storage identified. The room was paved with intact concrete in good condition with no oil stains observed. - The Screw Pump Pumping Station is concrete paved and houses 4 screw pumps (each situated on a concrete plinth of approx. 2.3m thick) located on the first floor of the building (approx. 3.4m above ground level). Each pump was connected to a water transfer pipe down to approx. 5m bgl. - Lubricating oil is typically required for the operation and maintenance of the screw pumps. - The concrete plinths and concrete paved floors were observed to be in good condition with no oil stains observed. - The Emergency Bypass Chamber is located on concrete paved ground for emergency diversion of sewage flow. The concrete paved ground was in good condition with no oil stains / potentially contaminating activities observed. 	Photo No. 655, 658 and 663 in Drawing No. 60505476/CAP/722, Photo No. 381 in Drawing No. 60505476/CAP/723	<ul style="list-style-type: none"> - Although lubricating oil is typically required for the operation and maintenance of the screw pumps, the pumps were situated on concrete of 5.7m above ground level and no leakage of lubricating oil was reported, hence the usage / handling of lubricating oil is unlikely to cause any land contamination issues. Land contamination impact is therefore not anticipated for the Screw Pump Pumping Station. - No land contamination impact is anticipated for the Central Control Room and the Emergency Bypass Chamber as no land contamination issues were identified in these areas. 	No
Detritors and Bar Screen Chamber	<ul style="list-style-type: none"> - There are 3 crossflow detritors within the detritor chambers which are of concrete construction (approx. 0.6m thick) located at approx. 3m above ground level for removing grits in sewage prior to further treatment. - The detritors are connected to 3 bar screen chambers which are also of concrete construction (approx. 0.78m thick) situated at approx. 2.3m above ground level. - The detritors and bar screen chamber are located on concrete paved ground in good condition with no stains / stressed vegetation observed. 	Photo No. 672, 675 and 411 in Drawing No. 60505476/CAP/723	No land contamination impact is anticipated as no land contamination issues were identified for the Detritors and Bar Screen Chamber.	No
Administration Building and Staff Changing Room	<ul style="list-style-type: none"> - The Administration building houses offices and a laboratory on the first floor. No chemicals were used or stored in the laboratory. - The staff changing room is concrete paved housing staff changing facilities. No chemicals / oils were used or stored in the staff changing room. 	Drawing No. 60505476/CAP/725	No land contamination impact is anticipated as no land contamination issues were identified.	No
Primary Sedimentation Tanks, Final Settling Tanks and associated distribution Chambers	<ul style="list-style-type: none"> - There are 8 Primary Sedimentation Tanks and 8 Final Settling Tanks with 4 screened sewage distribution chambers located within YLSTW for primary and tertiary wastewater treatment processes. - The tanks mainly contain wastewater only and are located on concrete paved ground of good condition with no oil stains / stressed vegetation / potentially contaminating activities observed. 	Photo No. 444 and 644 in Drawing No. 60505476/CAP/724	No land contamination impact is anticipated as no land contamination issues were identified.	No
Aeration Tanks	<ul style="list-style-type: none"> - There are 8 Aeration Tanks located within YLSTW for secondary wastewater treatment process. - The Aeration Tanks mainly contain sewage only and are located in a concrete paved area observed to be in good condition with no oil stains / stressed vegetation / potentially contaminating activities observed. 	Photo No. 566 in Drawing No. 60505476/CAP/724	No land contamination impact is anticipated as no land contamination issues were identified.	No

Facility / Area (approx. area)	Site Appraisal Findings	Reference	Potential Land Contamination Impact	Necessity for Intrusive Site Investigation (SI)
Sludge Holding Tanks and Sludge Digestion Tanks	<ul style="list-style-type: none"> - There are 4 Sludge Holding Tanks and 4 Sludge Digestion Tanks located in YLSTW. - The tanks are constructed with concrete located on concrete paved ground in good condition with no stains / stressed vegetation / potentially contaminating activities observed in the area. 	Photo No. 682 and 712 in Drawing No. 60505476/CAP/724	No land contamination impact is anticipated as no land contamination issues were identified.	No
Consolidation Tanks	<ul style="list-style-type: none"> - There are 6 consolidation tanks located in YLSTW. - The tanks mainly contain wastewater only and are located in a concrete paved area of good condition with no oil stains / stressed vegetation or potentially contaminating activities observed in the area. 	Photo No. 915 in Drawing No. 60505476/CAP/724	No land contamination impact is anticipated as no land contamination issues were identified.	No
Digested Sludge Conditioning Tanks and Gas Holders	<ul style="list-style-type: none"> - There are 2 digested sludge conditioning tanks and 2 gas holders located on concrete paved ground adjacent to the Sludge Dewatering House. - The tanks contain primarily digested sludge and the gas holders contain mainly methane gas from the digested sludge only. No oil stains were observed on the concrete paved ground and no stressed vegetation or potentially contaminating activities were noted in the area. 	Photo No. 679 in Drawing No. 60505476/CAP/724	No land contamination impact is anticipated as no land contamination issues were identified.	No
Waste Gas Burner	<ul style="list-style-type: none"> - There is a set of waste gas burner for burning the methane (biogas) generated from wastewater process. - The facility is in good condition and is located on concrete paved ground. - No oil stains were observed on the concrete paved ground and no stressed vegetation were noted in the area. 	Photo No. 702 in Drawing No. 60505476/CAP/724	No land contamination impact is anticipated as no land contamination issues were identified.	No

2.6 Identified Hotspots for Site Investigation

2.6.1 According to the findings of the site appraisal, the following 10 facilities / areas were identified with potential land contamination concerns:-

- Dangerous Goods (DG) Store;
- Sludge Dewatering House;
- Waste Storage Area;
- SAS Thickener House;
- Wash Water Pumping Station;
- Transformer House 'A';
- Transformer Houses 'B' and 'C';
- Mechanical Workshop;
- Workshops; and
- Screening Press House.

2.6.2 The locations of the above facilities / areas are shown in **Drawing No. 60505476/CAP/727**. Further site investigation (SI) works is considered necessary for confirming any land contamination in these concerned facilities / areas.

2.6.3 Based on the findings of the site appraisal, apart from the above facilities / areas, no land contamination issues were identified in the remaining facilities / areas within the Project Area. In addition, according to the historical records, no relocation of facilities within the YLSTW were noted since their construction and no chemical spillage / leakage incidents within the YLSTW were reported by DSD / EPD / FSD. Widespread contamination is therefore not envisaged across the Project site and any land contamination is likely to be restricted within the above concerned facilities / areas. As such, further SI works is considered not necessary in the remaining facilities / areas of the YLSTW.

2.7 Future Land Uses

2.7.1 Land contamination assessment on the potentially contaminated sites would need to be evaluated against the Risk-based Remediation Goals (RBRGs), soil saturation limits (C_{sat}) / solubility limits for non-aqueous phase liquid (NAPL), as stipulated in Table 2.1 and Table 2.2 of the Guidance Manual.

2.7.2 The 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 were developed for four different land use scenarios as below reflecting the typical physical settings in Hong Kong under which people could be exposed to contaminated soil and groundwater:

- Urban residential
- Rural residential
- Industrial
- Public parks

2.7.3 In addition to the RBRGs, screening criteria (soil saturation limits, C_{sat}, developed for NAPL in soil and solubility limits for NAPL in groundwater) for the more mobile organic chemicals must be considered to determine whether a site requires further action.

- 2.7.4 As the proposed development is an effluent polishing plant, the RBRGs for Industrial land use scenario are considered appropriate for the assessment.
- 2.7.5 The corresponding RBRGs levels, soil saturation limits (C_{sat}) and the solubility limits are presented in **Appendix 2.4**.

3. SAMPLING AND TESTING PLAN FOR SITE INVESTIGATION

3.1 Site Investigation Location

- 3.1.1 From the above, a total of 39 sampling locations are proposed to study the vertical profile of possible contamination within existing YLSTW. The sampling locations are illustrated in **Drawing No. 60505476/CAP/727**. The exact sampling locations are subject to fine adjustment according to the actual site conditions and existence of underground structures/utilities. The Chemicals of Concern (COCs) proposed for laboratory analysis included metals, VOCs, SVOCs, PCRs and PCBs. The sampling and testing plan with rationale is presented in **Table 3.1**.

Table 3.1 Sampling and Testing Plan

Concerned Facility / Area (Approx. area)	Hotspots (Approx. area)	Grid Size (m)	Sampling Location ID ¹	Rationale	Sampling Method	Sample Matrix/ Depth ²		Parameters to be Tested ³				
								PCRs	VOCs	SVOCs	PCBs	Metals
Dangerous Goods (DG) Store (15m ²)	The entire DG Store (15m ²)	-	ENV-BH01	One sampling location to target the DG Store (15m ²).	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
						GW	If present ⁴	√	√	√		Mercury only
Sludge Dewatering House (Basement) (322m ²)	5 sludge pumps (No.1: 1.5m ² ; No.2-3: 5m ² ; No.4-5: 2.5m ²), 2 ferric chloride circulation and 2 ferric chloride dosing pumps (6m ²), 6 polymer dosing pumps (No.1-4: 9m ² ; No. 5-6: 10m ²) and 3 air compressors (6m ²) on concrete plinths	-	ENV-BH02 ENV-BH03 ENV-BH04 ENV-BH05 ENV-BH06 ENV-BH07 ENV-BH08 ENV-BH09 ENV-BH10 ENV-BH11	One sampling location for: - each small area of sludge pumps (No.1, No.2-3 and No. 4-5; total 3 nos.); - the 2 ferric chloride circulation pumps (total 1 no.); - the 2 ferric chloride dosing pumps (total 1 no.); - each small area of polymer dosing pumps (No. 1-4 clustered in the centre of the area and No. 5-6; total 2 nos.); and - each air compressor (total 3 nos.).	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
						GW	If present ⁴	√	√	√		Mercury only
Waste Storage Area (144m ²)	All Storage Areas except for Waste Paper Storage (120m ²)	-	ENV-BH12 ENV-BH13 ENV-BH14 ENV-BH15	One sampling location for each of the 4 concerned storage areas (i.e. Lubrication Oil, Spent Oil, Chemical Waste and Waste Steel Storage Areas)	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
						GW	If present ⁴	√	√	√		Mercury only

Concerned Facility / Area (Approx. area)	Hotspots (Approx. area)	Grid Size (m)	Sampling Location ID ¹	Rationale	Sampling Method	Sample Matrix/ Depth ²	Parameters to be Tested ³					
							PCRs	VOCs	SVOCs	PCBs	Metals	
SAS Thickener House (975m ²)	2 abandoned sludge thickeners (70m ²), 4 thickened sludge pumps (13.2m ²) and 2 abandoned S.A.S. pumps on concrete plinths (2.3m ²)	-	ENV-BH16 ENV-BH17 ENV-BH18 ENV-BH19 ENV-BH20 ENV-BH21 ENV-BH22 ENV-BH23	One sampling location for each of the abandoned sludge thickeners (2 nos.), thickened sludge pumps (4 nos.) and abandoned S.A.S pumps (2 nos.).	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
						GW	If present ⁴	√	√	√		Mercury only
Wash Water Pumping Station (126m ²)	3 wash water pumps on concrete plinths (6.7m ²) and 2 air compressors on a concrete slab (0.75m ²)	-	ENV-BH24 ENV-BH25 ENV-BH26 ENV-BH27	One sampling location for each of the 3 wash water pumps. Additional one sampling location for the area of the air compressors.	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
						GW	If present ⁴	√	√	√		Mercury only
Transformer House 'A' (70m ²)	1 transformer on concrete foundation (approx. 4m ²)	-	ENV-BH28	One sampling location for the transformer (No. D1) located in Transformer Houses 'A'.	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√	√	√
						GW	If present ⁴	√	√	√	√	Mercury only

Concerned Facility / Area (Approx. area)	Hotspots (Approx. area)	Grid Size (m)	Sampling Location ID ¹	Rationale	Sampling Method	Sample Matrix/ Depth ²		Parameters to be Tested ³				
								PCRs	VOCs	SVOCs	PCBs	Metals
Transformer Houses 'B' and 'C' (25m ²)	2 transformers on concrete foundations (approx. 4m ² each)	-	ENV-BH29 ENV-BH30	One sampling location for each of the transformers (No. D2 and D3) located in Transformer Houses 'B' and 'C' respectively.	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√	√	√
							GW	If present ⁴	√	√	√	√
Maintenance and Workshop Area in Mechanical Workshop (90m ²)	Maintenance and Workshop Area only (90m ²)	-	ENV-BH31 ENV-BH32 ENV-BH33	Sampling to target the Maintenance and Workshop Area (90 m ² in area). 3 sampling locations proposed based on the minimum number of sampling points in Practice Guide.	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
							GW	If present ⁴	√	√	√	
Workshops (273m ²)	Area of Workshops only (273m ²)	9	ENV-BH34 ENV-BH35 ENV-BH36 ENV-BH37	Sampling to target the Workshops (273 m ² in area). A grid sampling approach based on Practice Guide and specified grid size was adopted for the sampling strategy.	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
							GW	If present ⁴	√	√	√	
Screening Press House (119m ²)	2 screening presses with secondary containment (0.8m ² each)	-	ENV-BH38 ENV-BH39	One sampling location for each of the 2 screening presses (No.1 and 2) observed in the Screening Press House.	Borehole drilling to 2m below the groundwater table or 6m bgl.	Soil	(i) 0.5m bgl; (ii) 1.5m bgl; (iii) 3.0m bgl; and (iv) above GW level if present or if no GW encountered, 6m bgl.	√	√	√		√
							GW	If present ⁴	√	√	√	

Note:

- (1) Refer to Drawing No. **Figure 60505476/CAP/727** for sampling locations.
- (2) bgl = Below ground level; GW = groundwater
- (3) The testing parameters refer to the parameters as shown in Table 2.1 – RBRGs for Soil & Soil Saturation Limit and Table 2.2 – RBRGs for Groundwater and Solubility Limit under VOCs, SVOCs (including PAHs), Metals, PCBs and PCRs in the Guidance Manual. For SVOCs, since the RBRG values 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 parameters would not be tested in groundwater sample.
- (4) Samples will only be collected if groundwater is encountered during the SI works.

3.2 Soil Sampling Method and Depth of Sampling

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

3.3 Strata Logging

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

3.4 Groundwater Sampling and Free Product Measurement

- 3.4.1 Groundwater samples should be collected at each of the sampling location if groundwater were encountered.
- 3.4.2 At each borehole location, a groundwater sampling well should be installed unless agreed otherwise by the land contamination specialist. A typical design of a groundwater monitoring well is shown in **Appendix 3.1**. After installation of the monitoring wells, the depth to water table at all monitoring wells should be measured with an interface probe in order to assess groundwater gradients and predominant flow direction. Prior to sampling activities, wells should be fully developed to ensure formation water is flowing into and out of the wells. The wells should then be allowed to stand for a day to permit groundwater conditions to equilibrate.
- 3.4.3 For trial pit, if groundwater is encountered, a groundwater sample should be taken after all required soil samples at each trial pit have been collected. The trial pits shall be pumped to near dry and allowed to stand for 24 hours before sampling.

- 3.4.4 Groundwater level and thickness of free product layer, if present, should be measured at each well before groundwater samples are taken. In the unlikely event that measurable thicknesses of free product were encountered, a sample should be collected for laboratory analysis to determine the composition.
- 3.4.5 Prior to groundwater sampling, the monitoring wells should be purged to collect representative fresh groundwater samples.
- 3.4.6 After purging, one groundwater sample should be collected at each well using Teflon bailer and decanted immediately into appropriate sample containers in a manner that minimises agitation and volatilization of VOCs from the samples for the purpose of storage and transportation. The sample containers should be supplied by the laboratory and should be new, clean and made of 'amber glass'. Groundwater samples should be placed in the glass containers with zero headspace and promptly sealed with a septum-lined cap. All samples should be uniquely labelled.
- 3.4.7 Immediately after collection, samples should be placed in ice chests, cooled and maintained at temperature of about 0-4°C until delivered to the analytical laboratory.

