Decommissioning and Demolition of Units L1 to L3 at Lamma Power Station

Project Profile

15 April 2024

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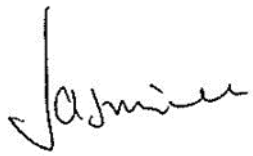

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1. BASIC INFORMATION

1.1 Project Title

The title of the project is “Decommissioning and Demolition of Units L1 to L3 at Lamma Power Station” (hereafter referred to as the Project).

1.2 Name of Project Proponent

The Hongkong Electric Co., Ltd. (HK Electric)

1.3 Purpose and Nature of Project

The Hongkong Electric Co., Ltd. (HK Electric) operates the Lamma Power Station (LPS) at Po Lo Tsui of Lamma Island, with a number of power generating units, including eight coal-fired units (i.e. L1 to L3 with capacity of 250MW and L4 to L8 with capacity of 350MW), and seven oil-fired open cycle gas turbine units (OCGTs) (i.e. GT1 to GT7). GT5 and GT7 were later converted into a gas-fired combined cycle gas turbine (CCGT) unit (GT57) in 2008.

The coal-fired units L1, L2 and L3, with power generating capacity of 250MW each, were retired in 2017, 2022 and 2018, respectively. To free up additional area for planning of other power generation project in the future, HK Electric proposes to decommission and demolish these retired units as well as the associated equipment and civil structures from 2024 onwards. If the other power generation project at the project site in the future will constitute designated projects under the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), HK Electric will obtain environmental permits for these projects following the EIAO process separately. The location of the Project site is shown in **Figure 1.1**.

1.4 Location and Scale of Project

1.4.1 Details of the Project

The Project site has an area of approximately 56,000m^2 and is located within the LPS (see **Figure 1.1**). The Project site is zoned “Other Specified Uses (Power Station)” on the Lamma Island Outline Zoning Plan No. S/I-LI/11. The proposed works of the Project includes decommissioning and demolition of the existing L1, L2 and L3 (with major components including steam turbines, generator, the boilers, and the electrostatic precipitators) as well as their associated equipment and civil structures. The existing foundations for the major civil structures will also be removed (apart from the piles of pile foundations which will be retained). All works will be undertaken within the Project site boundary as shown in **Figure 1.1**. Locations of L1, L2 and L3, their associated equipment and major civil structures to be demolished under this Project are illustrated in **Figure 1.2**. The major civil structures to be demolished and their relevant information is presented in **Table 1.1**.

Table 1.1 Information of Major Civil Structures to be Demolished

Major Civil Structures	Storeys of Buildings	Top Level of Buildings/ Structures (mPD)
Main Station Building for L1 to L3 and Connecting Footbridge	6 storeys	80
Unit 2 FGD [(c)] Electrical and Control Equipment Building including Pipe Rack	1 storey	18
Microwave Repeater Station	2 storeys	14.5
Electrostatic Precipitator Control Room No. 1 to 3	1 storey	10.5
GT57 & Coal Jetty Electrical Equipment Building	2 storeys	29.5
Junction Tower T16	-	66
Light Oil Tank Units 1 and 3	-	15

Major Civil Structures	Storeys of Buildings	Top Level of Buildings/ Structures (mPD)
Compressor House A & B	1 storey	13.5
Operational Store	1 storey	12
Sulphur Store	1 storey	14
L1 – 6 Sulphur Melt/ Store Tank Shelter	-	15
Circulating Water (C.W.) Pump Yard Control Room No. 1	1 storey	11
No. 1 Chimney	-	215
No. 1 C.W. Intake [(a)]	-	-
C.W. Culverts for L1 to L3 [(b)]	-	-

Notes:
(a) No. 1 C.W. Intake consists of underground/ underwater structures (i.e. intake culvert, intake chamber) down to about 12m below ground level.
(b) C.W. Culverts for L1 to L3 include three separate underground culverts at about 7m below ground level.
(c) FGD refers to Flue Gas Desulphurisation.

1.4.2 Demolition of Buildings and Associated Equipment

The existing L1, L2 and L3 as well as their associated buildings and equipment (including aboveground and foundation structures) as mentioned in **Section 1.4.1** will be decommissioned and demolished in phases. The decommissioning and demolition work of L1 to L3 and their associated equipment and civil structures will proceed in general order of preliminary works involving the modification / diversion of existing piping and cables, followed by the demolition of the plant equipment, and eventually the demolition of the buildings and civil structures. Typical construction equipment such as electric/ mechanical breakers, flame cutting, grinder, hydraulic crusher, overhead crane and other powered mechanical hand tools will be used during demolition works.

Demolition of L1, L2 and L3 and associated Plant Equipment

The removal of auxiliary equipment inside the Main Station Building for L1 to L3 such as pumps, coolers, air receivers and the associated pipework will involve the work sequence below:

i) Securing the pipework inside the Main Station Building by lifting gears, cutting into sections and removing the pipework,

ii) Disconnecting and removal of the pipes that are directly connected to the equipment,

iii) Dismantling and disconnecting the equipment by either cutting using a cutting tool or disconnecting the parts by removing the bolts connecting the equipment,

iv) Transportation of the dismantled pipework and equipment will be transported to a designated storage area.

The boilers and the power trains (i.e. the steam turbines, condensers and generators) for L1, L2 and L3 that are also housed within the Main Station Building for L1 to L3 will be decommissioned and demolished.

Regarding the power trains, the steam turbines (i.e. high pressure (HP)/ intermediate pressure (IP) and low pressure (LP) turbines) will be demolished and the main work sequence will include the following:

i) Removal of acoustic enclosures by frame cut and/or unbolt inside the enclosures,

ii) Removal of turbine insulation and associated piping and electrical control & instrumentation (EC&I) connected to the steam turbines,

iii) Removal of the bolts and nuts connected between the upper and lower casings of the HP/IP and LP steam turbines by using oxy-acetylene torch cutting,

iv) Lifting out the upper casings of the HP/IP and LP steam turbines or nut loosening,

v) Decoupling the HP/IP, LP and generator rotors and lifting the HP/IP and LP rotors out,

vi) Lifting out the lower casings of the HP/IP and LP steam turbines.

The above demolition sequence shall ensure that the power trains will be broken down into components with weights which are within the lifting capacity of the overhead crane for removal. Besides, for ease of transportation, some of the components such as turbine blades will be further cut by plasma cutting or other well-proven method before transporting out of site.

For the generator (adjacent to the LP steam turbine), its enclosure, exciter and air cooler will be removed first. A chain block system will then be set up to pull out the rotor from the stator with the assistance of the overhead crane. To reduce the weight of the stator for lifting in case required, it will be cut into smaller portions, lifted and transported off-site.

The removal of the condenser (under the LP steam turbine) will involve the following work sequence:

i) Using magnetic core drilling, saw cut or other proven mechanical cold work method to remove the shell skirt and shell plate of the condenser,

ii) Removal of the condenser tubes and internal structure by deploying the top down and cold cutting method or tube extraction machine,

iii) Removal of the base plate/frame by flame cutting.

For the boiler plant, the boilers as well as facilities between boiler house and chimney such as electrostatic precipitator, FGD and ducting will be demolished. To reduce dust, noise and vibration, the boiler will be dismantled by jack down method or other well-engineered method. Firstly, the equipment at furnace bottom which will cause obstruction to jack down will be demolished. Then, the jack system will be installed at boiler top and connected to the top girders which are supporting the whole boiler. The top girders will be cut and disconnected such that the whole boiler could be jacked down, and the boiler tubes could then be dismantled at the ground floor. The jack down process will be repeated until the whole boiler has been dismantled.

Demolition of Buildings and Civil Structures

Top-down demolition method down to footings and pile caps (where piles are to be retained) will be employed for the removal and demolition of abovementioned building structures, including the No. 1 Chimney and the No. 1 C.W. Intake (including the underground culverts within the Project site). Conventional manual flame cutting and machine crane lifting for removing the structural steel framework will be carried out, while conventional mechanical breaker and hydraulic crusher would be used for removing reinforced concrete elements. For the demolition of chimney reinforced windshield, mechanical breaker equipped with special climber may be deployed.

The demolition of No. 1 C.W. Intake (see **Figure 1.3**) will involve the work sequence below:

i) Installing vertical contiguous pipe pile wall around existing intake chamber,

ii) Setting up silt curtain around the marine works area, followed by removal of existing artificial sloping seawall at the No. 1 C.W. Intake,

iii) Sealing up existing intake culverts and discharging water inside until the culverts start to float,

iv) Towing away and removing the intake culverts by derrick barges,

v) Reinstating the artificial sloping seawall at the No. 1 C.W. Intake, followed by installation of contiguous pipe pile wall to form a close dry cofferdam enclosing existing intake chamber,

vi) Demolishing the intake chamber by conventional mechanical breaker and hydraulic crusher,

vii) Backfilling the site to match adjacent ground level.

The No. 1 C.W. Intake involves no sub-seabed structure, thus dredging or disturbance of the seabed associated with the demolition works is not expected.

1.4.3 Interfacing with the Existing Operation of LPS

The coal conveying system and the associated coal junction towers shall be retained and kept intact to prevent any disruption to the coal supply to Units L4 to L8 until the retirement of the respective units.

Light Oil Tanks No.1 and 3 as well as the associated fuel oil pump sets in Main Station Building for L1 to L3 will be isolated from main supply from Oil Tank Farm before demolition. The light oil supply/ return headers along Main Road in the demolition area are required to be retained for fuel oil supply to other units until the retirement of the respective units.

Fresh water supply to L1 to L3 Turbine Basement and water tanks in Main Station Building for L1 to L3 will also be isolated before demolition. There are three fresh water supply headers running along Main Road, Precipitation Road and Administration Road within the Project site which need to be retained for fresh water supply to Fresh Water Tanks and other units until the retirement of the respective units.

1.5 History of the Project Site

The LPS is situated on a 50-hectare site at Po Lo Tsui of Lamma Island, which was gazetted and granted to HK Electric in September 1978. The LPS was developed in phases, which comprises eight coal-fired units (L1 to L8) and seven OCGTs (GT1 to GT7). GT5 and GT7 were later converted into a gas-fired CCGT unit (GT57) in 2008.

The first three coal-fired units (L1 to L3) were commissioned in 1982, 1983 and 1984, respectively and the 8th one (L8) has been put in operation since 1997. L2, L4 and L5 were later retrofitted with FGD system in 2010, 2010 and 2009 respectively. Considering the retirement of L1, L2 and L3 (in 2017, 2022 & 2018 respectively), the retired L1, L2 and L3, and the associated equipment and civil structures would be decommissioned and demolished.

1.6 Name and Type of Designated Project to be Covered by this Project Profile

The decommissioning and demolition of the coal-fired units (i.e. L1, L2 and L3) and the associated equipment and civil structures at LPS are classified as a Designated Project under Schedule 2, Part II, Item 4 - "Decommissioning Projects: *An electricity power plant running on fossil fuel with a production capacity of more than 100 megawatts"* under the *Environmental Impact Assessment Ordinance* (EIAO) (Cap. 499).

This Project Profile was prepared to seek permission to apply directly for an Environmental Permit (EP) for the project under Section 5(11) of the EIAO. The environmental impact of the Project is unlikely to be adverse. Based on this, the Project shall meet the requirement of *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) to apply directly for the EP.

1.7 Name and Telephone Numbers of Contact Persons

ERM-Hong Kong, Limited (ERM) has been appointed to undertake the environmental permitting for this Project on behalf of the Project proponent. All queries regarding the project can be addressed to:

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Fax: (852) 3015 8052

Or the Project Proponent:

HK Electric

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Fax: (852) 2580 9032

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

The decommissioning and demolition work of L1 to L3 and their associated equipment and civil structures will be carried out in phases tentatively starting from 2024. The tentative implementation milestones of the Project are summarised in **Table 2.1** below. The actual work programme will be subject to further engineering review.

Table 2.1 Key Implementation Milestones

Key Milestones	Tentative Programme
Preliminary works including modification / diversion of existing piping and cables	Q4 2024 – Q3 2025
Demolition of equipment inside Main Station Building for L1 to L3 including the power trains and auxiliary equipment	Q2 2025 – Q4 2028
Demolition of Boiler Plant (including the boilers, electrostatic precipitators, FGD)	Q2 2025 – Q4 2028
Demolition of other equipment	Q4 2024 – Q4 2028
Demolition of superstructure	Q1 2029 – Q4 2034
Demolition of substructure [(a)]	Q1 2031 – Q1 2035

Note:
(a) Demolition of the intake culvert of the No. 1 C.W. Intake involving marine works would take around 3-6 months.

Demolition of L1-L3 and their associated equipment and civil structures are to be carried out in phases across a period of about 10 years to suit HK Electric's long-term strategic planning development. Also, as demolition of building structures are involved, lead time is planned in the entire project programme for obtaining consent and approval from relevant departments (e.g. Buildings Department) for the demolition works. Lead time is also considered in the overall demolition programme of the Project to cater for potential complications that may be encountered during the diversion of existing in-service piping and cables currently running through the Project site before the actual demolition works can be taken place. In addition, the time needed for undertaking land contamination site investigation (SI) works and subsequent remediation works (if required) is also taken into account in the overall project programme, where demolition of substructures involving excavation works will only be conducted upon completion of the SI works and remediation works (if required) and confirmation that the concerned areas are clear of land contamination.

The proposed decommissioning and demolition work will be planned with consideration of land usage constraints, technical feasibility, supply and security, health and safety, and environmental aspects by HK Electric's in-house engineers. Works of the Project will be carried out by the contractor appointed by HK Electric and HK Electric will deploy direct supervision for the Project. The appointment of consultant/contractor for the decommissioning and demolition works will be tentatively scheduled in Q4 2024.

2.2 Interactions with Other Surrounding Projects

The following existing, committed or planned projects in the vicinity of the Project site may potentially interface with this Project. Locations of these projects are shown in **Figure 2.1**.

- *Re-provision of Open Cycle Gas Turbines at Lamma Power Station (AEIAR-234/2022):* This project involves demolition of four retiring OCGTs (i.e. GT2, GT3, GT4 and GT6) and one CCGT (i.e. GT57), and construction and operation of up to four new OCGTs (i.e. GT8, GT9, GT10 and GT11) as replacement units to maintain peak-loping and emergency operational requirements. The re-provision programme commenced in early 2023 and is planned to be implemented in phases for completion in 2028 tentatively.

- *Gas-fired Power Station at Lamma Extension (AEIAR-010/1999):* This project includes the construction and operation of one 335MW and four 380MW combined cycle gas turbine (CCGT) units at the Lamma Extension (LMX). L9, L10 and L11 have been constructed and are currently under operation. L12 is currently under commissioning and is scheduled for commercial operation in early 2024. L13 is currently in planning stage, with piling installation scheduled for works commencement in early 2024 and plant completion ready for taking over by end of 2028 tentatively.

- *Improvement Dredging for Lamma Power Station Navigation Channel (AEIAR-212/2017):* This project involves improvement dredging of the Channel to the west of LPS during construction phase, and subsequent recurrent improvement dredging every 4 to 10 years during operation phase. The construction of the Project commenced in February 2020 and was completed in September 2021.

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

The existing environment of the Project site within 500m of the boundary of the Project and works areas is shown in **Figure 3.1**.

The Project site is located within the LPS at the western edge of Lamma Island. Major elements of the surrounding environment include the existing LPS, Hung Shing Ye to the east, Ko Long to the north, and vegetation, agricultural land and open space areas in various directions. The surrounding areas of the Project are zoned as Green Belt (GB), Other Specified Uses (OU) and Village Type Development (V) in accordance with the Outline Zoning Plan (OZP) for Lamma Island (Approved Outline Zoning Plan No. S/I-LI/11).

4. POTENTIAL IMPACTS ON THE ENVIRONMENT

4.1 Overview of Potential Environmental Impacts

The potential environmental impacts arising from the decommissioning and demolition of the Project have been investigated and discussed in this *Section*. An overview of the potential environmental impacts associated with the Project have been identified and summarised in **Table 4.1**.

The key potential impacts from the Project during decommissioning and demolition works are related to air quality, noise, water quality, waste management, land contamination and ecology. Further details on the consideration of the potential environmental impacts are provided in subsequent sections.

Table 4.1 Potential Environmental Impacts Arising from the Project during Decommissioning/ Demolition Phase

Potential Impacts	Decommissioning/ Demolition Phase [(a)]
Air Quality	
- Construction dust	✓
- Gaseous emissions	✓
- Odour	—
Noise	✓
Night-time Operations	✓
Traffic Generation	—
Liquid Effluents & Discharges	✓
Generation of Waste or By-products	✓
Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods	—
Hazard to Life	—
Disposal of Spoil Material, including Potentially Contaminated Materials	✓
Disruption of Water Movement or Bottom Sediment	✓ [(b)]
Change in Visual Appearance	—
Cultural & Heritage	—
Terrestrial Ecology	—
Marine Ecology & Fisheries	✓

Note:
(a) ✓ **=** Possible '—' = Not Expected
(b) Disruption of bottom sediment is not expected.

4.2 Air Quality

4.2.1 Air Sensitive Receivers

Two representative air sensitive receivers (ASRs) outside of LPS have been identified within 500m from the Project site boundary as shown in **Figure 4.1** and listed in **Table 4.2**. The closest representative ASR outside of LPS has been identified to be about 420m from the Project site.

Table 4.2 Identified Representative Air Sensitive Receivers Outside of LPS

ASR ID.	Description	Type of Use	Approximate Distance from the Project Site Boundary (m)
A1	Village House No. 20, Tai Shan West	Residential	420
A2	Village House No.10, Tai Shan Central	Residential	470

4.2.2 Potential Sources of Impacts

Potential sources of air quality impacts during decommissioning/ demolition phase include:

- fugitive dust emissions (key air pollutants including respirable suspended particulates (RSP) and fine suspended particulates (FSP)) generated from the demolition of the aboveground equipment and structures, and excavation works required for removal of foundation structures of the retired units and associated equipment;
- emissions from the on-site use of powered mechanical equipment (PMEs) and dump trucks (key air pollutants including nitrogen dioxide (NO_2) and sulphur dioxide (SO_2), RSP and FSP); and
- emissions from marine vessels (including NO_2, SO_2, RSP and FSP) for transportation of materials and equipment to and from LPS.

As L1, L2 and L3 have been retired and the associated civil structures are no longer in active operation, chemicals or furnace bottom ash have already been removed and handled in accordance with relevant regulations (i.e. *Waste Disposal (Chemical Waste) (General) Regulation* (CAP. 354C) and *Air Pollution Control (Construction Dust) Regulation* (CAP. 311R). As a precautionary measure, HK Electric will perform a final inspection prior to the implementation of the Project to confirm all chemicals and furnace bottom ash have been removed completely from the civil structures. As such, there would be no potential release of air pollutants from stored chemicals or residual furnace bottom ash during the demolition of these civil structures under this Project.

Asbestos containing materials (ACMs) may be present in the retired units and the associated equipment and civil structures. There is a potential the ACMs may be released from the decommissioning and demolition of these units and associated equipment and civil structures, if not managed and controlled properly. A Registered Asbestos Consultant shall be employed to undertake an asbestos survey to identify the presence of ACMs, if any, in these units and associated equipment and civil structures and submit an Asbestos Investigation Report (AIR) to EPD for approval. Should any ACM be found present, an Asbestos Abatement Plan (AAP) shall be prepared by the Registered Asbestos Consultant in accordance with the *Air Pollution Control Ordinance* (CAP.311) and *Codes of Practice on Asbestos Control*, and submitted to EPD for approval. The ACM would subsequently be removed by a registered asbestos contractor in accordance with the approved AAP prior to the commencement of the decommissioning and demolition works of the Project. The registered asbestos contractor is required to strictly follow the precautionary and proper removal procedures given in the approved AAP and in accordance with the APCO and the *Codes of Practice on Asbestos Control*. With the proper implementation of regulatory procedures of handling ACMs, the release of asbestos from ACMs and its potential air quality impact is not envisaged.

Dioxin is not a key pollutant from the operation of coal-fired power plant. For instance, with reference to the stack sampling for dioxins conducted by EPD at Unit L2 (1), the measured concentrations of dioxins were negligible (i.e. 0.00156 – 0.00454 ng I-TEQ/m^3, which was two orders of magnitude smaller than the emission limit of dioxins (0.1 ng I-TEQ/m^3 (2)). Given that electrostatic precipitators

(1) Stack Sampling Results on Dioxin, PCB and Mercury Conducted by EPD in 2004 and 2005

(2) Emission limit of dioxins is not stipulated in the EPD's Best Practicable Means (BPM) for coal-fired plant (BPM 7/1 (2018)). The emission limit of dioxins in the BPMs for various incinerators works is referenced (i.e. BPM 20 (08), BPM 12/2 (2020), BPM 12/1 (08), BPM 12/3 (10) and BPM 24 (08)).

were also in place to filter the flue gas and the fly ash was collected for disposal, the dioxins adhering in the structures of the coal-fired units (e.g. chimney), if any at all, is expected to be negligible. With the implementation of proper dust control measures during the demolition works, including covering structures to be demolished and watering, the release of dioxins to the atmosphere is not anticipated.

4.2.3 Evaluation of Impacts

Fugitive Dust Emissions

Site clearance, decommissioning and demolition of the units and the associated equipment and civil structures will all be carried out within the existing LPS site. Most of the works associated with the Project will involve demolition of aboveground equipment and structures. No major site formation will be required, except for the excavation works required for removal of foundation structures.

The estimated total quantity of excavated material from the excavation works is approximately 210,000 m^3. The excavation works will be carried out in phases throughout an extended period of time (i.e. tentatively from 2024 to 2035), with active excavation area of no more than 10,000 m^2 at any one time. Generation of fugitive dust emissions during decommissioning and demolition of the Project is expected to be localised within the LPS. Considering that the nearest ASR outside of LPS is more than 420m away from the Project site boundary, adverse fugitive dust impact on ASRs outside of LPS during decommissioning/demolition phase is not anticipated, provided that good construction site practices and relevant mitigation measures recommended in the *Air Pollution Control (Construction Dust) Regulation* are properly implemented.

It is noted that the Administration and Control Building is located immediately south of the Project site within the LPS. With the proper implementation of good construction site practices and relevant mitigation measures recommended in the *Air Pollution Control (Construction Dust) Regulation* and those listed in **Section 5.1**, HK Electric staff in the Administration and Control Building are not expected to be subject to adverse cumulative air quality impact arising from the demolition works under this Project and other concurrent projects within LPS. Furthermore, HK Electric will carry out administrative measures (e.g. posting notices of work progress of demolition works at the Administration and Control Building, setting up enquiry/ complaint hotline for the HK Electric staff) as appropriate and maintain good communication with their staff in the Administration and Control Building during the implementation of the Project to minimise any potential air quality impact to their staff as far as possible.

Emissions from the On-site Use of PMEs and Dump Trucks

It is estimated that no more than 40 number of on-site PMEs will be operating at a time within the Project site. The dump trucks would be primarily operated within the Project site for handling of excavated materials, as well as travelling between the Project site and the marine loading/ unloading points (see **Figure 4.1**) (no more than 60 truck trips per day) for equipment transport and delivering C&D materials off-site. In view of the large separation distance between the nearest ASR outside of LPS and the Project site (i.e. over 420m), adverse air quality impact from emissions from on-site PMEs and dump trucks to the ASRs outside of LPS during decommissioning/ demolition phase is not anticipated.

With the proper implementation of the requirements stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation*, *Air Pollution Control (Fuel Restriction) Regulation* and *Air Pollution Control (Smoke) Regulation* to control the emissions from the on-site PMEs and dump trucks, air quality impact arising from the emissions from the on-site PMEs and dump trucks to HK Electric staff in the Administration and Control Building is expected to be limited. In addition, power supply for on-site machinery will be provided if feasible, avoiding the use of diesel generators and machinery as far as practicable. The use of exempted Non-Road Mobile Machinery (NRMMs) on site will also be avoided. In view of the above, adverse air quality impact from emissions from the on-site use of PMEs and dump trucks during decommissioning/ demolition phase is not anticipated.

Emissions from Marine Vessels for Transportation of Materials and Equipment

Marine vessels, such as barges, will be used for transporting necessary equipment and import fill materials to the Project site, and delivering C&D materials off-site. It is expected that there will only be a few vessel trips per week for the marine transportation with only one vessel travelling to and from the marine loading/ unloading points at a time. During any loading/ unloading operation, all dusty materials will be sprayed with water or dust suppression chemical and the dropping heights will be controlled to minimise fugitive dust emission.

During cruising, the marine vessels will travel via the West Lamma Fairway with the travelling route of the marine vessels separated from the nearby ASRs for more than 500m. On approach to LPS, the marine vessels may be berthed at one of two possible loading and unloading points as shown in **Figure 4.1**. Although loading and unloading point 1 and the associated marine travelling route on approach may be within 500m from some village houses at Tai Wan Nam (behind the Lamma Power Station Beach and outside of the 500m Assessment Area, see **Figure 4.1**), there is still relatively large separation distance between them (about 350m apart). For berthing at loading and unloading point 2, the marine travelling route on approach and the berthing location are more than 500m from the identified ASRs. The Administration and Control Building of LPS is within 500m from the loading and unloading point 2 but is located at a sufficient distance away (about 400m apart). In addition, the marine vessels will prioritise the use berthing point 2 as much as possible during the construction phase in order to minimise the air quality impact for the nearby ASRs, including village houses at Tai Wan Nam and the Administration and Control Building of LPS. Furthermore, when at berth, the main engine of marine vessels will be switched off, and only the auxiliary engine may be in use for the loading and unloading operation.

With the limited number of marine vessels used and sufficient separation distances between the nearby ASRs and marine vessels, air quality impact due to emissions from the marine vessels is expected to be limited. In addition, other marine vessels are not expected to berth at berthing points 1 and 2 concurrently with the Project during the construction phase and thus cumulative impact from other marine vessels are not expected.

In addition, *Air Pollution Control (Marine Light Diesel) Regulation* and *Air Pollution Control (Fuel for Vessels) Regulation* will be followed to control the fuel use for marine vessels of the Project, including the limitation of 0.05% sulphur content in marine diesel fuel.

Taking into consideration of the above, adverse air quality impact due to marine vessel emissions during the decommissioning/demolition phase of the Project is not anticipated.

4.3 Noise

The decommissioning and demolition works for the Project will involve the use of Powered Mechanical Equipment (PME), including those for concreting breaking works, which have the potential to cause elevated noise levels. There are no representative Noise Sensitive Receivers (NSRs) identified within 300m from the Project site, in accordance with the criteria stipulated in Annex 13 of the *EIAO-TM*. The closest NSRs are the Village House No. 20 at Tai Shan West and Village House No. 10 at Tai Shan Central as shown in **Figure 4.2**, which are about 420m and 470m from the Project site, respectively. The Project site is separated from the NSRs by a mountain, providing a screening effect to the noise emission from the demolition works (see **Figure 4.3**) such that there is no direct line of sight between the NSRs and the structures within the Project site except the No. 1 chimney which is about 215mPD in height. The demolition of the No. 1 chimney is expected to last only about 6-12 months out of the entire demolition period of about 10 years. Proper noise mitigation measures as discussed in **Section 5** will be implemented as far as practicable during the chimney demolition, and that the chimney demolition will only be carried out during non-restricted working hours, to minimise any potential noise disturbances to the identified NSRs.

Given the large separation distance between the Project site and the identified NSRs, as well as the screening effect by the mountain for majority of the demolition works, adverse noise impact from the

decommissioning and demolition of the Project is not expected with proper noise mitigation measures in place, including the use of quieter construction methods/ equipment.

4.4 Night-time Operation

Decommissioning and demolition works of the Project are expected to be performed during non-restricted working hours, i.e. between 0700 and 1900 hours on any day not being a Sunday or general holiday, as far as possible. However, construction works (except chimney demolition) during restricted working hours may potentially be required on an as-needed basis throughout the decommissioning/ demolition phase of the Project. Under such circumstances, a Construction Noise Permits (CNP) shall be obtained in accordance with the requirements of the *Noise Control Ordinance (NCO)*. The Noise Control Authority will consider a well-justified CNP application, for construction works within restricted hours as guided by the relevant TMs issued under the NCO. The Noise Control Authority will take into account adjoining land uses and any previous complaints against construction activities at the site before making a decision. Nothing in this PP shall bind the Noise Control Authority in making its decision. The Noise Control Authority may include any conditions in a CNP that it considers appropriate. Failure to comply with any such conditions may lead to cancellation of the CNP and prosecution action under the NCO.

4.5 Water Quality

The Project Site is located within the catchment of the Southern Water Control Zone under the *Water Pollution Control Ordinance (WPCO)*. The marine water quality data from the nearest EPD monitoring station (i.e. SM5) in 2022 is provided in **Table 4.3**. Water quality near the LPS has achieved a high overall Water Quality Objectives (WQO) compliance rate in 2022, except for WQO exceedance of Total Inorganic Nitrogen (TIN), which is a result of both the relatively high contributions from the Pearl River as well as the stringent criterion for TIN at the Southern WCZ.

Table 4.3 Summary of EPD Routine Water Quality Monitoring Data from Station SM5 of the Southern WCZ in 2022

Parameter	Unit	SM5
Temperature	°C	24.6 (18.5 – 29.1)
Salinity		31.4 (24.7 - 34.0)
Dissolved Oxygen	mg/L	6.3 (5.5 – 7.1)
Dissolved Oxygen (Bottom)	mg/L	6.4 (5.1 – 7.6)
Dissolved Oxygen	% Saturation	90 (81 – 102)
Dissolved Oxygen (Bottom)	% Saturation	92 (78 – 114)
pH		7.8 (7.3 – 8.3)
Secchi Disc Depth	m	2.6 (1.4 – 5.2)
Turbidity	NTU	11.5 (4.1 – 42.4)
Suspended Solids	mg/L	5.3 (2.3 – 10.6)
5-Day Biochemical Oxygen Demand	mg/L	0.8 (<0.1 – 1.7)
Ammonia Nitrogen	mg/L	0.030 (0.009 - 0.077)
Unionised Ammonia	mg/L	0.001 (<0.001 – 0.003)
Nitrite Nitrogen	mg/L	0.014 (<0.002 – 0.036)

Parameter	Unit	SM5
Nitrate Nitrogen	mg/L	0.127 (<0.002 – 0.443)
Total Inorganic Nitrogen	mg/L	0.17 (0.003 – 0.51)
Total Kjeldahl Nitrogen	mg/L	0.33 (0.06 – 0.63)
Total Nitrogen	mg/L	0.47 (0.12 – 0.67)
Orthophosphate Phosphorus	mg/L	0.007 (<0.002 – 0.019)
Total Phosphorus	mg/L	0.04 (0.02 – 0.08)
Silica (as SiO_2)	mg/L	0.90 (0.11 – 2.83)
Chlorophyll-*a*	µg/L	4.0 (0.7 – 11.0)
E. coli	counts/100mL	1 (<1 – 7)
Faecal Coliforms	counts/100mL	2 (<1 – 25)

Notes:
(a) Unless otherwise specified, data presented are depth-averaged (A) values calculated by taking the means of three depths: Surface (S), Mid-depth (M), Bottom (B).
(b) Data presented are annual arithmetic means of the depth-averaged results except for *E. coli* and faecal coliform which are annual geometric means.
(c) Data in brackets indicate the ranges.
(d) During the periods of the special work arrangement under the COVID-19 pandemic in 2022, marine water quality monitoring frequency was adjusted and sampling at representative monitoring stations were maintained. Full scale monitoring was conducted in the periods of January to February and April to December 2022.

The water sensitive receivers (WSRs) that may be affected by changes in water quality arising from the Project have been identified in **Table 4.4** and shown in **Figure 4.4**. It is noted that the only WSR within the 500m Assessment Area for water quality is the LPS Seawater Intake. The nearest bathing beach at Hung Shing Yeh is about 1.2 km away, while the second nearest is the Lo So Shing Beach at 2.1 km away. Corals were also identified at northern Hung Shing Yeh about 1km away.

Table 4.4 Water Sensitive Receivers in the Vicinity of the Project Site

WSR ID.	Description	Type of Use	Approximate Distance from the Project Site Boundary (m)
W1	LPS Seawater Intake	Industrial	305
W2	Hung Shing Yeh Beach	Recreational	1,220
W3	Lo So Shing Beach	Recreational	2,135
W4	Corals at Northern Hung Shing Yeh	Ecological	1,040

The Project works primarily involve decommissioning and demolition of aboveground equipment and civil structures and thus wastewater is expected to be generated from the construction site. Construction site discharge will be collected and treated on site before discharge following a discharge licence to be issued under the WPCO. In addition, sewage will be generated from the construction workforce during the decommissioning and demolition works. Temporary toilets will be provided to collect sewage from the construction workers for off-site disposal on a regular basis. Furthermore, minor marine works may be required for the demolition of the existing intake culvert of the No. 1 C.W. Intake (around 3-6 months) and has the potential to disrupt the water movement temporarily during the demolition works. However, given such demolition works are considered relatively small scale and short-term, the potential disruption of water movement near shore is expected to be very localised and transient. The existing No. 1 C.W. Intake is located above the seabed and thus dredging or disturbance of marine sediments is not expected. Nevertheless, the

demolition works underwater still have the potential to cause elevation in suspended solids (SS) in the water column in close proximity to the works areas. Therefore, as a precautionary measure, during the demolition works for the No. 1 C.W. Intake as described in **Section 1.4.2**, silt curtain (with typical silt removal efficiency of around 75% reduction) will be installed around the works area (see **Figure 1.3 and Section 1.4.2**) to minimise the potential water quality impacts.

With implementation of good construction site practice, including the *Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN2/23)* and other relevant guidelines and statutory requirements, unacceptable water quality impact from the decommissioning and demolition works is not anticipated.

4.6 Waste Management

The site clearance, decommissioning and demolition activities of the Project will result in the following broad categories of waste:

- Construction and demolition (C&D) materials from site clearance and demolition of plant equipment and buildings;
- Excavated materials (soil and rock) from the demolition of building foundations;
- Chemical waste, such as ACMs, leftover diesel, petroleum products or chemicals from the equipment and oil tanks to be demolished, as well as from maintenance of construction vehicles and equipment during demolition works; and
- General refuse, including food waste from the on-site construction workforce and the packaging materials generated during demolition works.

4.6.1 C&D Materials

The estimated quantity of C&D materials generated from the demolition of major plant equipment and civil structures of buildings is summarised in **Tables 4.5** and **4.6.**

Table 4.5 Estimated Quantity of C&D Materials Generated during the Decommissioning and Demolition Works

Activity	Major Equipment / Buildings to be Demolished	Estimated Quantity
Demolition of Plant Equipment	power train, boiler steam system, condensate system, air & flue gas system, coal-firing /oil-firing system and light oil tank, lubrication oil system, generator/ unit transformer, SO_3 injection plant, chemical dosing system, bearing cooling water system, cooling water system, electrostatic precipitator, coal handling system, ash handling system, FGD plant (L2), other associated system/ equipment	1,298 m^3
Demolition of Civil Structures	Main Station Building for L1 to L3 & Connecting Footbridge, C.W. Pump Yard Control Room No. 1, Junction Tower T16, GT57 & Coal Jetty Electrical Equipment Building, Light Oil Tank Units 1 and 3, Compressor House A & B, Operational Store, Sulphur Store, L1 – 6 Sulphur Melt/ Store Tank Shelter, Microwave Repeater Station and E.P. Control Room No.1 to 3, Unit 2 FGD Electrical and Control Equipment Building (including pipe rack), No. 1 Chimney, No. 1 C.W. Intake and C.W. Culverts for L1 to L3, road pavement	1,963,860 m^3

Table 4.6 Breakdown of C&D Materials to be Generated during the Decommissioning and Demolition Works

Type of C&D Materials	Estimated Quantity			Proposed Handling/ Disposal Method
	Generated [(a)]	Onsite Reuse/ Offsite Recycle	Disposal	
Inert C&D Materials (e.g. broken concrete)	1,768,642 m^3	0 m^3	1,768,642 m^3	• Sent to public fill reception facilities (i.e. Tuen Mun Fill Bank, Tseung Kwan O Fill Bank) directly or via Mui Wo Temporary Public Fill Reception Facility for future beneficial use in other projects.
Non-inert C&D Materials (e.g. plastics, timber, cardboard, scrap metals)	196,516 m^3	Recycled as far as practicable	196,516 m^3	• Off-site recycling • Disposed of at landfill sites (e.g. West New Territories (WENT) Landfill) directly or via Outlying Island Transfer Facilities

Notes:
(a) Assuming 90% inert and 10% non-inert C&D materials.

C&D materials generated from demolition of plant equipment and civil structures would be primarily inert (e.g. broken concrete) and non-inert (e.g. scrap metals, plastics, timber, cardboard). The C&D materials (inert and non-inert) will be segregated at source and temporarily stored on site. Recyclables such as scrap metals will be recovered for recycling as far as practicable. The C&D materials will be transported to the identified loading/ unloading points at LPS and delivered off-site for recycling or disposal at landfills (non-inert) and public fill reception facilities (inert). With the demolition works to be carried out in phases over an extended period of time (i.e. most of the civil structures are expected to be demolished tentatively from Q1 2029 to Q1 2035), it is estimated that the generation of the C&D materials arising from the demolition of plant equipment and buildings within the Project site would require no more than a few barge trips per week [(3)] for off-site disposal or recycling. In view of the limited number of barge trips required, adverse environmental impact (including dust, noise, water quality) arising from the handling, transportation and disposal of C&D materials is not anticipated with the implementation of good construction site practices.