3.5 Sample Size and Decontamination Procedures

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

3.6 QA/QC Procedures

- 3.6.1 QA/QC samples should be collected in the following frequency during the SI works. Chain of Custody protocol should be adopted.
- 1 equipment blank per 20 samples for full suite analysis as shown in **Table 3.1**;
 - 1 field blank per 20 samples for full suite analysis as shown in **Table 3.1**;
 - 1 duplicate soil sample per 20 soil samples and 1 duplicate groundwater sample per 20 groundwater samples for corresponding parameters analysis as shown in **Table 3.1**; and
 - 1 trip blank sample per 10 trips for petroleum carbon range C6-C8.

3.7 Health and Safety

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

4. LABORATORY ANALYSIS

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

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

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

Item	Parameter	Soil		Groundwater	
		Reporting Limit (mg/kg) or otherwise specified	Reference Method*	Reporting Limit (µg/L) or otherwise specified	Reference Method*
33	Antimony	1	USEPA 6020	NA	USEPA 6020
34	Arsenic	1		NA	
35	Barium	1		NA	
36	Cadmium	0.2		NA	
37	Chromium III [^]	1	By calculation	NA	By calculation
38	Chromium VI	1	USEPA 3060	NA	APHA 3500 CR:D
39	Cobalt	1	USEPA 6020	NA	USEPA 6020
40	Copper	1		NA	
41	Lead	1		NA	
42	Manganese	1		NA	
43	Mercury	0.05		0.5	
44	Molybdenum	1		NA	
45	Nickel	1		NA	
46	Tin	1		NA	
47	Zinc	1		NA	
Petroleum Carbon Ranges					
48	C ₆ - C ₈	5	USEPA 8015/8260	20	USEPA 8015/8260
49	C ₉ - C ₁₆	200		500	
50	C ₁₇ - C ₃₅	500		500	
PCBs					
51	PCBs	0.1	USEPA 8270	1	USEPA 8270

Notes:

NA = Not Applicable

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

* Alternative testing methods with accreditation by HOKLAS or its Mutual Recognition Arrangement partners are also accepted.

4.1.2 All laboratory testing methods for the above parameters should be accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or one of its Mutual Recognition Arrangement partners.

5. EVALUATION OF POTENTIAL LAND CONTAMINATION IMPACT AND POSSIBLE REMEDIATION MEASURES

5.1 Evaluation of Potential Land Contamination Impact

- 5.1.1 Based on the site appraisal, 10 facilities / areas within YLSTW as listed in **Section 2.6** were identified with potential land contamination concerns and required further SI works. However, as all the concerned facilities / areas are in operation, it would not be feasible to carry out the proposed SI works under the EIA Study.
- 5.1.2 The potential land contamination concerns for the abovementioned facilities / areas were associated with handling and storage of hazardous substances. The sizes of the concerned facilities / areas (ranged from 15m² to 975m²) were considered small and all the handling and storage activities of hazardous substances were carried out on paved concrete floor. As reported by EPD, FSD and DSD, there are no records of spillages / leakages accidents of chemicals / chemical wastes within the YLSTW. It is therefore considered that the contamination (if indeed present) would likely be restricted to the concerned facilities / areas and extensive contamination is not expected within the Project Area.
- 5.1.3 Land contamination assessment including intrusive SI works and, if required, remediation works would need to be carried out at a later stage of the Project (refer to **Section 6** below for details) and should follow EPD's Guidance Manual, Guidance Note and Practice Guide. Any soil/groundwater contamination would be identified and properly treated prior to the commencement of construction works under the Project. The potential COCs identified include metals, VOCs, SVOCs, PCRs and PCBs and as discussed in **Section 5.2** below, there are commercially available technologies that could tackle these COCs.
- 5.1.4 Given the above, land contamination impacts are considered not insurmountable to the Project if the recommended actions as outlined in **Section 6** were followed and contaminated soil and groundwater (if any) were properly treated using appropriate remediation methods and according to EPD's agreed Remediation Action Plan (RAP).

5.2 Possible Remediation Measures

- 5.2.1 The actual remediation methods could only be determined after completion of the land contamination assessment (including intrusive SI works and EPD's agreement on the Contamination Assessment Report (CAR) and RAP) at the later stage of the Project. The RAP will provide details of the remedial actions for any identified contaminated soil and groundwater.
- 5.2.2 Nevertheless, based on the site appraisal, hotspots were identified within the existing YLSTW. The potential COCs may include metals, VOCs, SVOCs, PCRs and PCBs. For contaminated soil, there are a number of technologies commercially available to tackle the identified COCs and are presented in the Practice Guide. Technologies that are commonly used in Hong Kong are biopiling and cement solidification/stabilisation. These *ex-situ* methods were proven to be effective in treating the target COCs and the treated soil could then be reused on site (e.g. backfilling materials). Given the size of the existing YLSTW (approximately 8.6 ha), there would be sufficient space available to handle and treat the contaminated soil and the two methods are considered to be appropriate for the Project.
- 5.2.3 For groundwater, remediation is not commonly required as contaminants in

groundwater seldom exceed the land contamination criteria (i.e. RBRGs) and NAPL do not often present in groundwater. Contaminants in groundwater are often below the respective RBRGs as the potential risks that are posed to human receptors as a result of exposure to chemicals in groundwater is relatively low. This may be due to the fact that according to the EPD's Guidance Manual, groundwater in Hong Kong were not for drinking purposes and the exposure pathway of contaminants in groundwater to human receptors would be associated with inhalation of volatiles rather than direct exposure. Having said that, there are examples of remediation techniques as shown in EPD's Practice Guide (e.g. air sparging, recovery trenches / wells, in-ground containment/capping and permeable reactive barriers) that could be applied to this Project if contaminated groundwater were indeed identified.

6. WAY FORWARD AND PROGRAMME SCHEDULE

- 6.1.1 All the existing YLSTW facilities are currently in operation and it would not be feasible to carry out the proposed SI works under the EIA Study. Moreover, based on the tentative construction programme, the YLSTW will continue to operate during the construction period commencing in 2020 and the concerned facilities / areas will be decommissioned and demolished in stages between 2020 and 2024. There could be changes in YLSTW operation which may result in new hotspots. Therefore, the proposed SI works and any necessary remediation action are recommended to be carried out after decommissioning but prior to the construction works at the concerned facilities / areas.
- 6.1.2 Prior to the commencement of the SI works, a review of this CAP should be conducted to confirm whether the proposed SI works (e.g. sampling locations, testing parameters etc.) are still valid. Supplementary CAP(s), presenting findings of the review, the latest site conditions and updated sampling strategy and testing protocol, should be submitted to EPD for endorsement. The SI works should be carried out according to EPD's agreed supplementary CAP(s). Following completion of SI works and receipt of laboratory test results, CAR(s) should be prepared to present the findings of the SI works and to discuss the presence, nature and extent of contamination. If contamination is identified, RAP(s) which provides details of the remedial actions for the identified contaminated soil and / or groundwater should be endorsed by EPD.
- 6.1.3 Remediation action, if necessary, will be carried out according to EPD endorsed RAP(s) and Remediation Report(s) (RR(s)) will be submitted after completion of the remediation action. The RR(s) should be endorsed by EPD prior to the commencement of construction works at the respective identified contaminated areas (if any).
- 6.1.4 Based on the latest construction programme, the upgrading of the existing YLSTW into YLEPP under the Project would be carried out in 2 phases (viz. Phase I from 2020 to 2026 and Phase II from 2026 to 2030). The tentative decommissioning and demolition works schedule for the concerned facilities / areas in the existing YLSTW under the Project is shown in **Table 6.1** below.

Table 6.1 Tentative Decommissioning and Demolition Works Schedule for the Concerned Facilities / Areas under the Project

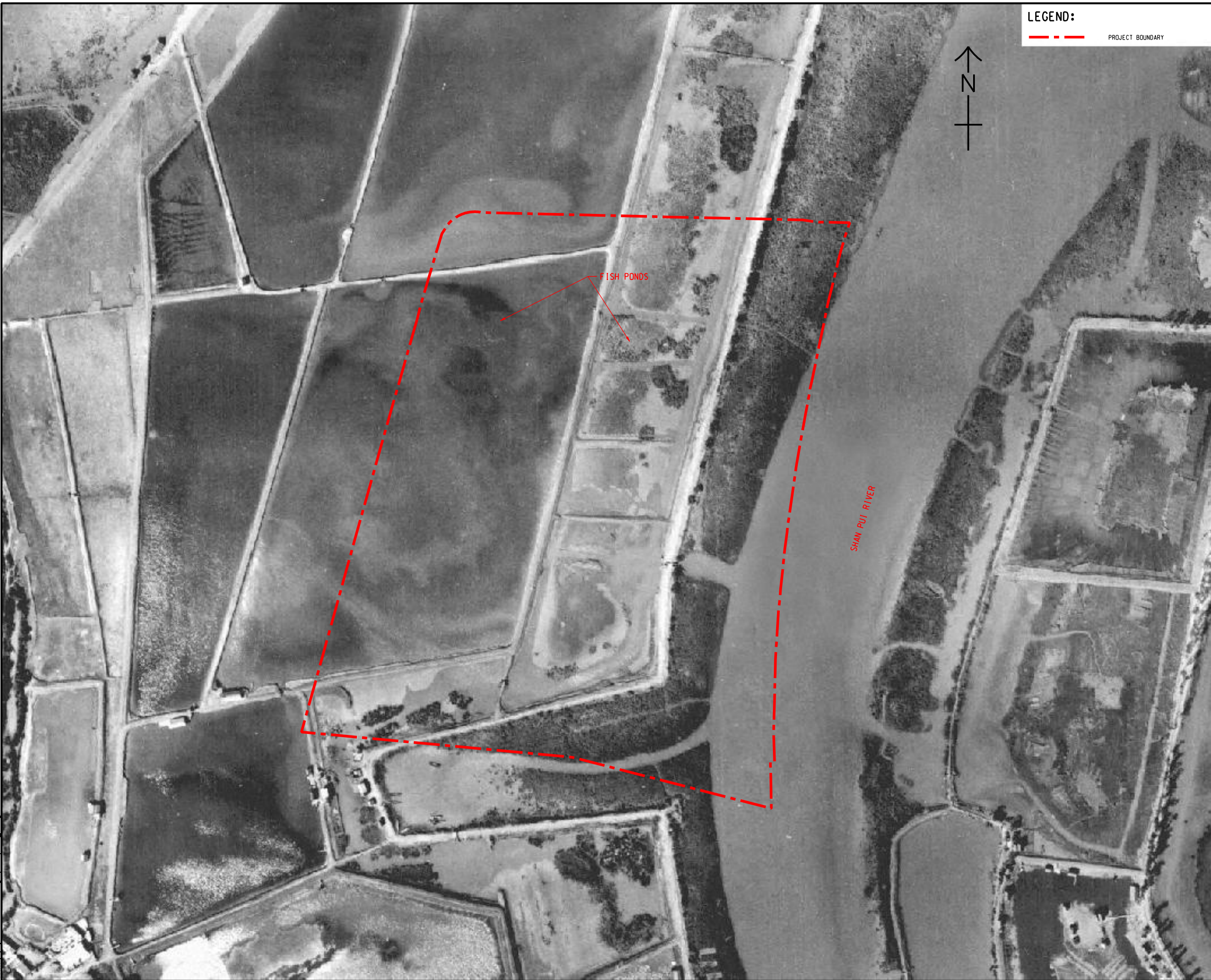
Concerned Facility / Area	Tentative Year for Decommissioning and Demolition works
Dangerous Goods Store	2024
Sludge Dewatering House	2024
Waste Storage Area	2021
SAS Thickener House	2021
Wash Water Pumping Station	2020
Transformer House 'A'	2024
Transformer House 'B' and 'C'	2020
Mechanical Workshop	2020
Workshops	2020
Screening Press House	2024

7. CONCLUSION

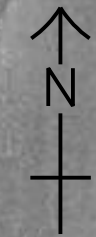
- 7.1.1 A site appraisal, in the form of desktop review and site walkover, had been carried out to identify the potential contaminative land uses and hotspots within the Project Area. Based on the site appraisal, a total of 10 facilities / areas of land contamination concerns were identified within the Project Area.
- 7.1.2 A sampling and testing programme, targeting the hotspots identified within the existing YLSTW had been proposed. A total of 39 locations were proposed for soil and groundwater sample collection. The collected samples will be tested for the COCs which are metals, VOCs, SVOCs, PCRs and/or PCBs.
- 7.1.3 All the existing YLSTW facilities are currently in operation and it would not be feasible to carry out the proposed SI works under the EIA Study. Based on the tentative construction programme, the existing YLSTW will continue to operate during the construction period commencing in 2020 and the concerned facilities / areas identified will be decommissioned and demolished in stages between 2020 and 2024. As such, there could be changes in operation which may result in new hotspots. Therefore, the proposed SI works and any necessary remediation action are recommended to be carried out after decommissioning but prior to the construction works at the concerned facilities / areas.
- 7.1.4 Prior to commencement of the SI works, a review of this CAP should be conducted to confirm whether the proposed SI works are still valid. Supplementary CAP(s), presenting findings of the review, the latest site conditions and any updated sampling strategy and testing protocol, should be submitted to EPD for endorsement. The SI works should be carried out according to EPD's agreed supplementary CAP(s). Following completion of SI works and receipt of laboratory test results, CAR(s) should be prepared to present the findings of the SI works and to discuss the presence, nature and extent of contamination. If contamination is identified, RAP(s) which provides details of the remedial actions for the identified contaminated soil and / or groundwater should be endorsed by EPD. Remediation action, if required, will be carried out according to the endorsed RAP(s) and RR(s) demonstrating the completion of remediation works at the identified contaminated area(s) (if any) will be prepared and submitted to EPD for approval. The RR(s) should be completed prior to the commencement of construction works at the respective identified contaminated area(s).
- 7.1.5 With the implementation of the aforementioned follow up works for the Project, any soil/groundwater contamination would be identified and properly treated prior to the construction works. No insurmountable land contamination impacts to the Project are therefore anticipated.

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Appendix 2.1
Selected Aerial Photographs



LEGEND:
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PROJECT
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**YUEN LONG EFFLUENT
 POLISHING PLANT -
 INVESTIGATION, DESIGN
 AND CONSTRUCTION**

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 Drainage Services Department

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 METRES

KEY PLAN
 索引圖

PROJECT NO.
 項目編號
 60505476

CONTRACT NO.
 合約編號
 CE 3/2015 (DS)

SHEET TITLE
 圖名
 AERIAL PHOTOGRAPH 1963

SHEET NUMBER
 圖號
 60505476/CAP/FIGURE 1

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60505476/CAP/FIGURE 2

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 60505476/CAP/FIGURE 3

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60505476/CAP/FIGURE 5

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 圖名
 AERIAL PHOTOGRAPH 2008

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 60505476/CAP/FIGURE 6



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 AERIAL PHOTOGRAPH 2015

SHEET NUMBER
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 60505476/CAP/FIGURE 7

Appendix 2.2
Acquisition of Information from Government Departments

Your Ref.:

Our Ref.: MTSW:ANTY:ymc2:60505476/2016009966W

23 August 2016

By Fax (2685 1133) & Post

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

Dear Sir / Madam,

**Agreement No. CE 3/2015 (DS)
Yuen Long Effluent Polishing Plant – Investigation, Design and Construction**

Request for Information of Chemical Waste Producer and Chemical Spillage Accident

AECOM Asia Co. Ltd. has been commissioned by the Drainage Services Department (DSD) to undertake the captioned Project including a land contamination assessment under the Brief requirement (DSD's Memo ref.: SP/8/4408DS/CE0315(DS) attached).