4.6.2 Excavated Materials

No surplus excavated materials will be generated from the demolition and removal of foundation structures of the buildings within the Project site. It is estimated that the total excavated materials to be generated from the demolition and removal of foundation structures of the buildings would be approximately 210,000 m^3. The excavated materials (as part of the C&D materials), which mainly comprise top soil and boulders, will be stockpiled temporarily on site for subsequent reuse for backfilling works. Temporary stockpiling locations will be set up within the Project site but the actual locations would depend on actual site condition during construction phase and could not be determined at this stage. It is expected all the excavated materials generated will be reused for backfilling on site with no surplus excavated materials requiring to be delivered off-site. Assuming the spaces originally occupied by the foundation structures would be backfilled to match the adjacent ground level, there would not be sufficient backfilling materials on site, and thus additional soil fill will be imported for the backfilling works. Reusing of inert C&D materials generated on site (e.g. broken concrete) for backfilling is not preferred, as this would involve the use of additional PMEs for crushing, sorting and handling of C&D materials on site, resulting in additional air quality impact during the construction phase. Space constraint is also a concern as the additional PMEs on site for treatment of C&D materials would take up additional space within the Project site and may interfere with the demolition works of the Project. Importing soil fill would require no more than a few barge trips per week. In view of the limited number of barge trips required, adverse marine traffic impact as well as

(3) Assuming a capacity of 1,500m^3 per barge.

environmental impact (including dust, noise, water quality) arising from the demolition of the Project is not expected with implementation of good construction site practices.

4.6.3 Chemical Waste

Chemical waste will be primarily generated from maintenance of construction vehicles and equipment during demolition works. The exact amount of such chemical waste is difficult to quantify since it will be highly dependent on the contractor's on-site maintenance activities and the quantity and/ or types of plant and equipment utilised. As an initial estimation, it is anticipated that the quantity of chemical waste to be generated from maintenance of construction vehicles and equipment during demolition works is in the order of few hundred litres per month throughout the decommissioning and demolition works of the Project.

The chemical waste generated from the Project will be collected by licensed chemical waste collectors and delivered to the licensed chemical waste treatment facilities for disposal (i.e. Chemical Waste Treatment Centre (CWTC) in Tsing Yi). The contractor will register with EPD as a chemical waste producer as appropriate in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*. With the incorporation of suitable arrangements for the storage, handling, transportation and disposal of chemical wastes under the requirements stated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*, no adverse environmental impact or other hazards is anticipated to arise from the handling, transportation and disposal of chemical waste of the Project.

4.6.4 General Refuse

It is conservatively estimated that a maximum of about 250 construction workers will be working on site at any one time during the decommissioning and demolition works of the Project. With a general refuse generation rate of 0.65 kg per worker per day, the maximum amount of general refuse to be generated by the construction workforce will be about 162.5 kg per day. To reduce the quantity of general refuse to be disposed of at landfill, recyclable materials (i.e. paper, plastic bottles, aluminum cans and glass bottles) and food waste will be segregated on-site for off-site recycling, as far as practicable. Adequate number of enclosed waste containers and recycling bins will be provided in prominent places to avoid over-spillage of waste and/ or recyclable materials and to promote source separation of waste. The non-recyclable refuse will be placed in bags and collected together with other general refuse generated from the LPS by existing waste management contractor at LPS, and subsequently disposed of at the landfills directly or via Outlying Island Transfer Facilities on a daily basis. Given that the quantity of general refuse to be disposed of at the landfills is small, no adverse impact on the operation of the landfills is anticipated. With proper housekeeping measures and refuse collection in place, no adverse environmental impacts (including air and odour, noise, water quality) caused by storage, handling, transport and disposal of general refuse are expected.

4.7 Land Contamination

4.7.1 Site Appraisal

The Project site can be separated into three (3) areas: i) Electrostatic Precipitator systems, FGD system, a chimney and auxiliary buildings at the northern part of the Project site; ii) Main Station Building for L1 to L3 consisting of the coal-fired and steam generation units at the centre part of the Project site; and iii) Cooling Water System, Junction Tower T16 and auxiliary buildings at the southern part of the Project site.

The site appraisal comprising desktop review and site walkover has been carried out to review the current and past land uses, historical aerial photographs and maps historical spillage and leakage records, (hydro) geology and underground soil profile to identify the potential for causing land contamination at the Project. A Contamination Assessment Plan (CAP) has been prepared to present

the details of the site appraisal and necessary SI works and testing plan for the Project. The CAP is presented in detail in **Appendix A**.

4.7.2 Potential Contamination Issues

According to the *Practice Guide for Investigation and Remediation of Contaminated Land* (the *Practice Guide*) issued by the EPD, based on the findings of the site appraisal presented Section 3 of the CAP (**Appendix A**), the potentially polluting activities of a power plant, including storage, transfer and use of fuels, oils and chemicals, storage, treatment and disposal of combustion residues, storage and handling of coal are mainly involved in the northern part and the Main Station Building for L1 to L3 at the centre part of the Project site. Therefore, only the northern part and the Main Station Building for L1 to L3 are considered as the potentially contaminated area. Junction Tower T16 is a supporting building structure for the overhead coal conveyor, coal pieces and mixture of coal residuals were observed on the ground of Junction Tower T16 at the southern part of the Project site, ground is concrete paved with approximate thickness of 200mm. Therefore, land contamination associated with Junction Tower T16 is considered unlikely, and a hot spots approach is proposed at Junction Tower T16. The details of the potential contamination area evaluation are detailed in the CAP.

As per the *Practice Guide*, it is recommended to investigate the potentially contaminated area in a regular grid pattern to have a comprehensive study on the potential land contamination site. Apart from the regular grid pattern, the *Practice Guide* also requires that attention should be paid to those locations where potential land contamination could occur. These are regarded as “hot spots” for investigation.

The hot spots are identified at the potential contaminated area and Project site during the site walkover are detailed in the CAP.

4.7.3 Sampling Plan

The northern part and the Main Station Building for L1 to L3 are considered as the potential contaminated area, with an area of approximately 33,500m^2. With reference to the *Practice Guide*, a regular grid pattern with a square size of 32m x 32m shall be adopted as the sampling approach. Additional sampling locations are proposed at the identified hot spots. Some regular grid sampling locations are adjusted to represented facilities (i.e. electrostatic precipitator units), as well as the nearby hot spots to serve as sampling locations for both regular grid and hot spots. A total thirty-four (34) regular grid sampling locations (namely Grid-BH-1 to Grid-BH-34) and fifty-four (54) hot spots sampling locations (namely HS-BH1 to HS-BH54) are proposed within the Project site.

A total of 15 coal grinding mills and 13 transformers have been identified as land contamination hot spots within the Main Station Building for L1 to L3. These units are located adjacent to each other in clusters. Given the similarity in nature of each individual unit and their close proximity in location, only one sampling location is proposed for these clusters within each sampling grid, rather than one sampling location for each individual unit. If contamination is identified during the SI at any of the selected coal grinding mills or transformers, then additional sampling will be performed as required at the remaining coal grinding mills or transformer units in all sampling grid.

The furnace bottom ash had been handled within an enclosed system from coal firing system, scraper conveyor and ash storage bin pit. As L1, L2, and L3 have been retired and no longer in active operation, any furnace bottom ash have already been removed and handled in accordance with relevant regulations (i.e. *Waste Disposal (Chemical Waste) (General) Regulation* (CAP. 354C) and *Air Pollution Control (Construction Dust) Regulation* (CAP. 311R). As a precautionary measure, HK Electric will perform a final inspection prior to the implementation of the Project to confirm all chemicals and furnace bottom ash have been removed completely from the civil structures. Therefore, the presence of furnace bottom ash is not anticipated during SI, and collection of ash sample is unnecessary.

The Project will tentatively commence in Q4 2024. The modification and diversion of existing piping and cables will be tentatively carried out from Q4 2024 to Q3 2025, followed by main bulk of demolition works of aboveground equipment and superstructure from Q2 2025 to Q4 2034, and finally the demolition of the substructure from Q1 2031 to Q1 2035. Since LPS equipment / facilities are still in place and it is not feasible to carry out SI works at this stage, SI and sampling shall be carried out when the proposed sampling locations are available after the demolition of the aboveground structures.

The details of the proposed sampling locations, sampling and testing plan, as well as the detailed sampling methodology are presented in Sections 5 and 6 of the CAP.

4.7.4 Recommended Further Works

Sampling and testing works proposed in this CAP will be supervised by a Land Contamination Specialist. Upon the receipt of laboratory testing reports, the results will be compared against the RBRGs for industrial land use.

If contamination is confirmed, the Contamination Assessment Report (CAR) will be accompanied by a Remediation Action Plan (RAP). The CAR and RAP will be a combined report for EPD's agreement. The RAP will be prepared to evaluate the needs of a remediation, and if so, identify appropriate remediation methods suitable for the site conditions and the contaminants requiring remediation.

The contamination extent (both horizontal and vertical) will be estimated in the RAP. The confirmation of such contamination extent, the implementation of remediation action, and the preparation of Remediation Report (RR) will be conducted according to the approved RAP by the demolition contractor.

Upon completion of remediation works (if necessary), a RR will be prepared and submitted to EPD to demonstrate that the decontamination works have been carried out in accordance with the approved CAR and RAP. No removal of substructures or excavation works within the contaminated area should be carried out before the agreement of the RR by EPD.

The Project will tentatively commence in Q4 2024. The modification and diversion of existing piping and cables will be tentatively carried out from Q4 2024 to Q3 2025, followed by main bulk of demolition works of aboveground equipment and superstructure from Q2 2025 to Q4 2034, and finally the demolition of the substructure from Q1 2031 to Q1 2035. Since LPS equipment / facilities are still in place and it is not feasible to carry out SI works at this stage, SI and sampling shall be carried out when the proposed sampling locations are available after the demolition of the aboveground structures. If any potentially polluting activities (as described in Table 2.3 of the Practice Guide) are carried out within the Project site during the idling periods (i.e. between the completion of demolition of the aboveground structures and the commencement of SI works, as well as between the completion of SI works and the removal of substructures and excavation works), it will be necessary to review and update the proposed sampling plan and locations outlined in this CAP. Subsequent updated CAP(s) will be required to be submitted to EPD for agreement.

4.7.5 Evaluation of Land Contamination Impacts

The findings of site appraisals and the evaluation of potential contaminated areas are detailed in Section 3 and 4 of the CAP. The northern part and the Main Station Building for L1 to L3 at the centre part of the Project site were identified as the potentially contaminated areas, hotspots were identified at the potentially contaminated area and at the southern part of the Project site. Since the Project site has been used as a power plant with coal handling facilities, the associated potential contaminants, chemicals of concern (COCs) are considered to include metals, Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), Petroleum Carbon Ranges (PCRs) and free cyanide. Free cyanide is only considered as the potential contaminant for soil at the coal griding mills. As confirmed by HK Electric, the chemicals used for the transformers are Polychlorinated Biphenyls (PCBs)-free, therefore, of PCBs are not considered as a potential contaminant. Intrusive SI and

sampling works are considered necessary. The SI sampling methodology and testing plan are presented in Sections 5 and 6 of the CAP.

Provided that any soil and groundwater contamination identified during the SI, if any, are properly treated using the appropriate remediation techniques in accordance with the approved RAP, adverse land contamination impacts associated with the Project is not anticipated. The possible remediation measures are outlined in **Section 5.5**.

4.8 Marine Ecology and Fisheries

The Project involves minor marine works during the demolition of the intake culvert of the existing No. 1 C.W. Intake. No dredging and backfilling of marine sediment will be required.

Literature review was conducted to review the baseline marine ecological and fisheries conditions within the 500m Assessment Area. The nearest fisheries sensitive receivers are the recognised spawning ground and nursery area of commercial fisheries resources in southern waters located in the vicinity of the Project site as shown in **Figure 4.5**. Some corals of common and widespread species were identified along the artificial sloping seawall of LMX, and at the northern Hung Shing Yeh about 1km away from the Project site. Other sensitive receivers within Southern Water Control Zone beyond the 500m Assessment Area are considered too far away to be affected by the Project.

As discussed in **Section 1.4.2**, the demolition of the intake culvert involves the removal of a small stretch of the artificial sloping seawall (about 80m) at the existing No. 1 C.W. Intake. According to the *EIA Report for Hong Kong Offshore LNG Terminal (Register No.: AEIAR-218/2018*), dive surveys were carried out along the western and southern artificial sloping seawall of LMX and the corals found were of low ecological value and low coverage (< 5%). In view of the similarity of the artificial substrates at LMX and the No. 1 C.W. Intake, it is expected that corals along the artificial sloping seawall at the No. 1 C.W. Intake, if present, would also be of low ecological value and low coverage, and thus unacceptable direct impact on coral communities is not anticipated as a result of the demolition of the No. 1 C.W. Intake. As a precautionary measure, a verification coral survey is recommended to be conducted at the No. 1 C.W. Intake location prior to the demolition of the No. 1 C.W. Intake to verify if there are any coral communities of high ecological value at the No. 1 C.W. Intake that will be directly affected by the Project. Additional measures (e.g. coral translocation) will be proposed for agreement with AFCD if significant coral communities are recorded at the No. 1 C.W. Intake.

The demolition of the intake culvert would not involve breaking of the concrete structure underwater. The demolition works underwater, though no concrete breaking or dredging is involved, have the potential to generate SS and may result in increased sediment deposition on the seabed in close proximity to the works areas. As a precautionary measure, during the demolition works, a marine works area with silt curtain enclosed will be established in the vicinity of the existing No. 1 C.W. Intake. As discussed above, corals found along the western and southern artificial sloping seawall of LMX were of low ecological value and low coverage (< 5%). According to the *EIA Report for Improvement Dredging for Lamma Power Station Navigation Channel (Register No.: AEIAR-212/2017)*, corals were identified at the northern Hung Shing Yeh about 1 km away, and they were generally recorded to be of low coverage (< 1% to <5%) and of low ecological value. The coral species are generally adapted to the variable turbidity in southern waters. As such, unacceptable indirect impacts to the corals due to elevation in SS and sedimentation rate are not anticipated.

Delivery of construction equipment and off-site disposal of construction waste will be based on marine transportation using works vessels and barges. The use of fuel/chemicals associated with the works vessels and construction plants would mean there is a potential of spillage or leakage of such materials if not properly managed. It is expected that chemicals used on the works vessels would be held in low quantities. Fuel spill or leaks would tend to float on the water surface and will evaporate into the atmosphere and dissipate rapidly. The potential for impact to specific biota would depend on the nature and degree of exposure received by a particular individual. However, given the risk of

spillage and leakage would generally be limited to minor volumes, no significant impacts would be expected in the event that an unplanned accidental spill or leak occurred. Measures would be implemented for the safe storage, handling and disposal of chemicals and oils to prevent the release into the marine environment. Precautionary measures such as bunding of machinery areas and availability of spill clean-up kits would be in place to prevent spillage or leakage of fuel/chemical to reach the marine environment. Unacceptable impacts on marine ecological resources, including the coral communities, are thus not expected.

Fisheries resources, habitats (including spawning ground and nursery area) and fishing operations have been identified to be at least more than 330m away from the existing No. 1 C.W. Intake. With sufficient separation distance from the marine works area of the Project, impacts to fisheries habitats and fishing ground due to the demolition of the existing No. 1 C.W. Intake, if any, are expected to be minimal, and fisheries resources are expected to return to the area following the cessation of demolition works. Considering the relatively small scale of the marine works involved, and the temporary and reversible nature of the disturbance, unacceptable impacts on fisheries are not expected.

4.9 Other Impacts

4.9.1 Terrestrial Ecology

As the Project site is located within the existing boundaries of the LPS site, there will be no disturbance to terrestrial ecological resources (e.g. recognised sites of conservation importance, habitats, vegetation and wildlife).

No impact to terrestrial ecology is thus expected during the decommissioning and demolition works of the Project.

4.9.2 Landscape and Visual

Existing roads within the LPS to the Project site will be used for transport of construction materials during the implementation of the Project. No new haul road is required as a result of the Project.

The Project involves demolition of existing units and structures within the LPS, with no addition of new structures or buildings under this Project. No change to the overall visual quality is envisaged with the implementation of the Project.

All existing trees/ vegetation within the Project site will be retained and will not be affected by the Project. Impact to landscape resources is not anticipated.

It is anticipated that the Project will not cause unacceptable visual and landscape impacts during the decommissioning and demolition of the Project.

4.9.3 Cultural Heritage

The Project site is located within the LPS which was formed by reclamation with no previous settlement or development other than the LPS. Excavation works for removal of the substructures under the scope of this Project are not expected to generate any marine sediment. Therefore, there will be no impact to cultural heritage/ archaeological resources. Cultural heritage impact is thus not expected due to the decommissioning and demolition works of the Project.

4.9.4 Hazard to Life

The decommissioning and demolition works are limited to within the existing area of L1, L2 and L3 of the LPS only (i.e. the Project site), and will not involve transport or handling of hazardous materials. Hazard to life concerns to existing LPS facilities or construction workers of the Project during the decommissioning and demolition works are not anticipated.

4.10 Cumulative Impacts

Several potential concurrent projects located in the vicinity of the Project site have been identified in **Section 2.2.** Concurrent projects that may have the potential to interact with the decommissioning/ demolition phase of the Project are discussed below.

Re-provision of Open Cycle Gas Turbines at Lamma Power Station

The programme of the re-provision of OCGTs at LPS commenced in early 2023 and coincides with the decommissioning/ demolition phase of the Project. The construction works of the re-provision of OCGTs at LPS involves essentially removal of old OCGTs and installation of new OCGTs with no foundation works required, as well as some minor excavation works for cable trench construction. The environmental impact (e.g. air quality, noise) associated with the re-provision of OCGTs would be limited and localised within the LPS. Considering the relatively small-scale work nature of the OCGT reprovision project and that it is located at a sufficient separation distance from the identified ASRs and NSRs outside LPS (about 690m apart) and from the Administration and Control Building in LPS (about 100m apart), adverse cumulative environmental impact (e.g. air quality, noise) from this concurrent project during the decommissioning/demolition phase of the Project is not expected, provided that good construction site practices and proper dust control measures are in place.

Gas-fired Power Station at Lamma Extension

As mentioned in **Section 2.2**, this project includes the construction and operation of five new gas-fired CCGT units at LMX. Three units (i.e. L9, L10 and L11) are currently under operation, one unit (i.e. L12) is currently under commissioning and is scheduled for commercial operation in early 2024, and the remaining one (i.e. L13) is planned to be constructed beyond 2024. The construction works of L13 may coincide with the decommissioning/ demolition phase of the Project. Details of the implementation programme of L13 are uncertain at the time preparing of this PP. The construction works for L13 at LMX is considered small-scale as the works involved are primarily superstructure works with foundation works within a confined footprint. Only minor excavation works would be required for the foundation works of L13. Considering that the LMX is located at a sufficient separation distance from the identified ASRs and NSRs outside LPS (about 860m apart) and from the Administration and Control Building in LPS (about 230m apart), and that the construction works involved for L13 are relatively small-scale, adverse cumulative environmental impact (e.g. air quality, noise) from the development of L13 is not expected provided that good construction site practices and proper dust control measures are in place.

Improvement Dredging for Lamma Power Station Navigation Channel

Improvement dredging works are to be carried out periodically every 4 to 10 years in the LPS Navigation Channel, which will overlap with the decommissioning/ demolition phase of the Project. The nearest dredging area of the works is about 410m northwest of the Project site. Considering its large separation distance from the Project site and the infrequent dredging works, adverse cumulative environmental impact (e.g. air quality, noise) from the improvement dredging works in the LPS Navigation Channel is not expected.

5. DESCRIPTION OF ENVIRONMENTAL PROTECTION MEASURES

5.1 Air Quality

The following mitigation measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* will be implemented to minimise dust nuisance during the decommissioning and demolition works:

- The area at which demolition of concrete structures takes place will be sprayed with water immediately prior to, during and immediately after the demolition activities so as to keep the entire surface wet;
- Any dusty materials remaining after a stockpile is removed will be wetted with water and cleared from the surface of roads;
- All demolished items that may dislodge dust particles will be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition;
- Every main haul road will be sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet;
- All areas involving site clearance and excavations works will be sprayed with water before, during and after the operations to maintain the entire surface wet;
- Appropriate plant and equipment will be employed to demolish the chimney stack from the top down, dropping each piece of concrete debris down through the chimney to reduce dust generation;
- Appropriate plant and equipment will be used around the top of the chimney to enclose the concrete stack, which helps to reduce potential dust emissions to the surrounding environment. This can also support the demolition equipment and progressively lower it down as the demolition progresses;
- Any stockpile of dusty materials on-site will be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 3-sides. They should also be sprayed with water or dust suppression chemical immediately prior to any loading, unloading or transfer operation to dampen the dusty materials; and
- Dropping heights for the fill materials /C&D materials to/ from the barges will be controlled to a practical height to minimise the fugitive dust arising from loading/ unloading operation.

The following mitigation measures will be implemented to minimise air quality impact from emissions of PMEs and marine vessels during the decommissioning and demolition works:

- Provide power supply for on-site machinery if feasible, and avoid the use of diesel generators and machinery as far as practicable;
- Exempted NRMMs shall be avoided; and
- Marine vessels fuelled in Hong Kong are required to operate using marine light diesel with sulphur content lower than 0.05% in accordance with the Air Pollution Control (Marine Light Diesel) Regulation.

5.2 Noise

The following good site practices will be adopted by the Contractor to minimise noise emissions during the decommissioning and demolition works:

- Only well-maintained equipment will be operated on-site and equipment will be serviced regularly during the works;

- Machines and equipment that are in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- Silencers or mufflers on demolition equipment will be utilised as far as practicable and should be properly maintained during the demolition works;
- With reference to *Preparation of Construction Noise Impact Assessment Under the Environmental Impact Assessment Ordinance (*GN 9/2023), quieter construction methods/ equipment such as electric breaker, hydraulic crusher, soundless non-explosive chemical expansion demolition agent, and/or use of quieter saw types (noise reducing diamond blade saw) will be used as far as is practicable instead of conventional, excavator-mounted breaker for large scale building demolition; and
- Where necessary, noise enclosures will be used to cover the noisy plant items, and mobile noise barriers will be positioned within a few metres of noisy plant items.

5.3 Water Quality

Appropriate measures will be implemented during the decommissioning and demolition of the Project to control potential contaminated run-off, thereby minimising SS and potential impacts on water quality, including the following:

- Proper site management measures will be implemented to minimise surface water run-off, soil erosion and the impacts of sewage effluents;
- Construction site discharge will be collected and treated on site before discharge following a discharge licence to be issued under the WPCO;
- Silt removal facilities such as silt traps or sedimentation facilities will be provided where necessary to remove silt particles from runoff to meet the requirements of the TM standard under the WPCO. The design of silt removal facilities will be based on the guidelines provided in *ProPECC PN 2/23*. All drainage facilities and erosion and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly;
- Temporary toilets will be provided to collect sewage from the construction workers workforce during the decommissioning and demolition works for off-site disposal on a regular basis; and
- During the demolition works for the No. 1 C.W. Intake as described in **Section 1.4.2**, silt curtain will be installed around the works area to minimise the potential water quality impacts.

Site run-off and drainage impacts will be controlled in accordance with the guidelines stipulated in the EPD's *Professional Persons Environmental Consultative Committee Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 2/23)*. The implementation of good housekeeping and best management practices will ensure that WPCO standards are met and that no unacceptable impacts on the WSRs arise during the implementation of the Project.

5.4 Waste Management

The contractors employed for the decommissioning and demolition of the Project will be required to incorporate recommendations on waste recycling, storage, transportation and disposal measures into a comprehensive on site waste management plan. Such a waste management plan should incorporate site-specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.

In the waste management plan to be prepared, the hierarchy presented below (in order of preference) will be used to evaluate waste management options, thus allowing maximum waste reduction and often reducing costs:

- Avoidance and minimisation, i.e. not generating waste through changing practices;
- Reuse of materials, thus avoiding disposal (generally with only limited reprocessing);
- Recovery and recycling, thus avoiding disposal (although reprocessing may be required); and
- Treatment and disposal, according to relevant laws, guidelines and good practice.

To further minimise waste arising and keep environmental impacts within acceptable levels, careful design, planning and good site management practice will be adopted, including:

- Approved personnel, such as site manager, will be nominated to be responsible for implementation of good site practices, arrangements for waste collection and effective disposal of all wastes generated at the site to appropriate facilities;
- Training on appropriate waste management procedures, including waste reduction, reuse and recycling and chemical waste handling procedures will be provided to the workers and site personnel;
- Sufficient waste disposal points will be provided and collection of waste for disposal will be arranged regularly;
- Different types of waste will be properly segregated and stored on-site to increase the feasibility of recycling certain components of the waste streams, such as steel; and
- Waste will be transported in enclosed containers or skips to minimise windblown litter and dust/odour nuisance during the transportation of waste.

With reference to Section 4.1.3 of Chapter 4 of the Project Administration Handbook (PAH) for Civil Engineering Works (2022 Edition), a Construction & Demolition Material Management Plan (C&DMMP) will be prepared and provided to the contractors employed for the decommissioning and demolition of the Project, to minimise C&D material generation and encourage proper management of such material. All C&D materials generated will be sorted on-site for recycling and reuse as fill materials using a balanced cut-and-fill approach as far as practicable prior to delivering to public filling areas and landfills. The stockpiling areas will be minimised as far as practicable and covered during heavy rainfall to minimise potential air quality, water quality and visual impact.

A trip ticket system will be implemented with reference to the *Development Bureau Technical Circular (Works) DEVB TC(W)) No.6/2010 "Trip Ticket System for Disposal of Construction & Demolition Materials"* for the disposal of C&D materials.

Chemical waste generated during the decommissioning and demolition of the Project will be properly stored in accordance with EPD's *Code of Practice on the Packaging, Labelling and Storage of Chemical Waste* for subsequent collection and disposal by a licensed Chemical Waste Collector. General refuse generated on site will be stored in enclosed bins and collected by waste collector on regular basis.

5.5 Land Contamination

The land contamination issues of the Project site that are identified as potentially contaminated would be considered surmountable to the construction workers during the decommissioning/ demolition phase of the Project, provided the recommended actions outlined in below were followed.

Possible Remediation Measures

The actual remediation methods should be confirmed after completion of the SI works and based on the approved CAR and RAP. The RAP will provide details of the remedial actions for any identified contaminated soil and groundwater.

For soil, there are several technologies commercially available to tackle these contaminants. Technologies that are commonly used in Hong Kong include biopiling and cement solidification/

stabilization. These ex-situ methods have been proven to be effective in treating the target Chemicals of Concern (COCs) (cement solidification/stabilization on metals and biopiling on hydrocarbons).

For groundwater, some examples of remediation techniques of contaminated groundwater (e.g., air sparging, recovery trenches / wells, in-ground containment/capping and permeable reactive barriers) are shown in the Practice Guide from EPD.

Mitigation Measures for Remediation Works

Mitigation measures for the remediation works would depend on the nature / extent of contamination and the method of treatment. The mitigation measures will be recommended in the RAP and would typically include the following:

- Excavation profiles must be properly designed and executed with attention to the relevant requirements for environment, health and safety;
- Excavation shall be carried out during dry season as far as possible to minimise contaminated runoff from contaminated soils;
- Supply of suitable clean backfill material (or treated soil) after excavation;
- Stockpiling site(s) shall be lined with impermeable sheeting and bunded. Stockpiles shall be fully covered by impermeable sheeting to reduce dust emission;
- Vehicles containing any excavated materials shall be suitably covered to limit potential dust emissions or contaminated wastewater run-off, and truck bodies and tailgates shall be sealed to prevent any discharge during transport or during wet conditions;
- Speed control for the trucks carrying contaminated materials shall be enforced;
- Vehicle wheel and body washing facilities at the site's exit points shall be established and used; and
- Pollution control measures for air emissions (e.g., from biopile blower and handling of cement), noise emissions (e.g., from blower or earthmoving equipment), and water discharges (e.g. runoff control from treatment facility) shall be implemented and complied with relevant regulations and guidelines.

Handling and Disposal Arrangement of Removed Diesel / Petroleum Products and Spill Prevention Measures during Demolition

Prior to commencement of demolition in the Project site area, the leftover diesel or other petroleum products in the equipment to be demolished shall be removed as much as possible. The removed diesel and other petroleum products shall be considered as chemical waste and are controlled under the *Waste Disposal (Chemical Waste) (General) Regulation*.

The demolition contractor who will generate chemical waste or cause it to be produced should register with the EPD as a chemical waste producer.

Removed diesel and petroleum products shall be labelled and stored in accordance with the requirement stipulated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* issued by EPD.

5.6 Marine Ecology and Fisheries

In order to minimise the potential disturbances on marine ecology and fishery resources arising from the Project, good site/ construction practice should be adopted as follows:

- A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced;
- Safe storage, handling and disposal of chemicals and oils to prevent the release into the marine environment;

- Bunding of machinery areas and availability of spill clean-up kits would be in place to prevent spillage or leakage of fuel/chemical to reach the marine environment;

The demolition works will be designed to confirm compliance with the assessment criteria at sensitive receivers and control water quality impacts to within acceptable levels. Water quality mitigation measures will be implemented to further avoid/reduce potential impacts. These measures are expected to control and reduce potential impacts to marine ecology and fisheries resources as well.

6. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

The potential environmental impacts (e.g. air quality, noise, water quality, waste management, land contamination, marine ecology and fisheries, etc) due to the implementation of the Project have been evaluated. With proper implementation of recommended mitigation measures, adverse environmental impact during the decommissioning and demolition works of the Project is not anticipated and thus environmental monitoring is considered not necessary. Nevertheless, it is recommended to have an Environmental Monitoring and Audit (EM&A) programme in place where environmental site inspections will be conducted regularly (i.e. on a weekly basis) throughout the decommissioning/ demolition phase such that the implementation of the recommended mitigation measures as mentioned in **Section 5** can be tracked and their effectiveness assessed.

Given the long project implementation period, the Environmental Team (ET) shall review the progress and programme of the decommissioning and demolition works at quarterly interval. Should there be possible suspension of works throughout the project implementation period, suspension of the EM&A programme for decommissioning/ demolition phase may be proposed with justification by the ET Leader and verification by the Independent Environmental Checker (IEC) before notifying EPD.

6.1 Organisation of EM&A

The EM&A will require the involvement of HK Electric, an ET, an IEC and the Contractor(s). HK Electric will appoint an ET to conduct the regular environmental site inspections, and to provide specialist advice on the undertaking and implementation of environmental responsibilities. The ET will be led and managed by the ET Leader. The ET Leader shall be a person who has at least 7 years of experience in EM&A or environmental management. Suitably qualified staff will be included in the ET, and the ET should not be in any way an associated body of the Contractor(s) for the Project.

To maintain strict control of the EM&A process, HK Electric will independently appoint an environmental consultant to act as an IEC to verify and validate/ audit the environmental performance of the Contractor(s) during the decommissioning/ demolition of the Project and effectiveness of ET. The IEC will have previous relevant experience with checking and auditing similarly sized EM&A programmes. The IEC shall be a person who has at least 7 years of experience in EM&A or environmental management. Sufficient and suitably qualified professional and technical staff will be employed by the IEC, and the IEC should not be in any way an associated body of the Contractor(s) for the Project.

6.2 Monitoring

No adverse dust impact is anticipated to arise from the chimney demolition works. However, as a precautionary measure, regular dust monitoring during the demolition works of the No. 1 Chimney is recommended. 1-hour monitoring of Total Suspended Particulates (TSP) shall be conducted at least three times in every six days when the highest dust impacts are likely to occur throughout the chimney demolition works. Dust monitoring location(s) shall be set up at the representative ASR(s). Detailed monitoring plan and location are subject to further review and agreement with EPD before commencement of the No. 1 Chimney demolition works.

As a precautionary measure, a verification coral survey is recommended to be conducted at the No. 1 C.W. Intake location prior to the demolition of the No. 1 C.W. Intake to verify if there are any coral communities of high ecological value at the No. 1 C.W. Intake that will be directly affected by the Project. Additional measures (e.g. coral translocation) will be proposed for agreement with AFCD if significant coral communities are recorded at the No. 1 C.W. Intake.

6.3 Reporting

The results and findings of the EM&A works during the decommissioning/ demolition phase will be recorded in the Monthly EM&A Reports prepared by the ET Leader. The EM&A reports will be

prepared and submitted within 2 weeks of the end of each reporting month, with the first report due the month after construction commences. Each monthly EM&A report will be submitted to the following parties: the Contractor(s), the IEC, HK Electric and the EPD, as well as to other relevant departments as required. Before submission of the first EM&A Report, the ET will liaise with the parties on the exact number of copies and format of the reports in both hard copy and electronic medium.

6.3.1 Contents of Monthly EM&A Reports

(1) Executive summary (1-2 pages), including:

- complaint log;
- notifications of any summons and successful prosecutions; and
- reporting changes

(2) Basic project information including a synopsis of the project organisation, programme and management structure, and a drawing of the Project area showing the environmentally sensitive receivers, programme, management structure and the work undertaken during the month.

(3) A brief summary of EM&A requirements including:

- environmental mitigation measures, as recommended in the Project Profile; and
- environmental requirements in contract documents.

(4) Environmental issues and actions, comprising:

- review issues carried forward and any follow-up procedures related to earlier non-compliance (complaints and deficiencies);
- description of the actions taken in the event of non-compliance and deficiency reporting;
- recommendations (should be specific and target the appropriate party for action); and
- implementation status of the mitigation measures and the corresponding effectiveness of the measures.

(5) A summary record of complaints received (written or verbal) for each media, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken and summary of complaints.

(6) A summary record of notifications of summons, successful prosecutions for breaches of environmental protection/pollution control legislation and actions to rectify such breaches.

(7) A forecast of the works programme for the next one month; and

(8) Comments, recommendations and conclusions for the reporting period.

6.3.2 Final EM&A Review Report

A final EM&A review report will be prepared by the ET at the end of the decommissioning/ demolition phase of the Project. The final EM&A Review Report will contain at least the following information:

(1) Executive Summary (1-2 pages).

(2) Drawing(s) showing the Project site area and any environmental sensitive receivers.

(3) Basic project information including a synopsis of the project organisation, contacts for key management staff and a synopsis of work undertaken during the course of the Project.

(4) A brief summary of EM&A requirements including environmental mitigation measures as recommended in the Project Profile.

(5) A summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the Project Profile and summarised in the updated implementation schedule.

(6) A summary of environmental non-compliance.

(7) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate.

(8) A description of the actions taken in the event of non-compliance.

(9) A summary record of complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken.

(10) A summary record of notifications of summonses and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches investigation, follow-up actions taken and results.

(11) A review of the success of the EM&A programme, including a review of the effectiveness and efficiency of the mitigation measures, and recommendations for any improvements in the EM&A programme. A clear cut statement on the environmental acceptability of the project should be made.

7. USE OF PREVIOUSLY APPROVED EIA REPORTS/ DIRECT APPLICATIONS FOR AN ENVIRONMENTAL PERMIT

The approved EIA reports/ direct applications for an environmental permit of projects that are of relevance to the Project are listed in **Table 7.1**.

Table 7.1 Previously Approved EIA Reports/ Direct Applications for An Environmental Permit Relevant to the Project

Register No.	Project Title	Date of Approval	Aspect of Relevance	Summary of the Findings and Recommended Measures of Relevance to the Project
AEIAR-234/2022	Re-provision of Open Cycle Gas Turbines at Lamma Power Station	1 April 2022	■ Nature of the Project ■ Surrounding environment and sensitive receivers ■ Potential environmental impacts of the Project, and the appropriate mitigation measures	■ Air quality, noise, water quality, waste management and land contamination impacts related to decommissioning and demolition works ■ No unacceptable environmental impacts related to air quality, noise, water quality, waste management and land contamination is anticipated with the implementation of mitigation measures ■ Implementation of mitigation measures and good site practices related to air quality, noise, water quality, waste management and land contamination
AEIAR-218/2018	Hong Kong Offshore LNG Terminal	5 October 2018	■ Surrounding environment and sensitive receivers	N/A
AEIAR-212/2017	Improvement Dredging for Lamma Power Station Navigation Channel	10 October 2017	■ Surrounding environment and sensitive receivers	N/A
AEIAR-197/2016	Additional Gas-fired Generation Units	7 June 2016	■ Potential environmental impacts of the Project, and the appropriate mitigation measures	■ No unacceptable environmental impacts related to air quality, noise, water quality, waste management, land contamination, marine ecology and fisheries is anticipated with the implementation of mitigation measures ■ Implementation of mitigation measures and good site practices related to air quality, noise, water quality, waste management, land contamination, marine ecology and fisheries
AEIAR-098/2006	Lamma Power Station Units L4 & L5 Flue Gas Desulphurisation	24 March 2006	■ Surrounding environment and sensitive receivers	N/A

Register No.	Project Title	Date of Approval	Aspect of Relevance	Summary of the Findings and Recommended Measures of Relevance to the Project
	Plant Retrofit Project			
PP-198/2003	Decommissioning of Two Open Cycle Gas Turbine Units and Associated Facilities at Tsing Yi Power Station	29 October 2003	■ Nature of the Project ■ Potential environmental impacts of the Project, and the appropriate mitigation measures	■ Air quality, noise, water quality, waste management and land contamination impacts related to decommissioning and demolition works ■ No unacceptable environmental impacts related to air quality, noise, water quality, waste management and land contamination is anticipated with the implementation of mitigation measures ■ Implementation of mitigation measures and good site practices related to air quality, noise, water quality, waste management and land contamination
PP-178/2002	Decommissioning of Gas Turbine Units (GT3 - GT6) Inside Castle Peak Power Station	10 January 2003	■ Nature of the Project ■ Potential environmental impacts of the Project, and the appropriate mitigation measures	■ Air quality, noise, water quality, waste management and land contamination impacts related to decommissioning and demolition works ■ No unacceptable environmental impacts related to air quality, noise, water quality, waste management and land contamination is anticipated with the implementation of mitigation measures ■ Implementation of mitigation measures and good site practices related to air quality, noise, water quality, waste management and land contamination
AEIAR-010/1999	1,800MW Gas-fired Power Station at Lamma Extension	5 May 1999	■ Surrounding environment and sensitive receivers ■ Potential environmental impacts of the Project, and the appropriate mitigation measures	■ No unacceptable environmental impacts related to air quality, noise, water quality, waste management, land contamination, marine ecology and fisheries is anticipated with the implementation of mitigation measures ■ Implementation of mitigation measures and good site practices related to air quality, noise, water quality, waste management, land contamination, marine ecology and fisheries
PP-007/1998	Felling of Five Power Station Chimneys at Tsing Yi Power Station	4 August 1998	■ Nature of the Project ■ Potential environmental impacts of the Project, and the	■ Air quality, noise, water quality and waste management impacts related to decommissioning and demolition works ■ No unacceptable environmental impacts related to air quality, noise,

Register No.	Project Title	Date of Approval	Aspect of Relevance	Summary of the Findings and Recommended Measures of Relevance to the Project
			appropriate mitigation measures	water quality and waste management is anticipated with the implementation of mitigation measures ■ Implementation of mitigation measures and good site practices related to air quality, water quality, and waste management

8. CONCLUSION

The Project will involve the decommissioning and demolition of Units L1 to L3 as well as their associated equipment and civil structures (aboveground and foundation) in phases within the LPS. Environmental impacts likely to arise as a result of the decommissioning and demolition works of the Project have been critically assessed and are considered acceptable with reference to the relevant assessment standards/criteria of the *EIAO-TM*. With the implementation of appropriate environmental mitigation measures recommended in the preceding sections, no unacceptable environmental impacts, and hence no further implications are anticipated.

Legend

Project Site Location

Key Plan

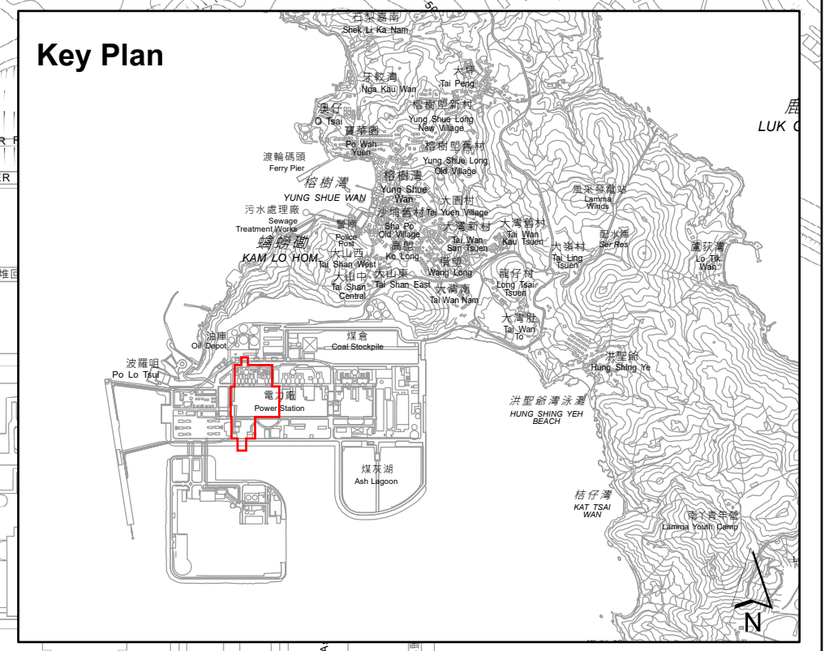

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Figure 1.1

Location of Project Site at Lamma Power Station

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Project_Site_v2.mxd
Date: 20/3/2024

Environmental Resources Management

ERM

Legend

- Project Site Location
- Main Station Building for L1 to L3 and Connecting Footbridge
- Unit 2 FGD Electrical and Control Equipment Building including Pipe Rack
- Microwave Repeater Station
- Electrostatic Precipitator Control Room No. 1 to 3
- GT57 & Coal Jetty Electrical Equipment Building
- Junction Tower T16
- Light Oil Tank Units 1 and 3
- Compressor House A & B
- Operational Store
- Sulphur Store
- L1 – 6 Sulphur Melt/ Store Tank Shelter
- Circulating Water (C.W.) Pump Yard Control Room No. 1
- No. 1 C.W. Intake
- No. 1 Chimney
- L1, L2 and L3 Associated Equipment

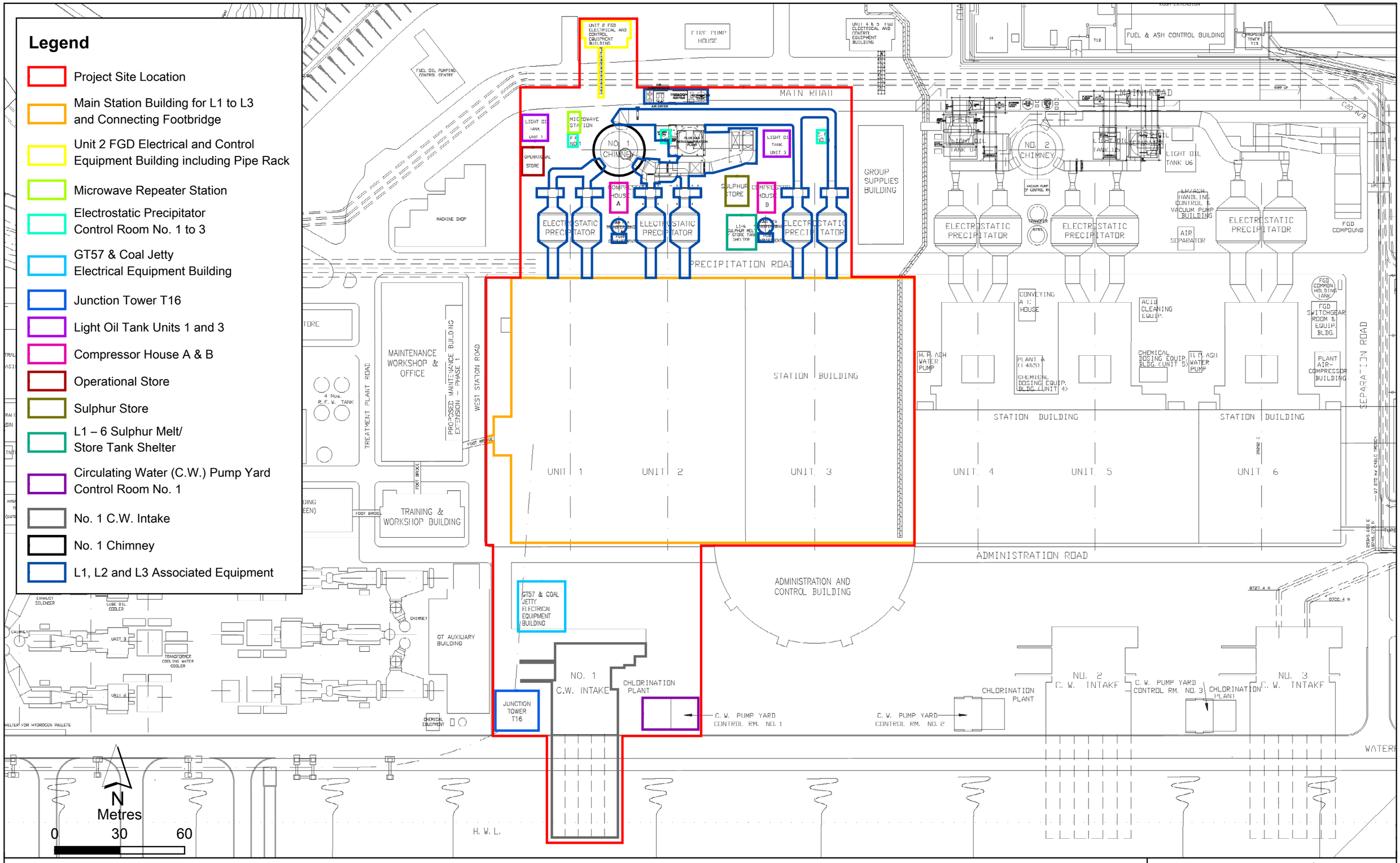

Figure 1.2

Location of L1, L2 and L3, Their Associated Equipment and Civil Structures

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Date: 22/3/2024

Environmental Resources Management

ERM

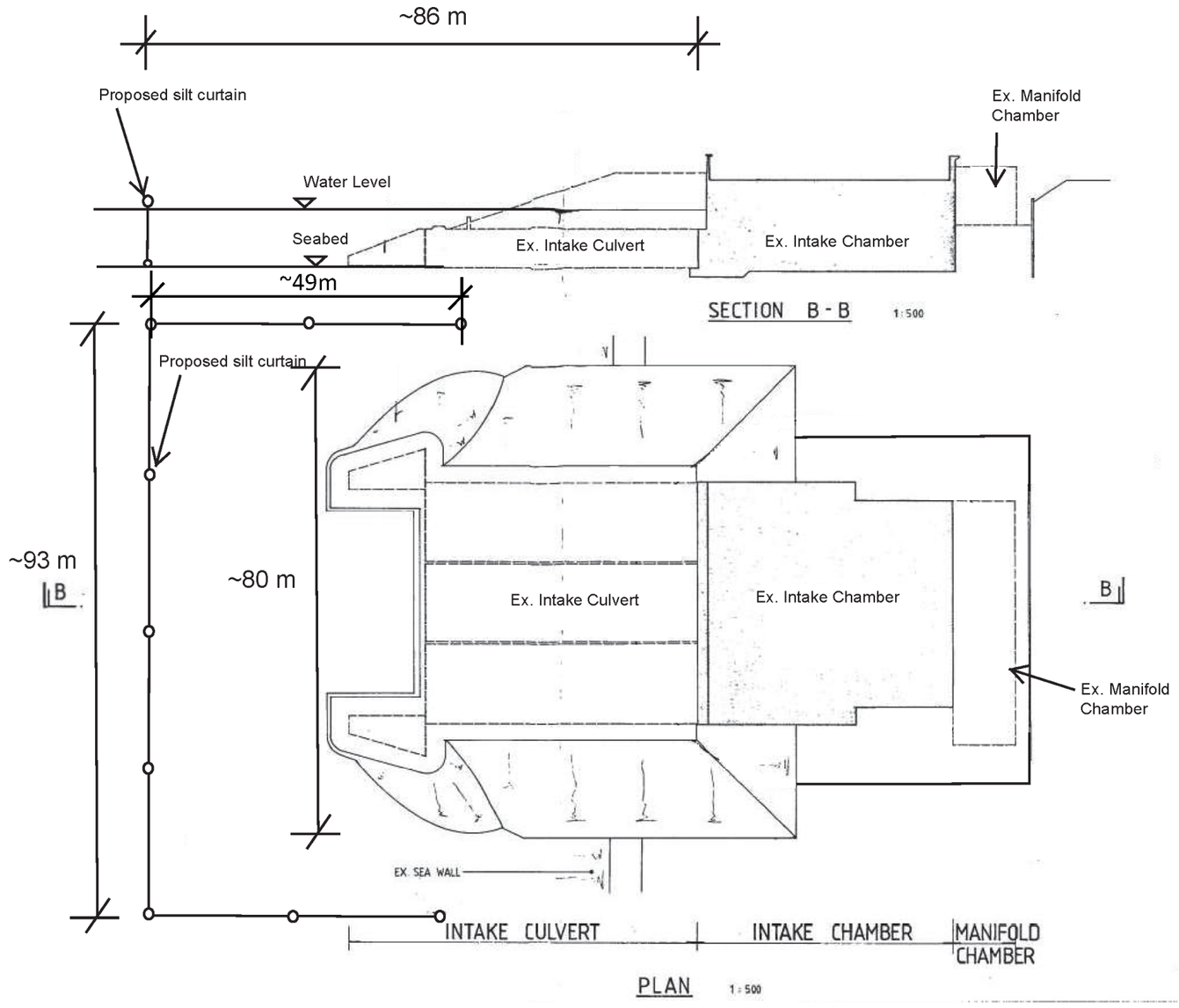

Figure 1.3

Demolition Works of No. 1 C.W. Intake with the Implementation of Silt Curtain

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Environmental Resources Management

ERM

Legend

Project Site Location

Concurrent Project

Gas-fired Power Station at Lamma Extension (AEIAR-010/1999)

Improvement Dredging for Lamma Power Station Navigation Channel (AEIAR-212/2017)

Re-provision of Open Cycle Gas Turbines at Lamma Power Station (AEIAR-234/2022)

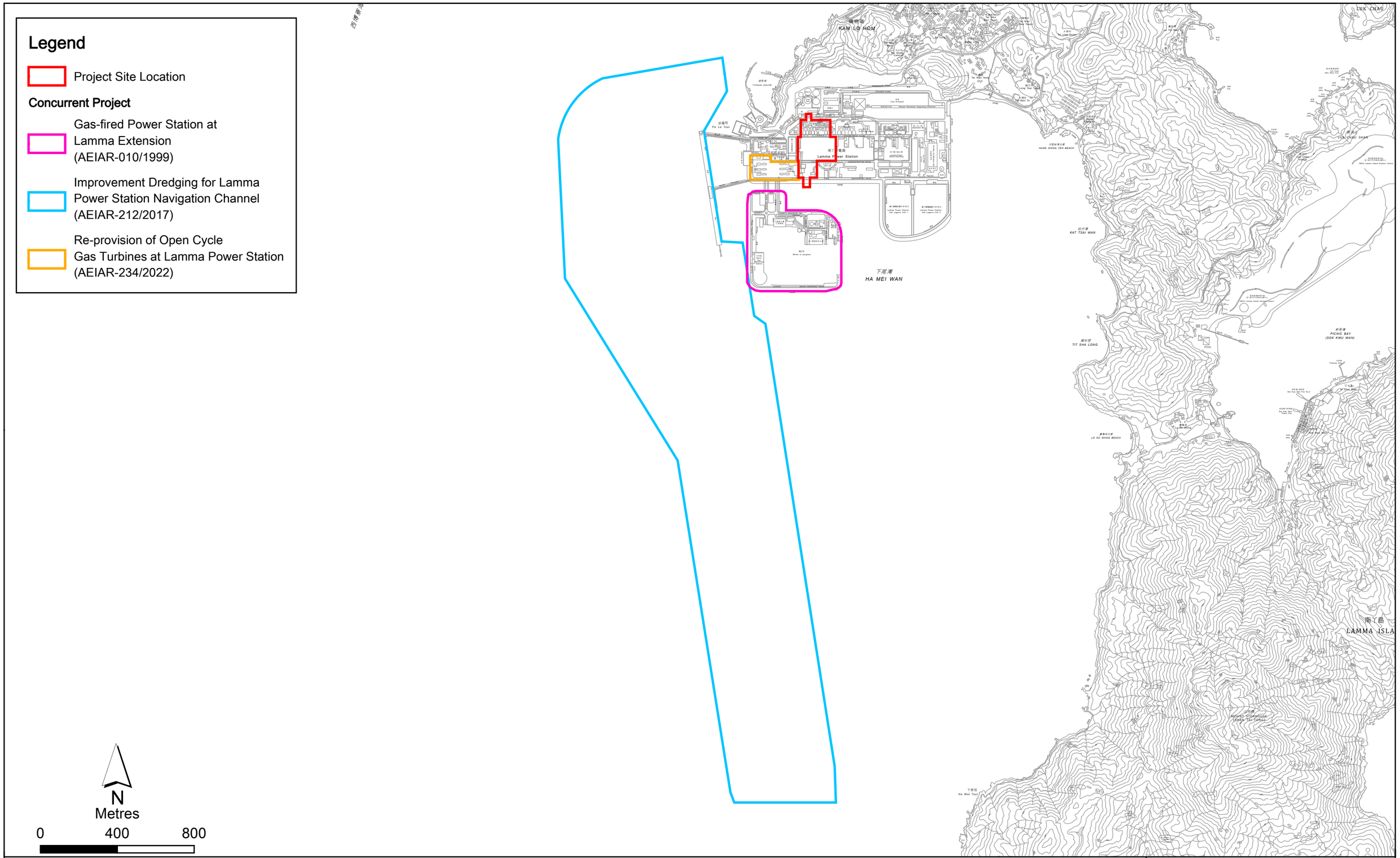

Figure 2.1

Location of Concurrent Projects

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Concurrent_Project.mxd
Date: 14/11/2023

Environmental Resources Management

ERM

Legend

- Project Site Location
- 500m Assessment Area

Outline Zoning Plan (OZP)

- Green Belt (GB)
- Other Specified Uses (OU)
- Village Type Development (V)

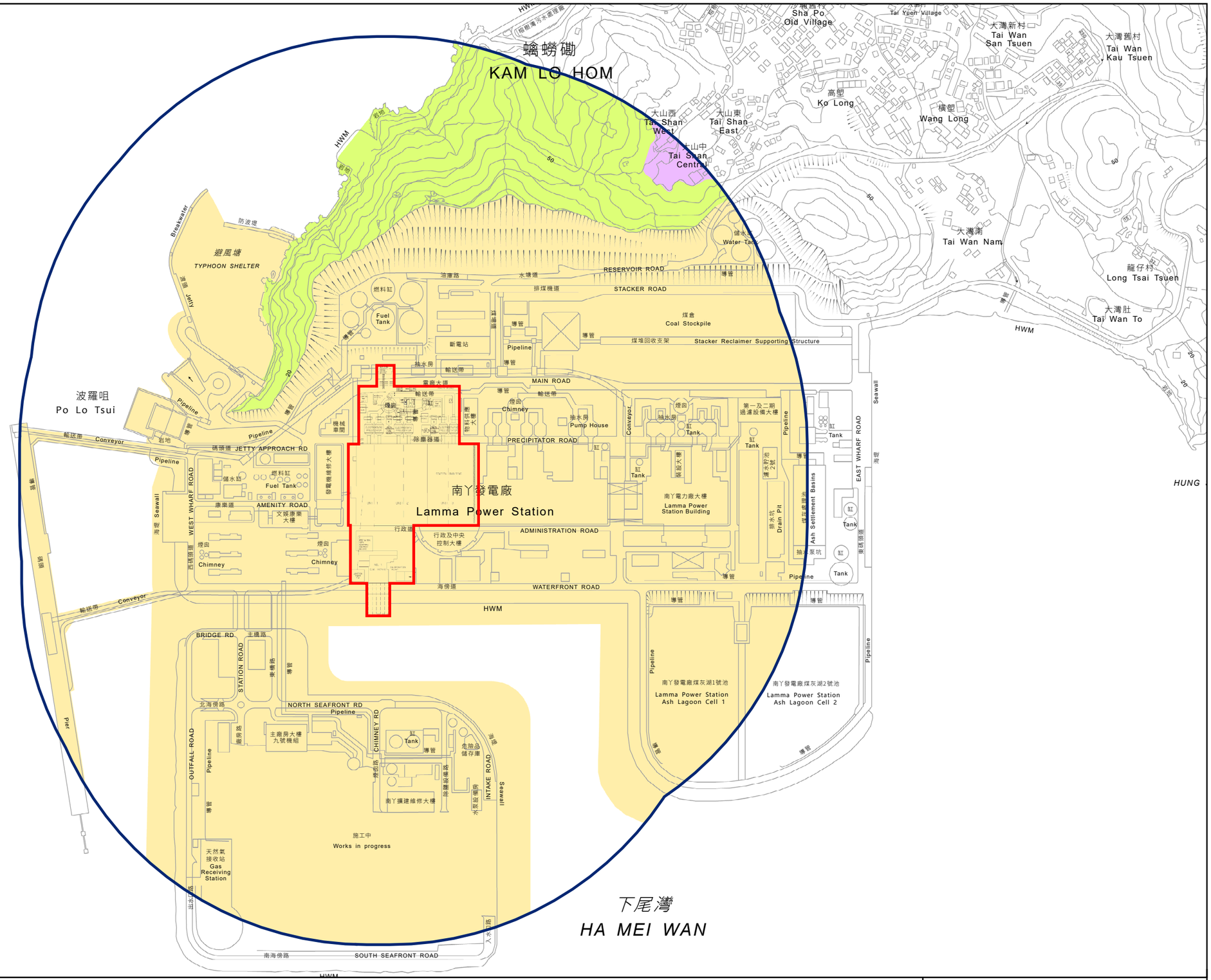

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Figure 3.1

Project Site and Surrounding Environment

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Date: 22/3/2024

Environmental Resources Management

ERM

Legend

- Air Sensitive Receiver (ASR)
- Preliminary Loading and Unloading Point
- Marine Routes
- Project Site Location
- 500m Assessment Area

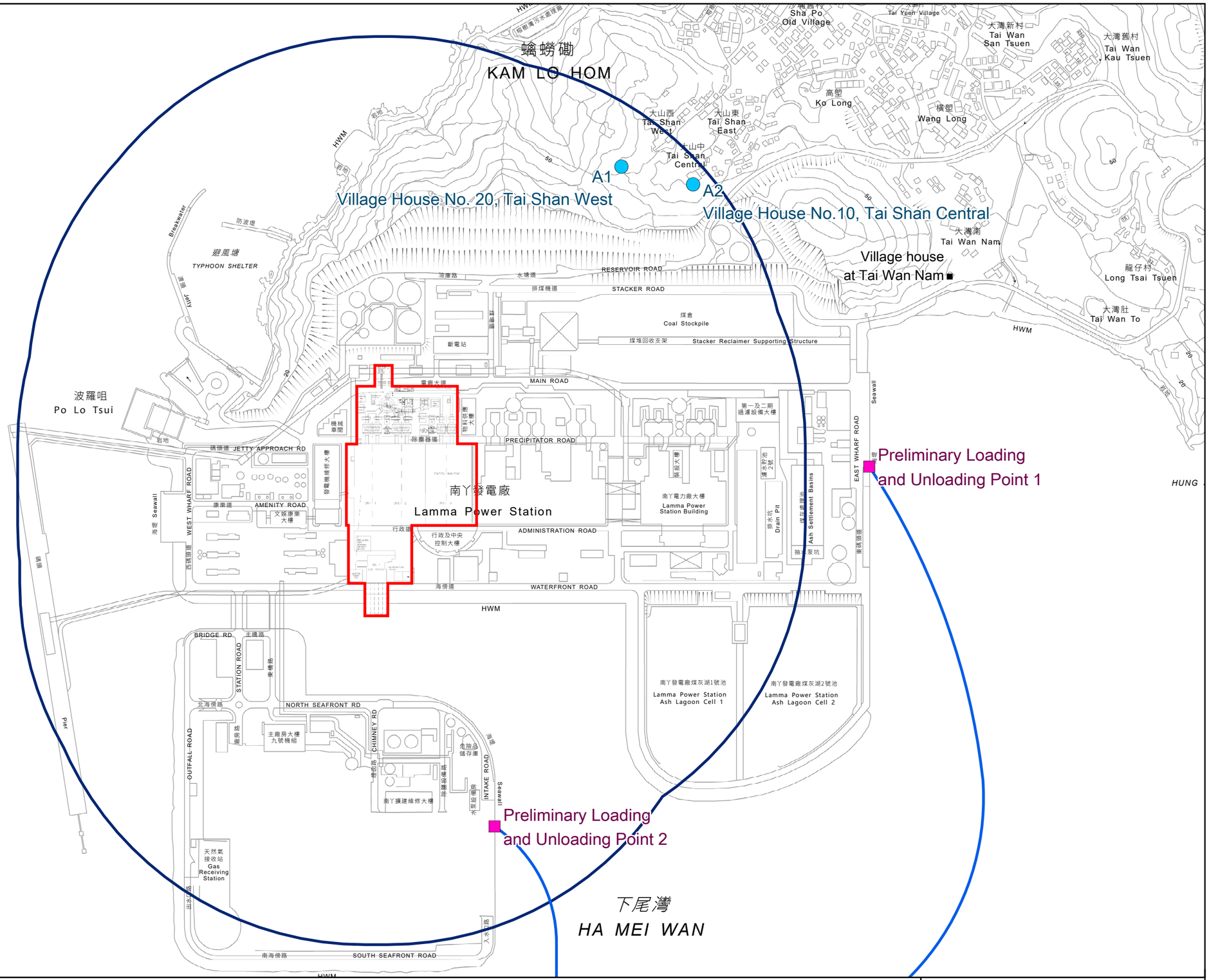

Figure 4.1

Locations of Representative Air Sensitive Receivers (ASRs)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_ASR.mxd
Date: 22/3/2024

Environmental Resources Management

ERM

Legend

- Noise Sensitive Receivers (NSRs)
- Project Site Location
- 300m Assessment Area

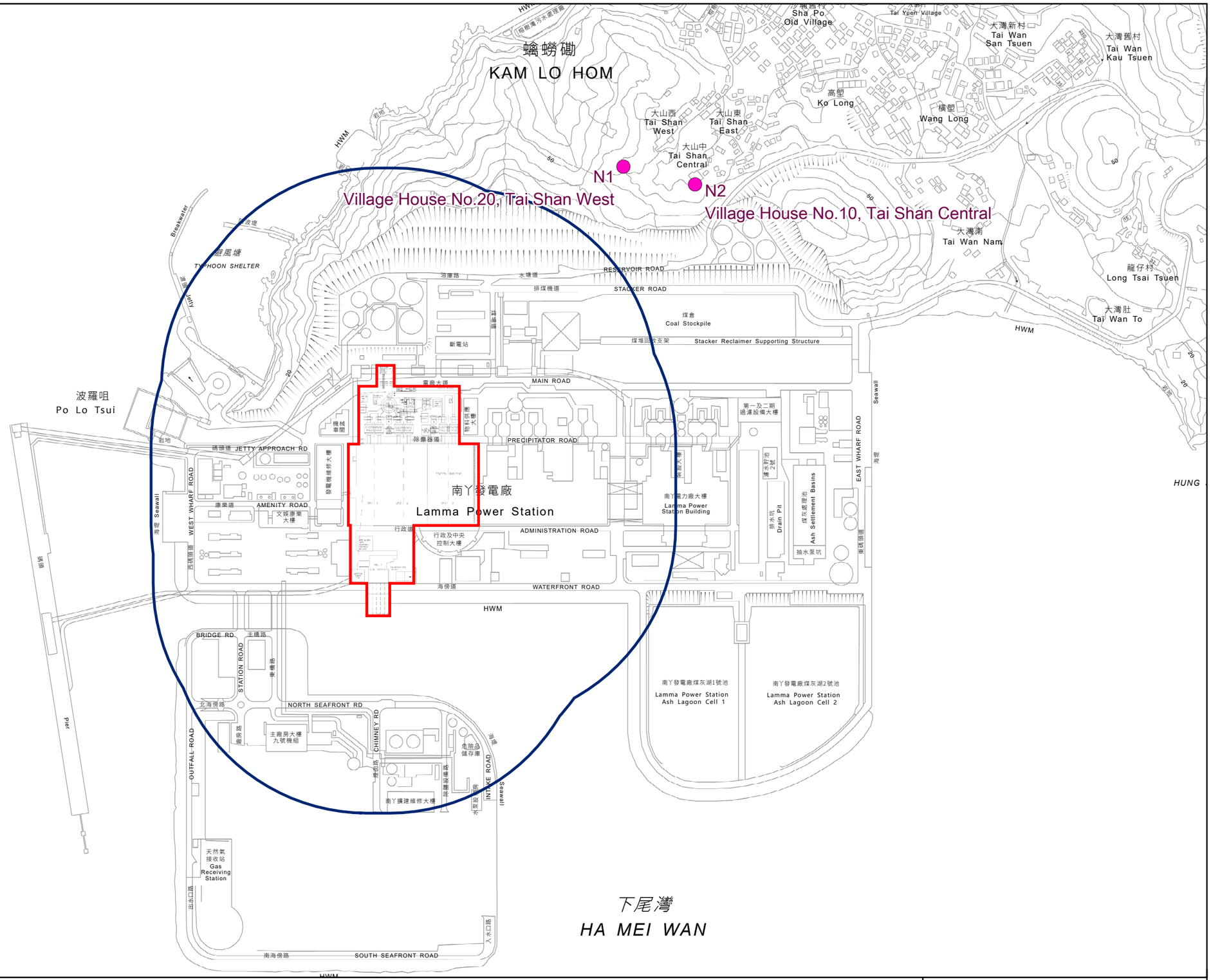

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Figure 4.2

Locations of Noise Sensitive Receivers (NSRs)

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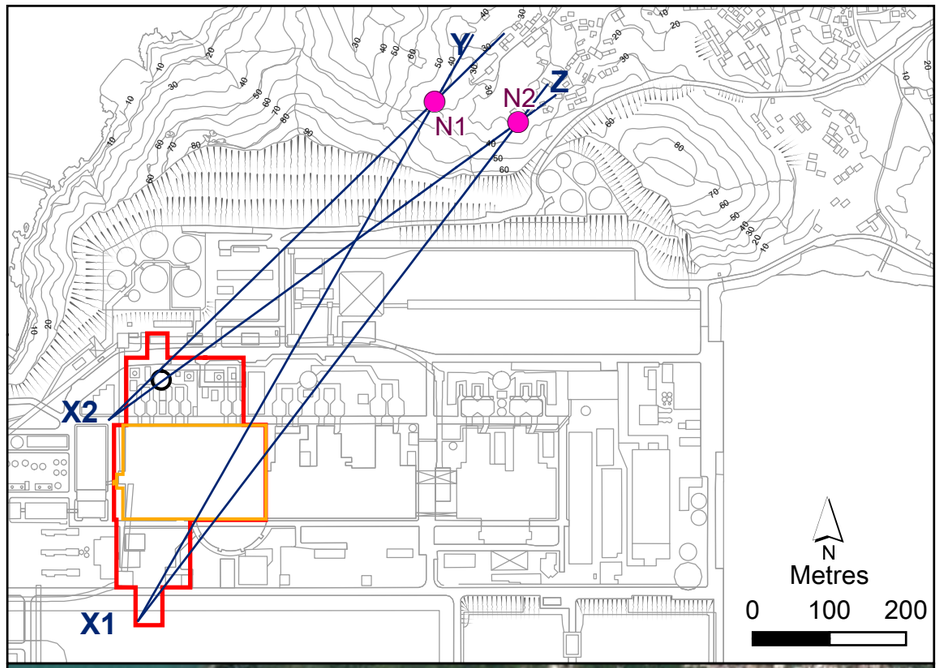
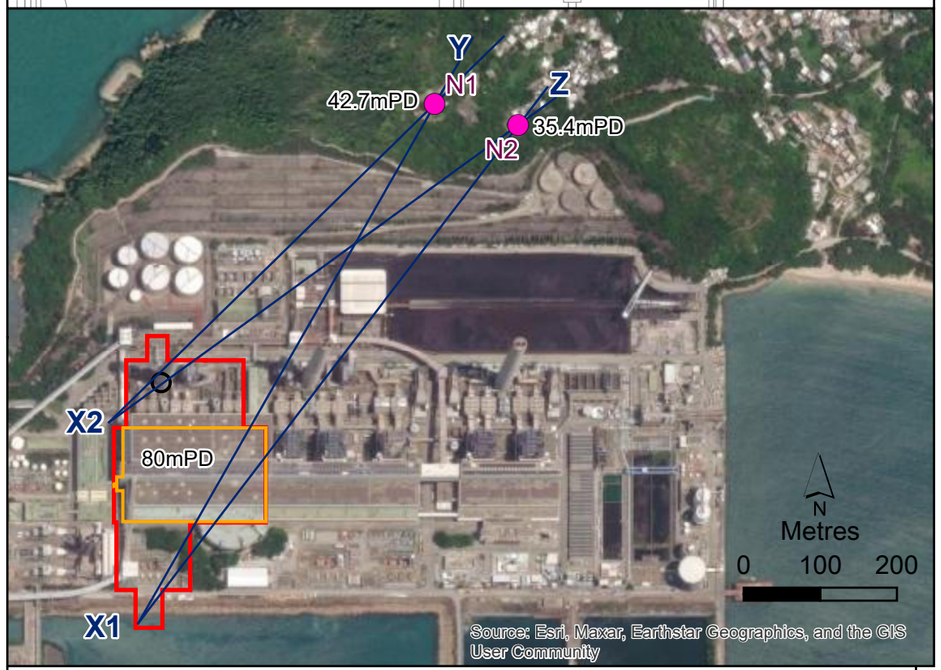
Date: 8/4/2024

Environmental Resources Management

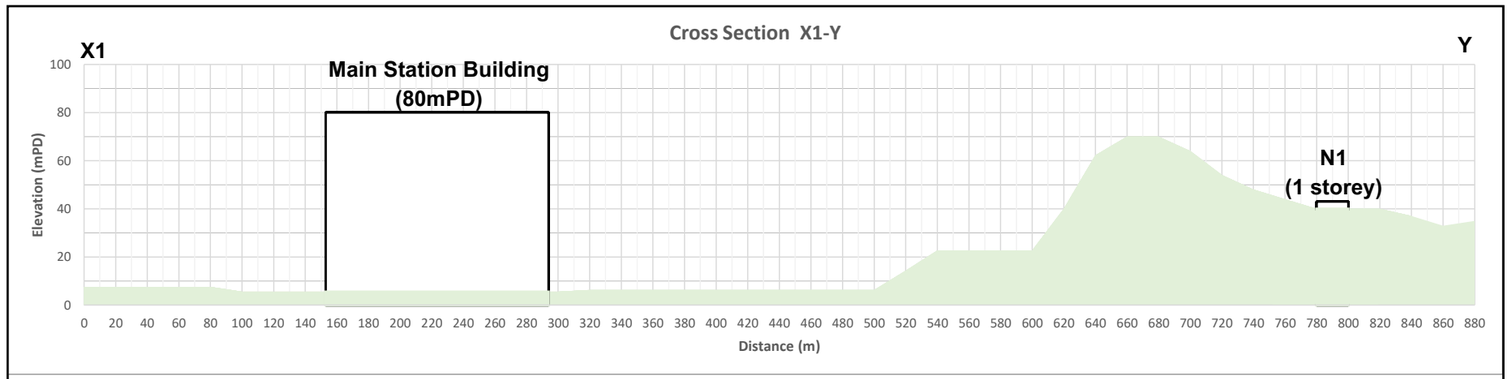
ERM

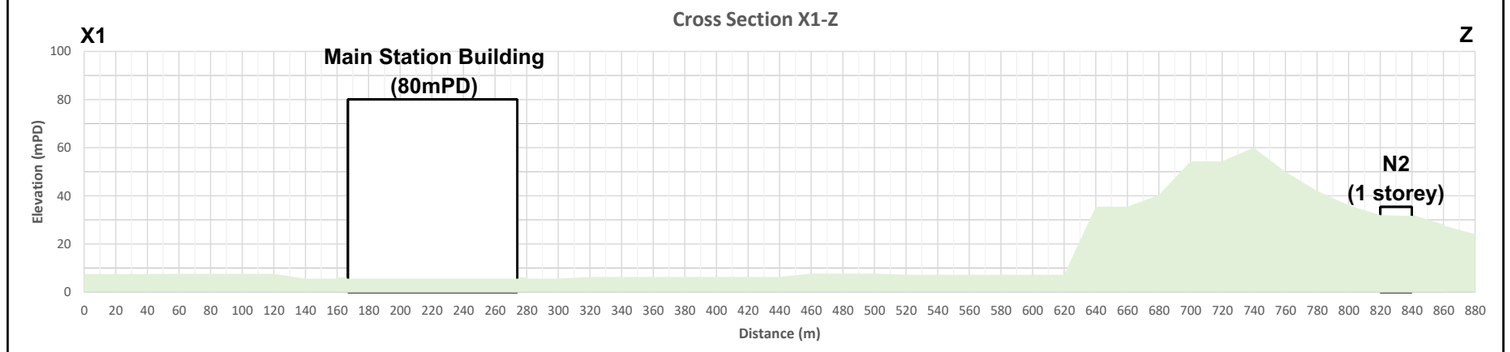


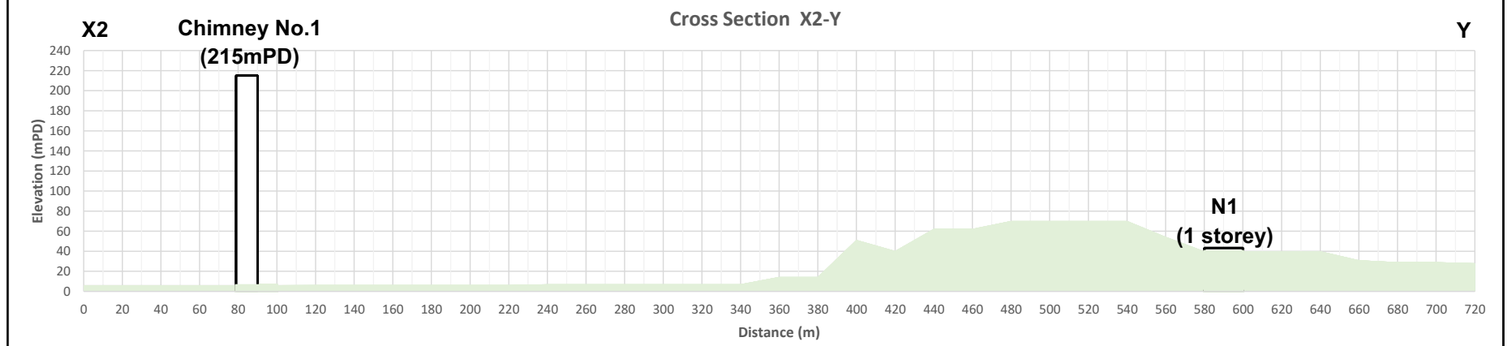


Legend

- Noise Sensitive Receivers (NSRs)
- Project Site Location
- Main Station Building for L1 to L3 and Connecting Footbridge
- No. 1 Chimney