The areas of concern (the Concerned Areas) for the land contamination assessment include the existing Yuen Long Sewage Treatment Works and a public car park located within the Yuen Long Industrial Estate. The Concerned Areas are shown in Drawing 60505476/EIAIR/701 attached.

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

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

Your assistance in this matter will be greatly appreciated. Please do not hesitate to contact our Mr. Kelvin Chiang at 3922-9507 should you have any queries.

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


Matthew Tsui
Technical Director
Water & Urban Development

cc CE/SP, DSD - Attn : Mr. SK WONG

Encl.

MEMO**Urgent by Fax**

From	Chief Engineer/Sewerage Projects, DSD	To	Distribution
Ref.	() in SP/8/4408DS/CE0315(DS)	Attn.:	
Tel. No.	2594 7502	Email	
Fax. No.	2827 8700	Your Ref.	
Email	wllee03@dspd.gov.hk	Dated	Fax. No.
Date	20 May 2016	Total Pages	2 + Encl.

**Agreement No. CE 3/2015 (DS)
Yuen Long Effluent Polishing Plant -
Investigation, Design and Construction**

We wish to inform you that AECOM Asia Company Ltd. (AECOM) has been appointed to undertake the captioned Assignment. The Assignment commenced on 19 May 2016 and will take about 150 months to complete. The location of Yuen Long Polishing Plant (YLEPP) is enclosed for your ease of reference.

2. The scope of the Assignment mainly comprises:

- (a) Investigation study, preliminary and detailed design, impact assessments, public engagement and consultation and preparation of tender documents for the Project;
- (b) Site investigation, surveys and laboratory testing;
- (c) Construction works for YLEPP;
- (d) Commissioning works for YLEPP;
- (e) Decommissioning of the existing YLSTW;
- (f) Demolition of existing structures; and
- (g) Any other works recommended from various technical studies and assessments in the contract.

3. During the course of the Assignment, AECOM may approach your Department/Office direct to search for information, to seek your comments/approvals where appropriate, or to seek other assistance relating to the Assignment. We should be grateful if you would render the necessary assistance to them.

4. Should you have any enquiry, please feel free to contact our Engineers, Mr. H. Y. CHAN (Tel: 2594 7456) or the undersigned.

-2-

5. Thank you for your assistance.

(W. L. LEE)

for Chief Engineer/Sewerage Projects
Drainage Services Department

Encl.

Distribution (with encl.)

S for DEV	(Attn.: Mr. K. H. CHAN)	- Fax: 2521 9682
PM/NTW, CEDD	(Attn.: Mr. W. K. LAU)	- Fax: 2693 2918
Head (GEO), CBDD	(Attn.: Ms. W. F. KWOK)	- Fax: 2194 0165
CE/LW, CBDD	(Attn.: Ms. Candy Y. S. LI)	- Fax: 2714 0079
SEPO(SI)5, EPD	(Attn.: Mr. Anthony W. K. FOK)	- Fax: 2519 0572
SEPO(A&N), EPD	(Attn.: Mr. Alex LYN)	- Fax: 2591 0558
AMO, LCSD	(Attn.: Ms. Candy P. W. CHAN)	- Fax: 3691 8185
DLO/YL, LandsD	(Attn.: Ms. Lily L. I. CHIU)	- Fax: 2473 3134
DO(YL), HAD	(Attn.: Mr. Harris H. K. CHAN)	- Fax: 2474 7261
STP/YLWI, PlanD	(Attn.: Ms. Bonita K. K. HO)	- Fax: 2489 9711
AC for T/NT, TD	(Attn.: Mr. K. C. HO)	- Fax: 2381 3799
CHE/NTW, HyD	(Attn.: Mr. K. C. WONG)	- Fax: 2714 5228
SSP (Traffic NTN, HKPF	(Attn.: Ms. W. S. TAM)	- Fax: 2697 5250
DC/YLDIV, HKPF	(Attn.: Ms. W. Y. SHIU)	- Fax: 2442 7161
CE/CM, WSD	(Attn.: Mr. Y. L. WONG)	- Fax: 2634 1800
CE/Development(2), WSD	(Attn.: Mr. C. W. HA)	- Fax: 2802 2579
D of ArchS	(Attn.: Mr. Fredrick L. T. CHUNG)	- Fax: 2877 1864
D of FS	(Attn.: Mr. Victor K. K. TUNG)	- Fax: 2739 8775

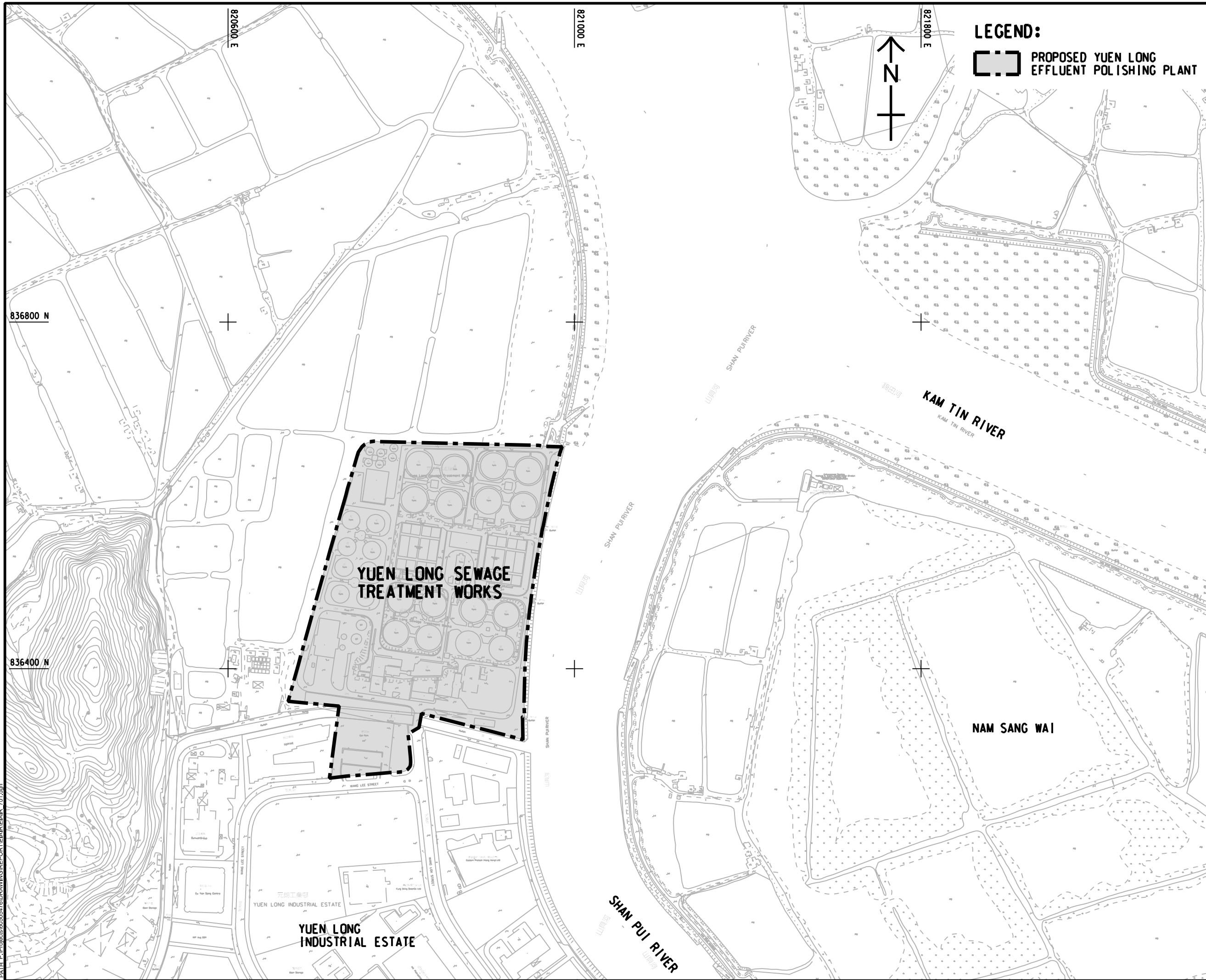
Internal (with encl.)

CE/CM, CE/PM, CE/DP, CE/E&MP, CE/ST1, CE/ST2, CE/IK&I, CE/MS, CE/LD,
CE/HATS, SE/CS

c.c. (with encl.) - By Fax

AECOM Asia Company Ltd. (Attn.: Mr. Matthew TSUI / Mr. Robert CHAN) - Fax: 3922 9797

-2-



LEGEND:

 PROPOSED YUEN LONG EFFLUENT POLISHING PLANT



PROJECT
項目

YUEN LONG EFFLUENT POLISHING PLANT

CLIENT
業主



CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

IR	DATE	DESCRIPTION	CHK.
修訂	日期	修訂描述	核對

STATUS
狀況

SCALE **DIMENSION UNIT**

A1 1: 2000 METRES

KEY PLAN
索引圖

PROJECT NO. **AGREEMENT NO.**

60505476 CE 3/2015 (DS)

SHEET TITLE
圖紙名稱

LOCATION OF PROPOSED
YUEN LONG EFFLUENT
POLISHING PLANT

SHEET NUMBER
圖紙號碼

60505476/EIAIR/701

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本署檔案
OUR REF: EP/RN/38046
來函檔案
YOUR REF: MTSW:ANTY:ymc2:60505476/20160099866W
電話
TEL NO: 2158 5852
圖文傳真
FAX NO: 2650 6033
網址
HOMEPAGE: <http://www.epd.gov.hk/>

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



環境保護署
環保法規管理科
區域辦事處(北)
香港新界沙田
上禾輦路一號
沙田政府合署10樓

By Fax (3922 9797) & Post

5 September 2016

AECOM
8/F Grand Central Plaza Tower 2
138 Shatin Rural Committee Road
Shatin Hong Kong
(Attn.: Mr. Matthew Tsui)

Dear Sir/Madam,

Request for Information of Chemical Waste Producer and Chemical Spillage Accident

I refer to your letter dated 23 August 2016 requesting current and past registered Chemical Waste Producer(s) and reported accidents of spillage/ leakage of chemical within the records within the concerned areas which is shown in your Drawing (60505476/EIAIR/701).

A register of chemical waste producers under Waste Disposal (Chemical Waste) (General) Regulation is open for inspection by the public during normal office hours in the department. The register contains prescribed particulars such as registered name, location, etc. If you would like to inspect, please contact Mr. HO Shui-lun, Aaron at 2835 1017.

There is no chemical spillage/leakage record within the concerned area as shown in your Drawing in the past three years.

For further enquiry, please contact our Senior Environmental Protection Inspector Mr SO Kwai-hong at tel. no.: 2158 5751.

Yours faithfully,

(Ashley M.H. PUN)
for Director of Environmental Protection

Environmental Protection Department

環境保護署

Waste Disposal Ordinance (Chapter 354)

香港法例第354章廢物處置條例

Waste Disposal (Chemical Waste) (General) Regulation

廢物處置(化學廢物)(一般)規例

Registration of Waste Producer

廢物產生者登記證

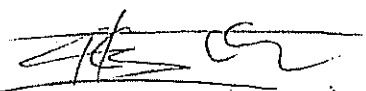
To: Waste Producer 致 廢物產生者	Full Name (English) 全 名 (英文)	Director of Drainage Services	
	(Chinese) (中文)	渠務署署長	I.D. Card No. (if any) 身份證號碼:(如有者)
	Business Reg. Cert. No. (if any) 商業登記證號碼:(如有者)	---	
	Address for Correspondence 通訊地址:	43/F., REVENUE TOWER, WANCHAI, HK	
	Tel. No. 電話:	2594 7140	Fax No. 圖文傳真:

With reference to your application dated 08 / 02 / 1996 for registration as a Waste Producer under the Waste Disposal (Chemical Waste) (General) Regulation, the Waste Producer Number, WPN 00114-528-Y2330-01 is assigned to you in respect of the location or premises listed below:—

前於 1996 年 02 月 08 日 根據廢物處置(化學廢物)(一般)規例而來信, 申請登記為廢物產生者, 茲特配予廢物產生者編號第 00114-528-Y2330-01 號, 予下開地點或樓宇: —

Location or Premises where the waste is produced 產生廢物的地點或樓宇	Name of Establishment 機 構 名 稱 :	YUEN LONG SEWAGE TREATMENT WORKS		
	Business Reg. Cert. No. (if any) 商 業 登 記 證 號 碼:(如有者)	---		
	Nature of Business 業 務 性 質 :	SEWAGE TREATMENT		
	Major chemical waste types 主 要 化 學 廢 物 種 類 :	SPENT LUB OIL, SPENT ULTRA-VIOLET LAMP, SPENT ELECTRICAL CLEANING SOLVENT, SPENT DIESEL OIL, SPENT BATTERY, SPENT CHEMICAL ABSORBENT AND SPENT FLUORESCENT LAMP		
	Address 地 址:	WANG LOK STREET, YUEN LONG INDUSTRIAL ESTATE, YUEN LONG, NT		
	Tel. No. 電 話 :	2670 6144	Fax No. 圖文傳真 :	2679 3351
	Contact Person (Full Name) 聯 絡 人:(全 名)	TIN SIU PANG	(Capacity) (職 位)	CTO/ST1/1




 (CHUNG KWOK-ON, JOHN)
 for Director of Environmental Protection
 環境保護署署長 (鍾國安 代行)
 Date
 日期 23 / May / 2007

WARNING: Any registered waste producer who fails to inform the Director of Environmental Protection of any change in his registration particulars commits an offence and is liable on conviction to a fine of \$10,000.

告: 任何已登記的廢物產生者, 若其登記資料有任何改變而不知會環境保護署署長, 即屬違法, 被定罪者最高罰款港幣10,000元。

Your Ref.:
Our Ref.: MTSW:ANTY:ymc2:60505476/2016009967W

23 August 2016

By Fax (2367 3631) & Post

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

Dear Sir / Madam,

**Agreement No. CE 3/2015 (DS)
Yuen Long Effluent Polishing Plant – Investigation, Design and Construction**

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

AECOM Asia Co. Ltd. has been commissioned by the Drainage Services Department (DSD) to undertake the captioned Project including a land contamination assessment under the Brief requirement (DSD's Memo ref.: SP/8/4408DS/CE0315(DS) attached).

The areas of concern (the Concerned Areas) for the land contamination assessment include the existing Yuen Long Sewage Treatment Works and a public car park located within the Yuen Long Industrial Estate. The Concerned Areas are shown in Drawing 60505476/EIAIR/701 attached.

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

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

Your assistance in this matter will be greatly appreciated. Please do not hesitate to contact our Mr. Kelvin Chiang at 3922-9507 should you have any queries.

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



Matthew Tsui
Technical Director
Water & Urban Development

cc CE/SP, DSD - Attn : Mr. SK WONG

Encl.

MEMO**Urgent by Fax**

From	Chief Engineer/Sewerage Projects, DSD	To	Distribution
Ref.	() in SP/8/4408DS/CE0315(DS)	Attn.:	
Tel. No.	2594 7502	Email	
Fax. No.	2827 8700	Your Ref.	
Email	wllee03@dtd.gov.hk	Dated	Fax. No.
Date	20 May 2016	Total Pages	2 + Encl.

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Yuen Long Effluent Polishing Plant -
Investigation, Design and Construction**

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- (e) Decommissioning of the existing YLSTW;
- (f) Demolition of existing structures; and
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-2-

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(W. L. LEE)

for Chief Engineer/Sewerage Projects
Drainage Services Department

Encl.

Distribution (with encl.)