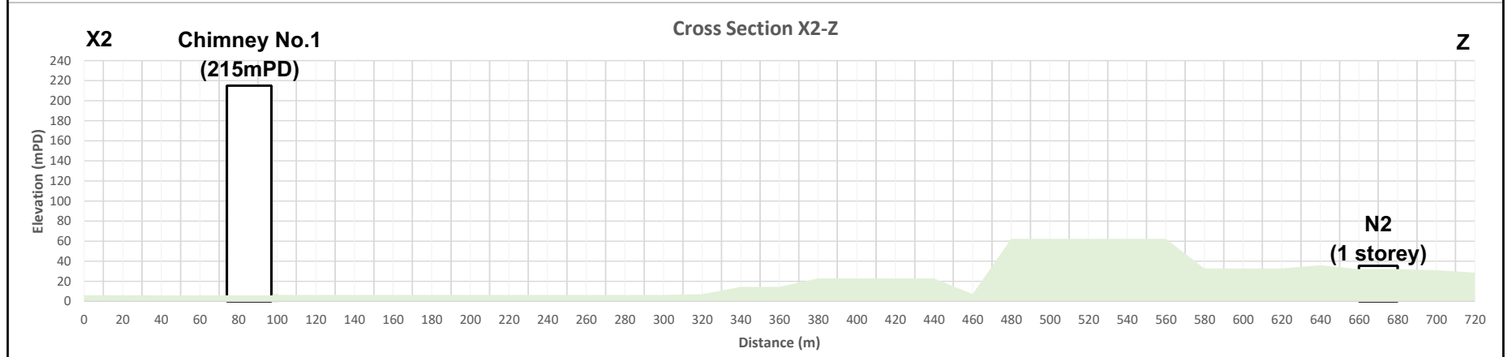


Figure 4.3

Section Plan of Lamma Power Station and NSR N1 and N2

File: T:\GIS\CONTRACT\0685764\mxd\0685764_NSR_Cross_Section_v2.mxd
Date: 8/4/2024

Environmental Resources Management

ERM

Legend

- Water Sensitive Receivers (WSRs)
- EPD Monitoring Station
- Project Site Location
- 500m Assessment Area

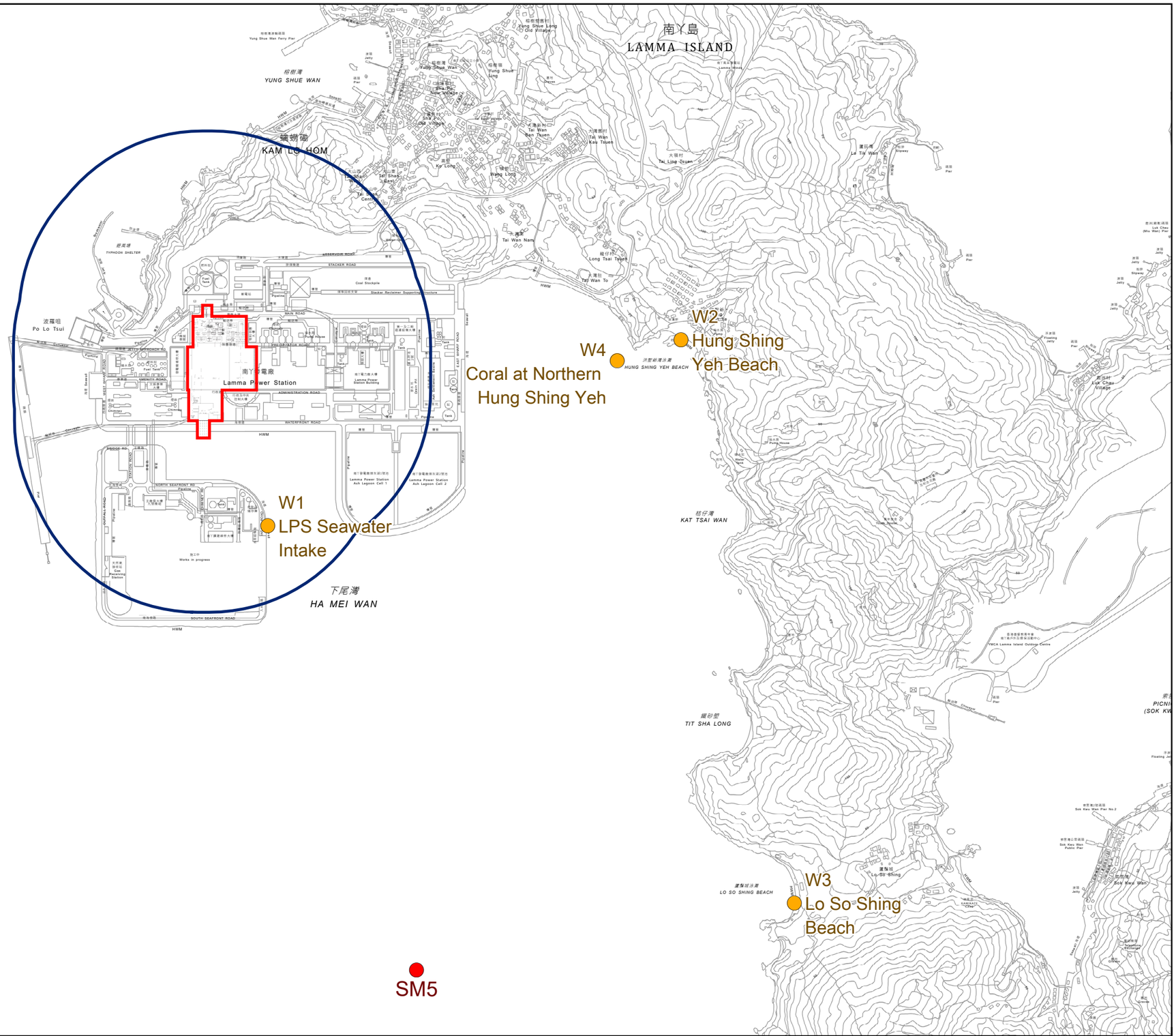


Figure 4.4

Locations of Representative Water Sensitive Receivers (WSRs)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_WSR.mxd
Date: 15/4/2024

Environmental Resources Management

ERM

Legend

- Project Site Location
- 500m Assessment Area
- Coral at Northern Hung Shing Yeh (AEIAR-212/2017)
- Transect Locations for Coral Survey (AEIAR-218/2018)
- Spawning Ground of Commercial Fisheries Resources
- Nursery Area of Commercial Fisheries Resources

蟾蜍磡
KAM LO HOM

波羅咀
Po Lo Tsui

避風塘
TYPHOON SHELTER

南丫發電廠
Lamma Power Station

施工中
Works in progress

下尾灣
HA MEI WAN

N
Metres
0 125 250

Figure 4.5

Locations of Marine Ecological Habitat and Fisheries Sensitive Receivers

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Marine_Ecological_and_Fisheries_Sensitive_Receivers.mxd
Date: 12/4/2024

Environmental Resources Management

ERM

APPENDIX A CONTAMINATION ASSESSMENT PLAN (CAP)

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1. INTRODUCTION

1.1 Background

The Hongkong Electric Co., Ltd. (HK Electric) operates the Lamma Power Station (LPS) which comprises of a number of existing power generating units, including eight coal-fired units (i.e., L1 to L8 with capacity of 3 x 250MW and 5 x 350MW), and seven oil-fired open cycle gas turbine units (OCGTs) (i.e., GT1 to GT7). GT5 and GT7 were later converted into a gas-fired combined cycle gas turbine unit (CCGT) in 2008. GT2, GT3, GT4, GT6 and GT57 are currently undergoing a reprovision programme where the units will be replaced progressively by up to four new units (i.e., GT8, GT9, GT10 and GT11), under the Environmental Permit (EP-600/2022) issued by the Environmental Protection Department (EPD) in April 2022.

The coal-fired units L1, L2 and L3, with power generating capacity of 250MW each, were retired in 2017, 2022 and 2018, respectively. As a result of the retirement of L1, L2 and L3, HK Electric proposes to decommission and demolish these retired units as well as the associated equipment and civil structures (hereafter referred to as “the Project”) from 2024 onwards.

The location of the Project and the Project boundary are presented in **Figure 1.1**.

1.2 Purpose of this Project Profile

The Contamination Assessment Plan (CAP) aims to identify the presence of potential land contamination sites within the Project area and determine whether potential land contamination sites, if any, are within the boundaries of work areas. The land history of the Project site area in relation to possible contamination would be reviewed in the CAP. This CAP would also determine the need for an intrusive land contamination site investigation (SI) at the Project site to close the data gaps for the desk top review. If it is considered necessary to conduct SI, this CAP would describe the approach and methodology to identify the nature and extent of on-site contamination (if any).

1.3 Structure of this CAP

Following this introduction section, the subsequent sections of the CAP are structured as follows.

- **Section 2** outlines the statutory requirements and the evaluation criteria for land contamination assessment;
- **Section 3** presents the findings of the site appraisal, including site survey, information on the past and present land uses;
- **Section 4** presents potential contamination evaluation for the Project site;
- **Section 5** proposes the sampling and testing plan;
- **Section 6** proposes the proposed sampling methodology; and
- **Section 7** presents the conclusion and recommendations.

2. STATUTORY REQUIREMENTS AND EVALUATION CRITERIA

2.1 Statutory Framework

The following EPD's guiding documents are referenced for this land contamination assessment:

- Annex 19 of the *Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO), Guidelines for Assessment of Impact On Sites of Cultural Heritage and Other Impacts (Section 3: Potential Contaminated Land Issues)*, Environment Protection Department (EPD), 2023;
- *Guidance Note for Contaminated Land Assessment and Remediation* (the *Guidance Note*), Revised in April 2023;
- *Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management* (the *Guidance Manual*), Revised in April 2023; and
- *Practice Guide for Investigation and Remediation of Contaminated Land* (the *Practice Guide*), Revised in April 2023.

The following legislation, documents and guidelines may cover or have some bearing upon the assessment of contamination and the handling, treatment and disposal of contaminated materials for this Project:

- *Water Pollution Control Ordinance* (WPCO) (CAP 358);
- *Waste Disposal Ordinance* (WDO) (CAP 354);
- *Waste Disposal (Chemical Waste) (General) Regulation* (CAP 354C); and
- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*.

2.2 Selection of RBRGs Land Use Scenario

In accordance with Section 2 of the *Guidance Note*, the Project site's future land use and the appropriate set of Risk-based Remediation Goals (RBRGs) corresponding to the land use scenarios should be determined prior to the site appraisal. The Hong Kong RBRGs are developed for four different post-restoration land use scenarios, namely urban residential, rural residential, industrial, and public parks.

Although the future use of the Project site is unplanned, as the Project site is within the LPS, it is believed the future land use will remain as industrial use, and so the RBRGs conceptual site model under industrial land use scenarios will be adopted. Therefore, the RBRGs for industrial land use shall be adopted in this Project. The adopted RBRGs for soil and groundwater are presented in **Table 2.1**.

Table 2.1 RBRGs for Industrial Land Use for Soil and Groundwater & Soil Saturation Limit / Solubility Limit

Chemical	RBRGs for Soil		RBRGs for Groundwater	
	Industrial (mg/kg)	Soil Saturation Limit (C_{sat}) (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
Metals				
Lead	2,290	-	-	-
Antimony	261	-	-	-
Arsenic	196	-	-	-
Barium	1.00E+04[(a)]	-	-	-
Cadmium	653	-	-	-
Cobalt	1.00E+04[(a)]	-	-	-

Chemical	RBRGs for Soil		RBRGs for Groundwater	
	Industrial (mg/kg)	Soil Saturation Limit (C_{sat}) (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
Copper	1.00E+04[(a)]	-	-	-
Manganese	1.00E+04[(a)]	-	-	-
Molybdenum	3,260	-	-	-
Nickel	1.00E+04[(a)]	-	-	-
Tin	1.00E+04[(a)]	-	-	-
Zinc	1.00E+04[(a)]	-	-	-
Chromium III	1.00E+04[(a)]	-	-	-
Chromium VI	1,960	-	-	-
Mercury	38.4	-	6.79	-
Petroleum Carbon Ranges (PCRs)				
C6 - C8	1.00E+04[(a)]	1,000	1,150	5.23
C9 - C16	1.00E+04[(a)]	3,000	9,980	2.8
C17 - C35	1.00E+04[(a)]	5,000	178	2.8
Volatile Organic Compounds (VOCs)				
Acetone	1.00E+04[(a)]	[(b)]	1.00E+04[(a)]	[(b)]
Benzene	9.21	336	54	1,750
Bromodichloromethane	2.85	1,030	26.2	6,740
2-Butanone	1.00E+04[(a)]	[(b)]	1.00E+04[(a)]	[(b)]
Chloroform	1.54	1,100	11.3	7,920
Ethylbenzene	8,240	138	1.00E+04[(a)]	169
Methyl tert-Butyl Ether	70.1	2,380	1,810	[(b)]
Methylene Chloride	13.9	921	224	[(b)]
Styrene	1.00E+04[(a)]	497	1.00E+04[(a)]	310
Tetrachloroethene	0.777	97.1	2.95	200
Toluene	1.00E+04[(a)]	235	1.00E+04[(a)]	526
Trichloroethene	5.68	488	14.2	1,100
Xylenes (Total)	1,230	150	1,570	175
Semi Volatile Organic Compounds (SVOCs)				
Acenaphthene	1.00E+04[(a)]	60.2	1.00E+04[(a)]	4.24
Acenaphthylene	1.00E+04[(a)]	19.8	1.00E+04[(a)]	3.93
Anthracene	1.00E+04[(a)]	2.56	1.00E+04[(a)]	0.0434
Benzo(a)anthracene	91.8	-	-	-
Benzo(a)pyrene	9.18	-	-	-
Benzo(b)fluoranthene	17.8	-	7.53	0.0015
Benzo(g,h,i)perylene	1.00E+04[(a)]	-	-	-
Benzo(k)fluoranthene	918	-	-	-
bis-(2-Ethylhexyl)phthalate	91.8	-	-	-
Chrysene	1,140	-	812	0.0016
Dibenzo(a,h)anthracene	9.18	-	-	-
Fluoranthene	1.00E+04[(a)]	-	1.00E+04[(a)]	0.206
Fluorene	1.00E+04[(a)]	54.7	1.00E+04[(a)]	1.98
Hexachlorobenzene	0.582	-	0.695	6.2
Indeno(1,2,3-cd)pyrene	91.8	-	-	-
Naphthalene	453	125	862	31
Phenanthrene	1.00E+04[(a)]	28	1.00E+04[(a)]	1
Phenol	1.00E+04[(a)]	7,260	-	-
Pyrene	1.00E+04[(a)]	-	1.00E+04[(a)]	0.135

Chemical	RBRGs for Soil		RBRGs for Groundwater	
	Industrial (mg/kg)	Soil Saturation Limit (C_{sat}) (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
Dioxins / Polychlorinated Biphenyls (PCBs)				
Dioxins (I-TEQ)	0.005	-	-	-
PCBs	0.748	-	5.1100	0.031
Other Inorganic Compounds				
Cyanide, free	1.00E+04[(a)]	-	-	-
Organometallics				
TBTO	196	-	-	-

Notes:

(a) Indicates a 'ceiling limit' concentration.

(b) Indicates that the C_{sat} value / solubility limit exceeds the 'ceiling limit' therefore the RBRG applies.

3. SITE APPRAISAL

The site appraisal, which comprises desktop review and site walkover, has been carried out to review the current and past land uses, historical aerial photographs and maps, historical spillage and leakage records, (hydro) geology and underground soil profile to identify the potential for causing land contamination at the Project site.

3.1 Project Site Environment and Site Setting

The Project site is situated within the LPS with an area of approximate 56,000m^2. The whole Project site is concrete paved except the planter areas. The Project site comprises the three (3) coal-fired units L1, L2 and L3 with associated equipment including the following main areas:

- Electrostatic Precipitator systems, Unit 2 Flue Gas De-sulphurisation (FGD) system, No. 1 Chimney and auxiliary buildings at the northern part of the Project site;
- Main Station Building for L1 to L3 consists of the coal-fired and steam generation units at the centre part of the Project site; and
- Circulating water system, Junction Tower T16 and auxiliary buildings at the sourthern part of the Project site.

The Project site is bounded by the oil tanks area of the LPS to the north, LPS extension to the south, LPS L4, plant house and equipment supplies building to the east, and maintenance workshop, office, training workshop building and GT auxiliary building to the west.

3.2 Review of Historical Land Uses

A review of past land uses at the Project site was conducted based on information provided by HK Electric and a review of aerial photographs in the years of 1978, 1980, 1981, 1982, 1990, 2001, 2010 and 2022. The historical land use of the Project site is summarised in **Table 3.1**. The aerial photographs were obtained from the Lands Department (LandsD). The referenced aerial photographs of Project site are attached in **Annex A**.

Table 3.1 Summary of Historical Land Uses

Year	Description of Land Uses	Owner or Occupier	Off-site Property Affected?
1978	The Project site was undeveloped and in the open sea area.	N/A	No
1980	Land reclamation works and the construction of LPS were underway.	HK Electric	No
1981	Land reclamation works completed and the construction of LPS were underway. The circulating water system and the No. 1 Chimney were constructed.	HK Electric	No
1982	The overall structure of the Main Station Building for L1, L2 and L3 was completed. L1, L2 and L3 were commissioned in 1982, 1983 and 1984, respectively. The associated facilities / equipment (including the Light Oil Tank Units 1 and 3, etc.) were constructed between 1982 and 1985.	HK Electric	No
1990	There was no significant change of land use.	HK Electric	No
2000 / 2001	Junction Tower T16 and associated auxiliary buildings were under construction between 2000 and 2001.	HK Electric	No
2009 / 2010	L2, L4 and L5 were retrofitted with FGD system in 2010, 2010 and 2009 respectively.	HK Electric	No

Year	Description of Land Uses	Owner or Occupier	Off-site Property Affected?
2022	The overall structures of L1, L2 and L3 remained unchanged, but the units have been decommissioned as of 2017, 2022 & 2018 respectively.	HK Electric	No

3.3 Site Inspection and Observation

A site walkover covering the Project site was conducted on 21 July 2023 to observe the current land uses of the Project site and its conditions. During the site walkover, it was observed that the Main Station Building for L1 to L3 and other auxiliary buildings consist of levels of structures, but from the land contamination perspective, only the ground level of those buildings were assessed in the site walkover and this study. The observations of the main areas of the Project site are summarised below.

Main Station Building for L1 to L3

During the site walkover inside the Main Station Building for L1 to L3, the three (3) coal-fired units L1, L2 and L3 with the following associated unutilised equipment / system were observed (Photos 1 to 61 in **Annex B**):

- Ash handling system at the boiler area: a submerged scraper conveyor and furance bottom ash storage bin pit at each unit (Photos 6 to 9 in **Annex B**);
- Blow down drain pit at each unit (Photos 10 to 11 in **Annex B**);
- Oil-firing system including fuel oil heater, fuel oil pumps and fuel oil drain tank for each unit (Photos 12 to 15 in **Annex B**);
- Coal firing system including a series of coal grinding mills along the Main Station Building for L1 to L3 (Photos 16 to 17 in **Annex B**);
- Chemical dosing system (hydrazine, ammonia and phosphate tank): a set for both L1 and L2; two (2) for L3 (Photos 18 to 22 in **Annex B**);
- Lubrication oil system including: a large lubrication oil tank at L1, aboveground main oil tanks for L1 and L2, two (2) small lubrication oil tanks at L3, lubrication oil conditioner (a set for each L1 and L2 and two (2) sets for L3), lubrication oil coolers at L1 and L2 and two lubrication oil conditioner sets, and an oil transfer pump and sump pit at L3 (Photos 23 to 31 in **Annex B**);
- Seal oil supply unit for each of L1 and L2 and two (2) for L3 (Photos 32 to 35 in **Annex B**);
- Condensate system: one (1) set for each of L1 and L2, two (2) sets for L3 (Photo 36 in **Annex B**);
- Series of primary air fans and forced draft fans (Photos 37 to 40 in **Annex B**);
- Transformers (Photos 47 to 60 in **Annex B**);
- Sump pits (Photos 16, 30 and 31 in **Annex B**);
- Oily drain sump outside the Main Station Building for L1 to L3 (Photo 55 in **Annex B**); and
- Other auxiliary system: (Photos 41 to 46 in **Annex B**).

The Main Station Building for L1 to L3 was well-paved with concrete with a general concrete ground thickness of 150 mm. Some oil stains were observed near the seal oil supply units, lubrication oil conditioners and near a forced draft fan unit in L2. All equipment associated with fuel, oil and chemical storage was concrete-padded (with thickness of ~ 150 mm), bund-walled and inspected by HK Electric's health and safety team regularly. Besides, no other signs of suspected contamination such as abnormal odour or clear damage of ground surface was observed.

Northern Part of the Project Site

The structures of the Electrostatic Precipitator systems including air heaters and ash hoppers were observed connecting from the Main Station Building for L1 to L3 to each of the units (Photos 62 to 64 in **Annex B**). An additional FGD plant, including structures of absorber, oxidation air blower, booster fans, air compressors and water tank, was observed to be connected to the Electrostatic Precipitator systems of L2. Moreover, oil stains were observed at the oxidation air blower units (Photos 65 to 69 in **Annex B**). A chimney for exhausting the flue gas from L1-L3 was observed at the northern part of the Project site (Photos 70 in **Annex B**).

Two (2) aboveground Light Oil Tank Units 1 and 3 were observed at the northern part of the Project site, which were concrete-paved, with concrete bunding (Photos 71 and 73 in **Annex B**). According to HK Electric's representatives, the two tanks were both emptied. Auxiliary buildings of the Operational Store with a switch room and a recycling plant room of FM200 & NOVEC 1230 (FM200 & NOVEC 1320 are fire suppression systems) (Photo 74 in **Annex B**), as well as the Unit 2 FGD Electrical and Control Equipment Building including a battery room, FM-200 cylinder room, control equipment room and a switchgear room were observed at this part of the Project site (Photos 75 to 79 in **Annex B**). Outside the switchgear room, a storage area of equipment with oil stains and emptied chemical containers in place was also observed (Photo 80 in **Annex B**).

An enclosed concrete paving structure storing bags of solid sulphur in cage trolleys was observed, and two (2) sulphur melting / store tanks underneath a shelter were also observed nearby (Photos 81 to 82 in **Annex B**). Oil stains were noticeable next to the shelter.

The northern part of the Project site was well-paved with concrete with a general concrete ground thickness of 200 mm and a small section of brick pavers outside the Unit 2 FGD Electrical and Control Equipment Building. Some oil stains were observed at the air compressor units and booster fan units of the Unit 2 FGD plant, outside the switchgear room of the Unit 2 FGD Electrical and Control Equipment Building and at the sulphur melting / store tanks shelter. All equipment associated with fuel, oil and chemical storage was concrete-padded, bund-walled and inspected by HK Electric's health and safety team regularly. Besides, no other sign of suspected contamination such as oil staining, abnormal odour and/or distress vegetation or clear ground damage was observed.

Southern Part of the Project Site

The southern part of the Project site is an open area well-paved with concrete, featuring vegetation/plantation areas and a small section of brick pavers outside the GT57 & Coal Jetty Electrical Equipment Building. The concrete ground with a general thickness of 200mm. A circulating water system including the seawater intake facilities, Circulating Water Pump Yard Control Room No.1, and an electrochlorination plant (a dangerous goods manufacture installation) (Photos 83 to 86 in **Annex B**). Auxiliary buildings of GT57 & Coal Jetty Electrical Equipment Building (including switchgear room, uninterruptible power supply (UPS) & programmable logic controller (PLC) room, transformer room etc.) (Photos 87 to 90 in **Annex B**) and Junction Tower T16 for providing support to the coal conveyor belt are also present. Coal pieces and a mixture of coal residuals were observed on the ground of Junction Tower T16 (Photo 83 in **Annex B**). No other sign of suspected contamination such as oil staining, abnormal odour and/or distress vegetation or clear ground damage was observed.

The available photo records taken during the site walkover and the completed site walkover checklist are presented in **Annex B** and **Annex C**, respectively.

3.4 Information from Government Departments

Apart from the above-mentioned information reviewed, the following enquires to the HKSAR Government Departments listed in **Table 3.2** have been made to obtain the latest information regarding the land use status and records of land contamination and/or spillage at the Project site. A summary of correspondence is presented in **Table 3.2** below. Copies of the relevant replies from various Government Departments are included in **Annex D** for reference.

Table 3.2 Enquires and Responses on Land Contamination Related Records

Department	Responses Letter Ref.	Response Date	Summary of Responses
Environmental Protection Department (EPD)	EP749/11/3	13 November 2023	There is only one registered Chemical Waste Producer which is Hong Kong Electric. There are no records of chemical spillage of leakage, or any land contamination within the Project site.
Fire Services Department (FSD)	(113) in 4R Pt. 49	26 October 2023	Total two (2) incidents were recorded within LPS which include: 1) Late Call Fire on East Wharf Road, Limestone Unloader No.1 Lamma Power Station on 9 April 2022; and 2) No. 2 Fire Alarm at GT Auxiliary Building, Lamma Power Station on 26 February 2023. Total four (5) Dangerous Goods (DGs) licenses have been issued by FSD from 1990 which include: 1) Hypochlorite solution (Quantity: N/A); 2) Nitrogen, compressed (Quantity: N/A); 3) Heptafluoropropane (Quantity: N/A); and 4) Diesel, 200,000L 5) Diesel, 200,000L

An enquiry has been made to the registry of chemical waste producers maintained in the Territorial Control Office of EPD at Wan Chai on 19 September 2023. The registry record is updated as of 12 June 2023. The records of the registered chemical waste producers related to the LPS and nature of business are listed in **Annex E**.

A total of 11 active chemical waste producers (“Valid Records”) and 29 inactive chemical waste producers (“Invalid Records”) were registered with addresses at the LPS. Upon further confirmation with HK Electric, no chemical waste storage has been established within the Project site boundary.

From the EPD’s responses, there is no records of chemical spillage of leakage, or any land contamination within the Project site. HK Electric also further confirmed that there was no major spillage/leakage of chemical in the Project site’s history. Land contamination issue associated with these chemical waste producers are not anticipated.

An information request was sent to FSD regarding any historical Dangerous Goods (DG) licence records and incident records within the LPS. According to FSD letter correspondence dated 26 October 2023, a total of two (2) fire incidents were recorded within the LPS and a total of 5 DG licenses were identified within the LPS which are consistent with the records provided by HK Electric. The two (2) fire incidents recorded were found outside the Project site boundary, therefore, land contamination issue associated with these fire incidents are not anticipated. Details of the DG licences within the Project site are presented in **Table 3.3**. HK Electric also further confirmed there was no fire incident happened in the Project site’s history. Information provided by FSD is included in **Annex D**.

Table 3.3 Manufacture Licenses and Storage Licenses of DG within the Project Site

Manufacture or DG Storage License No.	Description	Location	Type of DG	Quantity
L003998	Category 3A: Light Oil Day Tank No.1	Light oil tank at northern part of the Project site	Diesel	200,000 Litres
L004026	Category 3A: Light Oil Day Tank No.3	Light oil tank at northern part of the Project site	Diesel	200,000 Litres
M/L004087 (Manufacture License)	Category 2.2: Recycling plant room of FM200	Operational Store at northern part of the Project site	Heptafluoropropane	N/A for Manufacture License
M/L004088 (Manufacture License)	Category 2.2: Recycling plant room of NOVEC 1230	Operational Store at northern part of the Project site	Nitrogen, compressed	N/A for Manufacture License
M/L005079 (Manufacture License)	Category 8: Electrochlorination Plant	Circulating water system at southern part of the Project site	Hypochlorite solution	N/A for Manufacture License

Manufacture Licences (M/L) of Cat. 2.2 DGs were permitted to the Recycling plant room of FM200 and NOVEC 1230 of the Operational Store. FM200 and NOVEC 1230 are fire suppression agents and Cat 2.2 DGs are classified as non-flammable and non-toxic gases. Therefore, no land contamination issue associated with the M/L licences for these areas is anticipated.

Manufacture Licences (M/L) of Cat. 8 DG (hypochlorite solution) was also permitted to the Electrochlorination plant. The electrochlorination plant generates sodium hypochlorite through onsite electrolysis of seawater, which is then dosed to seawater to prevent fouling of equipment by marine growth. Sodium hypochlorite is produced as required, and thus storage is not required. The byproduct from the electrolysis process is hydrogen, which is vented to the open atmosphere. Sodium hypochlorite is commonly used in industrial applications to control slime and bacteria formation in the circulating water. This process does not rely on any stored chlorine gas or hypochlorite brought from offsite. Therefore, land contamination issue associated with the M/L license for the electrochlorination plant at southern part of the Project site is also not anticipated.

3.5 (Hydro) Geology and Underground Soil Profile

Previous Ground Investigation (GI) records within the LPS obtained from HK Electric were reviewed. According to the previous drillhole records available at and near the Project site, the geological strata mainly consists of thick fill material of soil and boulders, with depths ranging from 0 to 38 m bgl throughout the Project site. In the northern portion of the Project site, intermittent layer of marine deposits of dark grey silty sand are observed beneath the fill material, with a relative thin layer within thickness of approximately 5.0m. Moving towards, to the centre/ south of the Project site, a more substantial layer of marine deposit of grey/ dark grey clayey silty sand is encountered beneath the fill material with thickness ranging from approximately 2 to 10 m. Throughout the Project site, localised occurrences of alluvium layer was observed within the strata beneath the marine deposit layer before a layer of slightly to completed weathered granite was reached towards the end of the exploratory hole. The approximate groundwater level was 2.5 to 3.7 m bgl.

The groundwater flow in the area of the Project site is estimated based on the groundwater level information obtained from the previous GI records. The location of the closest surface water body is

also taken into consideration. The identified groundwater levels at the north of the Project site are generally higher than the south of the Project site. In addition, the north of the Project site is a range of hills, while the immediate east, south and west of the Project site are shorelines. As groundwater always flows from high points to low points by gravity, the direction of groundwater flow of the Project site is potentially from the north towards the south.

Copies of the previous borehole records are attached in **Annex F**.

4. REVIEW OF POTENTIALLY CONTAMINATED AREA AND HOT SPOTS

4.1 Potential Contaminated Area

The Project site can be separated into three (3) areas: i) the Electrostatic Precipitator systems and the FGD system at the northern part of the Project site; ii) the Main Station Building for L1 to L3 consisting of the coal-fired and steam generation units at the centre part of the Project site; and iii) the circulating water system at the southern part of the Project site. According to the *Practice Guide* and based on the findings of the site appraisal presented **Section 3**, the potentially polluting activities of a power plant include: storage, transfer and use of fuels; oils and chemicals; storage, treatment and disposal of combustion residues; and storage and handling of coal. These activities are mainly located in the northern part of the Project site and the Main Station Building for L1 to L3 in the centre part of the Project site. Therefore, only the northern part of the Project site and the Main Station Building for L1 to L3 are considered as the potentially contaminated areas. Junction Tower T16 is a supporting building structure for the overhead coal conveyor, coal pieces and a mixture of coal residuals were observed on the ground of Junction Tower T16 at the southern part of the Project site, ground is concrete paved with approximate thickness of 200mm. Therefore, land contamination associated with Junction Tower T16 is considered unlikely, and a hot spots approach to sampling is proposed at Junction Tower T16.

The blowdown drain pit collects drains from the blowdown seal boxes of the boiler. The depth of the pit ranges from 3.2m to 4.0m, and the substructure will be demolished. Boiler blowdown involves the removal of water from a boiler. Its purpose is to control boiler water parameters within prescribed limits to minimize scale, corrosion, carryover, and other specific problems. Blowdown is also used to remove suspended solids present in the boiler system. The boilers are coal-fired power generation units. A conservative, hot spots approach to sampling is proposed for the blowdown drain pit.

The electrical equipment buildings are designed to protect critical electrical systems and power distribution equipment during operations, which usually contains some switchgear rooms, control rooms, UPS & PLC room, transformer room, air conditioning plant room. Therefore, nature of GT57 & Coal Jetty Electrical Equipment Building and Unit 2 FGD Electrical and Control Equipment Building are considered without land contamination issue, thus excluded from the potential contaminated area. Hotspots were identified at transformers room and battery room inside the GT57 & Coal Jetty Electrical Equipment Building and Unit 2 FGD Electrical and Control Equipment Building. The access roads, Main Road, Precipitation Road and Administrative Road are considered without land contamination and excluded from the potential contaminated area.

4.2 Identification of Hot Spots

As per the *Practice Guide*, it is recommended to investigate the potentially contaminated area in a regular grid pattern in order to have a comprehensive study on the potential land contamination site. Apart from the regular grid pattern, the *Practice Guide* also requires attention be paid to those locations where potential land contamination could occur. These are regarded as “hot spots” for investigation.

The Site Investigation for land contamination should include hot spots that have the potential for land contamination due to various previous site activities, locations of any leakage events, stains observed and/or former storage locations for chemicals and chemical wastes. During site walkovers, attention was paid to any signs of obvious/suspected contamination, such as oil staining, abnormal odour and/or distress vegetation, and these were identified as hot spots.

As mentioned in **Section 3.3**, the following hot spots are identified at the potentially contaminated area of the Project site during the site walkover. The additional sampling locations should be proposed at the identified hot spots.

<u>Main Station Building for L1 to L3</u>

- Ash handling system at the boiler area: a submerged scraper conveyor and furance bottom ash storage bin pit at each unit;
- Blowdown drain pit at each L1-L3;
- Oil-firing System including fuel oil heater, fuel oil pumps and fuel oil drain tank for each L1-L3;
- Coal firing system including a series of coal grinding mills along the Main Station Building for L1 to L3;
- Chemical dosing system (hydrazine, ammonia and phosphate tank): a set for each of L1 and L2, two (2) for L3;
- Lubrication oil system including, a large lubrication oil tank at L1, an aboveground main oil tank for L1 and L2, two (2) small lubrication oil tanks at L3, lubrication oil conditioner (a set for each L1 and L2 and two (2) sets for L3), lubrication oil coolers at L1 and L2 and two sets of lubrication oil conditioner, oil transfer pump and sump pit at L3;
- Seal oil supply unit for each L1 and L2 and two (2) units for L3;
- Oil stains near a forced draft fan in L2;
- Sump pits;
- Oily drain sump outside the Main Station Building for L1 to L3; and
- Transformers.

Northern Part of the Project Site

- Two (2) Light Oil Tank Units 1 and 3;
- Battery room;
- A storage area of equipment with oil stains and emptied chemical containers;
- Sulphur Store;
- Sulphur melting / store tanks shelter and oil stains nearby; and
- Oil stains at the air compressor units and air booster fans of the flue gas desulphurization plant.

Southern Part of the Project Site

- Junction Tower T16; and
- Transformer room.

The locations of the potentially contaminated area and the hot spots are presented in **Figures 4.1a-c**.

4.3 Chemicals of Concern (COCs)

The selection of potential COCs recommended for laboratory analysis is based on the information collected during the site reconnaissance and the nature of historical and current land uses / activities of each potentially contaminated area which was accessible / visually accessible for the site inspections, and also the *Guidance Manual* and *Practice Guide*. Since the Project site has been used as a power plant with coal handling facilities, COCs including metal, VOCs, SVOCs, PCRs and free cyanide, a total of fifty-one (51) chemicals, are selected for laboratory analysis. Free cyanide will be analysed only for soil samples collected at the coal griding mills. As confirmed by HK Electric, the chemicals used for the transformers are PCBs-free, therefore, analysis of PCBs are excluded.

5. SAMPLING AND TESTING PLAN

5.1 Proposed Site Investigation (SI) Strategies

As mentioned in **Section 4.1**, the northern part of the Project site and the Main Station Building for L1 to L3 are considered as the potentially contaminated area, with an area of approximately 33,500m^2. With reference to the *Practice Guide*, a regular grid pattern with a square size of 32m x 32m is proposed for the potentially contaminated area. Additional sampling locations are proposed at the identified hot spots. Some regular grid sampling locations are adjusted to the nearby represented facilities (i.e., electrostatic precipitator units), as well as the nearby hot spots to serve as sampling locations for both the regular grid and hot spots. A total of thirty-four (34) regular grid sampling locations (namely Grid-BH-1 to Grid-BH-34) and fifty-four (54) hot spot sampling locations (namely HS-BH1 to HS-BH54) are proposed within the Project site.

A total of 15 coal grinding mills and 13 transformers have been identified as land contamination hot spots within the Main Station Building for L1 to L3. These units are located adjacent to each other in clusters. Given the similarity in nature of each individual unit and their close proximity in location, only one sampling location is proposed for these clusters within each sampling grid, rather than one sampling location for each individual unit. If contamination is identified during the SI at any of the selected coal grinding mills or transformers, then additional sampling will be performed as required at the remaining coal grinding mills or transformer units in all sampling grid.

The furnace bottom ash had been handled within an enclosed system from coal firing system, scraper conveyor and ash storage bin pit. As L1, L2, and L3 have been retired and no longer in active operation, any furnace bottom ash has already been removed and handled in accordance with relevant regulations. As a precautionary measure, HK Electric will perform a final inspection prior to the implementation of the Project to confirm all furnace bottom ash has been removed completely from the civil structures. Therefore, the presence of furnace bottom ash is not anticipated during SI, and collection of ash sample is unnecessary.

The Project will tentatively commence in Q4 2024. The modification and diversion of existing piping and cables will be tentatively carried out from Q4 2024 to Q3 2025, followed by main bulk of demolition works of aboveground equipment and superstructure from Q2 2025 to Q4 2034, and finally the demolition of the substructure from Q1 2031 to Q1 2035. Since LPS equipment / facilities are still in place and it is not feasible to carry out SI works at this stage, SI and sampling shall be carried out when the proposed sampling locations are available after the demolition of the aboveground structures.

During the site investigation and sampling stage, a Land Contamination Specialist shall oversee the entire process and record any new visual signs of potential contamination such as oil leakage or oil stains. The Land Contamination Specialist shall also review the need for additional sampling to capture potential contamination observed during the work.

Table 5.1 summarises the details of the sampling plan, including the number of sampling locations, the sampling methods, the number of samples, the selected RBRGs land use scenario, and the parameters that will be analysed. The proposed sampling locations are presented in **Figures 5.1a-c**.

Table 5.2 presents the laboratory analytical methods and reporting limits proposed for the soil and groundwater samples.

Table 5.1 Summary of Proposed Sampling Locations

Potential Contaminated Area / Hot Spots	Sampling Location ID	Drill Depth and Method [b]	Soil Sampling		Groundwater		RBRGs Land Use Scenario
			Sampling Depths (m bgl) [b], [c]	Parameter to be Analysed [d], [e], [f], [g], [k]	Sampling Depths (m bgl)	Parameter to be Analysed [e], [f], [h], [i]	
Main Station Building for L1 to L3 and Northern Part of the Project site	Grid-BH-1 to Grid-BH-34	Borehole constructed by rotary drilling to 6.0m below ground level (bgl) and 2.0m below ground water level.	Manual excavation of Inspection Pit (0-1.5m bgl): ■ To collect disturbed sample at 0.5m and 1.5m bgl Rotary drilling of boreholes from: ■ Continuous drilling from bottom of the inspection pit and collected disturbed samples at 3.0m bgl for laboratory analysis, 4.5m bgl and 6.0m bgl for visual checking. PID testing for all disturbed samples collected.	Metal, PCRs, VOCs, SVOCs, free Cyanide	Collect one (1) groundwater sample at static groundwater level, if groundwater is encountered before end of borehole.	Mercury, PCRs, VOCs, SVOCs	Industrial
Battery room	HS-BH1						
Two (2) aboveground Light Oil Tank Units 1 and 3	HS-BH2 to HS-BH3						
Fuel oil drain tank at L1	HS-BH4						
Fuel oil heaters and fuel oil pumps area at L1	HS-BH5 to HS-BH6						
Fuel oil drain tank at L2	HS-BH7						
Fuel oil heater and fuel oil pumps at L2	HS-BH8 to HS-BH9						
Fuel oil drain tank at L3	HS-BH10						
Fuel oil heater and fuel oil pumps at L3	HS-BH11 to HS-BH12						
Blown down drain pits at each L1 to L3	HS-BH13 to HS-BH15						
Submerged scraper conveyor and furnace bottom ash storage bin at each L1 to L3	Grid-BH-18, Grid-BH-19, Grid-BH-21 [j]						
Sump pits	HS-BH16 to HS-BH17						
Series of coal grinding mills	HS-BH18 to HS-BH22						
Sump pits near the coal grinding mills	HS-BH23 to HS-BH24						
Chemical dosing systems	HS-BH25 to HS-BH28						
Sump pits	HS-BH29 to HS-BH30						
Large lubrication oil tank and transfer pump at L1	HS-BH31						
Lubrication oil conditioners and coolers at each L1 and L2	HS-BH32 to HS-BH33						
2 sets of Lubrication oil conditioners, oil transfer pumps and sump pit at L3	HS-BH34 to HS-BH37						
Seal oil supply unit at L1	Grid-BH-29 [j]						
Seal oil supply units at L2 and L3	HS-BH38 to HS-BH40						
Main oil tank at L1	Grid-BH-30 [j]						
Main oil tank at L2	HS-BH41						
Two small lubrication oil tanks at L3	Grid-BH-33 to Grid-BH-34 [j]						
Oil drain sump outside the Main Station Building for L1 to L3	HS-BH42						
Oil stain near a forced draft fan unit in L2	HS-BH43						
Sulphur melting / store tanks shelter and Oil stain nearby	Grid-BH9 [j]						
Storage area of equipment with oil stain and emptied chemical containers	HS-BH44						
Oil stains at the oxidation air blower near the flue gas desulphurization plant	HS-BH45						
Junction Tower T16	HS-BH46						
Sulphur Store	HS-BH47						
Transformers / Transformer Room	HS-BH48 to HS-BH54						

Notes:

(a) Exact coordinates to be confirmed by contractor after sub-surface utility scanning and will be provided in the Contamination Assessment Report.
(b) In case any below ground structure (i.e. sump pit) and thick surface concrete layer, sampling depth shall be adjusted (i.e. sampling from below the sump pit or below the concrete layer).
(c) Sampling depths may be changed if there is presence of rock/big boulders during rotary drilling. Exact sampling locations shall be subject to the instructions of land contamination specialist during supervision.
(d) Metals for soil samples: Antimony, Arsenic, Barium, Cadmium, Chromium III, Chromium VI, Cobalt Copper, Lead, Manganese, Mercury, Molybdenum, Nickel, Tin and Zinc, all-inclusive as listed in **Annex G**.
(e) Petroleum Carbon Ranges: C6-C8, C9-C16, C17-C35, all-inclusive as listed in **Annex G**.
(f) VOCs: Acetone, Benzene, Bromodichloromethane, 2- Butanone, Chloroform, Ethylbenzene, Methyl tert-Butyl Ether, Methylene Chloride, Styrene, Tetrachloroethene, Toluene, Trichloroethene, and Xylenes (Total).
(g) SVOCs for Soil: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, bis-(2-Ethylhexyl)phthalate, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Hexachlorobenzene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Phenol, and Pyrene.
(h) SVOCs for Groundwater: Acenaphthene, Acenaphthylene, Anthracene, Benzo(b)fluoranthene, Chrysene, Fluoranthene, Fluorene, Hexachlorobenzene, Naphthalene, Phenanthrene, and Pyrene.
(i) Mercury will be analysed for groundwater samples.
(j) Free cyanide will be analysed for soil samples collected at hot spot locations at the coal grinding mills.
(k) The regular grid sampling location is adjusted to the nearby hot spots to serve as sampling locations for both regular grid and hot spots.

Table 5.2 Laboratory Testing Methods and Reporting Limits

Test Parameter	Soil		Groundwater	
	Reference Method	Reporting Limit (mg/kg)	Reference Method	Reporting Limit (µg/L)
Metals [b]				
Lead	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Antimony	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Arsenic	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Barium	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Cadmium	USEPA 6020	0.2	USEPA 6020	Not to be tested [a]
Cobalt	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Copper	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Manganese	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Molybdenum	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Nickel	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Tin	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Zinc	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Chromium III	By Calculation	1	By Calculation	Not to be tested [a]
Chromium VI	USEPA3060	1	APHA3500 Cr:D	Not to be tested [a]
Mercury	APHA3500Cr:D	0.05	APHA3112B	0.5
PCRs [b]				
C6-C8	USEPA 8015	5	USEPA 8015	20
C9-C16	USEPA 8015	200	USEPA 8015	500
C17-C35	USEPA 8015	500	USEPA 8015	500
VOCs [b]				
Benzene	USEPA 8260	0.2	USEPA 8260	5
Toluene	USEPA 8260	0.5	USEPA 8260	5
Ethylbenzene	USEPA 8260	0.5	USEPA 8260	5
Stryene	USEPA 8260	0.5	USEPA 8260	5
Xylenes (Total)	USEPA 8260	2	USEPA 8260	20
Acetone	USEPA 8260	50	USEPA 8260	500
2-Butanone	USEPA 8260	5	USEPA 8260	50
Methylene chloride	USEPA 8260	0.5	USEPA 8260	50
Trichloroethene	USEPA 8260	0.1	USEPA 8260	5
Tetrachloroethene	USEPA 8260	0.04	USEPA 8260	5
Chloroform	USEPA 8260	0.04	USEPA 8260	5
Bromodichloromethane	USEPA 8260	0.1	USEPA 8260	5
Methyl tert-Butyl Ether	USEPA 8260	0.5	USEPA 8260	5
SVOCs [b]				
Acenaphthene	USEPA 8270	0.5	USEPA 8270	2
Acenaphthylene	USEPA 8270	0.5	USEPA 8270	2
Anthracene	USEPA 8270	0.5	USEPA 8270	2
Benzo(a)anthracene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]
Benzo(a)pyrene	USEPA 8270	0.5	USEPA 8270	Not to be tested[a]
Benzo(b)fluoranthene	USEPA 8270	0.5	USEPA 8270	1
Benzo(k)fluoranthene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]
Benzo(g,h,i)perylene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]

Test Parameter	Soil		Groundwater	
	Reference Method	Reporting Limit (mg/kg)	Reference Method	Reporting Limit (µg/L)
Bis-(2-Ethylhexyl)phthalate	USEPA 8270	5	USEPA 8270	Not to be tested [(a)]
Chrysene	USEPA 8270	0.5	USEPA 8270	1
Dibenzo(a,h)anthracene	USEPA 8270	0.5	USEPA 8270	Not to be tested [(a)]
Fluoranthene	USEPA 8270	0.5	USEPA 8270	2
Fluorene	USEPA 8270	0.5	USEPA 8270	2
Hexachlorobenzene	USEPA 8270	0.2	USEPA 8270	4
Indeno(1,2,3-cd)pyrene	USEPA 8270	0.5	USEPA 8270	Not to be tested [(a)]
Napththalene	USEPA 8270	0.5	USEPA 8270	2
Phenanthrene	USEPA 8270	0.5	USEPA 8270	2
Pyrene	USEPA 8270	0.5	USEPA 8270	2
Other Inorganic Compounds [(b)]				
Cyanide, free	APHA 45000CN:B,C,E & I ISO 17380	1	APHA 45000CN: B & N	100

Notes:

(a) Not to be tested – No corresponding RBRGs was established for groundwater.

(b) All analysis shall be conducted according to the reference test methods accredited by HOKLAS or one of its Mutual Recognition Arrangement partners, along with laboratory internal Quality Assurance/Quality Control (QA/QC) procedures.

6. SAMPLING METHODOLOGY

6.1 Overview

Borehole drilling is proposed as the means of sampling to investigate and determine the presence of potential soil and groundwater contamination. The drilling works and soil and groundwater sampling will be supervised by a Land Contamination Specialist. The soil sampling methodologies are based on the *Practice Guide*. These methods include decontamination procedures, sample collection, preparation and preservation, and chain-of-custody documentation as described in the following sections.

6.2 Role of Land Contamination Specialist during the Site Investigation

The Land Contamination Specialist will be responsible for management and oversight of the SI and sampling works. The Land Contamination Specialist shall:

- Provide on-site supervision and management of the whole SI and sampling works; and
- Prepare on-site records (e.g. photo records, site field records) to demonstrate the SI works and sampling works meet the requirements stated in agreed CAP and the land contamination guidelines published by EPD.

6.3 Sampling Locations

Sampling locations are proposed to be conducted at the potential land contaminated area. The proposed sampling location is presented in **Figures 5.1a-c**.

The exact sampling locations of the SI will be determined on site and subject to fine adjustment due to site specific conditions (e.g., exact oil stain locations, presence of foundations, underground utilities, delivery pipes and services, etc.).

6.4 Soil Sampling

The borehole will be advanced by means of dry rotary drilling method, i.e., without the use of a flushing medium, as far as practicable. Adjustment of sampling locations will be considered in order to facilitate the drilling if rocks / large boulders are encountered during the drilling.

For safety reasons and to inspect for underground utilities, utility scanning will be performed at all proposed borehole locations to ensure sufficient clearance from underground utilities prior to excavation. In addition, an inspection pit will be excavated down manually to about 1.5m bgl to perform underground utility clearance at each of the borehole locations before drilling commences.

Disturbed soil samples will be collected at the depth of 0.5 m from the inspection pits using a hand-driven decontaminated sampler then be taken by stainless steel spoon and placed into the containers provided by the HOKLAS accredited laboratory. Soil boring using rotary drill rigs will then be performed from 1.5m bgl to a maximum depth of 6.0m bgl and 2 m below static groundwater level.

During soil sampling, as a preliminary scanning for boreholes, soil colour, odour, visual inspection and on-site screening test (e.g. photoionization detection (PID)) will be used as in-situ measure for determining the vertical extent of contamination.

In case of sign of soil contamination (such as high PID reading of 20ppmv or above detected, stained, unnaturally coloured soil and/or petroleum or solvent odours in soil, etc.) is encountered, additional soil samples at the vertical directions should be taken so as to obtain an accurate estimation of the extent of soil contamination.

For soil sampling using boreholes, boreholes will be drilled down to 6m bgl or as advised by the Land Contamination Specialist. Soil samples at 0.5m, 1.5m and 3.0m bgl will be collected for laboratory analysis. For the soil samples collected at 4.5m and 6.0m bgl, on-site screening test (e.g. PID) shall be conducted and the Land Contamination Specialist will determine whether the collected soil

samples from 4.5m and 6.0m bgl shall be taken for laboratory analysis based on the on-site screening test results and in-situ observations. At least three soil samples should be collected from each borehole for laboratory analysis.

All soil samples collected will undergo on-site pre-screening test. A portion of the soil samples shall be placed in a plastic zip-lock bag and the bag sealed. The contents of the bag should then be manually mixed and undergo the PID screening test. Portable PID device should be adopted for on-site screening test. The results of the PID screening test would be recorded and reported in the Contamination Assessment Report (CAR).

In addition to the samples collected for laboratory analysis, a strata log will be kept for record of additional data to aid in the interpretation of results. Information on the general structure of the subsurface strata including grain size, colour, wetness, and the depth and thickness of each soil/rock layer will be noted. The presence of any foreign material such as metals, wood, or plastics will also be recorded.

6.5 Groundwater Sampling

One (1) groundwater monitoring well should be installed at each borehole, if groundwater is present. One (1) groundwater sample will be collected from all of the boreholes when the groundwater table is first encountered during soil sampling for contamination investigation.

A groundwater monitoring well will be installed at each trial pit / borehole by making reference to Section 2.4.5 of the *Practice Guide*. The borehole to be used for groundwater monitoring will be drilled to a minimum depth of two meters below the water table and/or suspected contamination depth and installed with well materials to allow for groundwater sampling. A PVC pipe will be used for the groundwater sampling well. All PVC pipes will be decontaminated prior to installation. A PVC pipe sections should be connected together using appropriate methods such as pre-fabricated threaded joints or rivets and not connected using solvent based glues. Empty voids between the PVC pipe and the borehole will be packed with clean gravels and/or sand. The groundwater sampling wells should be secured to prevent contamination from the surface. Bentonite and cement will be used to fill up the top of the void and well caps will be used to close the pipe.

Upon completion of installation of monitoring wells, approximately five times volume of well will be flushed to remove silt and drilling fluid residue from the wells. The wells will then be allowed to stand for a day to permit groundwater conditions to equilibrate. Prior to sampling, the groundwater will be purged three times the volume of groundwater within the borehole to remove fine-grained materials and to collect freshly recharged representative samples using a Teflon / stainless steel bailer, stainless steel spoon or mechanical pump or similar device. Groundwater level and thickness of free product layer, if present, will be measured by dip meter and interface probe respectively, measurement will be taken after 2 hours of purging and before the collection of groundwater samples. Prior to sampling, at least three consecutive stable readings of temperature, electrical conductivity and pH value will be obtained. The free-product, if present, will be sampled to allow identification by the laboratory.

If the permeability of the surrounding strata and storage is low, dewatering by purging may dry up the hole, in which case the on-site Land Contamination Specialist will decide whether the requirement to purge three times the liquid volume is to be waived.

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

6.6 Decontamination Procedures

Equipment in contact with the ground should be thoroughly decontaminated between each sampling event to minimise the potential for cross contamination. The equipment should be decontaminated by steam cleaning, washed with phosphate-free detergent and rinsed with water. A clean area

immediately adjacent to the sample location should be established with a clean plastic sheet where all cleaned and foil wrapped equipment should be placed.

During sampling and decontamination activities, disposable latex gloves should be worn to prevent the transfer of contaminants from other sources. Disposable accessories, such as latex gloves, will be discarded properly after use.

6.7 Sample Size

Prior to sampling, the laboratory responsible for chemical analysis will be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis. **Table 6.1** lists the recommended sample container types, sizes and preservation method.

Table 6.1 Summary of Sample Container Type, Sizes and Preservation Method

Test Parameters	Container Type, Size and Preservation Method
Soil	
Metals	1 x 250 ml glass jar with Teflon-lined cap
VOCs / PCRs	1 x 250 ml glass jar with Teflon-lined cap
SVOCs	1 x 250ml glass jar with Teflon-lined cap
Free Cyanide	1 x 250ml glass jar with Teflon-lined cap
Groundwater	
Metals (Mercury)	1 x 250 ml plastic (nitric acid)
VOCs / PCRs	2 x 40 ml amber glass vials (hydrochloric acid)
SVOCs / PCRs	1 x 1,000 ml amber glass (no preservative)
Free Cyanide	1 x 250 ml plastic (sodium hydroxide)

6.8 Sample Handling and Laboratory Analysis

The soil and groundwater sampling should be conducted by an experienced sampling technician and supervised by an on-site Land Contamination Specialist, and appropriate procedures should be adhered to. Sampling methodologies are based on the techniques developed by the USEPA. Sampling tools should be cleaned thoroughly before, in-between and after each sampling. Special care would be taken to prevent any cross contamination of samples during collection, handling and storage.

All soil samples are to be taken by stainless steel spoon and placed into the containers provided by the HOKLAS accredited laboratory. A sufficient volume of soil as per the advice of the HOKLAS accredited laboratory shall be obtained. Chain-of-custody documentation will be initiated immediately after samples are collected. Containers will be labelled in the field with the date, well designation, project name, time of collection and analysis to be performed. The samples will be properly stored at a temperature range between 0°C and 4ºC in the dark but not frozen, labelled and delivered to the HOKLAS accredited laboratory on the same day for chemical analyses. All analysis will be conducted according to the test methods accredited by HOKLAS or one of its Mutual Recognition Arrangement partners, along with laboratory internal QA/QC procedures.

Similarly, all groundwater samples collected will be treated and preserved in the identical manner as that for soil samples.

6.9 Quality Assurance and Quality Control (QA/QC)

QA/QC samples will be collected to allow an assessment of the quality of data collected. The QA/QC samples required are listed below. The estimated total number of QA/QC samples are presented in **Table 6.2**.

- One (1) field duplicate sample for every twenty (20) soil samples and every twenty (20) groundwater samples. Precision will be calculated as the relative percent difference (RPD) between the original sample and the blind duplicate. The testing parameters of the duplicate sample will be same as the associated soil and groundwater samples.
- One (1) field blank for every twenty (20) soil samples and every twenty (20) groundwater samples. The testing parameters of the field blank will be same as the associated soil or groundwater samples;
- One (1) equipment blank per for every twenty (20) soil samples and every twenty (20) groundwater samples. The testing parameters of the equipment blank will be same as the associated soil or groundwater samples; and
- One (1) trip blank for every twenty (20) soil samples and every twenty (20) groundwater samples. The testing parameters of the trip blank will be PCRs (C6-C8) and relevant VOC parameters same as the associated soil or groundwater samples to detect any cross contamination during transport. Laboratory prepared spiked VOC samples should be stored, handled and transported in exactly the same way as the soil and groundwater samples collected.

Table 6.2 Estimation of Total QA/QC Site Samples

Type of Sample	Number of Sample [(a)]
(1) For Soil Sample (for 88 boreholes)	
Soil Sample + Duplicate Sample	264 + 14
Trip Blank Sample	14
Field Blank Sample	14
Equipment Blank Sample	14
(2) For Groundwater Sample (for 88 boreholes)	
Groundwater Sample + Duplicate Sample	88 + 5
Trip Blank Sample	5
Field Blank Sample	5
Equipment Blank Sample	5

Note:
(a) Number of each type of QA/QC sample is subject to the actual number of soil and groundwater samples collected during the SI works.

6.10 Fieldwork Health and Safety Precautions

The following measures are to be implemented to minimise risks to all field personnel during the SI stage:

- Sweep at and in the vicinity of the sampling locations with a metal detector to check for the presence of any unexploded ordnance and underground utilities prior to soil sampling works. If there is any metal scrap discovered under the ground during the course of SI, the SI Contractor is to cease work immediately until the identity is confirmed. For areas suspect of ordnance, the SI Contractor is to inform engineer immediately for necessary notification to the Hong Kong Police Force for subsequent action;
- Minimise the exposure to any contaminated material by wearing appropriate clothing and personal protective equipment (PPE) such as gloves, goggles, protective coveralls and safety boots (when interacting directly with suspected contaminated material);
- Provide information to all workers on the potential hazards in the vicinity of sampling locations;
- Provide adequate hygiene and washing facilities; and

- Prohibit smoking or eating during activities with potential exposure to contaminated soil and/or groundwater.

6.11 Reinstatement

The proposed SI for soil and groundwater contamination assessment involve considerable earthwork including excavation of inspection pits and drilling of boreholes. In order to minimise the import and use of fill material, it is recommended to backfill inspection pits and boreholes with the original material from corresponding inspection pits and boreholes.

Since the proposed locations for SI are potential contaminated and to avoid possible cross-contamination, it is also recommended to place the excavated material on impervious sheeting adjacent to inspection pits/ boreholes. For each individual inspection pit and borehole, it can only be backfilled with excavated material from its own corresponding inspection pit/ borehole. No backfilling with cross inspection pits/ boreholes shall be allowed.

7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

Based on the site appraisal findings, the northern part of the Project site and the Main Station Building for L1 to L3 are considered as the potentially contaminated area. With reference to the *Practice Guide*, a regular grid pattern with a square size of 32m x 32m shall be adopted for sampling. Additional sampling locations are proposed at the identified hot spots. A total of thirty-four (34) regular grid sampling locations (namely Grid-BH-1 to Grid-BH-34) and forty-seven (47) hot spots sampling locations (namely HS-BH1 to HS-BH47) are proposed within the Project site for SI to collect soil and groundwater samples for laboratory testing.

Since LPS equipment / facilities are still in place and not feasible to carry out SI works at this stage. SI and sampling shall be carried out when the proposed sampling locations are available after the demolition of the aboveground structures.

During the site investigation and sampling stage, a Land Contamination Specialist shall oversee the entire process and record any new visual signs of potential contamination such as oil leakage or oil stains. The Land Contamination Specialist shall also review the need for additional sampling to capture potential contamination observed during the work.

7.2 Way Forward and Recommendations for the Project

Sampling and testing works proposed in this CAP will be supervised by a Land Contamination Specialist. Upon the receipt of laboratory testing reports, the results will be compared against the RBRGs for industrial land use (see **Annex G**) and a CAR will be prepared and submitted to EPD for agreement.

If contamination is confirmed, the CAR will be accompanied by a Remediation Action Plan (RAP). The CAR and RAP will be a combined report for EPD's agreement. The RAP will be prepared to evaluate the needs of remediation, and if so, identify appropriate remediation methods suitable for the site conditions and the contaminants requiring remediation.

The contamination extent (both horizontal and vertical) will be estimated in the RAP. The confirmation of such contamination extent, the implementation of remediation action, and the preparation of a Remediation Report (RR) will be conducted according to the approved RAP by the demolition contractor.

Upon completion of remediation works (if necessary), a RR will be prepared and submitted to EPD to demonstrate that the decontamination works have been carried out in accordance with the approved CAR and RAP. No removal of substructure and excavation works within the contaminated area should be carried out before the agreement of the RR by EPD.

The Project will tentatively commence in Q4 2024. The modification and diversion of existing piping and cables will be tentatively carried out from Q4 2024 to Q3 2025, followed by main bulk of demolition works of aboveground equipment and superstructure from Q2 2025 to Q4 2034, and finally the demolition of the substructure from Q1 2031 to Q1 2035. Since LPS equipment / facilities are still in place and it is not feasible to carry out SI works at this stage, SI and sampling shall be carried out when the proposed sampling locations are available after the demolition of the aboveground structures. If any potentially polluting activities (as described in Table 2.3 of *the Practice Guide*) are carried out within the Project site during the idling periods (i.e. between the completion of demolition of the aboveground structures and the commencement of SI works, as well as between the completion of SI works and the removal of substructures and excavation works), it will be necessary to review and update the proposed sampling plan and locations outlined in this CAP. Subsequent updated CAP(s) will be required to be submitted to EPD for agreement.

7.3 Handling and Disposal Arrangement of Removed Diesel / Petroleum Products and Spill Prevention Measures during Demolition

Prior to commencement of demolition in the Project area, the leftover diesel or other petroleum products in the equipment to be demolished shall be removed as much as possible. The removed diesel and other petroleum products shall be considered as chemical waste and are controlled under the *Waste Disposal (Chemical Waste) (General) Regulation*.

The demolition contractor who will generate chemical waste or cause it to be produced should register with the EPD as a chemical waste producer.

Removed diesel and petroleum products shall be labelled and stored in accordance with the requirement stipulated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* issued by EPD.

The removed petrol and petroleum products are required to be collected by licensed chemical waste collector for disposal. Trip tickets system shall be implemented during the collection and disposal of removed petrol and diesel.

The following mitigations measures shall be implemented to ensure that risk of ground contamination as a result of oil spills or leaks is kept to a practical minimum:

- Regular visual inspections to detect any signs of fuel leakage prior to demolition;
- Provision of impermeable lining or absorbent materials to contain leaks;
- Provision of secondary containment for the temporary storage of removed diesel or petroleum products, demolished structures and pipes; and
- Provision of spill control materials and equipment.

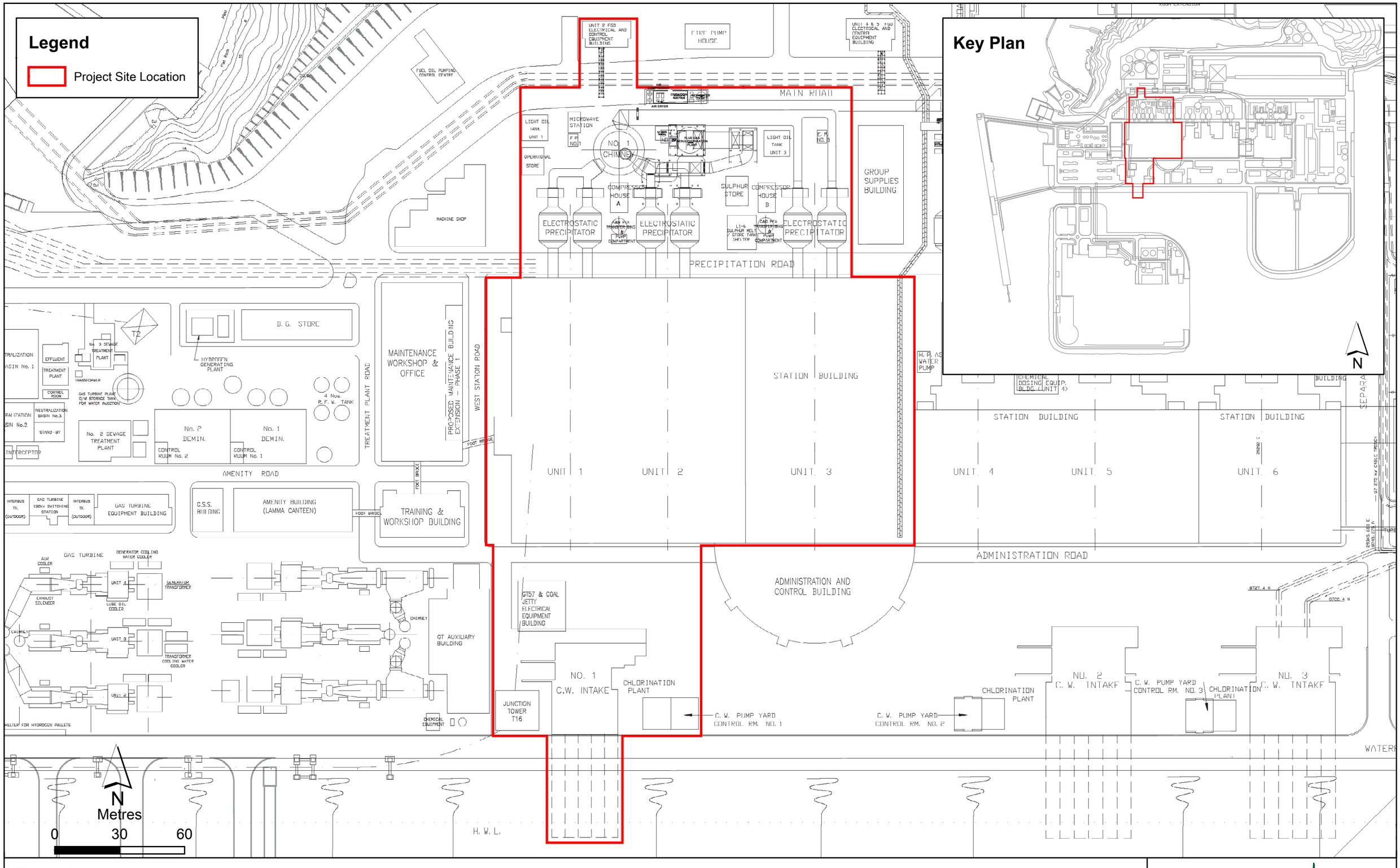


Figure 1.1

Location of the Project Site

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Project_Site.mxd
Date: 22/3/2024

Environmental Resources Management

ERM

Legend

- Project Site Location
- Potentially Contaminated Areas

Hotspots

- Ash Handing System
- Coal Handling Units
- Chemical / Oil Storage or Handling Unit
- Oil Stain
- Sump Pit, Drain Pit, Oil Drain Sump
- Transformer / Transformer Room

Number	Structure
1	Battery Room
2	Aboveground light oil tanks
3	Fuel oil drain tank
4	Fuel oil heater
5	Fuel oil pump
6	Blown down drain pits
7	Submerged scraper conveyor
8	Furnace bottom ash storage bin
9	Sump pits
10	Coal grinding mills
11	Chemical dosing systems
12	Lubrication oil tank
13	Lubrication oil conditioner
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store

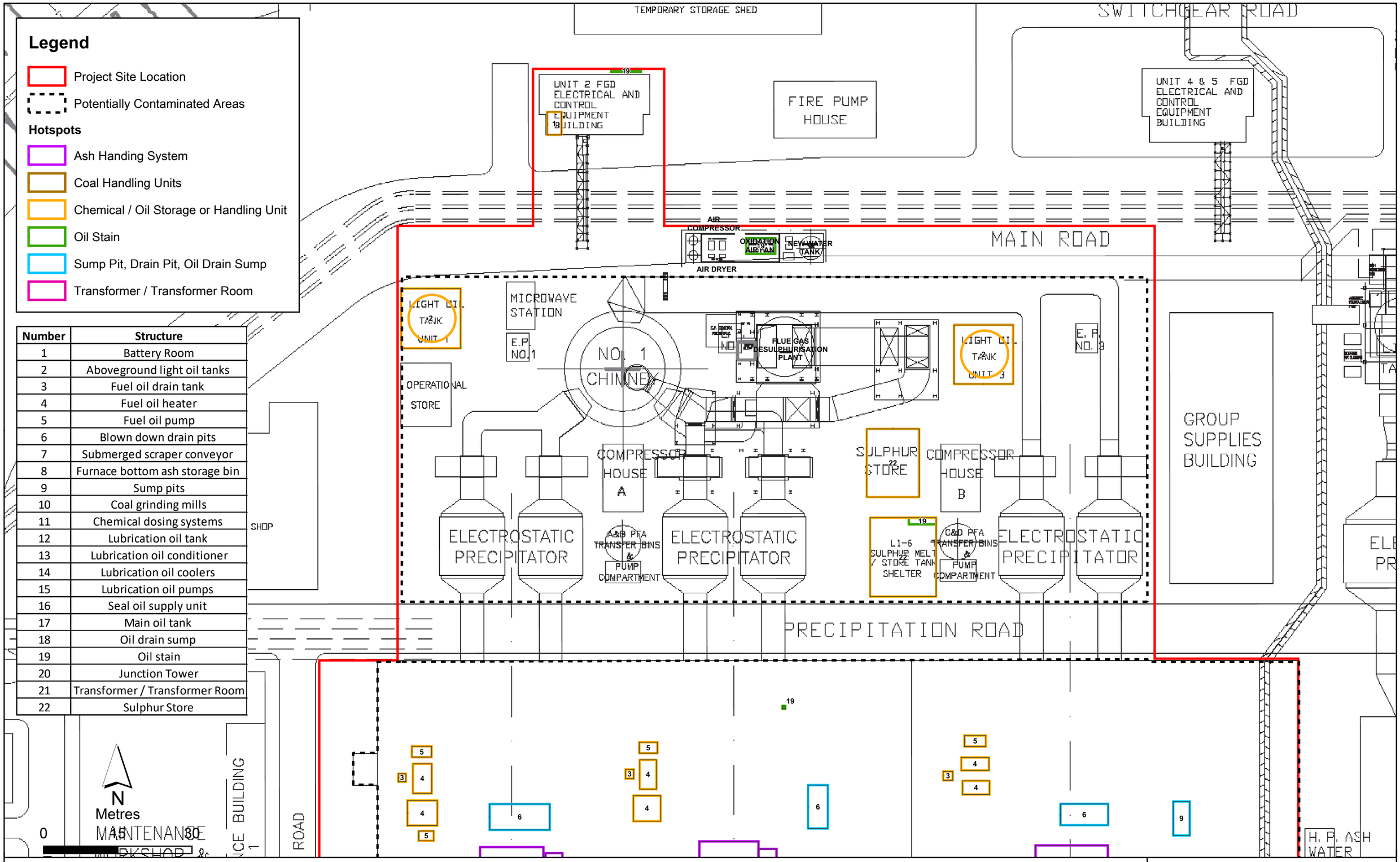


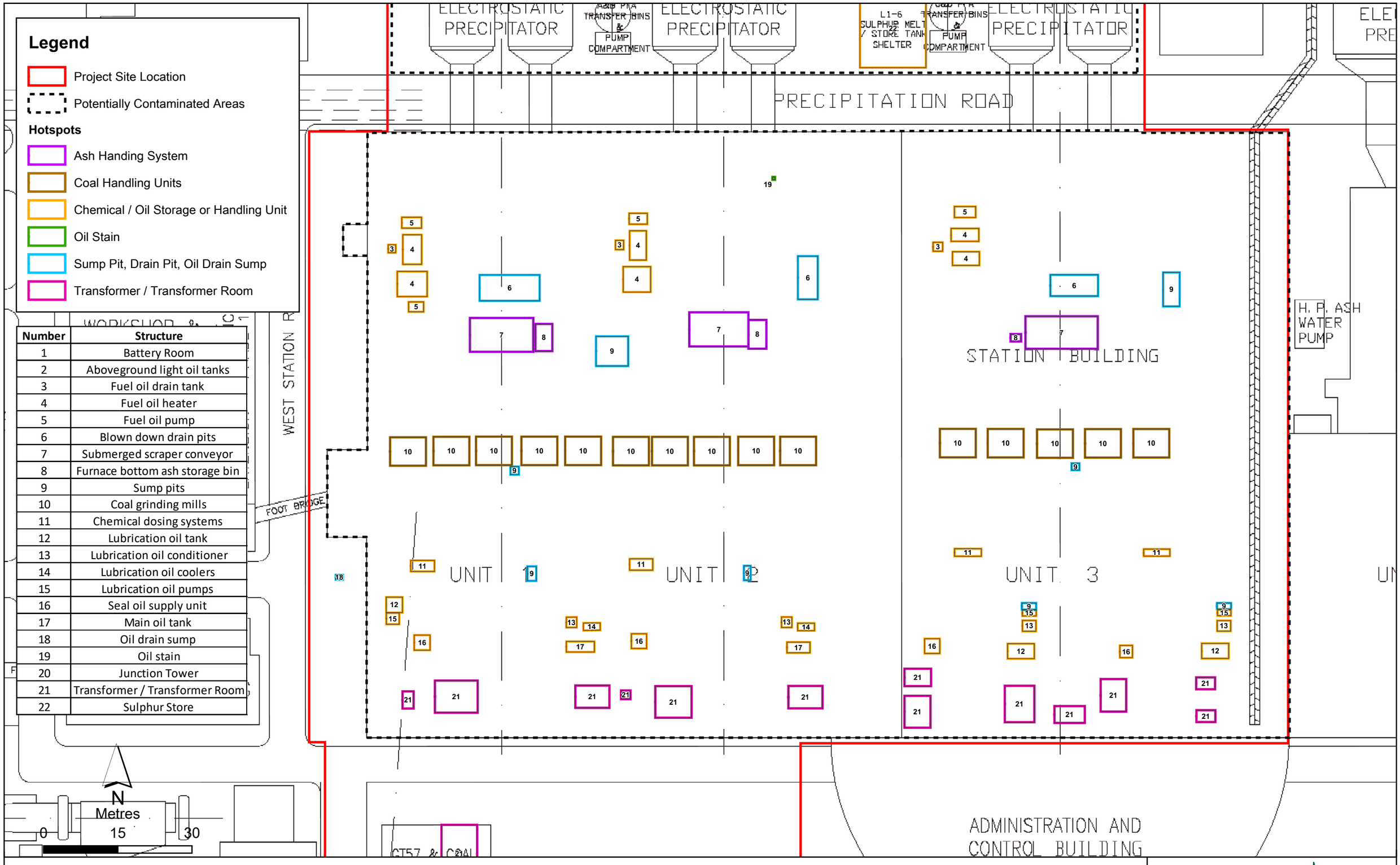
Figure 4.1a

Potential Contaminated Area and Location of Hot Spots
(Sheet 1 of 3)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Potentially_Contaminated_Areas_1.mxd
Date: 22/3/2024

Environmental Resources Management

ERM



Number	Structure
1	Battery Room
2	Aboveground light oil tanks
3	Fuel oil drain tank
4	Fuel oil heater
5	Fuel oil pump
6	Blown down drain pits
7	Submerged scraper conveyor
8	Furnace bottom ash storage bin
9	Sump pits
10	Coal grinding mills
11	Chemical dosing systems
12	Lubrication oil tank
13	Lubrication oil conditioner
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store