S for DEV	(Attn.: Mr. K. H. CHAN)	- Fax: 2521 9682
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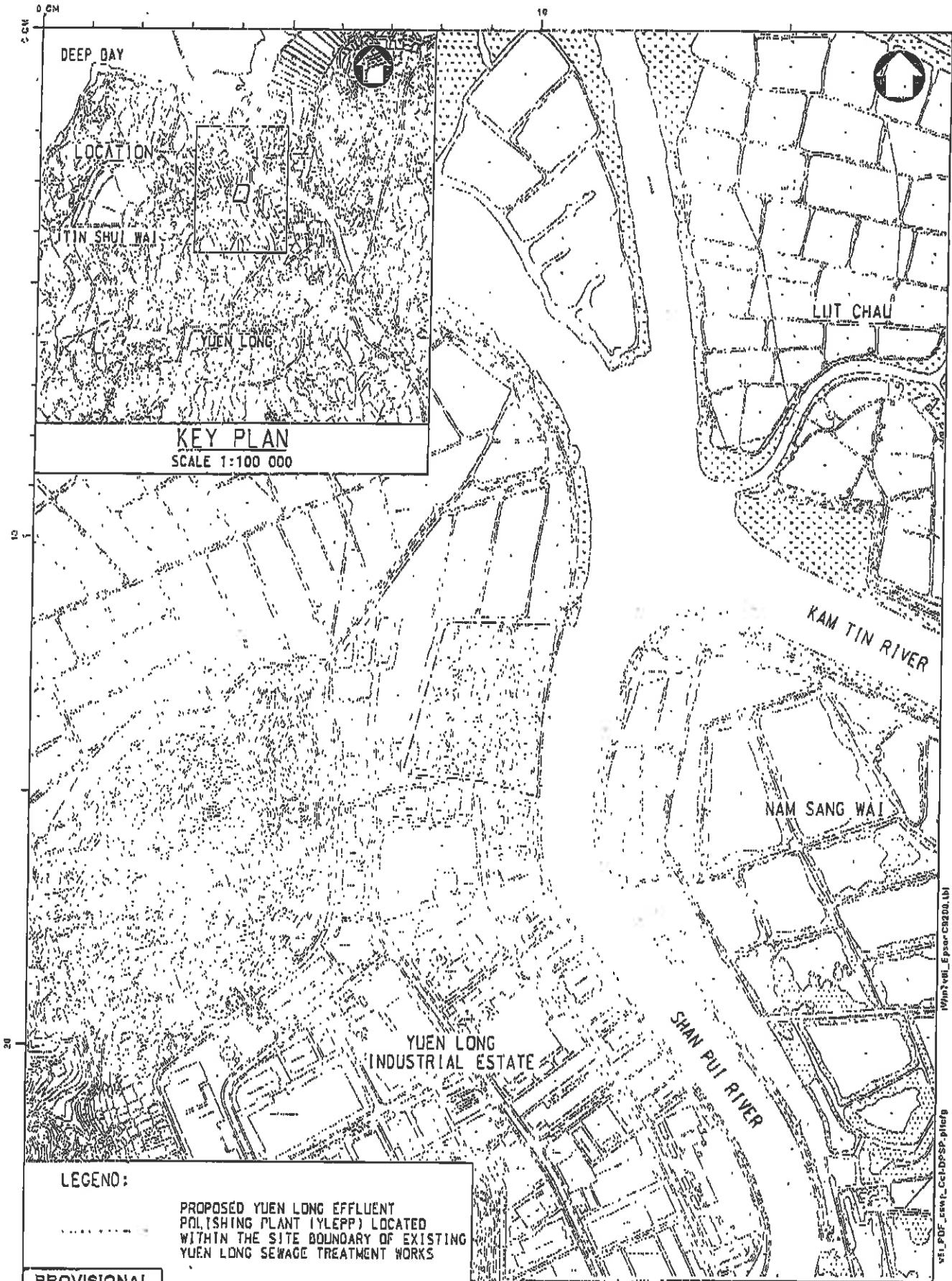
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CE/HATS, SE/CS

c.c. (with encl.) - By Fax

AECOM Asia Company Ltd. (Attn.: Mr. Matthew TSUI / Mr. Robert CHAN) - Fax: 3922 9797


-2-

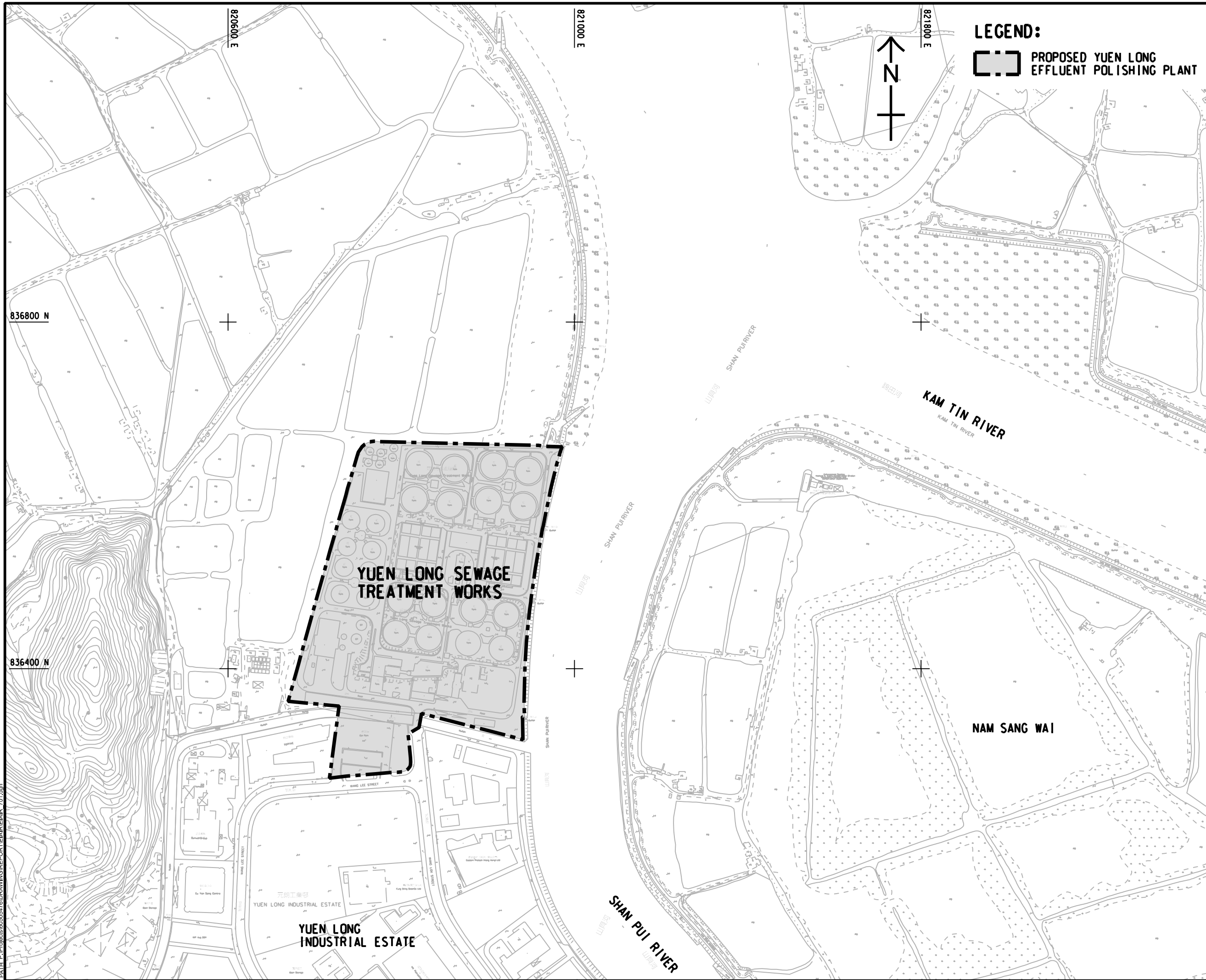


LEGEND:

PROPOSED YUEN LONG EFFLUENT POLISHING PLANT (YLEPP) LOCATED WITHIN THE SITE BOUNDARY OF EXISTING YUEN LONG SEWAGE TREATMENT WORKS

PROVISIONAL
SUBJECT TO AMENDMENT

no.	date	description	initial
drawing title	drawn	drawing no.	scale
YUEN LONG EFFLUENT POLISHING PLANT SITE LAYOUT PLAN	C. S. YU	DSP/CE0315/11011	1:10000 OR AS SHOWN
	checked	COPYRIGHT RESERVED	
	Ir S. K. PUN	 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION	
	approved		
	Ir W. L. LEE		
	office		
	SEWERAGE PROJECTS DIVISION		



LEGEND:

 PROPOSED YUEN LONG EFFLUENT POLISHING PLANT

AECOM

PROJECT
項目

YUEN LONG EFFLUENT POLISHING PLANT

CLIENT
業主

 **渠務署**
Drainage Services Department

CONSULTANT
工程師/顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程師/顧問公司

ISSUE/REVISION
修訂

IR	DATE	DESCRIPTION	CHK.
修訂	日期	修訂內容	校核

STATUS
狀況

SCALE
比例

A1 1: 2000

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60505476

AGREEMENT NO.
協議編號

CE 3/2015 (DS)

SHEET TITLE
圖紙名稱

LOCATION OF PROPOSED
YUEN LONG EFFLUENT
POLISHING PLANT

SHEET NUMBER
圖紙編號

60505476/EIAIR/701

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消防處

香港九龍尖沙咀東部康莊道1號
消防總部大廈



FIRE SERVICES DEPARTMENT
FIRE SERVICES HEADQUARTERS
BUILDING,
No.1 Hong Chong Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong.

本處檔號 OUR REF. : (27) in FSD GR 6-5/4 R Pt. 13
來函檔號 YOUR REF. : MTSW:ANTY:ymc2:60505476/2016009967W
電子郵件 E-mail : hkfsdenq@hkfsd.gov.hk
圖文傳真 FAX NO. : 2739 5879
電話 TEL NO. : 2733 7741

8 September 2016

AECOM Asia Co. Ltd
8/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong.
(Attn: Mr. Matthew TSUI)

Dear Mr. TSUI,

**Yuen Long Effluent Polishing Plant
Investigation, Design and Construction
Request for Information of Dangerous Goods & Incident Records**

I refer to your letter dated 23.8.2016 regarding the captioned request.

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

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

Yours sincerely,

(LEE Kui-hung)
for Director of Fire Services

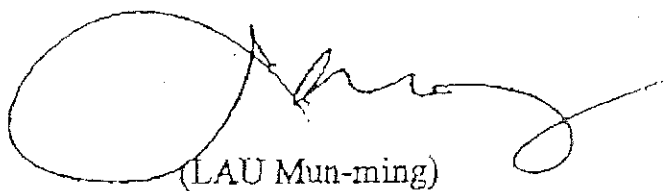
MEMO

From	Director of Fire Services	To	Director of Drainage Services
Ref.	(67) in NTN 12/2722(G)	(Att:)	Mr. CHAN Chi-man
Tel. No.	2417 5757	Your Ref.	(29) in YL 2/14
Fax No.	2413 0873	dated	26.8.2003 Fax No. 2479 8620
Date	07 April 2004	Total Pages	1

**Proposed 1 x Cat. 5 Dangerous Goods Store
at G/E, Yuen Long Sewage Treatment Plant**

An inspection made by an officer of this department on 31.3.2004 revealed that all fire safety recommendations formulated for the above-mentioned Cat. 5 Dangerous Goods Store were complied with. As such, I have no objection to the above Dangerous Goods Store being put in use for the storage of the following dangerous goods:-

Type	Quantity
(1) Light Diesel	200 litres
(2) Thinner	40 litres
(3) Paint	200 litres
(4) Unleaded Gasoline	36 litres



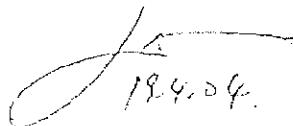
(LAU Mun-ming)
for Director of Fire Services

LMM/LCH/ssl

Handwritten notes:
6/6/07
6/6/07
f-y-j
6/6/07

Tax 23633008

Mr. CHAN



Appendix 2.3
Site Walkover Checklist

Annex C1

Site Walkover Checklist

GENERAL SITE DETAILS

SITE OWNER/CLIENT Drainage Services Department (DSD)

PROPERTY ADDRESS Wang Lok Street, Yuen Long Industrial Estate, Yuen Long, N.T.

PERSON CONDUCTING THE QUESTIONNAIRE

NAME Mr. Kelvin Chiang, Ms. Chloe Ng

POSITION Environmental Consultant (AECOM)

AUTHORIZED OWNER/CLIENT REPRESENTATIVE (IF APPLICABLE)

NAME Mr. Kwai Chan

POSITION Senior Mechanical Inspector / Yuen Long (DSD)

TELEPHONE 2486 6401

SITE ACTIVITIES

Briefly describe activities carried out on site, including types of products/chemicals/materials handled.
Obtain a flow schematic if possible.

Number of employees: Full-time: 35

Part-time: N/A

Temporary/Seasonal: 5 per shift

Maximum no. of people on site at any time: 40

Typical hours of operation: 24

Number of shifts: 4

Days per week: 7

Weeks per year: 52

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas Yes/~~Ne~~
Electricity Yes/~~Ne~~
Coal ~~Yes~~/No
Oil ~~Yes~~/No
Other Yes/~~Ne~~ (Renewable Energy)

SITE DESCRIPTION

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

What is the total site area: 8.6 ha

What area of the site is covered by buildings (%): ~60%

Please list all current and previous owners/occupiers if possible. _____

Current: Drainage Services Department; Previous: Private fish pond owners

Is a site plan available? If yes, please attach. Yes/~~Ne~~ Drawing No. 60505476/CAP/712 in CAP

Are there any other parties on site as tenants or sub-tenants? ~~Yes~~/No

If yes, identify those parties: _____

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Rural – Fish ponds and wetlands

South: Industrial – Drainage nullah and Yuen Long Industrial Estate

East: Rural – Shan Pui River and Nam Sang Wai wetland area

West: Rural and Residential – Fish ponds and village houses

Annex C1

Site Walkover Checklist

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

Flat terrain, adjacent to the Shan Pui River.

State the size and location of the nearest residential communities.

A few village houses at southwest adjacent to the site.

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

Wetlands adjacent to the north, east and west of the site. Mai Po Nature Reserve approx. 1.5km north of the site.