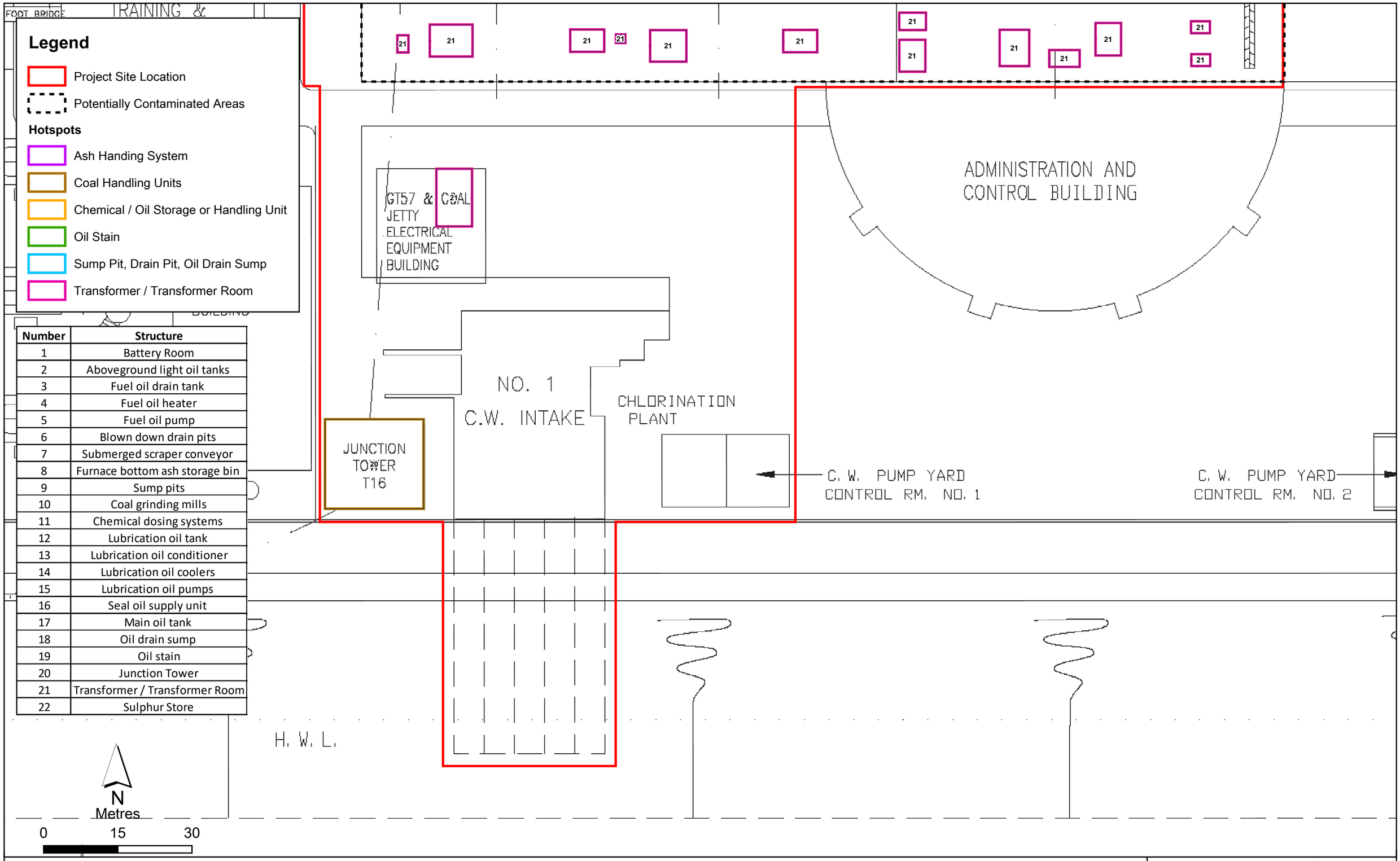
Figure 4.1b

Potential Contaminated Area and Location of Hot Spots
(Sheet 2 of 3)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Potentially_Contaminated_Areas_2.mxd
Date: 22/3/2024

Environmental Resources Management

ERM



Number	Structure
1	Battery Room
2	Aboveground light oil tanks
3	Fuel oil drain tank
4	Fuel oil heater
5	Fuel oil pump
6	Blown down drain pits
7	Submerged scraper conveyor
8	Furnace bottom ash storage bin
9	Sump pits
10	Coal grinding mills
11	Chemical dosing systems
12	Lubrication oil tank
13	Lubrication oil conditioner
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store

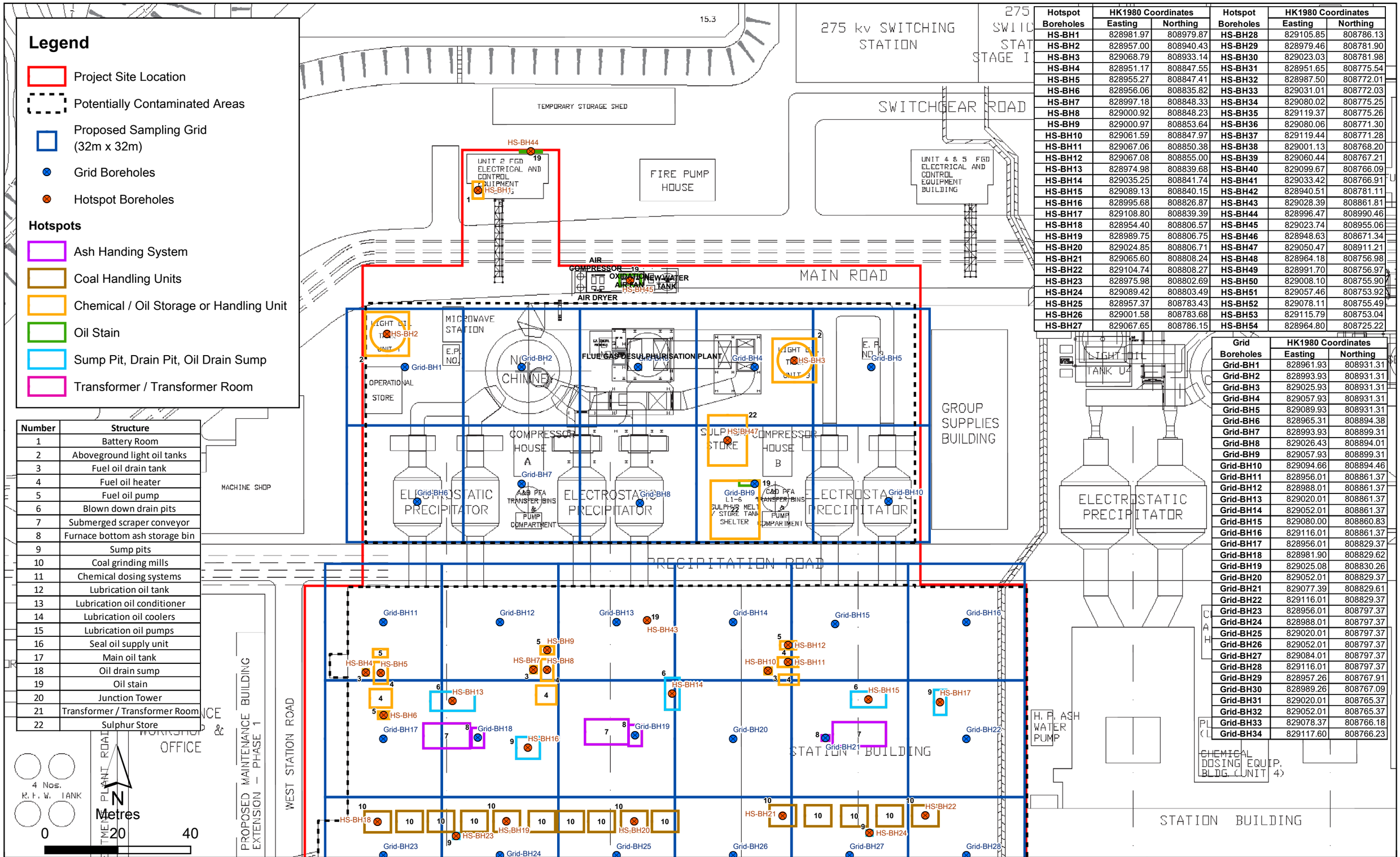
Figure 4.1c

Potential Contaminated Area and Location of Hot Spots
(Sheet 3 of 3)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Potentially_Contaminated_Areas_3.mxd
Date: 22/3/2024

Environmental
Resources
Management

ERM



Number	Structure
1	Battery Room
2	Aboveground light oil tanks
3	Fuel oil drain tank
4	Fuel oil heater
5	Fuel oil pump
6	Blown down drain pits
7	Submerged scraper conveyor
8	Furnace bottom ash storage bin
9	Sump pits
10	Coal grinding mills
11	Chemical dosing systems
12	Lubrication oil tank
13	Lubrication oil conditioner
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store

Hotspot Boreholes	HK1980 Coordinates		Hotspot Boreholes	HK1980 Coordinates	
	Easting	Northing		Easting	Northing
HS-BH1	828981.97	808979.87	HS-BH28	829105.85	808786.13
HS-BH2	828957.00	808940.43	HS-BH29	828979.46	808781.90
HS-BH3	829068.79	808933.14	HS-BH30	829023.03	808781.98
HS-BH4	828951.17	808847.55	HS-BH31	828951.65	808775.54
HS-BH5	828955.27	808847.41	HS-BH32	828987.50	808772.01
HS-BH6	828956.06	808835.82	HS-BH33	829031.01	808772.03
HS-BH7	828997.18	808848.33	HS-BH34	829080.02	808775.25
HS-BH8	829000.92	808848.23	HS-BH35	829119.37	808775.26
HS-BH9	829000.97	808853.64	HS-BH36	829080.06	808771.30
HS-BH10	829061.59	808847.97	HS-BH37	829119.44	808771.28
HS-BH11	829067.06	808850.38	HS-BH38	829001.13	808768.20
HS-BH12	829067.08	808855.00	HS-BH39	829060.44	808767.21
HS-BH13	828974.98	808839.68	HS-BH40	829099.67	808766.09
HS-BH14	829035.25	808841.74	HS-BH41	829033.42	808766.91
HS-BH15	829089.13	808840.15	HS-BH42	828940.51	808781.11
HS-BH16	828995.68	808826.87	HS-BH43	829028.39	808861.81
HS-BH17	829108.80	808839.39	HS-BH44	828996.47	808990.46
HS-BH18	828954.40	808806.57	HS-BH45	829023.74	808955.06
HS-BH19	828989.75	808806.75	HS-BH46	828948.63	808671.34
HS-BH20	829024.85	808806.71	HS-BH47	829050.47	808911.21
HS-BH21	829065.60	808808.24	HS-BH48	828964.18	808756.98
HS-BH22	829104.74	808808.27	HS-BH49	828991.70	808756.97
HS-BH23	828975.98	808802.69	HS-BH50	829008.10	808755.90
HS-BH24	829089.42	808803.49	HS-BH51	829057.46	808753.92
HS-BH25	828957.37	808783.43	HS-BH52	829078.11	808755.49
HS-BH26	829001.58	808783.68	HS-BH53	829115.79	808753.04
HS-BH27	829067.65	808786.15	HS-BH54	828964.80	808725.22

Grid Boreholes	HK1980 Coordinates	
	Easting	Northing
Grid-BH1	828961.93	808931.31
Grid-BH2	828993.93	808931.31
Grid-BH3	829025.93	808931.31
Grid-BH4	829057.93	808931.31
Grid-BH5	829089.93	808931.31
Grid-BH6	828965.31	808894.38
Grid-BH7	828993.93	808899.31
Grid-BH8	829026.43	808894.01
Grid-BH9	829057.93	808899.31
Grid-BH10	829094.66	808894.46
Grid-BH11	828956.01	808861.37
Grid-BH12	828988.01	808861.37
Grid-BH13	829020.01	808861.37
Grid-BH14	829052.01	808861.37
Grid-BH15	829080.00	808860.83
Grid-BH16	829116.01	808861.37
Grid-BH17	828956.01	808829.37
Grid-BH18	828981.90	808829.62
Grid-BH19	829025.08	808830.26
Grid-BH20	829052.01	808829.37
Grid-BH21	829077.39	808829.61
Grid-BH22	829116.01	808829.37
Grid-BH23	828956.01	808797.37
Grid-BH24	828988.01	808797.37
Grid-BH25	829020.01	808797.37
Grid-BH26	829052.01	808797.37
Grid-BH27	829084.01	808797.37
Grid-BH28	829116.01	808797.37
Grid-BH29	828957.26	808767.91
Grid-BH30	828989.26	808767.09
Grid-BH31	829020.01	808765.37
Grid-BH32	829052.01	808765.37
Grid-BH33	829078.37	808766.18
Grid-BH34	829117.60	808766.23

Figure 5.1a

Proposed Sampling Locations
(Sheet 1 of 3)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Proposed_Sampling_Locations_1_v2.mxd
Date: 22/3/2024

Environmental Resources Management

ERM

Legend

- Project Site Location
- Potentially Contaminated Areas
- Proposed Sampling Grid (32m x 32m)
- Grid Boreholes
- Hotspot Boreholes

Hotspots

- Ash Handing System
- Coal Handling Units
- Chemical / Oil Storage or Handling Unit
- Oil Stain
- Sump Pit, Drain Pit, Oil Drain Sump
- Transformer / Transformer Room

Number	Structure
1	Battery Room
2	Aboveground light oil tanks
3	Fuel oil drain tank
4	Fuel oil heater
5	Fuel oil pump
6	Blown down drain pits
7	Submerged scraper conveyor
8	Furnace bottom ash storage bin
9	Sump pits
10	Coal grinding mills
11	Chemical dosing systems
12	Lubrication oil tank
13	Lubrication oil conditioner
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store

Hotspot Boreholes	HK1980 Coordinates Easting	Northing	Hotspot Boreholes	HK1980 Coordinates Easting	Northing
HS-BH1	828981.97	808979.87	HS-BH28	829105.85	808786.13
HS-BH2	828957.00	808940.43	HS-BH29	828979.46	808781.90
HS-BH3	829068.79	808933.14	HS-BH30	829023.03	808781.98
HS-BH4	828951.17	808847.55	HS-BH31	828951.65	808775.54
HS-BH5	828955.27	808847.41	HS-BH32	828987.50	808772.01
HS-BH6	828956.06	808835.82	HS-BH33	829031.01	808772.03
HS-BH7	828997.18	808848.33	HS-BH34	829080.02	808775.25
HS-BH8	829000.92	808848.23	HS-BH35	829119.37	808775.26
HS-BH9	829000.97	808853.64	HS-BH36	829080.06	808771.30
HS-BH10	829061.59	808847.97	HS-BH37	829119.44	808771.28
HS-BH11	829067.06	808850.38	HS-BH38	829001.13	808768.20
HS-BH12	829067.08	808855.00	HS-BH39	829060.44	808767.21
HS-BH13	828974.98	808839.68	HS-BH40	829099.67	808766.09
HS-BH14	829035.25	808841.74	HS-BH41	829033.42	808766.91
HS-BH15	829089.13	808840.15	HS-BH42	828940.51	808781.11
HS-BH16	828995.68	808826.87	HS-BH43	829028.39	808861.81
HS-BH17	829108.80	808839.39	HS-BH44	828996.47	808990.46
HS-BH18	828954.40	808806.57	HS-BH45	829023.74	808955.06
HS-BH19	828989.75	808806.75	HS-BH46	828948.63	808671.34
HS-BH20	829024.85	808806.71	HS-BH47	829050.47	808911.21
HS-BH21	829065.60	808808.24	HS-BH48	828964.18	808756.98
HS-BH22	829104.74	808808.27	HS-BH49	828991.70	808756.97
HS-BH23	828975.98	808802.69	HS-BH50	829008.10	808755.90
HS-BH24	829089.42	808803.49	HS-BH51	829057.46	808753.92
HS-BH25	828957.37	808783.43	HS-BH52	829078.11	808755.49
HS-BH26	829001.58	808783.68	HS-BH53	829115.79	808753.04
HS-BH27	829067.65	808786.15	HS-BH54	828964.80	808725.22

Grid Boreholes	HK1980 Coordinates Easting	Northing
Grid-BH1	828961.93	808931.31
Grid-BH2	828993.93	808931.31
Grid-BH3	829025.93	808931.31
Grid-BH4	829057.93	808931.31
Grid-BH5	829089.93	808931.31
Grid-BH6	828965.31	808894.38
Grid-BH7	828993.93	808899.31
Grid-BH8	829026.43	808894.01
Grid-BH9	829057.93	808899.31
Grid-BH10	829094.66	808894.46
Grid-BH11	828956.01	808861.37
Grid-BH12	828988.01	808861.37
Grid-BH13	829020.01	808861.37
Grid-BH14	829052.01	808861.37
Grid-BH15	829080.00	808860.83
Grid-BH16	829116.01	808861.37
Grid-BH17	828956.01	808829.37
Grid-BH18	828981.90	808829.62
Grid-BH19	829025.08	808830.26
Grid-BH20	829052.01	808829.37
Grid-BH21	829077.39	808829.61
Grid-BH22	829116.01	808829.37
Grid-BH23	828956.01	808797.37
Grid-BH24	828988.01	808797.37
Grid-BH25	829020.01	808797.37
Grid-BH26	829052.01	808797.37
Grid-BH27	829084.01	808797.37
Grid-BH28	829116.01	808797.37
Grid-BH29	828957.26	808767.91
Grid-BH30	828989.26	808767.09
Grid-BH31	829020.01	808765.37
Grid-BH32	829052.01	808765.37
Grid-BH33	829078.37	808766.18
Grid-BH34	829117.60	808766.23

Figure 5.1b

Proposed Sampling Locations
(Sheet 2 of 3)

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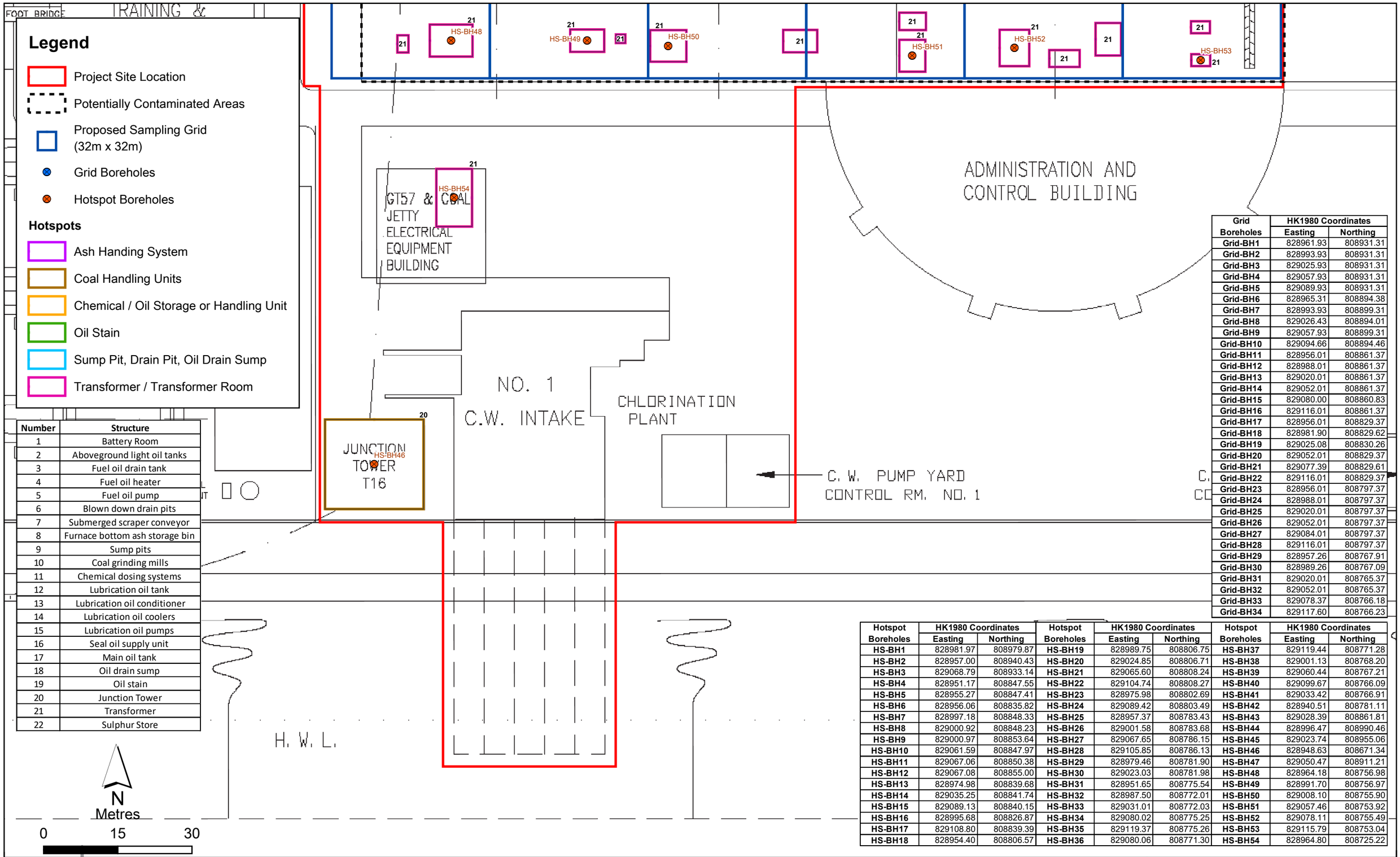
Date: 22/3/2024

Environmental Resources Management



Number	Structure
1	Battery Room
2	Aboveground light oil tanks
3	Fuel oil drain tank
4	Fuel oil heater
5	Fuel oil pump
6	Blown down drain pits
7	Submerged scraper conveyor
8	Furnace bottom ash storage bin
9	Sump pits
10	Coal grinding mills
11	Chemical dosing systems
12	Lubrication oil tank
13	Lubrication oil conditioner
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer
22	Sulphur Store

Grid Boreholes	HK1980 Coordinates	
	Easting	Northing
Grid-BH1	828961.93	808931.31
Grid-BH2	828993.93	808931.31
Grid-BH3	829025.93	808931.31
Grid-BH4	829057.93	808931.31
Grid-BH5	829089.93	808931.31
Grid-BH6	828965.31	808894.38
Grid-BH7	828993.93	808899.31
Grid-BH8	829026.43	808894.01
Grid-BH9	829057.93	808899.31
Grid-BH10	829094.66	808894.46
Grid-BH11	828956.01	808861.37
Grid-BH12	828988.01	808861.37
Grid-BH13	829020.01	808861.37
Grid-BH14	829052.01	808861.37
Grid-BH15	829080.00	808860.83
Grid-BH16	829116.01	808861.37
Grid-BH17	828956.01	808829.37
Grid-BH18	828981.90	808829.62
Grid-BH19	829025.08	808830.26
Grid-BH20	829052.01	808829.37
Grid-BH21	829077.39	808829.61
Grid-BH22	829116.01	808829.37
Grid-BH23	828956.01	808797.37
Grid-BH24	828988.01	808797.37
Grid-BH25	829020.01	808797.37
Grid-BH26	829052.01	808797.37
Grid-BH27	829084.01	808797.37
Grid-BH28	829116.01	808797.37
Grid-BH29	828957.26	808767.91
Grid-BH30	828989.26	808767.09
Grid-BH31	829020.01	808765.37
Grid-BH32	829052.01	808765.37
Grid-BH33	829078.37	808766.18
Grid-BH34	829117.60	808766.23

Hotspot Boreholes	HK1980 Coordinates		Hotspot Boreholes	HK1980 Coordinates		Hotspot Boreholes	HK1980 Coordinates	
	Easting	Northing		Easting	Northing		Easting	Northing
HS-BH1	828981.97	808979.87	HS-BH19	828989.75	808806.75	HS-BH37	829119.44	808771.28
HS-BH2	828957.00	808940.43	HS-BH20	829024.85	808806.71	HS-BH38	829001.13	808768.20
HS-BH3	829068.79	808933.14	HS-BH21	829065.60	808808.24	HS-BH39	829060.44	808767.21
HS-BH4	828951.17	808847.55	HS-BH22	829104.74	808808.27	HS-BH40	829099.67	808766.09
HS-BH5	828955.27	808847.41	HS-BH23	828975.98	808802.69	HS-BH41	829033.42	808766.91
HS-BH6	828956.06	808835.82	HS-BH24	829089.42	808803.49	HS-BH42	828940.51	808781.11
HS-BH7	828997.18	808848.33	HS-BH25	828957.37	808783.43	HS-BH43	829028.39	808861.81
HS-BH8	829000.92	808848.23	HS-BH26	829001.58	808783.68	HS-BH44	828996.47	808990.46
HS-BH9	829000.97	808853.64	HS-BH27	829067.65	808786.15	HS-BH45	829023.74	808955.06
HS-BH10	829061.59	808847.97	HS-BH28	829105.85	808786.13	HS-BH46	828948.63	808671.34
HS-BH11	829067.06	808850.38	HS-BH29	828979.46	808781.90	HS-BH47	829050.47	808911.21
HS-BH12	829067.08	808855.00	HS-BH30	829023.03	808781.98	HS-BH48	828964.18	808756.98
HS-BH13	828974.98	808839.68	HS-BH31	828951.65	808775.54	HS-BH49	828991.70	808756.97
HS-BH14	829035.25	808841.74	HS-BH32	828987.50	808772.01	HS-BH50	829008.10	808755.90
HS-BH15	829089.13	808840.15	HS-BH33	829031.01	808772.03	HS-BH51	829057.46	808753.92
HS-BH16	828995.68	808826.87	HS-BH34	829080.02	808775.25	HS-BH52	829078.11	808755.49
HS-BH17	829108.80	808839.39	HS-BH35	829119.37	808775.26	HS-BH53	829115.79	808753.04
HS-BH18	828954.40	808806.57	HS-BH36	829080.06	808771.30	HS-BH54	828964.80	808725.22

Figure 5.1c

Proposed Sampling Locations
(Sheet 3 of 3)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Proposed_Sampling_Locations_3.mxd
Date: 6/3/2024

Environmental Resources Management

ERM

ANNEX A HISTORICAL AERIAL PHOTOS

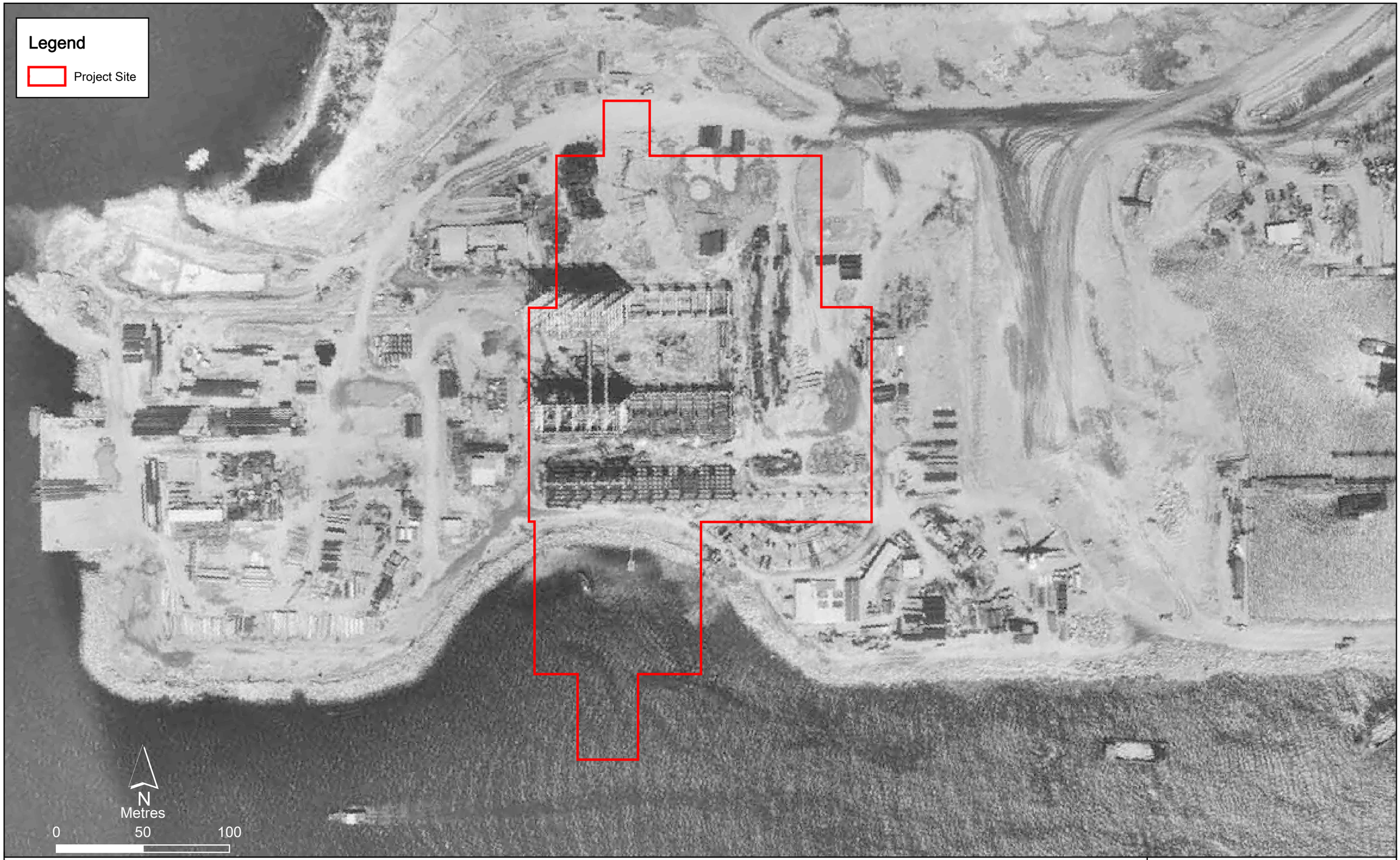
Annex A

Historical Aerial Photo (1978)

File: T:\GIS\CONTRACT\0685764\mxd\Aerial_Photo\0685764_Aerial_Photo_1978_v2.mxd
Date: 1/9/2023

Environmental Resources Management

ERM



Annex A

Historical Aerial Photo (1980)

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Date: 1/9/2023

Environmental Resources Management

ERM

Annex A

Historical Aerial Photo (1981)

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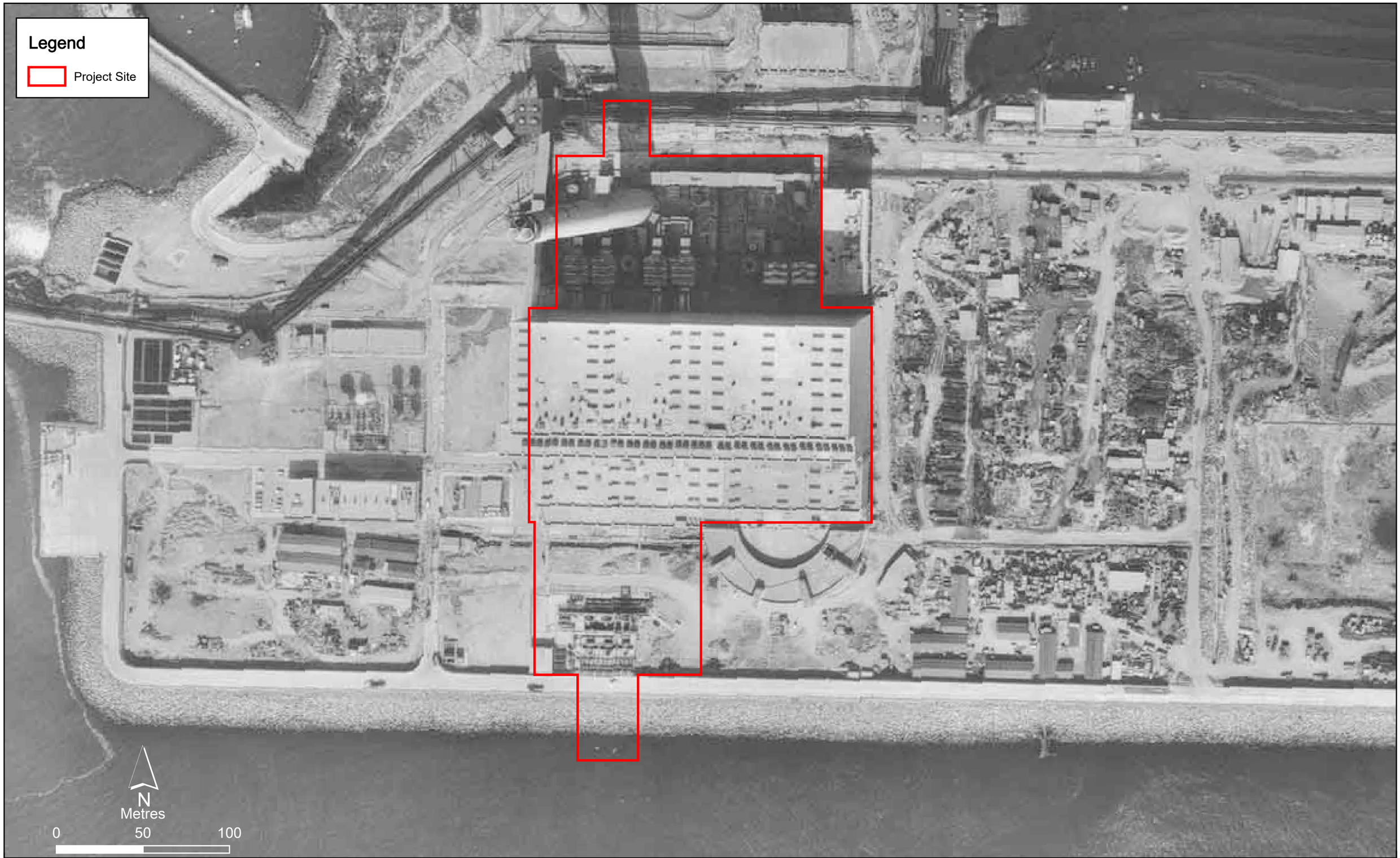
Environmental Resources Management

ERM



Annex A

Historical Aerial Photo (1982)

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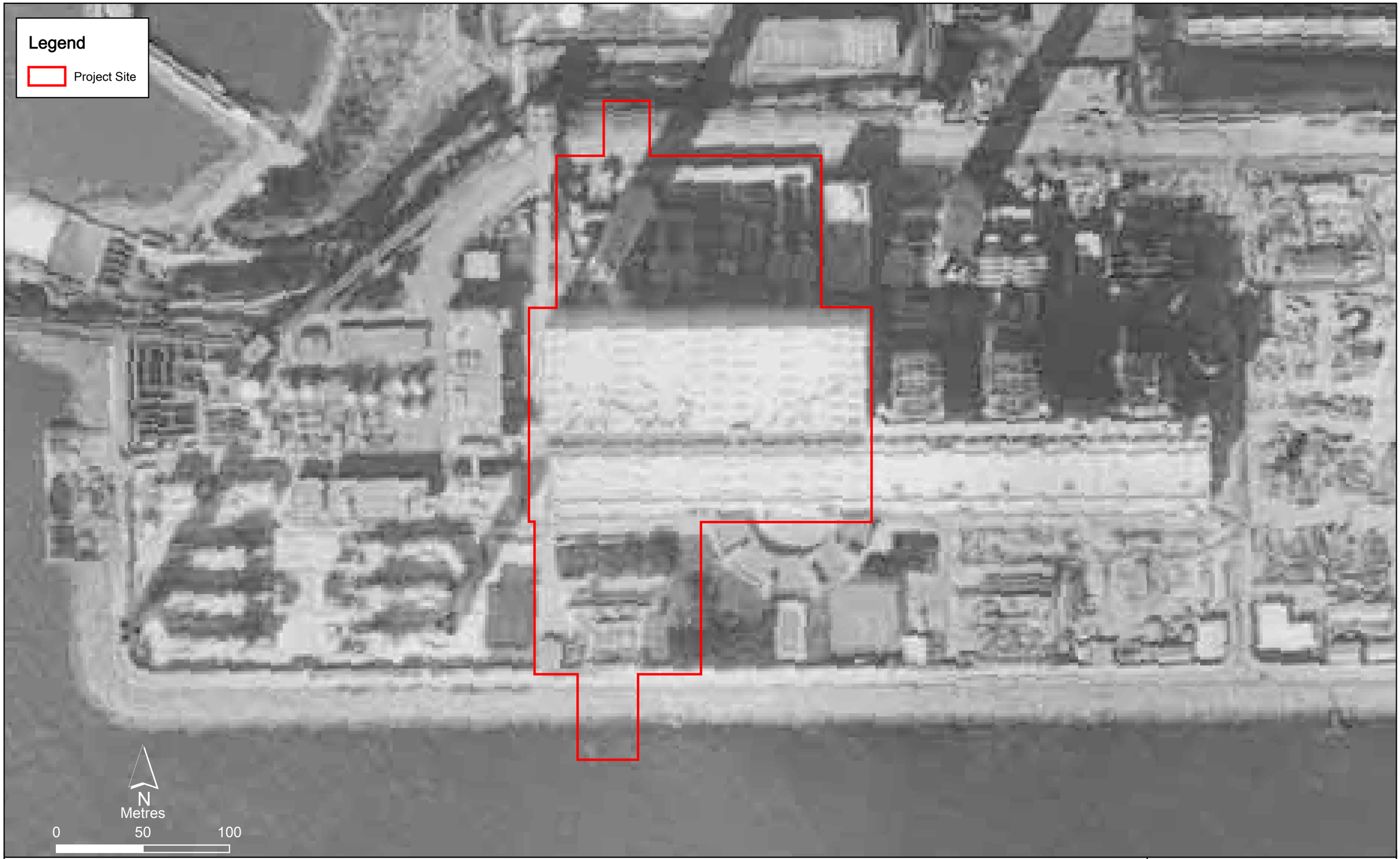
Environmental Resources Management

ERM



Annex A

Historical Aerial Photo (1990)