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No	Notes
1. What are the main activities/operations at the above address?	-	Sewerage treatment works operation.
2. How long have you been occupying the site?	-	STW started operation since 1984.
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	No	
4. Prior to your occupancy, who occupied the site?	-	Private fish pond owners.
5. What were the main activities/operations during their occupancy?	-	Fish farming.
6. Have there been any major changes in operations carried out at the site in the last 10 years?	No	-
7. Have any polluting activities been carried out in the vicinity of the site in the past?	No	-
8. To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	No	-
9. Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	No	
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	Yes	The storage of dangerous goods within the DG Store at YLSTW has been inspected and approved by the FSD in 2004.
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	Ferric chloride and polymer.
<ul style="list-style-type: none"> Where do you store these chemicals? 	-	Ferric chloride stored in underground tanks and polymer stored in bags within the Sludge Dewatering House.
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	Yes	Updated when materials are purchased and delivered to site.
13. Has the facility produced a separate hazardous substance inventory?	No	
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	No	

	Yes/No	Notes
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	N/A	Ferric chloride are received by tanker and pumped directly to the storage tanks. Polymers are received via truck and stored within bags within the Sludge Dewatering House.
16. Do you have any underground storage tanks? (If yes, please provide details.)	Yes	
• How many underground storage tanks do you have on site?	N/A	Two.
• What are the tanks constructed of?	N/A	
• What are the contents of these tanks?	N/A	Ferric chloride.
• Are the pipelines above or below ground?	N/A	Above ground.
• If the pipelines are below ground, has any leak and integrity testing been performed?	N/A	
• Have there been any spills associated with these tanks?	No	
17. Are there any disused underground storage tanks?	No	
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	Yes	Regular checks are conducted every 3 months and daily inspection conducted by site staff per shift.
19. How are the wastes disposed of?	-	General waste including grit screening waste are disposed via contractors to landfill; Sludge cakes are transferred to sludge treatment facilities.
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	
21. Have any spills occurred on site? (If yes, please provide details.)	No	
• When did the spill occur?	N/A	
• What were the substances spilled?	N/A	
• What was the quantity of material spilled?	N/A	
• Did you notify the relevant departments of the spill?	N/A	
• What were the actions taken to clean up the spill?	N/A	
• What were the areas affected?	N/A	
22. Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	No	
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	
24. Are there any known contaminations on site? (If yes, please provide details.)	No	
25. Has the site ever been remediated? (If yes, please provide details.)	No	

Annex C1

Site Walkover Checklist

Observations

	Yes/No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	Yes	Floors of the workshop, Sludge Dewatering House, SAS Thickener House, DG Store and Waste Storage Area are concrete paved. Chemicals are stored on concrete paved floors, within cupboards, on shelves or plastic pallets. Polymer and Ferric chloride aboveground storage tanks are provided with bund walls.
2. What are the conditions of the bund walls and floors?	N/A	Both in good condition.
3. Are any surface water drains located near to drum storage and unloading areas?	No	
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	Yes	Spent lubricating oil, diesel oil and hydraulic oil, spent batteries, spent oil contaminated materials, metal wastes, waste paint containers, spent UV and florescent lamps.
5. Is there a storage site for the wastes?	Yes	Waste Storage Area.
6. Is there an on-site landfill?	No	
7. Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	
8. Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	Yes	Stained surfaces noted in the Chemical Waste Storage Area and Spent Oil Storage Area.
9. Are there any potential off-site sources of contamination?	No	
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	Yes	Transformers.
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	Only tanks for sewage treatment.
12. Any noticeable odours during site walkover?	Yes	Odour from sewage.
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	Yes	Diesel, gasoline, lubricating oils, hydraulic oils, thinners, anti-corrosive paints and metal wastes.

Appendix 2.4
Risk-Based Remediation Goals (RBRGs) for Soil and Soil Saturation Limit and for
Groundwater and Solubility Limit

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

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

Notes:

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

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

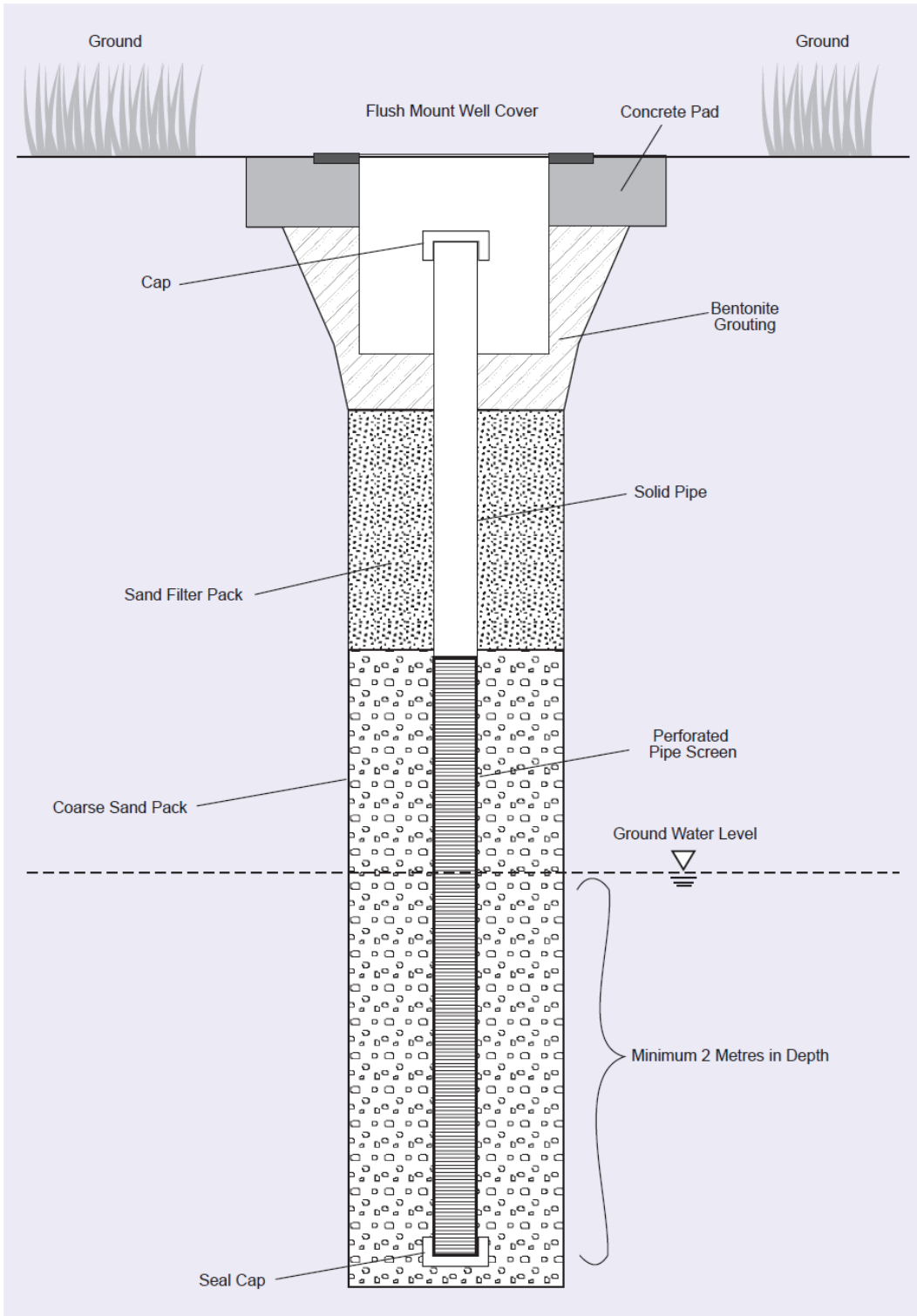
Chemical	Risk-Based Remediation Goals for Groundwater			Solubility Limit (mg/L)
	Urban Residential (mg/L)	Rural Residential (mg/L)	Industrial (mg/L)	
VOCs				
Acetone	1.00E+04*	1.00E+04*	1.00E+04*	***
Benzene	3.86E+00	1.49E+00	5.40E+01	1.75E+03
Bromodichloromethane	2.22E+00	8.71E-01	2.62E+01	6.74E+03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

Notes:

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

Appendix 3.1
Typical Design of a Groundwater Monitoring Well

Typical Design of a Groundwater Monitoring Well



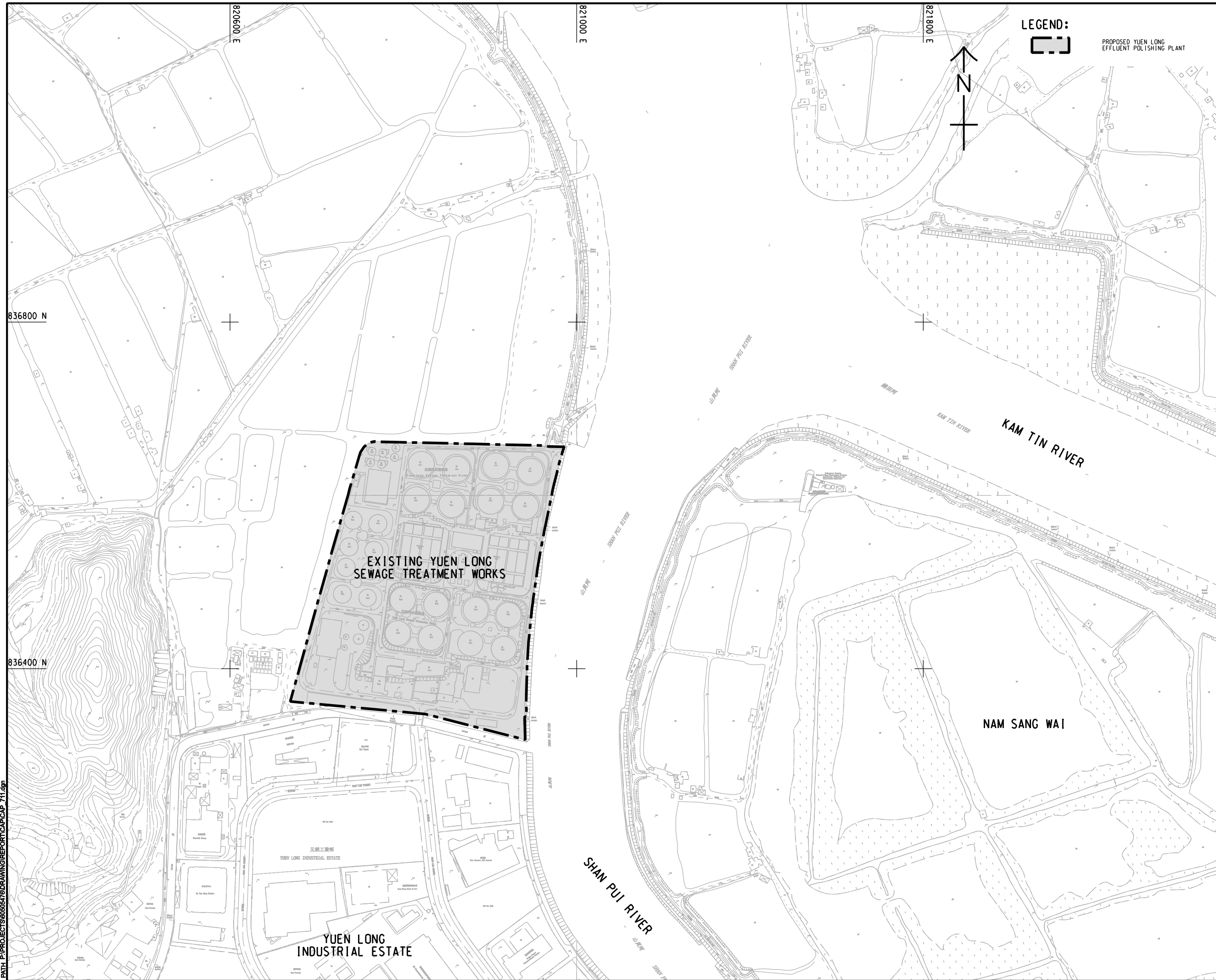
Source: Practice Guide for Investigation and Remediation of Contaminated Land, EPD, Aug. 2011

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Drawings

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 Approved:
 Checked:
 Designer:
 Project Management Initials:

Pld File by: ZENGFX 2017/01/13
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AECOM

PROJECT
 項目
YUEN LONG EFFLUENT POLISHING PLANT - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
 業主
 渠務署
 Drainage Services Department

CONSULTANT
 工程顧問公司
 AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS
 分門工程顧問公司

ISSUE/REVISION
 修訂

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

STATUS
 階段

SCALE
 比例
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DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN
 索引圖

PROJECT NO.
 項目編號
 60505476

CONTRACT NO.
 合約編號
 CE 3/2015 (DS)

SHEET TITLE
 圖名
 LOCATION OF PROPOSED YUEN LONG EFFLUENT POLISHING PLANT

SHEET NUMBER
 圖號
 60505476/CAP/711

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LEGEND:

PROJECT BOUNDARY



AECOM

PROJECT

YUEN LONG EFFLUENT POLISHING PLANT - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT



CONSULTANT

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SUB-CONSULTANTS

ISSUE/REVISION

IR/	DATE	DESCRIPTION	CHK.
號	日期	內容摘要	號

STATUS

SCALE DIMENSION UNIT

A3 1: 1500 METRES

KEY PLAN

PROJECT NO. CONTRACT NO.

60505476 CE 3/2015 (DS)

SHEET TITLE

GENERAL SITE LAYOUT PLAN OF EXISTING YLSTW

SHEET NUMBER

60505476/CAP/712

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SHAN PUI RIVER
山貝河

SHAN PUI RIVER

元朗污水處理廠
Yuen Long Sewage Treatment Works

元朗污水處理廠
Yuen Long Sewage Treatment Works

特佳機城
TOPFINE

巴士車廠
Bus Depot

ISO A1 594mm x 841mm
 Approved:
 Checked: 836460 N
 Designer:
 Project Management Initials:
 836420 N
 6
 2017/01/12
 ZENGFY
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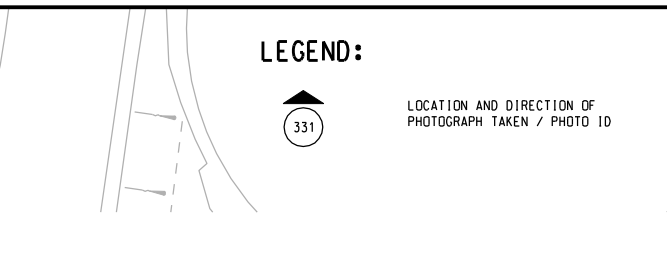
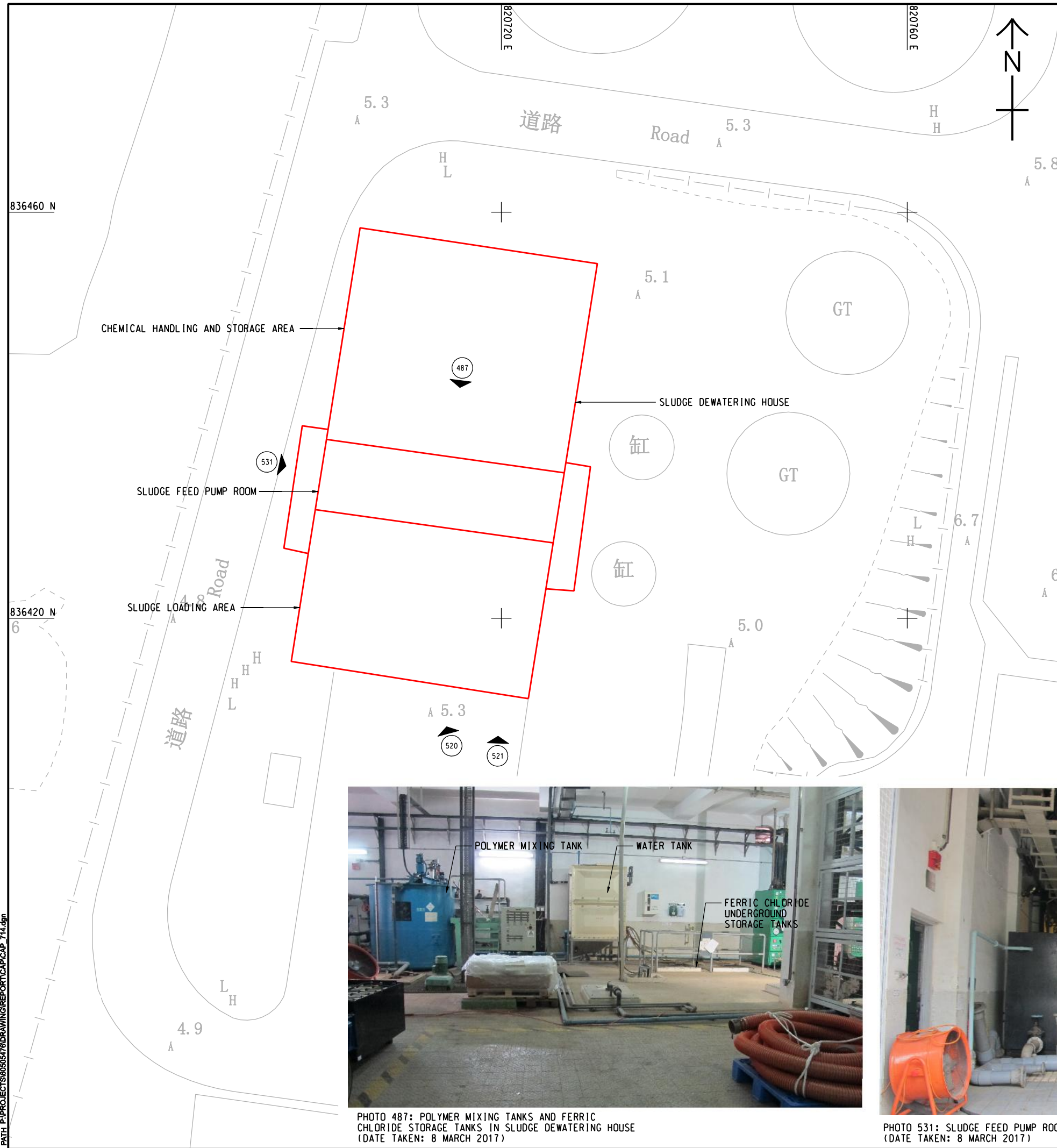


PHOTO 521: SLUDGE LOADING AREA AND GENERAL STORE OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 8 MARCH 2017)



PHOTO 520: SLUDGE LOADING AREA OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 8 MARCH 2017)



PHOTO 487: POLYMER MIXING TANKS AND FERRIC CHLORIDE STORAGE TANKS IN SLUDGE DEWATERING HOUSE (DATE TAKEN: 8 MARCH 2017)



PHOTO 531: SLUDGE FEED PUMP ROOM ON THE GROUND FLOOR OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 8 MARCH 2017)

AECOM

PROJECT
 項目
YUEN LONG EFFLUENT POLISHING PLANT - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
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 分判工程顧問公司

ISSUE/REVISION
 修訂

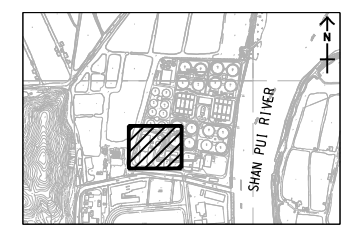
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STATUS
 狀態

SCALE
 比例
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DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN
 索引圖
 A1 1:10000



PROJECT NO.
 項目編號
 60505476

CONTRACT NO.
 合約編號
 CE 3/2015 (DS)

SHEET TITLE
 圖紙名稱
 PHOTOGRAPHIC RECORDS OF SITE WALKOVER FOR THE GROUND FLOOR OF SLUDGE DEWATERING HOUSE AT YLSTW

SHEET NUMBER
 圖紙編號
 60505476/CAP/714

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PHOTO 688: STORAGE OF OIL DRUMS ON PLASTIC PALLET ON THE GROUND FLOOR OF METHANE COMPRESSOR HOUSE (DATE TAKEN: 22 JULY 2016)



PHOTO 360: BIOGAS PIPES LOCATED IN THE BASEMENT OF METHANE COMPRESSOR HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 687: GROUND FLOOR OF METHANE COMPRESSOR HOUSE (DATE TAKEN: 22 JULY 2016)



PHOTO 988: PIPE GALLERY IN THE BASEMENT BETWEEN WATER HEATER HOUSE AND METHANE COMPRESSOR HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 686: ENTRANCE OF METHANE COMPRESSOR HOUSE (DATE TAKEN: 22 JULY 2016)



PHOTO 561: ENTRANCE OF WATER HEATER HOUSE (DATE TAKEN: 8 MARCH 2017)



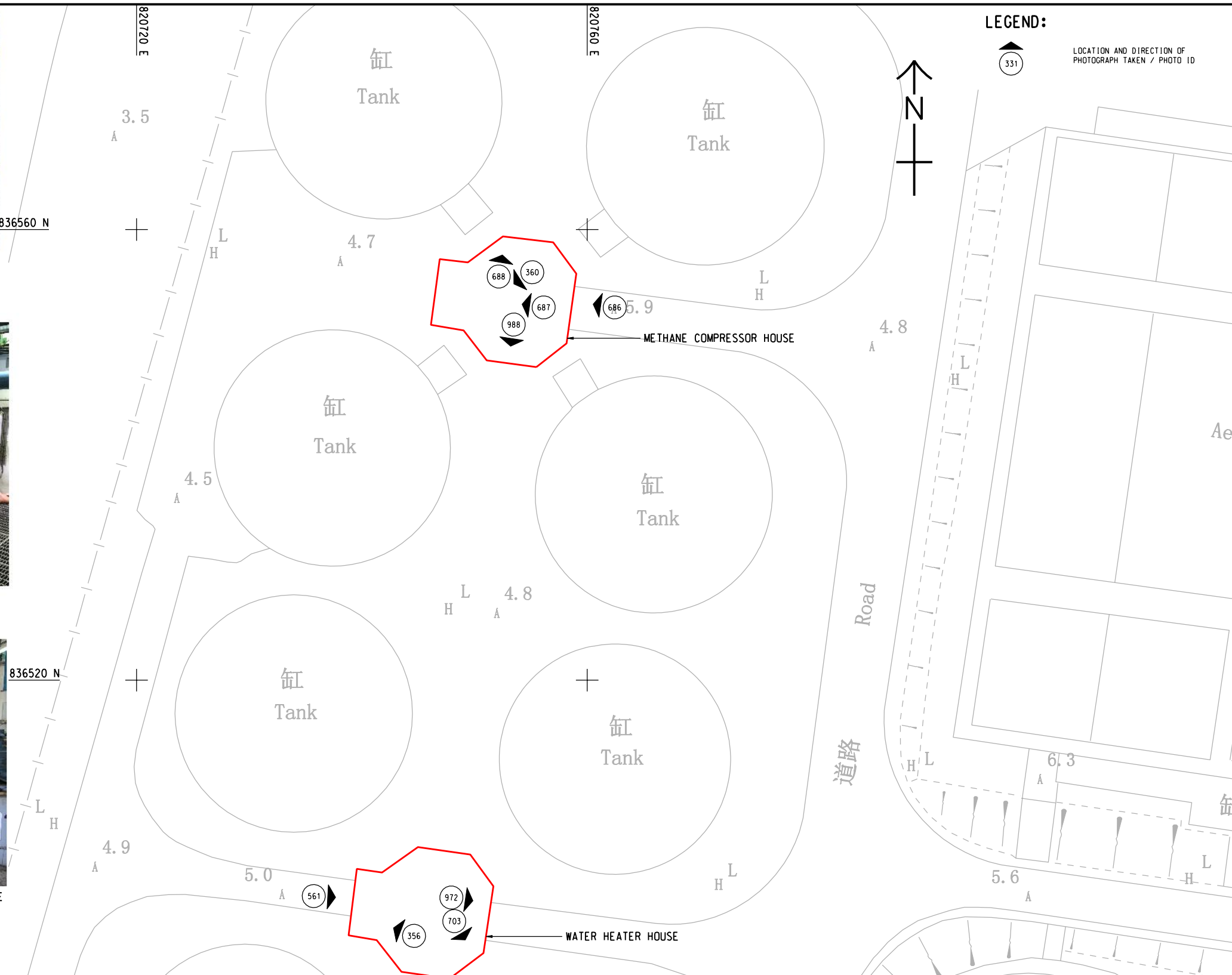
PHOTO 356: SUBMERSIBLE DRAINAGE PUMPS LOCATED IN THE BASEMENT OF WATER HEATER HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 972: SLUDGE TRANSFER PUMPS LOCATED IN THE BASEMENT OF WATER HEATER HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 703: ELECTRIC WATER HEATER CONNECTING TO GAS FIRED CONDENSING BOILERS ON THE GROUND FLOOR OF WATER HEATER HOUSE (DATE TAKEN: 8 MARCH 2017)



LEGEND:



LOCATION AND DIRECTION OF PHOTOGRAPH TAKEN / PHOTO ID

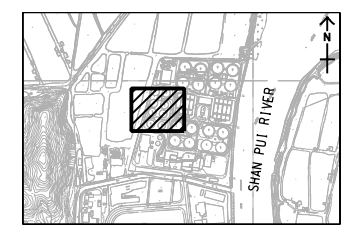
ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.

STATUS

SCALE
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DIMENSION UNIT
METRES

KEY PLAN A1 1:10000



PROJECT NO.
60505476
CONTRACT NO.
CE 3/2015 (DS)

SHEET TITLE
PHOTOGRAPHIC RECORDS OF SITE WALKOVER FOR WATER HEATER HOUSE AND METHANE COMPRESSOR HOUSE AT YLSTW

SHEET NUMBER
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331
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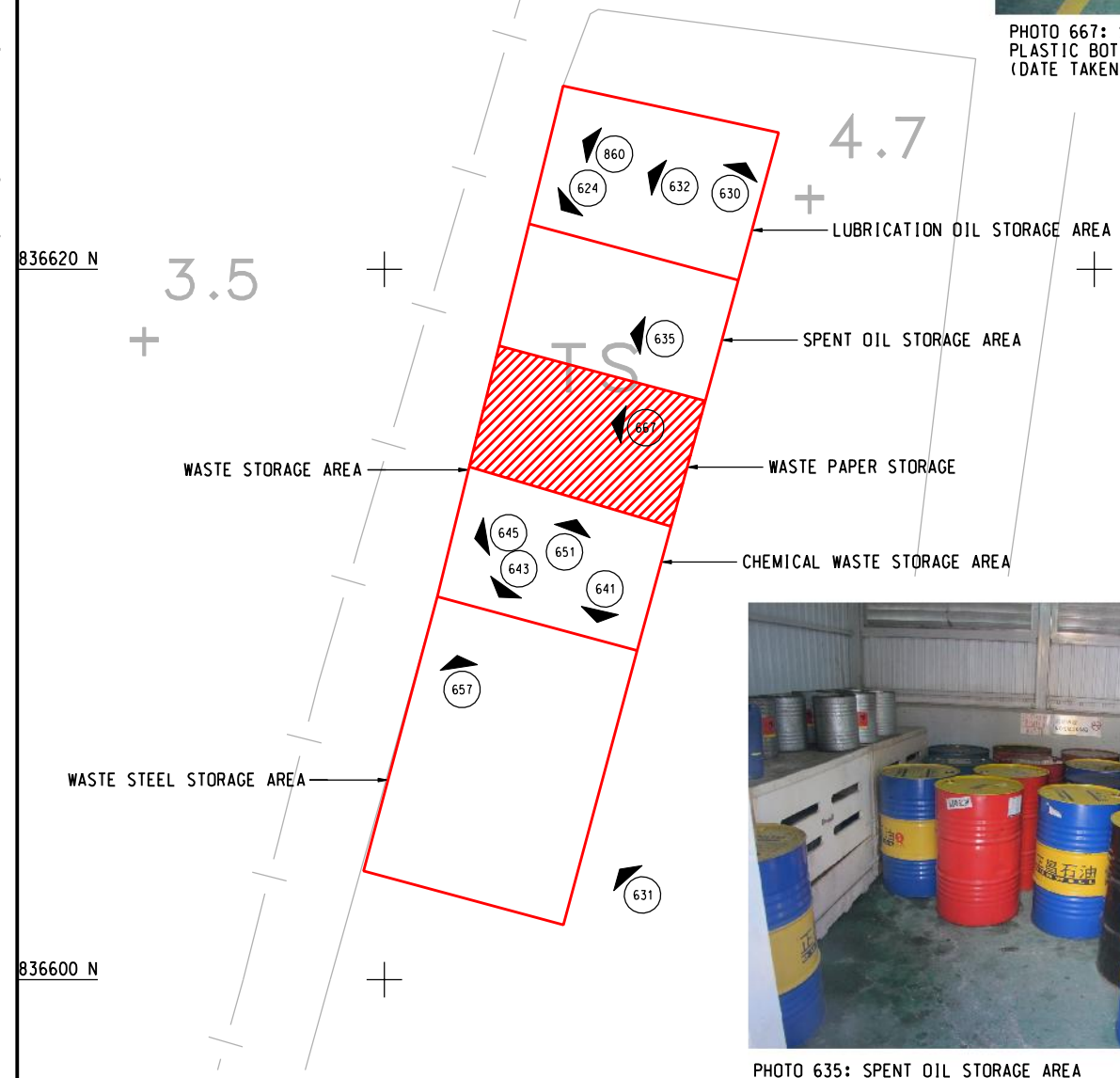


PHOTO 667: STORAGE OF WASTE PAPER AND PLASTIC BOTTLES IN WASTE PAPER STORAGE (DATE TAKEN: 22 JULY 2016)



PHOTO 860: STORAGE OF LUBRICATION OIL ON PLASTIC PALLET IN LUBRICATION OIL STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 624: STORAGE OF LUBRICATION OIL IN CUPBOARD WITHIN LUBRICATION OIL STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 632: LUBRICATION OIL STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 630: HYDRAULIC OIL STORAGE IN LUBRICATION OIL STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 635: SPENT OIL STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 645: STORAGE OF WASTE PAINT CONTAINERS IN CHEMICAL WASTE STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 643: STORAGE OF SPENT BATTERIES IN CHEMICAL WASTE STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 651: STORAGE OF SPENT OIL CONTAMINATED MATERIALS IN CHEMICAL WASTE STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 641: STORAGE OF WASTE LIGHTING TUBES IN CHEMICAL WASTE STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 657: WASTE STEEL STORAGE AREA (DATE TAKEN: 22 JULY 2016)



PHOTO 631: EXTERNAL VIEW OF WASTE STORAGE AREA (DATE TAKEN: 8 MARCH 2017)

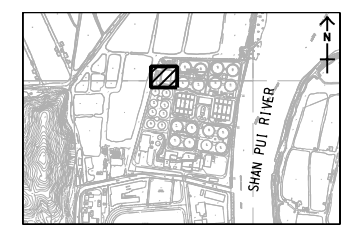
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NO.	DATE	DESCRIPTION	CHK.

STATUS

SCALE A1 1:100
DIMENSION UNIT METRES

KEY PLAN A1 1:10000



PROJECT NO. 60505476
CONTRACT NO. CE 3/2015 (DS)

SHEET TITLE
PHOTOGRAPHIC RECORDS OF SITE WALKOVER FOR WASTE STORAGE AREA AT YLSTW

SHEET NUMBER
60505476/CAP/716

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PHOTO 636: FERRIC CHLORIDE TANKS WITHIN DOSING FACILITY OUTSIDE THE SAS THICKENER HOUSE (DATE TAKEN: 8 MARCH 2017)



PHOTO 677: COAGULANT MIXERS AND COAGULANT STORED INSIDE CHEMICAL STORE ROOM (DATE TAKEN: 22 JULY 2016)



PHOTO 673: THICKENED SLUDGE PUMPS AT BELOW GROUND LEVEL (DATE TAKEN: 22 JULY 2016)



PHOTO 680: ENTRANCE OF CHEMICAL STORE ROOM (DATE TAKEN: 22 JULY 2016)



LEGEND:



PHOTO 012: EXTERNAL VIEW OF SAS THICKENER HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 674: ABANDONED S.A.S PUMPS AT BELOW GROUND LEVEL (DATE TAKEN: 22 JULY 2016)



PHOTO 681: ABANDONED SLUDGE THICKENERS ON THE GROUND FLOOR OF SAS THICKENER HOUSE (DATE TAKEN: 22 JULY 2016)



PHOTO 675: CHEMICAL MIXING TANK NO.1 AND NO.2 ON THE GROUND FLOOR OF SAS THICKENER HOUSE (DATE TAKEN: 22 JULY 2016)

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PROJECT
YUEN LONG EFFLUENT POLISHING PLANT - INVESTIGATION, DESIGN AND CONSTRUCTION

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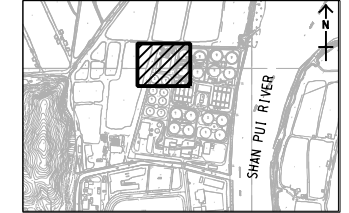
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STATUS