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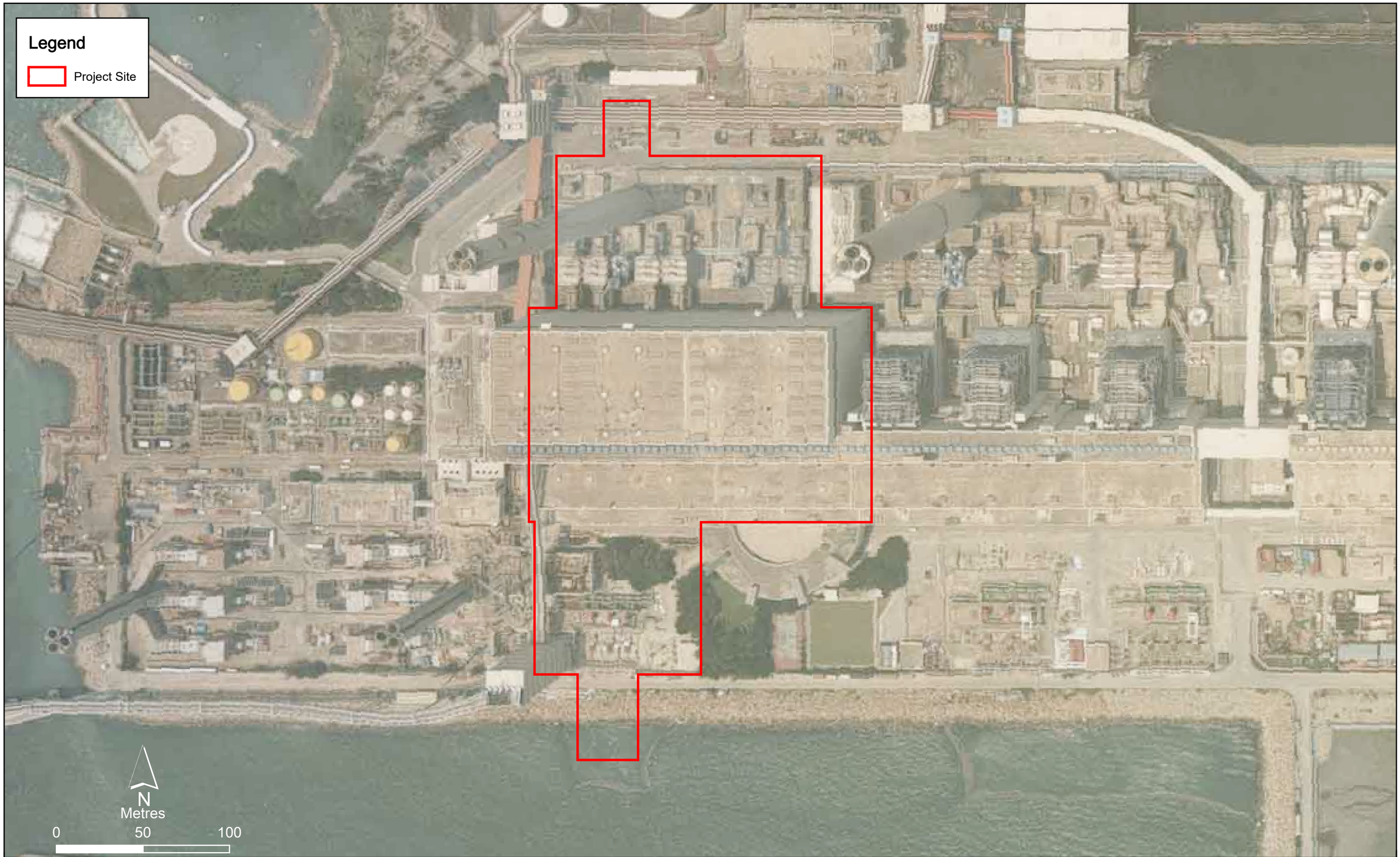
Environmental Resources Management

ERM



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Historical Aerial Photo (2001)

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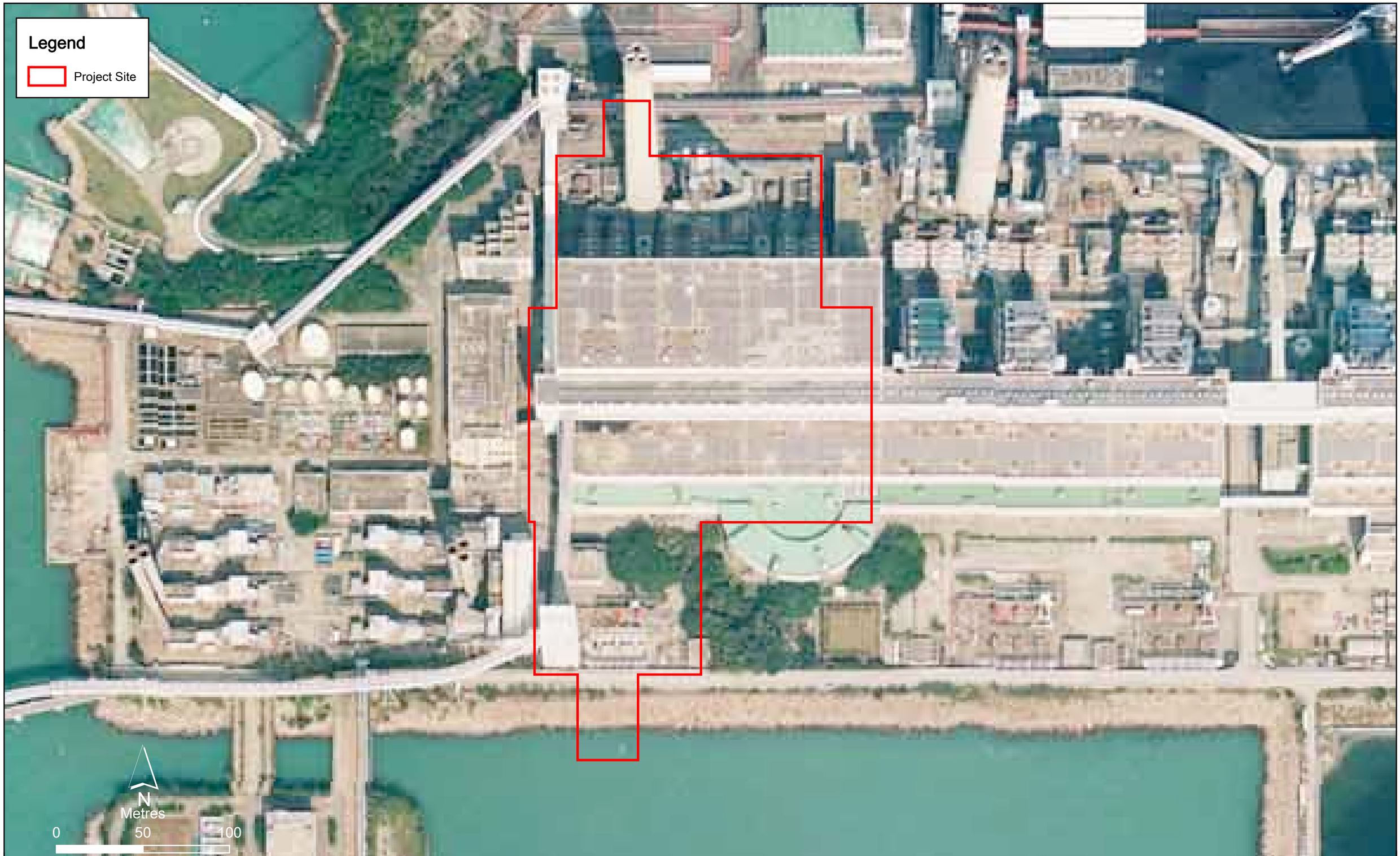
Environmental Resources Management

ERM



Annex A

Historical Aerial Photo (2010)

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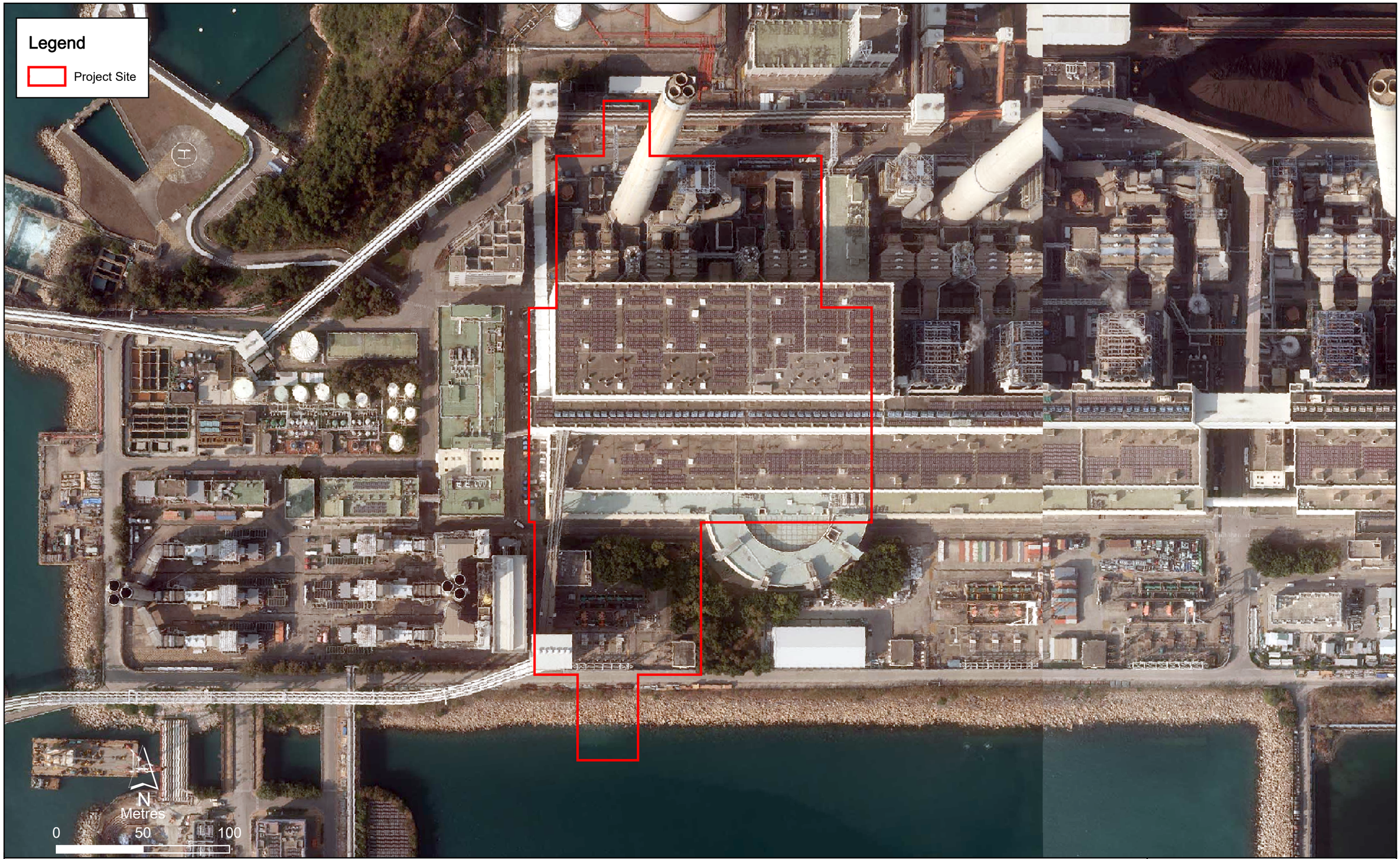
Date: 1/9/2023

Environmental Resources Management

ERM



Annex A

Historical Aerial Photo (2022)

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Date: 31/8/2023

Environmental Resources Management

ERM

ANNEX B PHOTO RECORDS OF SITE WALKOVER

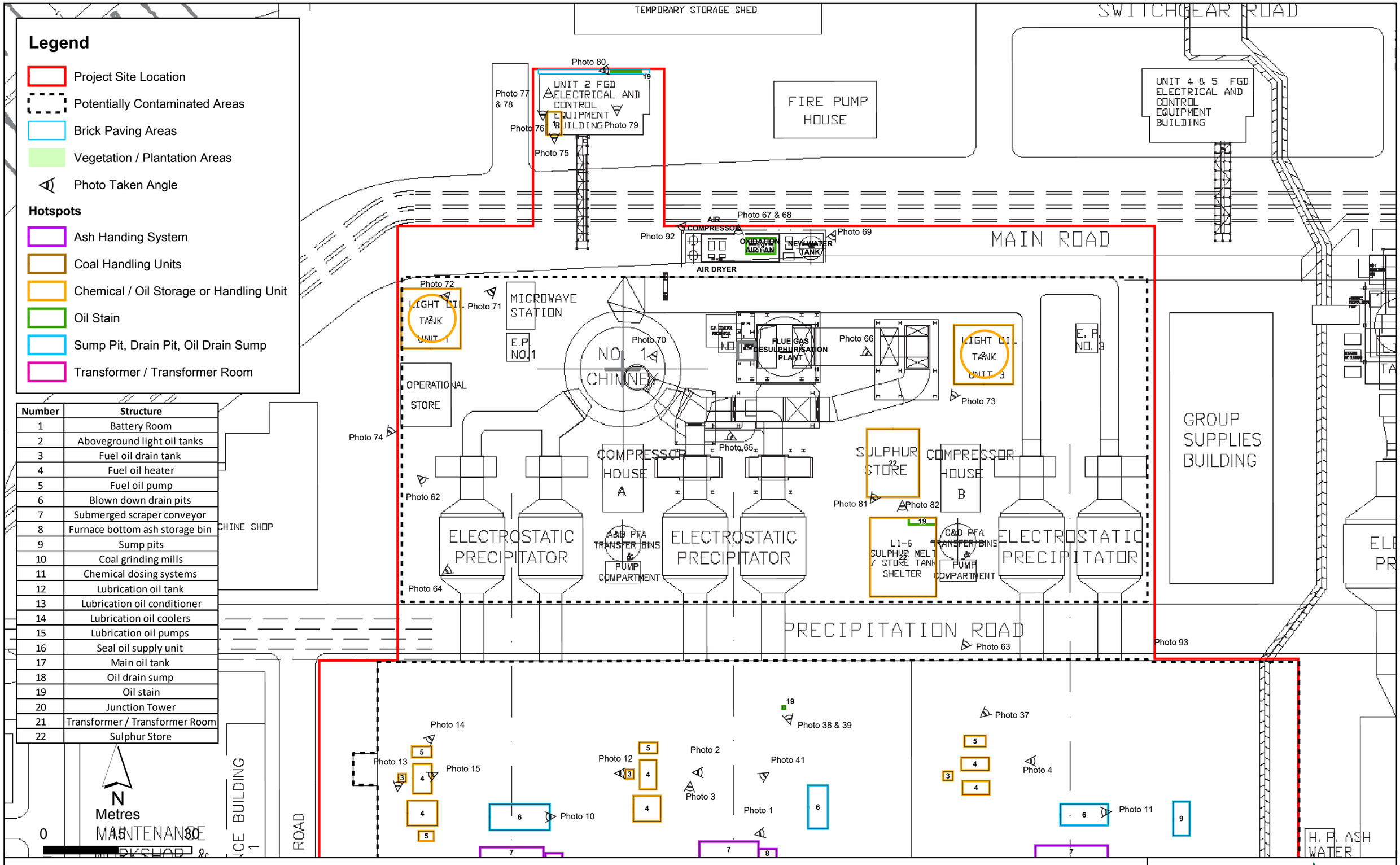
Legend

- Project Site Location
- Potentially Contaminated Areas
- Brick Paving Areas
- Vegetation / Plantation Areas
- Photo Taken Angle

Hotspots

- Ash Handing System
- Coal Handling Units
- Chemical / Oil Storage or Handling Unit
- Oil Stain
- Sump Pit, Drain Pit, Oil Drain Sump
- Transformer / Transformer Room

Number	Structure
1	Battery Room
2	Aboveground light oil tanks
3	Fuel oil drain tank
4	Fuel oil heater
5	Fuel oil pump
6	Blown down drain pits
7	Submerged scraper conveyor
8	Furnace bottom ash storage bin
9	Sump pits
10	Coal grinding mills
11	Chemical dosing systems
12	Lubrication oil tank
13	Lubrication oil conditioner
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store



Annex B

Location of the Photo Records Taken
(Sheet 1 of 3)

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Location_of_the_Photo_Records_Taken_1.mxd
Date: 22/3/2024

Environmental Resources Management

ERM

Legend

- Project Site Location
- Potentially Contaminated Areas
- Brick Paving Areas
- Vegetation / Plantation Areas
- Photo Taken Angle

Hotspots

- Ash Handing System
- Coal Handling Units
- Chemical / Oil Storage or Handling Unit
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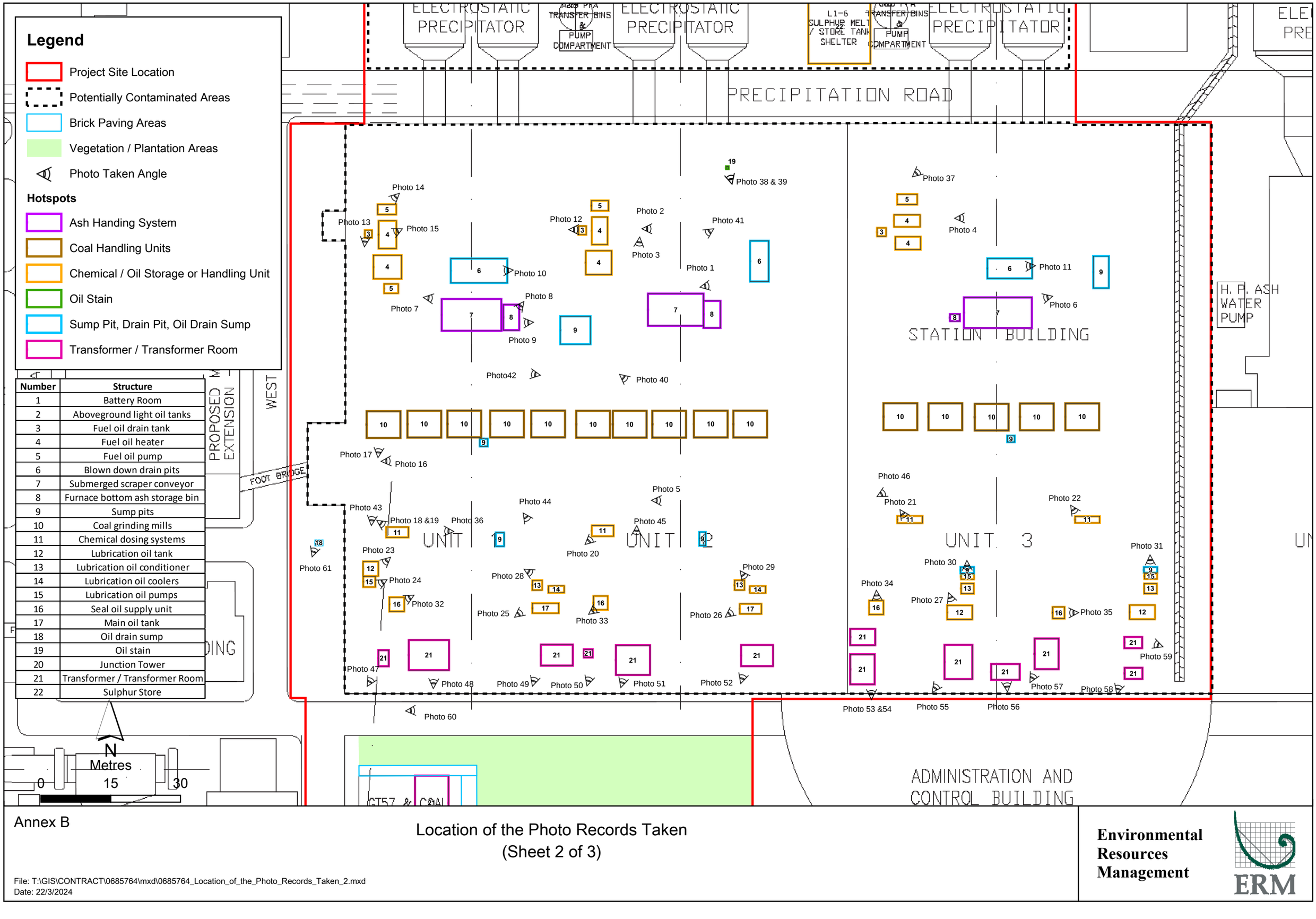
14	Lubrication oil coolers
15	Lubrication oil pumps
16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store



Annex B

Location of the Photo Records Taken
(Sheet 2 of 3)

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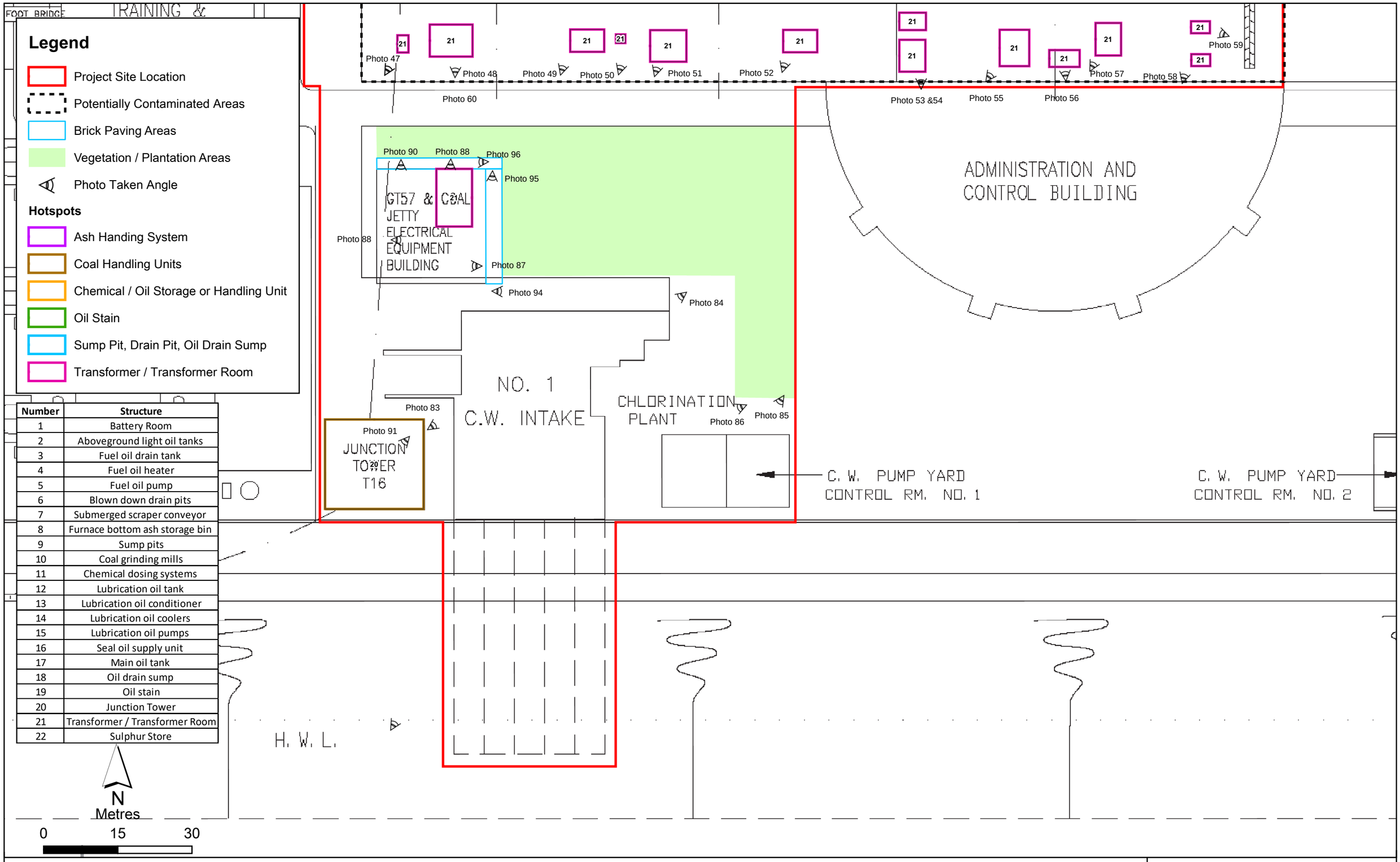
Date: 22/3/2024

Environmental Resources Management

ERM



Legend

- Project Site Location
- Potentially Contaminated Areas
- Brick Paving Areas
- Vegetation / Plantation Areas
- Photo Taken Angle

Hotspots

- Ash Handing System
- Coal Handling Units
- Chemical / Oil Storage or Handling Unit
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16	Seal oil supply unit
17	Main oil tank
18	Oil drain sump
19	Oil stain
20	Junction Tower
21	Transformer / Transformer Room
22	Sulphur Store

Annex B

Location of the Photo Records Taken
(Sheet 3 of 3)

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Date: 22/3/2024

Environmental Resources Management

ERM

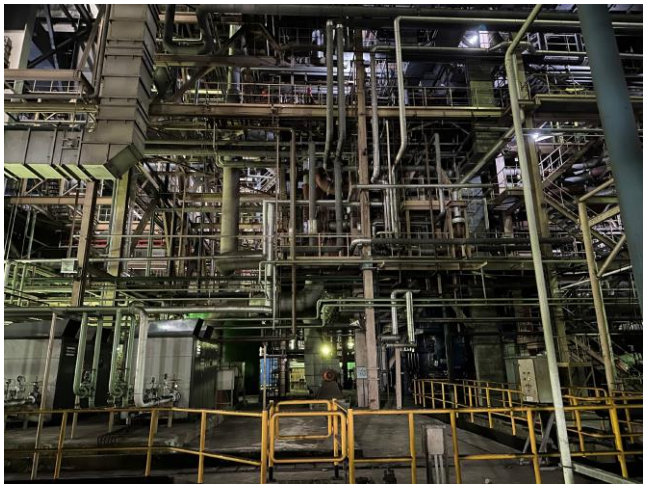


Photo 1: Overall view inside the Main Station Building

Photo 2: Overall view inside the Main Station Building

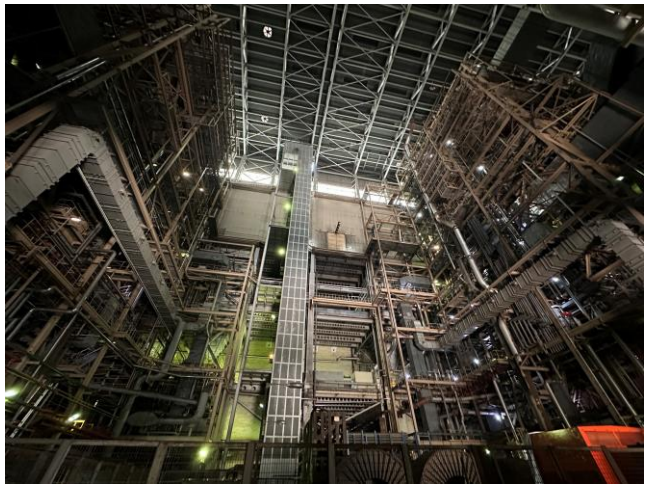


Photo 3: Overall view inside the Main Station Building

Photo 4: Overall view inside the Main Station Building

Photo 5: Overall view inside the Main Station Building

Photo 6: Boiler area and submerged scraper conveyor

Photo 7: Boiler area and submerged scraper conveyor

Photo 8: A furance bottom ash storage bin pit

Photo 9: Boiler area and submerged scraper conveyor

Photo 10: A blown down drain pit

Photo 11: A blown down drain pit

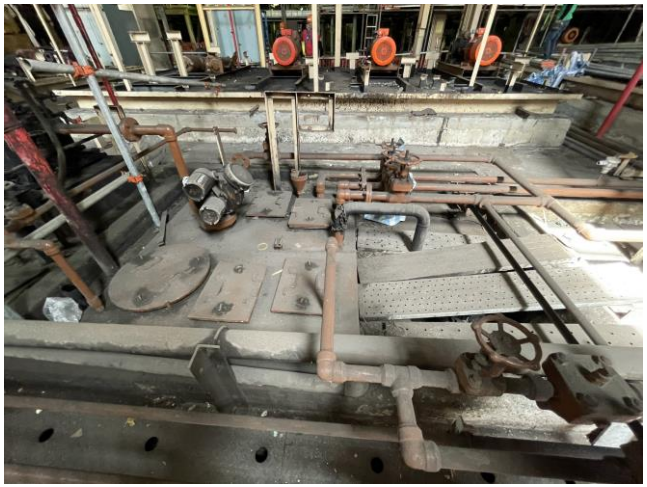


Photo 12: A fuel oil drain tank

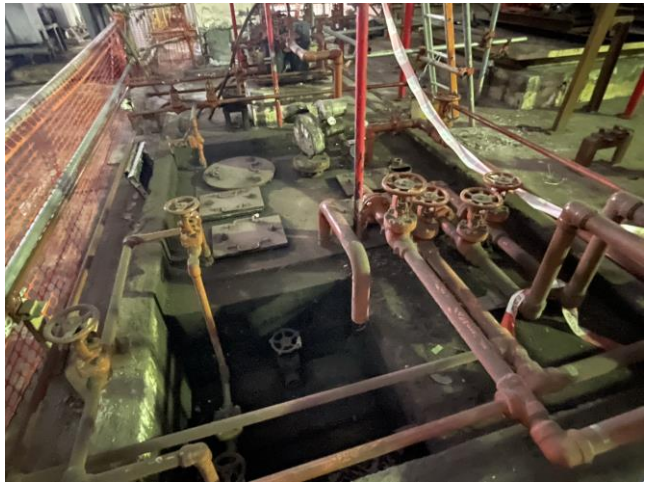


Photo 13: A fuel oil drain tank

Photo 14: Fuel oil pumps

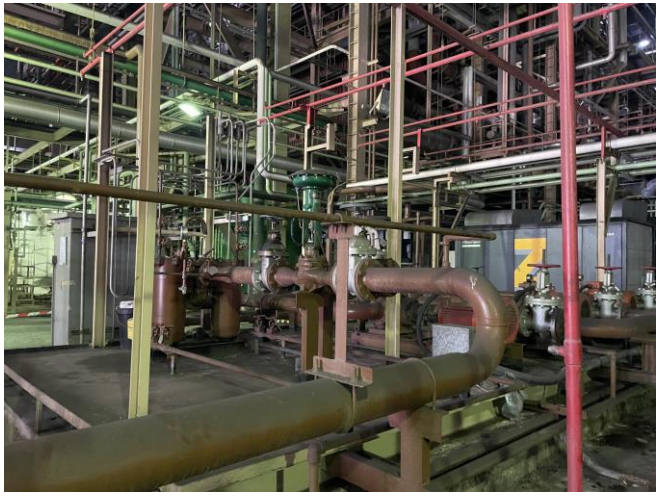


Photo 15: Fuel oil heaters

Photo 16: A series of coal grinding mills along the Main Station Building and sump pit

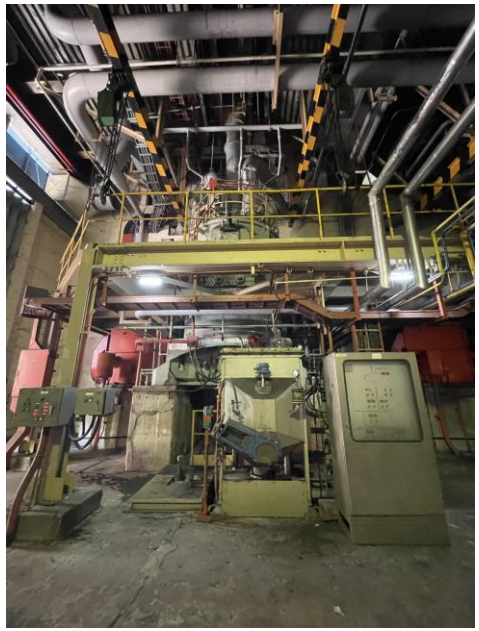


Photo 17: A coal grinding mill unit

Photo 18: Chemical dosing system at L1

Photo 19: A Hydrazine tank at the chemical dosing system

Photo 20: Chemical dosing system at L2

Photo 21: Chemical dosing system at L3

Photo 22: Chemical dosing system at L3

Photo 23: Lubrication oil storage tank

Photo 24: Oil transfer pump

Photo 25: Main oil tank at L1

Photo 26: Main oil tank at L2

Photo 27: Lubrication oil tank at L3

Photo 28: Lubrication oil conditioner and coolers at L1

Photo 29: Lubrication oil conditioner and coolers at L2

Photo 30: Lubrication oil conditioner, oil pumps and sump pit at L3 with oil stains observed

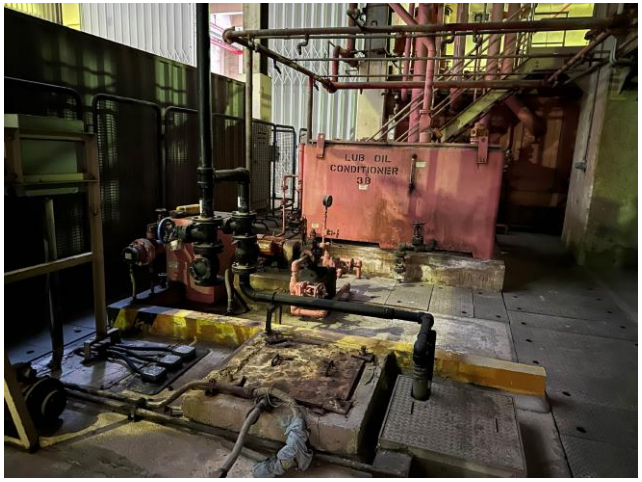


Photo 31: Lubrication oil, oil pumps and sump pit at L3 with oil stains observed

Photo 32: Seal oil supply unit at L1

Photo 33: Seal oil supply unit at L2

Photo 34: Seal oil supply unit at L3

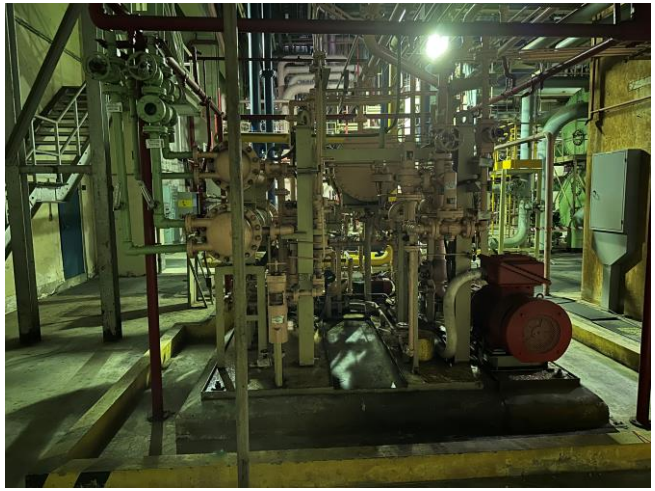


Photo 35: Seal oil supply unit at L3

Photo 36: Condenser unit

Photo 37: A forced draft fan unit

Photo 38: A oil stain near a forced draft fan unit in L2

Photo 39: A oil stain near a forced draft fan unit in L2

Photo 40: Primary air fan units

Photo 41: Boiler air receiver units

Photo 42: Water tank and overflow water tank

Photo 43: Area near the boiler feed pumps

Photo 44: Bearing cooling water pump

Photo 45: Condensate extraction pumps

Photo 46: Boiler feed pumps

Photo 47: Transformer along the Main Station Building

Photo 48: Transformer along the Main Station Building

Photo 49: Transformer along the Main Station Building

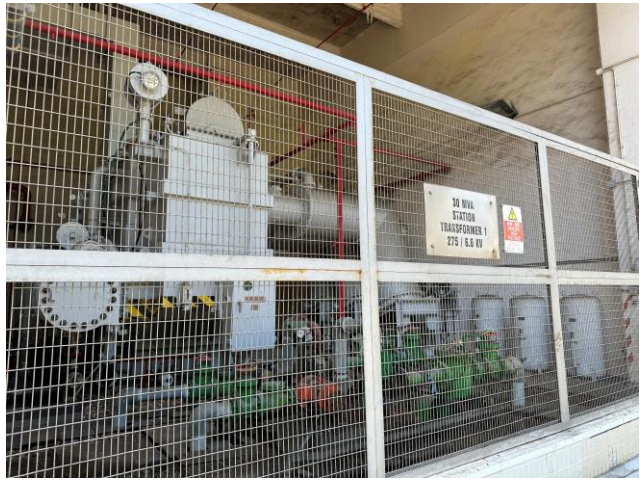


Photo 50: Transformer along the Main Station Building

Photo 51: Transformer along the Main Station Building

Photo 52: Transformer along the Main Station Building

Photo 53: Transformer along the Main Station Building

Photo 54: Transformer along the Main Station Building

Photo 55: Transformer along the Main Station Building

Photo 56: Transformer along the Main Station Building

Photo 57: Transformer along the Main Station Building

Photo 58: Transformer along the Main Station Building

Photo 59: Transformer along the Main Station Building

Photo 60: Transformer units along the Main Station Building

Photo 61: The oily drain sump outside the Main Station Building for L1 to L3

Photo 62: Electrostatic precipitator systems connecting from the Main Station Building for L1 to L3

Photo 63: Electrostatic precipitator systems connecting from the Main Station Building for L1 to L3

Photo 64: Ash hopper of the electrostatic precipitator system

Photo 65: Structures of the Flue Gas De-sulphurisation (FGD) plant

Photo 66: The absorber of the Flue Gas De-sulphurisation (FGD) plant

Photo 67: The air compressor units of the Flue Gas De-sulphurisation (FGD) plant

Photo 68: The oxidation air blower units of the FGD plant with oil stains observed

Photo 69: Water tank for the FGD plant

Photo 70: Inside view of the chimney with mixture of dirt and stagnant water observed

Photo 71: Secondary containment of Unit 1 Light Oil Tank

Photo 72: Unit 1 Light Oil Tank

Photo 73: Unit 3 Light Oil Tank

Photo 74: Operation store of FM200 Recycling & NOVEC 1230 plant room

Photo 75: Battery room in Unit 2 FGD Electrical and Control Equipment Building

Photo 76: FM-200 cylinder room in Unit 2 FGD Electrical and Control Equipment Building

Photo 77: Control equipment room in Unit 2 FGD Electrical and Control Equipment Building

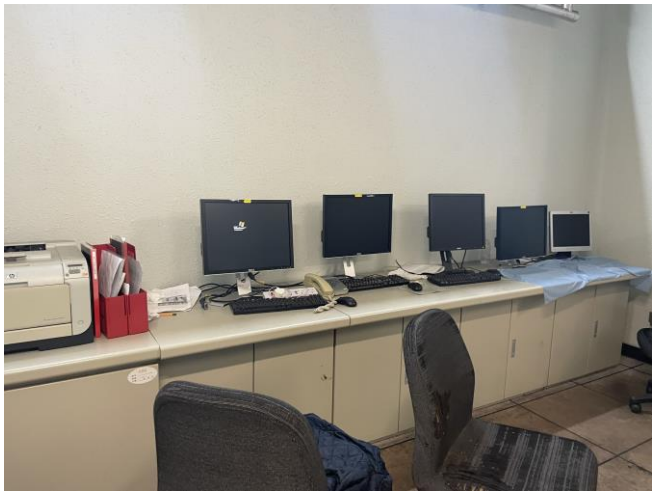


Photo 78: Control equipment room in Unit 2 FGD Electrical and Control Equipment Building

Photo 79: Switchgear room in Unit 2 FGD Electrical and Control Equipment Building

Photo 80: A storage area of equipment with oil stains and emptied chemical containers in place

Photo 81: Storage of Sulphur solid

Photo 82: Two Sulphur melting / store tanks underneath a shelter with oil stain observed.