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DIMENSION UNIT
METRES

KEY PLAN A1 1:10000



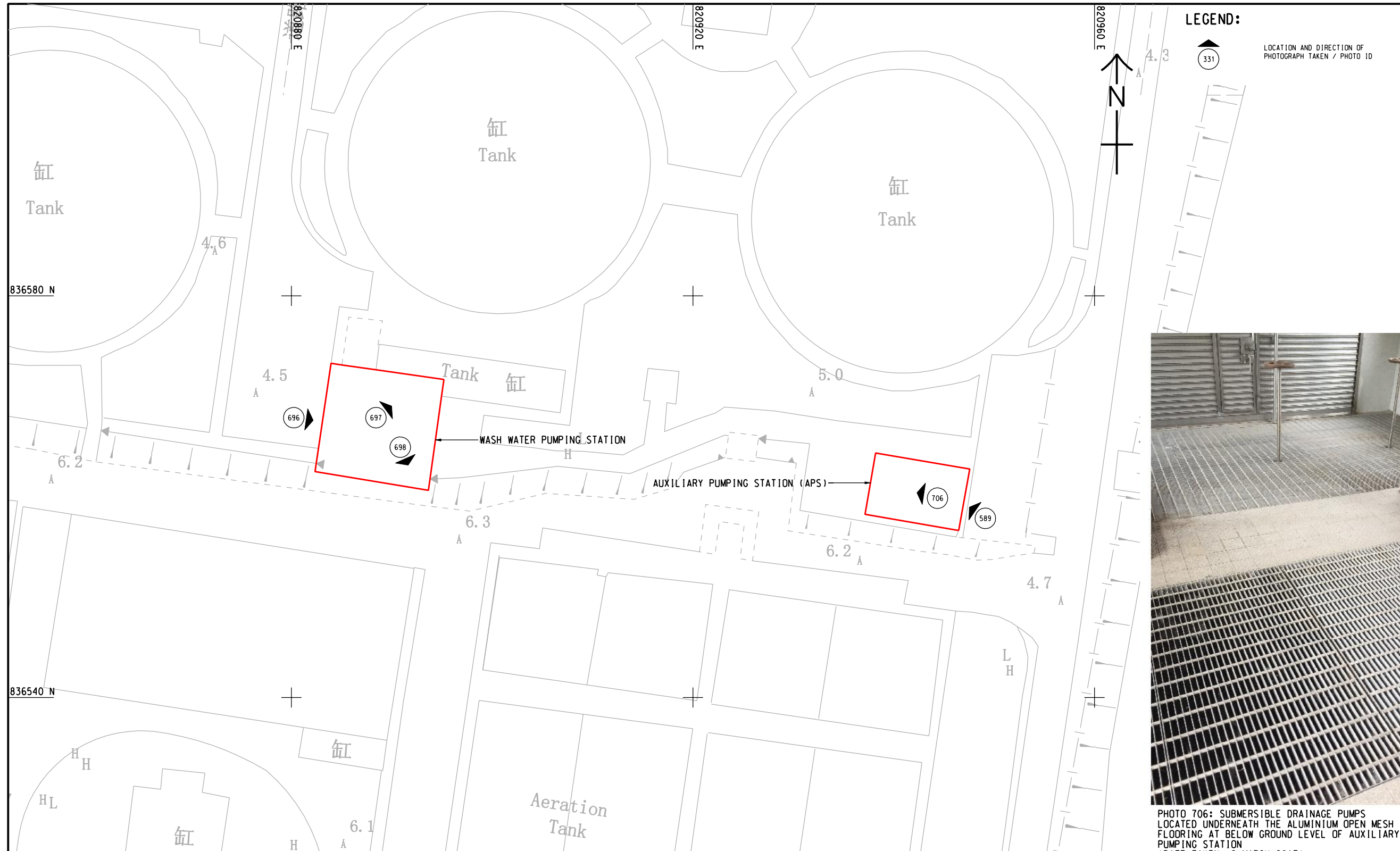
PROJECT NO.
60505476

CONTRACT NO.
CE 3/2015 (DS)

SHEET TITLE
PHOTOGRAPHIC RECORDS OF SITE WALKOVER FOR SAS THICKENER HOUSE AT YLSTW

SHEET NUMBER
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PHOTO 706: SUBMERSIBLE DRAINAGE PUMPS LOCATED UNDERNEATH THE ALUMINIUM OPEN MESH FLOORING AT BELOW GROUND LEVEL OF AUXILIARY PUMPING STATION (DATE TAKEN: 8 MARCH 2017)



PHOTO 696: EXTERNAL VIEW OF WASH WATER PUMPING STATION (DATE TAKEN: 22 JULY 2016)



PHOTO 697: WASH WATER PUMPS IN WASH WATER PUMPING STATION (DATE TAKEN: 22 JULY 2016)



PHOTO 698: AIR COMPRESSORS IN WASH WATER PUMPING STATION (DATE TAKEN: 22 JULY 2016)



PHOTO 589: EXTERNAL VIEW OF AUXILIARY PUMPING STATION (DATE TAKEN: 8 MARCH 2017)



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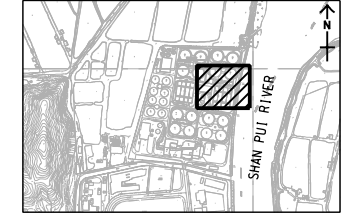
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STATUS

SCALE
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DIMENSION UNIT
METRES

KEY PLAN A1 1:10000



PROJECT NO.
60505476
CONTRACT NO.
CE 3/2015 (DS)

SHEET TITLE
PHOTOGRAPHIC RECORDS OF SITE WALKOVER FOR WASH WATER AND AUXILIARY PUMPING STATIONS AT YLSTW

SHEET NUMBER
60505476/CAP/718

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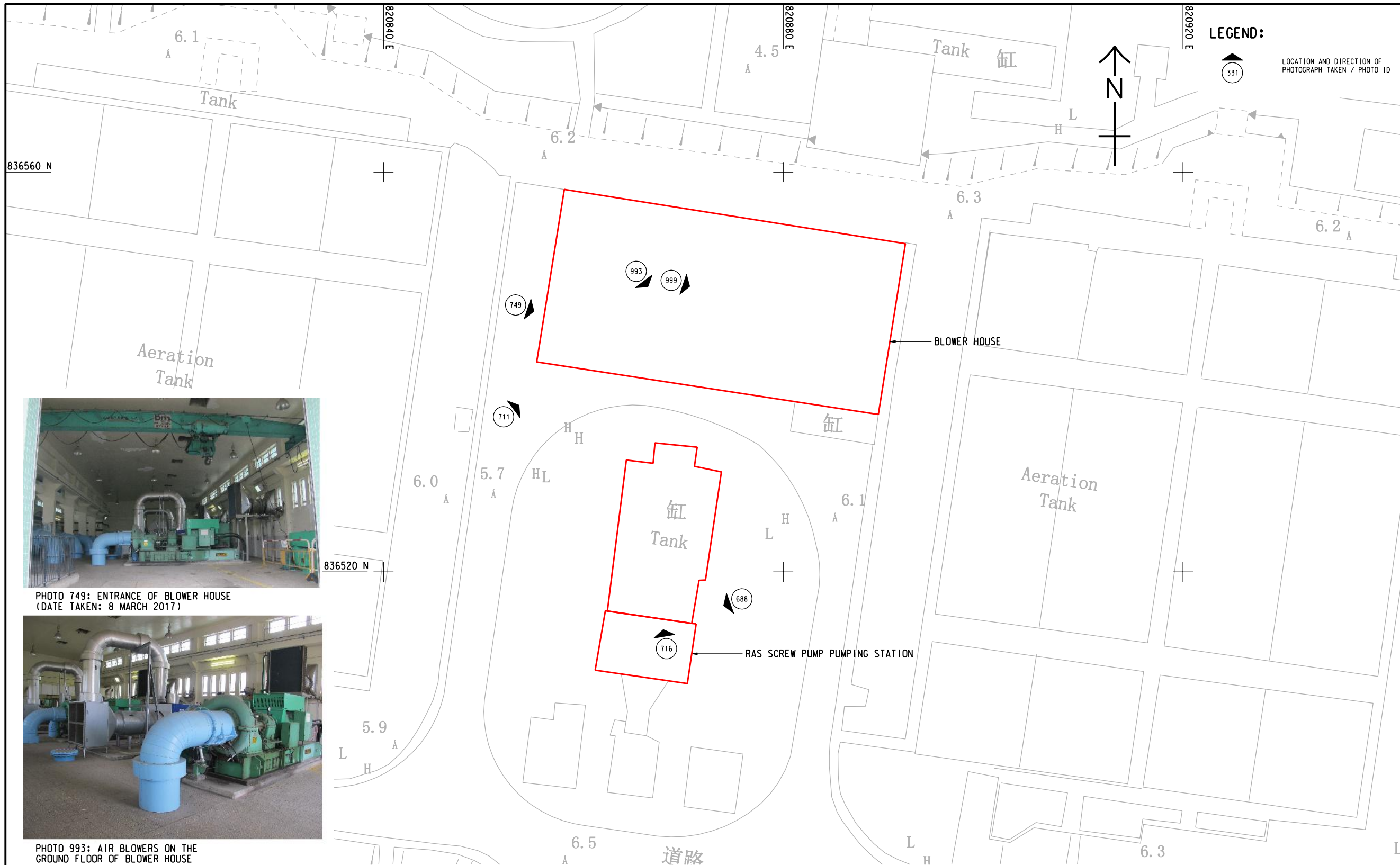


PHOTO 749: ENTRANCE OF BLOWER HOUSE
 (DATE TAKEN: 8 MARCH 2017)



PHOTO 993: AIR BLOWERS ON THE
 GROUND FLOOR OF BLOWER HOUSE
 (DATE TAKEN: 22 MAY 2017)



PHOTO 999: BASEMENT OF BLOWER HOUSE
 (DATE TAKEN: 22 MAY 2017)



PHOTO 711: EXTERNAL VIEW OF BLOWER HOUSE
 (DATE TAKEN: 22 JULY 2016)



PHOTO 688: EXTERNAL VIEW OF RAS
 SCREW PUMP PUMPING STATION
 (DATE TAKEN: 8 MARCH 2017)



PHOTO 716: RAS PUMPS IN
 RAS SCREW PUMP PUMPING STATION
 (DATE TAKEN: 22 JULY 2016)

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PROJECT
 項目
**YUEN LONG EFFLUENT
 POLISHING PLANT -
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NO.	DATE	DESCRIPTION	CHK.

STATUS
 階段

SCALE
 比例

DIMENSION UNIT
 尺寸單位

A1 1:200 METRES

KEY PLAN A1 1:10000



PROJECT NO.
 項目編號
 60505476

CONTRACT NO.
 合約編號
 CE 3/2015 (DS)

SHEET TITLE
 圖紙名稱
 PHOTOGRAPHIC RECORDS OF SITE
 WALKOVER FOR BLOWER HOUSE
 AND RAS SCREW PUMP
 PUMPING STATION AT YLSTW

SHEET NUMBER
 圖紙編號
 60505476/CAP/719

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PHOTO 663: CONTROL PANEL IN CENTRAL CONTROL ROOM (DATE TAKEN: 8 MARCH 2017)



PHOTO 658: SCREW PUMPS IN SCREW PUMP PUMPING STATION (DATE TAKEN: 8 MARCH 2017)



PHOTO 655: EXTERNAL VIEW OF SCREW PUMP PUMPING STATION (DATE TAKEN: 8 MARCH 2017)



PHOTO 925: SCREENING PRESS NO. 1 IN SCREENING PRESS HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 670: ENTRANCE OF SCREENING PRESS HOUSE (DATE TAKEN: 8 MARCH 2017)



PHOTO 919: SCREENING PRESS CONTAINING HYDRAULIC OIL (DATE TAKEN: 22 MAY 2017)



PHOTO 928: SCREENING PRESS NO. 2 IN SCREENING PRESS HOUSE (DATE TAKEN: 22 MAY 2017)

LEGEND:



LOCATION AND DIRECTION OF PHOTOGRAPH TAKEN / PHOTO ID



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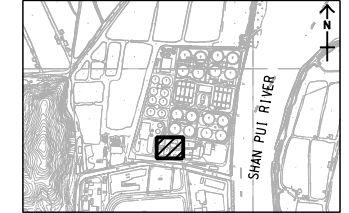
ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.

STATUS

SCALE
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DIMENSION UNIT
METRES

KEY PLAN A1 1: 10000



PROJECT NO.
60505476
CONTRACT NO.
CE 3/2015 (DS)

SHEET TITLE
PHOTOGRAPHIC RECORDS OF SITE WALKOVER FOR CENTRAL CONTROL ROOM, SCREW PUMP PUMPING STATION AND SCREENING PRESS HOUSE AT YLSTW

SHEET NUMBER
60505476/CAP/722

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PHOTO 644: FINAL SETTLING TANK
(DATE TAKEN: 8 MARCH 2017)



PHOTO 915: CONSOLIDATION TANKS
(DATE TAKEN: 22 JULY 2016)



PHOTO 721: SLUDGE DIGESTION TANK
(DATE TAKEN: 8 MARCH 2017)



PHOTO 566: AERATION TANKS
(DATE TAKEN: 8 MARCH 2017)



PHOTO 682: SLUDGE HOLDING TANK
(DATE TAKEN: 8 MARCH 2017)



LEGEND:

--- PROJECT BOUNDARY

LOCATION AND DIRECTION OF PHOTOGRAPH TAKEN / PHOTO ID

331



PHOTO 468: DIGESTED SLUDGE
CONDITIONING TANK
(DATE TAKEN: 8 MARCH 2017)



PHOTO 702: WASTE GAS BURNER
(DATE TAKEN: 8 MARCH 2017)



PHOTO 444: PRIMARY SEDIMENTATION TANKS
(DATE TAKEN: 8 MARCH 2017)



PHOTO 679: GAS HOLDERS
(DATE TAKEN: 8 MARCH 2017)

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IR/	DATE	DESCRIPTION	CHK.
號	日期	內容摘要	核實

STATUS

圖則

SCALE **DIMENSION UNIT**

比例 尺寸單位

A3 1: 1500 METRES

KEY PLAN

索引圖

PROJECT NO. **CONTRACT NO.**

項目編號 合約編號

60505476 CE 3/2015 (DS)

SHEET TITLE

圖則名稱

PHOTOGRAPHIC RECORDS OF SITE
WALKOVER FOR WASTEWATER /
SLUDGE TREATMENT TANKS AND
WASTE GAS BURNER AT YLSTW

SHEET NUMBER

圖則編號

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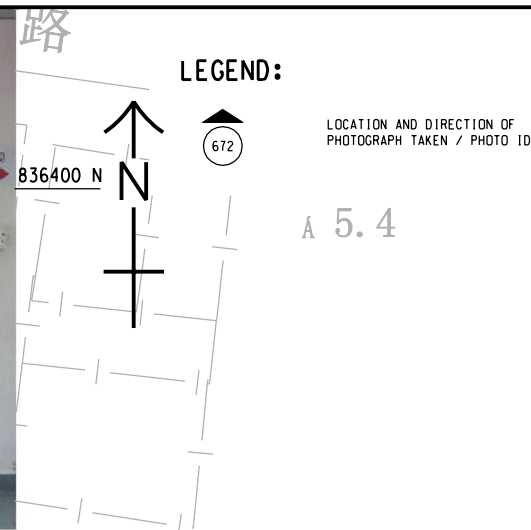


PHOTO 900: ENTRANCE OF YLSTW AND ADMINISTRATION BUILDING BEYOND (DATE TAKEN: 22 MAY 2017)

PHOTO 712: STAFF CHANGING ROOM (DATE TAKEN: 8 MARCH 2017)

PHOTO 901: ENTRANCE LOBBY ON THE GROUND FLOOR OF ADMINISTRATION BUILDING (DATE TAKEN: 22 MAY 2017)

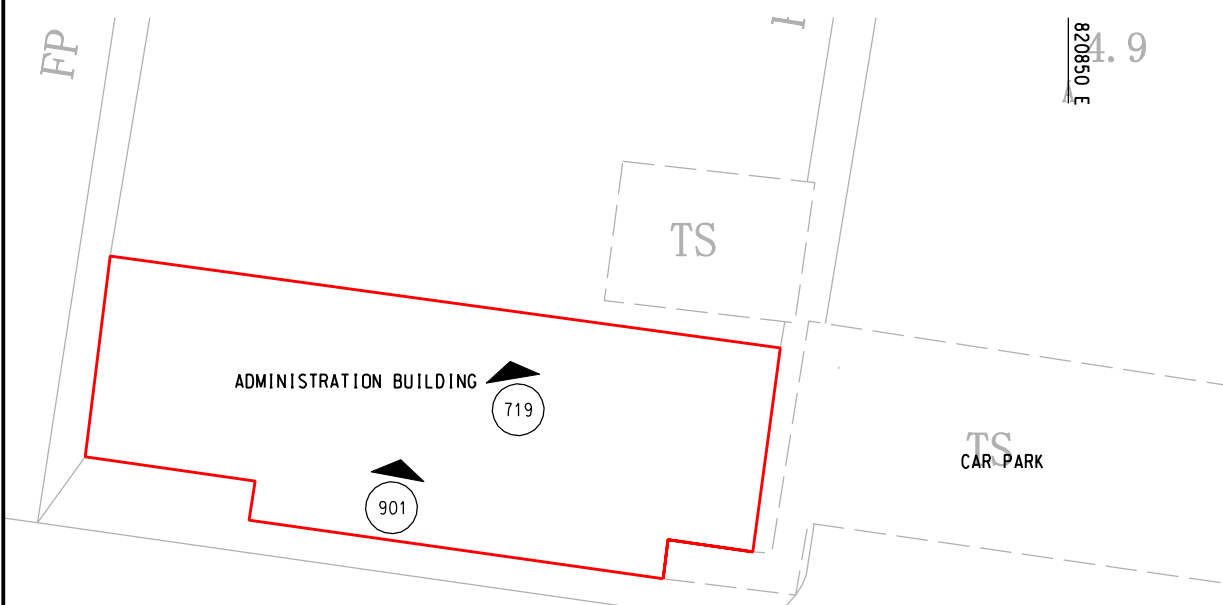
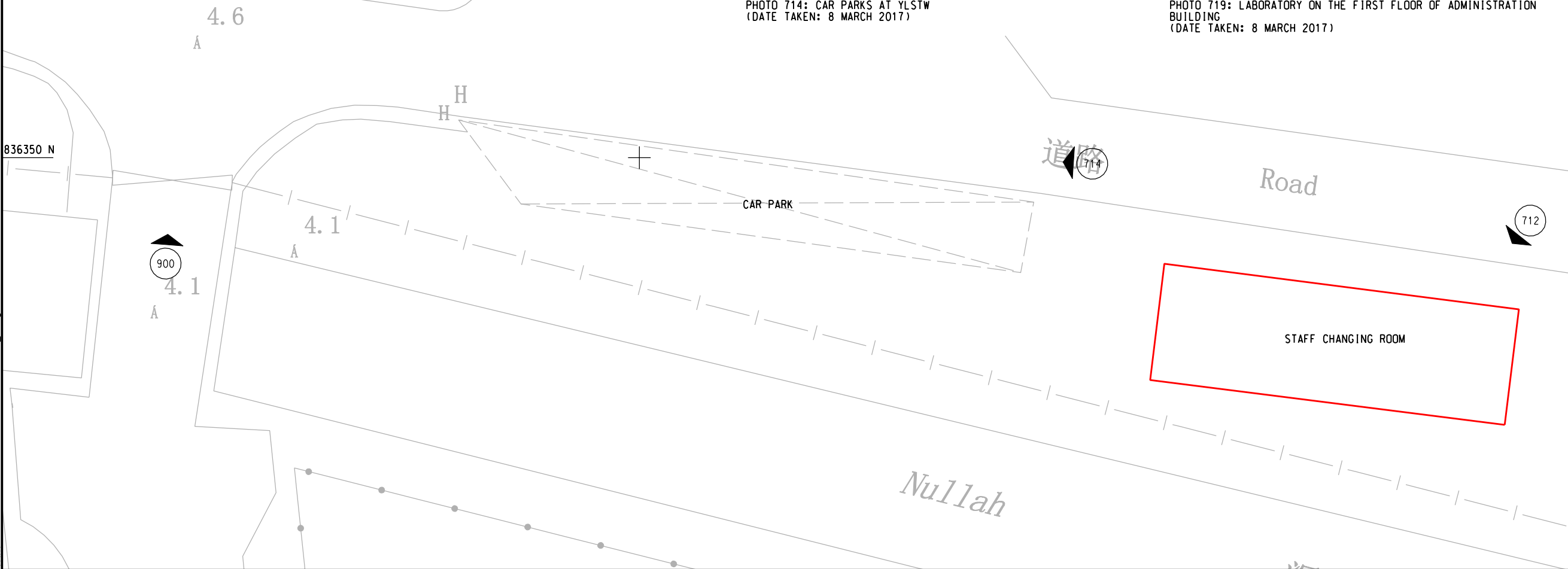


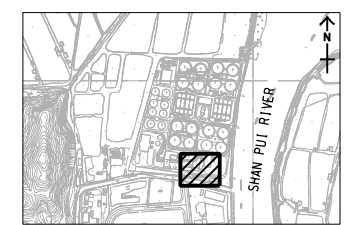
PHOTO 714: CAR PARKS AT YLSTW (DATE TAKEN: 8 MARCH 2017)



PHOTO 719: LABORATORY ON THE FIRST FLOOR OF ADMINISTRATION BUILDING (DATE TAKEN: 8 MARCH 2017)



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11/13
PATH: F:\projects\60505476\DRAWINGS\REPORT\CAP\CAP-728.dgn



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LOCATION AND DIRECTION OF PHOTOGRAPH TAKEN / PHOTO ID

5.1
A

GT

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缸

5.3
A



PHOTO 344: SLUDGE PUMP NO.1 IN THE BASEMENT OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 345: SLUDGE PUMPS NO.2-3 IN THE BASEMENT OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 952: FERRIC CHLORIDE CIRCULATION AND DOSING PUMPS IN THE BASEMENT OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 964: AIR COMPRESSORS IN THE BASEMENT OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 957: SLUDGE PUMPS NO. 4-5 IN BASEMENT OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 954: POLYMER DOSING PUMPS NO.1-4 IN THE BASEMENT OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 22 MAY 2017)



PHOTO 961: POLYMER DOSING PUMPS NO.5-6 IN THE BASEMENT OF SLUDGE DEWATERING HOUSE (DATE TAKEN: 22 MAY 2017)

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PROJECT
项目
YUEN LONG EFFLUENT POLISHING PLANT - INVESTIGATION, DESIGN AND CONSTRUCTION

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更改

I/R	DATE	DESCRIPTION	CHK.

STATUS
階段

SCALE
比例
A1 1: 100

DIMENSION UNIT
尺寸單位
METRES

KEY PLAN
索引圖
A1 1: 10000

PROJECT NO.
項目編號
60505476

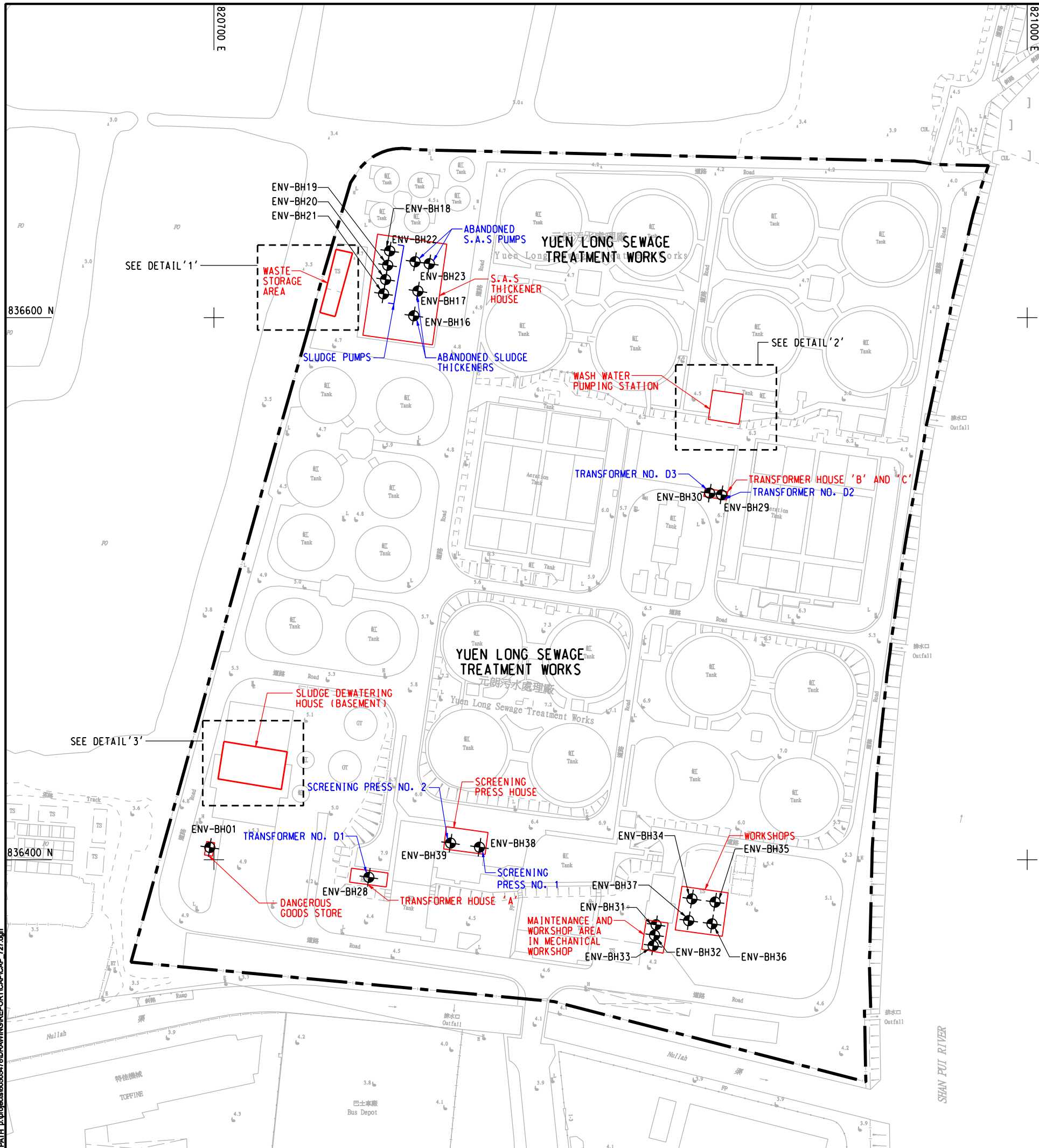
CONTRACT NO.
合約編號
CE 3/2015 (DS)

SHEET TITLE
圖紙名稱
PHOTOGRAPHIC RECORDS OF SITE WALKOVER FOR THE BASEMENT OF SLUDGE DEWATERING HOUSE AT YLSTW

SHEET NUMBER
圖紙編號
60505476/CAP/728

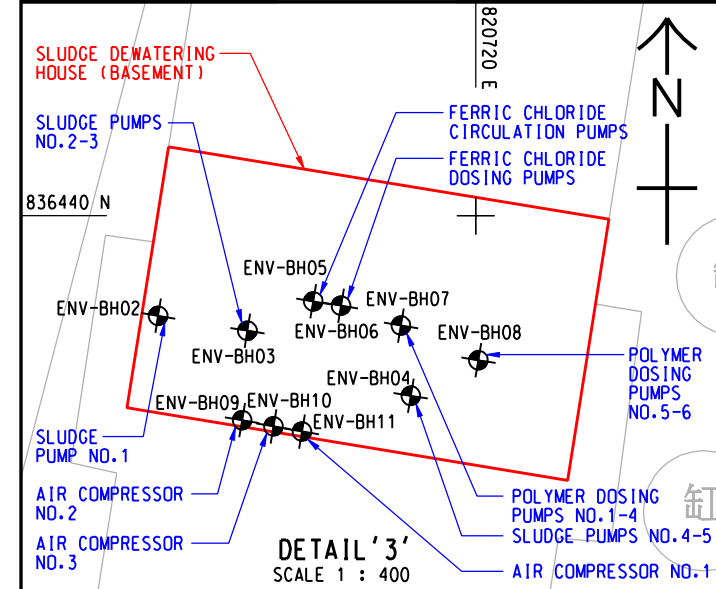
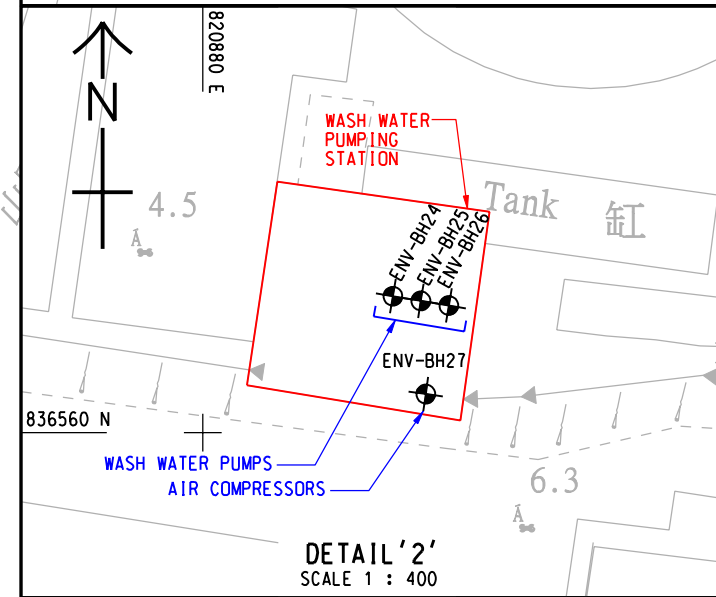
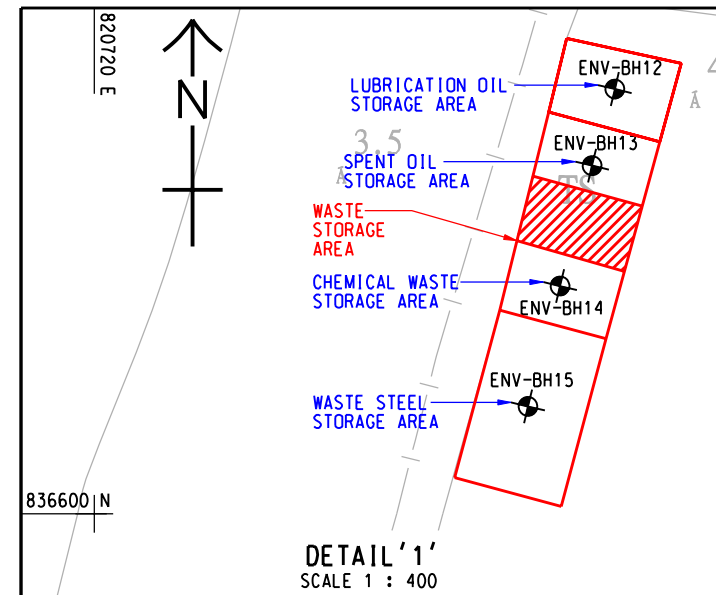
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LEGEND:

- PROJECT BOUNDARY
- CONCERNED FACILITY / AREA
- ENV-BH01 SAMPLING LOCATION



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 修訂

NO.	DATE	DESCRIPTION	CHK.

SCALE
 比例
 A3 1:1500

DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN
 索引圖

PROJECT NO.
 項目編號
 60505476

CONTRACT NO.
 合約編號
 CE 3/2015 (DS)

SHEET TITLE
 圖紙名稱
 CONCERNED FACILITIES / AREAS AND PROPOSED SAMPLING LOCATIONS WITHIN EXISTING YLSTW

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