Photo 83: Overview of the southern part of the Project site.

Photo 84: Overview of the circulating water system and Junction Tower T16 at the back

Photo 85: Cooling water system control room

Photo 86: Electrochlorination plant

Photo 87: Switchgear room in the GT57 & Coal Jetty Electrical Equipment Building

Photo 88: Switchgear room in the GT57 & Coal Jetty Electrical Equipment Building

Photo 89: Transformer room in the GT57 & Coal Jetty Electrical Equipment Building

Photo 90: Uninterruptible power supply (UPS) & programmable logic controller (PLC) room.

Photo 91: Inside of Junction Tower T16, coal pieces and mixture of coal residuals on ground

Photo 92: Overview of the Main Road

Photo 93: Overview of the Precipitation Road

Photo 94: Concrete paving at the southern part of the Project site

Photo 95: Brick pavers area outside the GT57 & Coal Jetty Electrical Equipment Building

Photo 96: Brick pavers area outside the GT57 & Coal Jetty Electrical Equipment Building

ANNEX C SITE WALKOVER CHECKLIST

ANNEX C

SITE WALKOVER CHECKLIST

(Site Walkover conducted on 21 July 2023)

GENERAL SITE DETAILS

SITE OWNER/CLIENT	The Hongkong Electric Co., Ltd. (HK Electric)
PROPERTY ADDRESS	Lamma Power Station, Po Lo Tsui, Lamma Island, Hong Kong

PERSON CONDUCTING THE QUESTIONNAIRE

NAME	Kisten Ma
POSITION	Consultant

AUTHORIZED OWNER/CLIENT REPRESENTATIVE (IF APPLICABLE)

NAME	-
POSITION	-
TELEPHONE	-

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:	Approximately 500
	Part-time:	Nil
	Temporary/Seasonal:	Nil
Maximum no. of people on site at any time:		Not available
Typical hours of operation:		24 hours
Number of shifts:		2 shifts to 3 shifts
Days per week:		7 days
Weeks per year:		52 weeks
Scheduled plant shut-down:		Nil

Detail the main sources of energy at the site:

Gas	~~Yes~~/No
Electricity	Yes/~~No~~
Coal	~~Yes~~/No
Oil	~~Yes~~/No
Other	~~Yes~~/No

SITE DESCRIPTION

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

What is the total site area: 56,000m^2

What area of the site is covered by buildings (%): Approximately 85%

Please list all current and previous owners/occupiers if possible.
Previous: N/A; Current: HKE

Is a site plan available? If yes, please attach. Yes/~~No~~

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

If yes, identify those parties: N/A

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

North: Industrial: Oil tanks area of the Lamma Power Station

South: Industrial: Lamma Power Station Extension

East: Industrial: Lamma Power Station Unit L4 and Plant House, Equipment Supplies Building

West: Industrial: West Station Road, Maintenance Workshop & Office, Training Workshop Building, GT Auxiliary Building,

Annex C1 – Site Walkover Checklist (Page 43)

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

Flat concrete paved terrain.

State the size and location of the nearest residential communities.

Village houses located about 600m away to the north east

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

No.

Questionnaire with Existing/Previous Site Owner or Occupier

Ref.		Yes/No	Notes
1.	What are the main activities/operations at the above address?	Yes	Power Generation.
2.	How long have you been occupying the site?	Yes	About 40 years since 1982.
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy?)	Yes	-
4.	Prior to your occupancy, who occupied the site?	N/A	No previous occupant.
5.	What were the main activities/operations during their occupancy?	N/A	No previous occupant.
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	There is no boreholes/wells or natural springs on site and its surrounding area
10	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	Light oil, Lube Oil, Seal Oil Ammonia, Phosphate, Hydrazine, Sulphur solid.
	• Where do you store these chemicals?	Yes	Aboveground oil tanks, individual aboveground tanks onsite for Ammonia, Phosphate,

			Hydrazine. A storage room for sulphur solid.
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	No	There is no material inventory list.
13.	Has the facility produced a separate hazardous substance inventory?	No	
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	No	
15.	How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	Yes	Via marine transportation and trucks. Stored on site in tanks, drums etc.
16.	Do you have any underground storage tanks? (If yes, please provide details.)	No	There is no underground storage of oil tanks. There are no underground storage tanks for sodium hypochlorite at the Electrochlorination plant.
	▪ How many underground storage tanks do you have on site?	No	There are no underground storage tanks within the Project Site.
	▪ What are the tanks constructed of?	N/A	
	▪ What are the contents of these tanks?	N/A	
	▪ Are the pipelines above or below ground?	N/A	
	▪ 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?	N/A	
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 inspection by HK Electric's H&S team.
19.	How are the wastes disposed of?	Yes	Residual ash was transported offsite via ash pipe for further arrangement. General refuse was collected and transfer to designated waste

			storage area,
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 rearrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	No	
23.	Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	
24.	Are there any known contaminations on site? (If yes, please provide details.)	No	
25.	Has the site ever been remediated? (If yes, please provide details.)	No	

Observations

1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	Yes	
2.	What are the conditions of the bund walls and floors?	Yes	Concrete with good condition with no cracks
3.	Are any surface water drains located near to drum storage and unloading areas?	Yes	
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	Yes	Light Oil, Lube Oil, Seal Oil
5.	Is there a storage site for the wastes?	Yes	Outside the Project 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	An oil stain observed inside Unit L2
9.	Are there any potential off-site sources of contamination?	Yes	Other power generation unit in close vicinity of the Project Area
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	None of the site equipment might contains PCBs

11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	Yes	Sump pits
12.	Any noticeable odours during site walkover?	No	
13.	Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?		Light Oil, Lube Oil, Seal Oil

ANNEX D COPY OF THE RELEVANT REPLIES FROM VARIOUS GOVERNMENT DEPARTMENTS

Kisten Ma

From: Kisten Ma
Sent: Tuesday, September 5, 2023 2:32 PM
To: hotline_s@epd.gov.hk
Cc: Chris Hoi; Alex Waheed
Subject: Request for Information of Chemical Wast Producers Registry and Spillage / Leakage Records _Demolition of Unit L1 to L3 at Lamma Power Station
Attachments: Attachement 1_Project Site.pdf; Attachment 2_Appointment Record.pdf

Importance: High

Dear Sir/Madam,

We, ERM-Hong Kong, Ltd., are appointed by The Hongkong Electric Co., Ltd. (HKE) for the captioned project of preparing the Project Profile for the Direct Environmental Permit (EP) Application for Demolition of Unit L1 to L3 at Lamma Power Station. As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the project locations required as part of the vetting process. In this regards, we kindly request your assistance in providing the following information related to the Project Site for our assessment:

1) Current and past (early as the records are available) registered Chemical Water Producer(s) within the Project Site (preferably with the registration date, status (valid or invalid), nature of the major chemical waste); and
2) Reported accidents of spillage/leakage of chemicals within the Project Site.

We enclosed herewith a map showing the Project Site at Lamma Power Station (see attachment 1) and the appointment record from HKE (see attachment 2) for your reference. Due to the tight project schedule, we would be much appreciated if you could provide the requested information by 12 September 2023.

Should you have any queries, please contact the undersigned. Thank you for your attention to this matter.

Regards,
Kisten Ma
Consultant

ERM
2509, 25/F, One Harbourfront | 18 Tak Fung Street | Hung Hom | Hong Kong |
T +852 2271 3322
E kisten.ma@erm.com | **W** www.erm.com

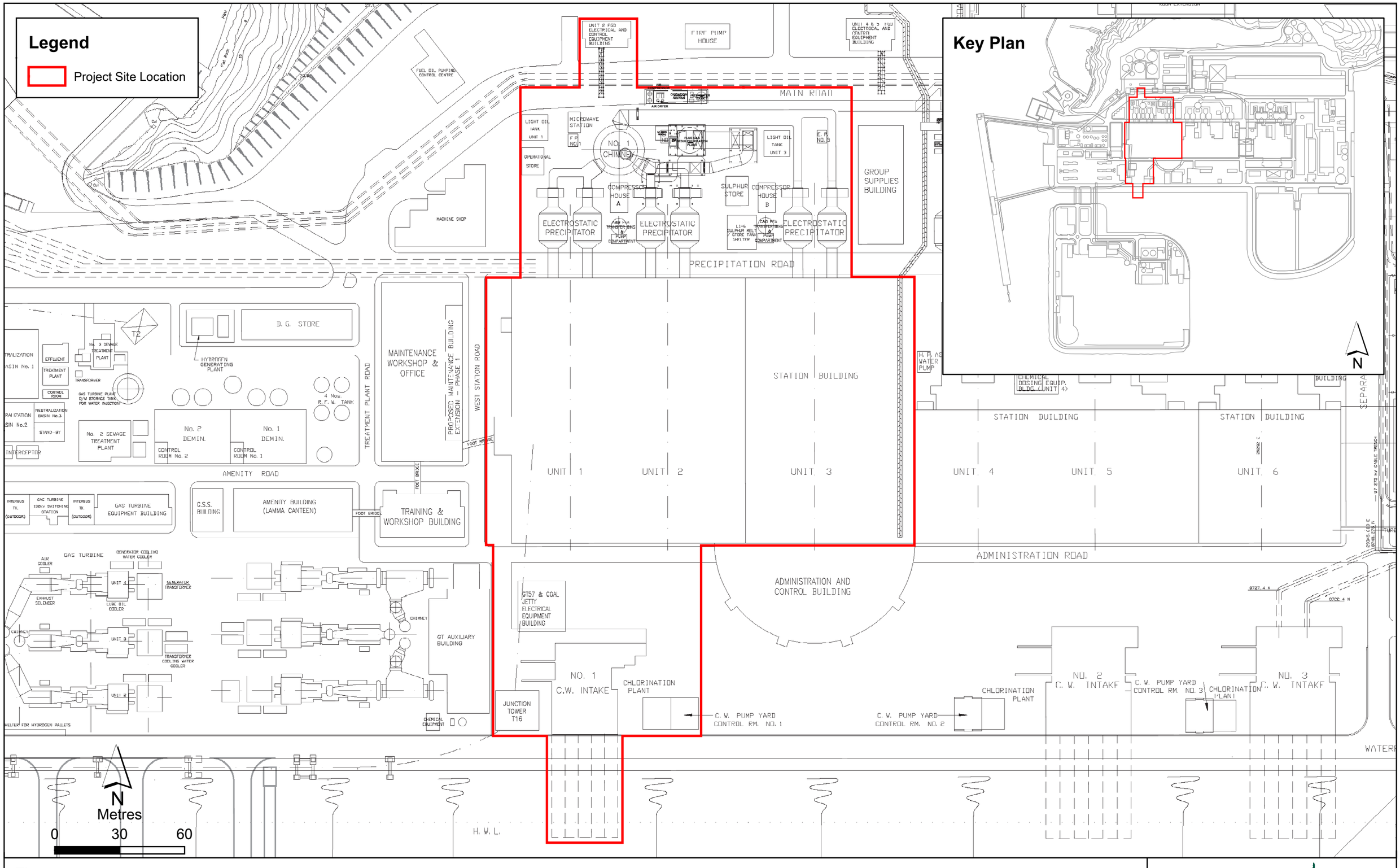


Figure 1

Project Location Map

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Project_Site.mxd
Date: 22/3/2024

Environmental Resources Management

ERM

香港電燈有限公司
The Hongkong Electric Co., Ltd.

香港堅尼地道四十四號港燈中心
Hongkong Electric Centre, 44 Kennedy Road, Hong Kong
電話/Tel 2843 3111 傳真/Fax 2810 0506
電郵/Email mail@hkelectric.com
www.hkelectric.com

港燈 HK Electric 130+ 推動永續未來 Powering for Sustainability

By Fax & Mail (Fax No. 3015 8052)

CONFIDENTIAL

Our Ref: GCD.CN/500/05/095

22 AUG 2023

ERM-Hong Kong, Ltd.
2507, 25/F, One Harbourfront,
18 Tak Fung Street,
Hunghom, Kowloon,
Hong Kong

Dear Sirs,

CONTRACT NO. 23-23201
PREPARATION OF PROJECT PROFILE FOR APPLICATION OF EIA STUDY BRIEF FOR DEMOLITION OF UNITS L1 TO L3 AT LAMMA POWER STATION

Variation Order No. 1 - Consultancy Services for Direct EP Application

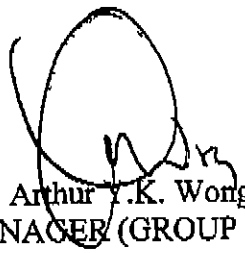
With reference to your quotation ref. P0667777_HKE DIR for L1-L3_20230609.docx dated 9 June 2023 in response to our enquiry dated 5 June 2023 and the subsequent correspondence as detailed in Appendix I for the subject Contract, we are pleased to issue this Variation Order No. 1 for the provision of Consultancy Services for Direct Environmental Permit (EP) Application at a sum of with details shown in Appendix II.

Terms of Payment

Cont'd/2....

This Variation Order is forwarded to you in duplicate. You are required to acknowledge your receipt by signing and returning the attached duplicate copy within one week from the date of this letter.

Yours faithfully,



Arthur Y.K. Wong
GENERAL MANAGER (GROUP COMMERCIAL)

Encl.
/aw

We confirm receipt of this Contract No. 23-23201 Variation Order No. 1.

Company Chop & Signature Date

本署檔案 EP749/I1/3
OUR REF:
來函檔案
YOUR REF:
電　話 2516 1719
TEL NO:
圖文傳真 2960 1760
FAX NO:
網　址
HOMEPAGE: http://www.epd.gov.hk/

Environmental Protection Department
Environmental Compliance Division
Regional Office (South)
2/F., Chinachem Exchange Square
1 Hoi Wan Street
Quarry Bay, Hong Kong

環境保護署
環保法規管理科
區域辦事處(南)
香港鰂魚涌
海灣街一號
華懋交易廣場二樓

13 November 2023

By Mail

To: **ERM**
2509, 25/F
One Harbourfront
18 Tak Fung Street
Hung Hom
Hong Kong
(Attn: Kisten MA – Consultant)

Dear Sir,

Demolition of Unit L1 to L3 at Lamma Power Station
Request for Information - Chemical Spillage Accident Record

I refer to your email requesting the following information about chemical spillage or leakage incidents with respect to the study area in your attached figures:-

(1) Current and past registered Chemical Waste Producer(s) within the Project Area; and
(2) Reported accidents of spillage/ leakage of chemicals within the Project Area.

Under our record, there is only one registered Chemical Waste Producer which is your client. You are advised to visit our territory-wide register of chemical waste producers, maintained at the Territory Control Office (in Wan Chai). Please contact our Environmental Protection Inspector Mr. LO Kin-hang (Tel: 2835 1357) to make an appointment for the access to the register.

We do not have any records of chemical spillage or leakage, or any land contamination within the Project Area. You are reminded that this information is not exhaustive and you are advised to check with other concerned parties/authorities responsible for handling chemical leakage/spillage incidents. You may also consider taking samples for your study of land contamination, if necessary.

Yours sincerely,

(Colin FAN)
for Director of Environmental Protection

Kisten Ma

From: Kisten Ma
Sent: Tuesday, September 5, 2023 2:48 PM
To: hkfsdenq@hkfsd.gov.hk; ado_mg_1@hkfsd.gov.hk
Cc: Chris Hoi; Alex Waheed
Subject: Request for Information of Dangerous Goods, Spillage / Leakage Incidents and Fire Records _Demolition of Unit L1 to L3 at Lamma Power Station
Attachments: Attachement 1_Project Site.pdf; Attachment 2_Appointment Record.pdf

Importance: High

Dear Sir/Madam,

We, ERM-Hong Kong, Ltd. are appointed by The Hongkong Electric Co., Ltd. (HKE) for the captioned project of preparing the Project Profile for the Direct Environmental Permit application for Demolition of Unit L1 to L3 at Lamma Power Station. As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the project locations required as part of the vetting process. In this regards, we kindly request your assistance in providing the following information related to the Project Site for our assessment:

a) Past and present Dangerous Goods Records:
b) Past and present spillage / leakage / incident records of the Project Site; and
c) Past and present fire record of the of the Project Site.

We enclosed herewith a map showing the Project Site at Lamma Power Station (see attachment 1) and the appointment record from HKE (see attachment 2) for your reference. Due to the tight project schedule, we would be much appreciated if you could provide the requested information by **12 September 2023**.

Should you have any queries, please contact the undersigned. Thank you for your attention to this matter.

Regards,
Kisten Ma
Consultant

ERM
2509, 25/F, One Harbourfront | 18 Tak Fung Street | Hung Hom | Hong Kong |
T +852 2271 3322
E kisten.ma@erm.com | **W** www.erm.com

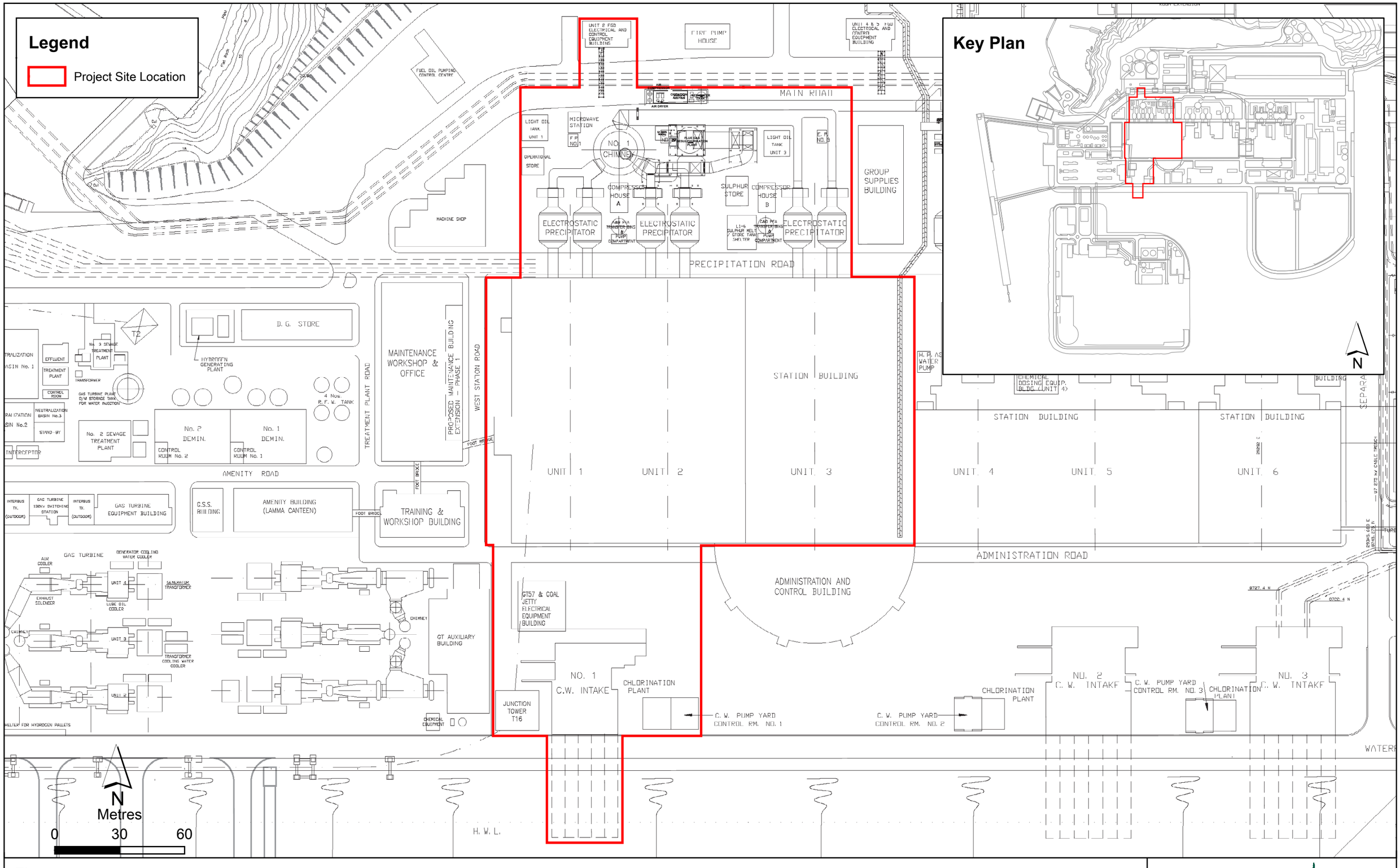


Figure 1

Project Location Map

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Project_Site.mxd
Date: 22/3/2024

Environmental Resources Management

ERM

香港電燈有限公司
The Hongkong Electric Co., Ltd.

香港堅尼地道四十四號港燈中心
Hongkong Electric Centre, 44 Kennedy Road, Hong Kong
電話/Tel 2843 3111 傳真/Fax 2810 0506
電郵/Email mail@hkelectric.com
www.hkelectric.com

港燈 HK Electric 130+ 推動永續未來 Powering for Sustainability

By Fax & Mail (Fax No. 3015 8052)

CONFIDENTIAL

Our Ref: GCD.CN/500/05/095

22 AUG 2023

ERM-Hong Kong, Ltd.
2507, 25/F, One Harbourfront,
18 Tak Fung Street,
Hunghom, Kowloon,
Hong Kong

Dear Sirs,

CONTRACT NO. 23-23201
PREPARATION OF PROJECT PROFILE FOR APPLICATION OF EIA STUDY BRIEF FOR DEMOLITION OF UNITS L1 TO L3 AT LAMMA POWER STATION

Variation Order No. 1 - Consultancy Services for Direct EP Application

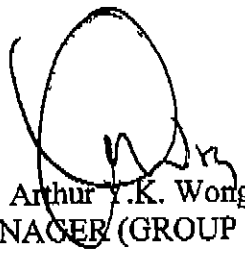
With reference to your quotation ref. P0667777_HKE DIR for L1-L3_20230609.docx dated 9 June 2023 in response to our enquiry dated 5 June 2023 and the subsequent correspondence as detailed in Appendix I for the subject Contract, we are pleased to issue this Variation Order No. 1 for the provision of Consultancy Services for Direct Environmental Permit (EP) Application at a sum of with details shown in Appendix II.

Terms of Payment

Cont'd/2....

This Variation Order is forwarded to you in duplicate. You are required to acknowledge your receipt by signing and returning the attached duplicate copy within one week from the date of this letter.

Yours faithfully,



Arthur Y.K. Wong
GENERAL MANAGER (GROUP COMMERCIAL)

Encl.
/aw

We confirm receipt of this Contract No. 23-23201 Variation Order No. 1.

Company Chop & Signature Date

消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防處總部大廈

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.** : (113) in FSD GR 6-5/4 R Pt. 49
來函檔號 **YOUR REF.** :
電子郵件 **E-mail** : hkfsdenq@hkfsd.gov.hk
圖文傳真 **FAX NO.** : 2739 5879
電 話 **TEL NO.** : 2733 7741

26 October 2023

ERM-Hong Kong, Limited
2501, 2507-10, 25/F, Office Tower One,
The Harbourfront,18 Tak Fung Street,
Kowloon, Hong Kong
(Attn: Ms. Kisten MA, Consultant)

Dear Ms. MA,

Demolition of Unit L1 to L3, Lamma Power Station
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 5.9.2023 regarding the captioned request and reply below in response to your questions:-

1. According to our record, from the year of 1990 to present moment, dangerous goods licenses have been issued by this department to the subject address, with details as shown in **Appendix A**.

2. A total of two incident records were found at the subject location. Please refer to **Appendix B** for details.

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

Yours sincerely,

(NG Wing-chit)
for Director of Fire Services

Demolition of Unit L1 to L3, Lamma Power Station
Request for Information of Dangerous Goods & Incident Records

Item	Type of dangerous goods	Quantity	Location of storage
1.	Hypochlorite Solution	N/A	Lamma Power Station
2.	Nitrogen, compressed	N/A	
3.	Heptafluoropropane	N/A	
4.	Diesel	200,000 Litres	
5.	Diesel	200,000 Litres	

Appendix B

Demolition of Unit L1 to L3, Lamma Power Station
Request for Information of Dangerous Goods & Incident Records

No.	Date	Type of Incident	Address
1	9/4/2022	Late Call Fire	East Wharf Road, Limestone Unloader No.1 Lamma Power Station
2.	26/2/2023	No. 2 Fire Alarm	GT Auxiliary Building, Lamma Power Station

ANNEX E DETAILS OF CHEMICAL WASTE PRODUCERS RECORD

ANNEX E

CHEMICAL WASTE PRODUCERS RECORD

EPD Territorial Control Office
Southorn Centre 25/F, Wan Chai
(Inspected on 19 Sep 2023)

Table 1 Valid Records (Document up to date as of 12 June 2023)

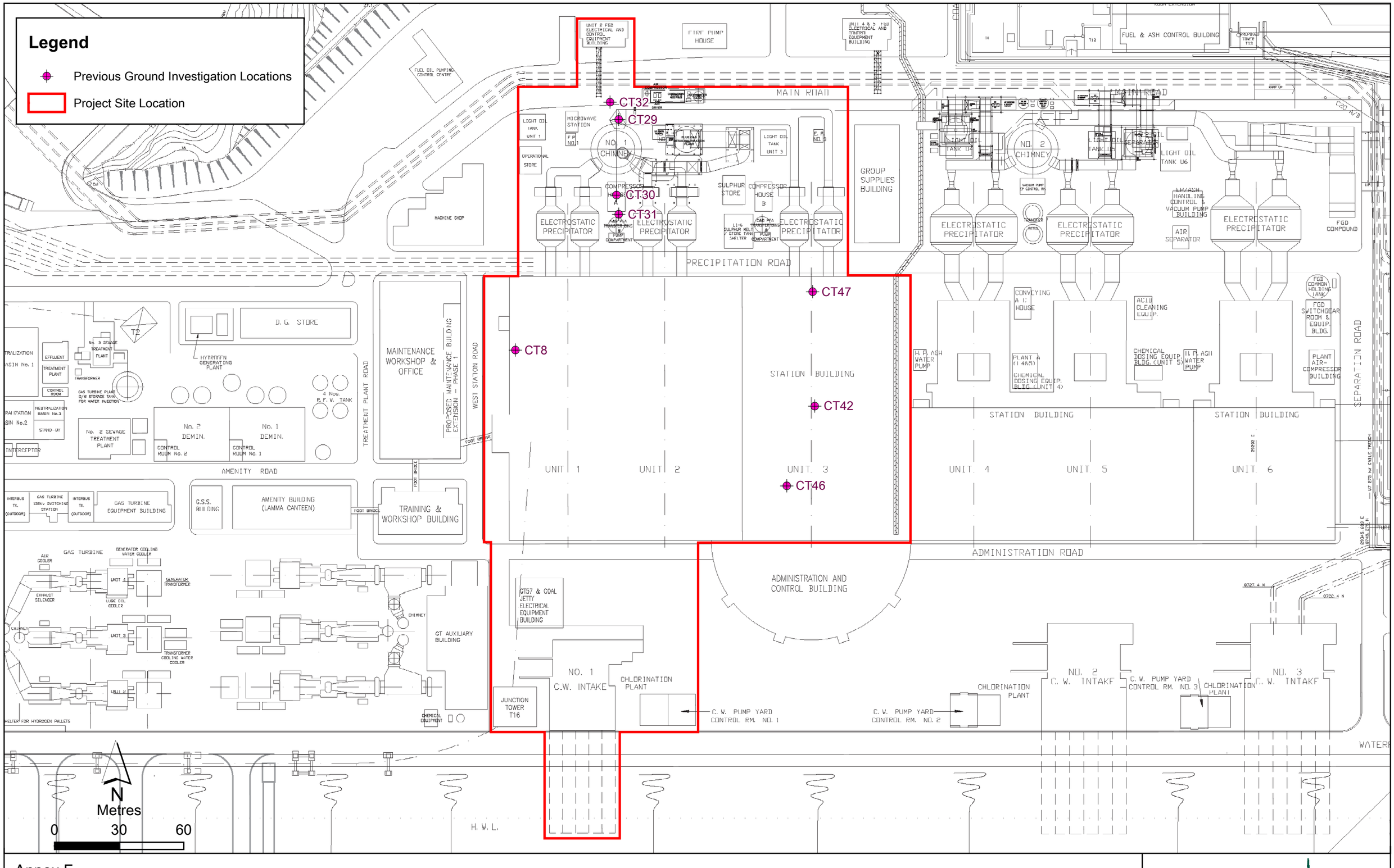
Company Name	Nature of Business	Address
The Hongkong Electric Co, Ltd	Generation of Electricity	Lamma Power Station Po Lo Tsui, Lot 1934 Lamma Island, NT
Chun Yuen Engineering Services, Ltd	Engineering	Lamma Power Station, Lamma Island, N.T.
Sunley Engineering and Construction Co., Ltd.	Engineering and Construction	Lamma Power Station Extension foundation Works for Unit L12, Lamma Island, Outlying Island, NT
RMA Fiventures Hong Kong Limited	Electrical and Mechanical Works	Lamma Power Station, Lamma Island, NT
Anderson Concrete Limited	Concrete Production	Lamma Power Station, Lamma Island, Hong Kong, D.D.3, Lot 1934
Taihei Dengyo Kaisha Ltd	E&M Equipment Installation and Maintenance (for H.E.C.)	Lamma Power Station, Lamma Island, Hong Kong
Xian Electric Engineering (Hong Kong) Company Limited	Electrical Engineering	Hong Kong Electric Co. Ltd. – Lamma Power Station LMA East Store Building, Lanma (*sic*) Island, N.T.
Wai Luen Development Ltd.	E&M Equipment Installation and Maintenance	Lamma Power Station, Lamma Island, HK
Kong Tech Services Limited	Repair and Replace Mechanical Equipment	Lamma Power Station, Lamma Island, N.T.
Sumitomo Electric Industries, Ltd.	Electrical Engineering Construction	Lamma Power Station (Extension), Lamma Island, Outlying Island
Kum Shing E&M Limited	Engineering	Lamma Power Station, Lamma Island, New Territories

Table 2 Invalid Records (Document up to date as of 12 June 2023)

Company Name	Nature of Business	Address
J Lian & Son	Steelwork Contractor	Lamma Power Station, Hongkong Electric Co. Lamma Island NT
Mitsubishi Electric (Hong Kong) Ltd	Construction & Engineering	Lamma Extension Substation, Lamma Power Station, Lamma Island, Hong Kong
Wormald Engineering Services Limited	Fire Protection Engines	Lamma Power Station Extension, Lamma Island, Hong Kong
Alstom Power Service (Hong Kong) Limited	Light Oil Transfer Pump and Valve Installation	Light Oil Pump Station, Lamma Power Station, Lamma Island
Excel Engineering Company Limited	Construction	Contract No. 14/8002, Construction Site at Waterfront Road, Lamma Power Station, Lamma Island
Mitsubishi Electric (Hong Kong) Limited	Construction & Engineering	Shunt Reactor Bay No. 2 & 8, Lamma Power Station, Lamma Island
Guo Hua International Contracting (Overseas) Ltd.	Contracting	Lamma Power Station, Outlying Island
Taihei Dengyo Kaisha Ltd	E&M Equipment Installation and Maintenance (for H.E.C.)	Lamma Power Station Lamma Island HK
Linden Engineering Co., Ltd.	E&M Installation Contractor	The Hong Kong Electric Co., Ltd Lamma Power Station Lamma Island NT
Streerers Engineering Limited	Mechanical Erection	The Hongkong Electric Co., Ltd Lamma Power Station HK
Wai Luen Company	E&M Equipment Installation & Maintenance	Lamma Power Station Lamma Island NT
Kaden Construction Limited	Civil Engineering	Lamma Power Station – Foundation and Civil Works for Units 4 & 5 Retrofit of FGD Plant, Lamma Island, New Territories. (HKE Contract No. 06/8005)
Fuji I-Tech Co., Ltd.	Engineering	Lamma Power Station, Lamma Island
Gammon Skanska Limited	Civil Engineers & Contractors	Lamma Power Station Extension – Unit L9 Piling Foundation Lamma Island
REC Engineering Company Limited	Engineering	Lamma Power Station, Lamma Island, N.T.
M Y Cheng & Co Engineering Limited	Engineering & Contracting	Lamma Power Station, Lamma Island, N. T.
Kong Tech Developing Ltd	Engineering	Lamma Power Station Lamma Island
ABB (Hong Kong) Limited	Mechanical Electrical Engineer	Lamma Power Station Lamma Island

Company Name	Nature of Business	Address
Davenham Engineering Projects Ltd	Installation & Maintenance for Electric & Fire Service Equip	Lamma Power Station Construction Site Lamma Island HK
Kier Hong Kong Ltd.	Civil Engineering	Construction Site of Civil Works for 275 kV Cable Route from Yung Shue Wan South Landing (N2) to Lamma Power Station
Bosson Engineering Limited	Ship Repairing & Structure Stell Works	Construction Site at Lamma Power Station, Lamma Island, New Territories.
Ready Mixed Concrete (H.K.) Ltd	Concrete Manufacturing	D.D.3, Lot 1934 Lamma Power Station Lamma Island HK
Kier Hong Kong Limited	Civil Engineering	North Coal Jetty of Lamma Power Station, Lamma Island, New Territories
Wai Kee (Zens) Construction & Transportation Co Ltd	Civil Works	Construction Site of Lamma Power Station Extension Project Lamma Island NT
China Harbour Engineering Company Limited	Construction	Lamma Power Station, Lamma Island, Hong Kong
Chung Hing Construction Company Limited	Construction Site	Fuel & Ash Control Building, Lamma Power Station, Lamma Island
Penta-Ocean Construction Co Ltd Hong Kong Branch	Building & Construction	Offshore of Lamma Power Station Lamma Island NT
Sunley Engineering & Construction Company Limited	Engineering & Construction	Construction Site at Lamma Power Station Extension, Unit L11 (Contract No. 16/8015)
Sunley Engineering & Construction	Engineering & Construction	Lamma Power Station Extension – Unit L10, YSW, Lamma Island

ANNEX F PREVIOUS GROUND INVESTIGATION (GI) RECORD



Annex F

Previous Ground Investigation Locations

File: T:\GIS\CONTRACT\0685764\mxd\0685764_Previous_GI_Locations.mxd
Date: 22/3/2024

Environmental Resources Management

ERM

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG.
Tel 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/~~BOREHOLE~~ No. CT8 Sheet 1 of 2

Client/Consultant ATS
Job No./~~Tender No.~~ 436
Location LAMMA POWER STATION
Ex. Ground Level/~~Sea Bed Level~~ 13.7 m P.D.
Coordinates N 8837 E 28941

Orientation VERTICAL
Method ROTARY
Machine D25
Core Barrel T2101 Flushing Medium WATER
Date From 13-2-1980 To 29-2-1980

Progress	Sample Depth (m)	No.	Blows/305 mm	Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
13-2-1980					NIL AT 8:00	PX					
	2.0		(13)	S.	NIL AT 19:00		2				
					NIL AT 8:00		3.0 3.1	Brownish yellow, CLAYEY SILTY SAND with BROKEN BOULDERS. (FILL)		100	0
25-2-1980							4 4.5 4.6			100	6
	6.5	1	(25)	S.D.			6				
							7.5 7.6 8			100	0
	9.5	2	(25)	S.D.			10				
	10.9	3	(4)	S.D.	2.8m AT 19:00			Grey, SILTY SAND with gravels. (MARINE DEPOSIT)			
					3.6m AT 8:00		12				
26-2-1980							13.5 13.6 13.40	Broken BOULDERS with grey SILTY		7 100	7 0
					3.0m AT 19:00		15.2 15.3			7	0
					3.5m AT 8:00	16.4m	16.4				
27-2-1980							17.4 18 18.1	Purplish grey, greyish white, green & dark grey, coarse grained, moderately widely/closely spaced joints, GRANITE, slightly weathered to fresh.		100 100 100	56 100 100
							19.1 19.3 19.7			100 75	93 40

Remarks :

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
–: Hole Depth
Ws: Washed Sample
W: Water Sample.

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/~~BOREHOLE~~ No. CT8 Sheet 2 of 2

Client/Consultant ATS
Job No./~~Tender No.~~ 436
Location LAMMA POWER STATION
Ex. Ground Level/~~Sea Bed Level~~ + 3.7 m P.D.
Coordinates N 8837 E 28949

Orientation VERTICAL
Method ROTARY
Machine D25
Core Barrel T2101 Flushing Medium WATER
Date From 13-2-1980 To 29-2-1980

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
							19.7			94	0
28/2					3.8m AT 8:00		20.0			60	0
29/2					3.7m AT 8:00		20.5			100	26
							21.4	Purplish grey, greyish white, green & dark grey, coarse grained, closely / moderately widely spaced joints, GRANITE, slightly to moderately weathered.			
							22				
							24	Operation stopped at 21.4m as instruction given			
							26				
							28				
							30				
							32				
							34				
							36				
							38				
							40				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
–: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House 2nd Floor, 12 Harcourt Road, HONG KONG.
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CT 2 Sheet 1 of 1

Client/Consultant ATS
Job No./Tender No. 836
Location LAMMA ISLAND POWER STATION
Ex. Ground Level/Sea Bed Level +43 m P.D.
Coordinates N 8983 E 29050

Orientation VERTICAL
Method ROTARY
Machine DCP
Core Barrel TM/L Flushing Medium WATER
Date From 26-3-80 To 29-3-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
26-3-80						4"					
								Brown SANDY SILT with GRANITE BOULDERS. (FILL)		59	13
							1.52				
							1.83			97	0
27-3-80							2.44			98	71
							2.74				
							3.23			73	47
						3.96	3.96			70	33
						106	4	Brown SILTY SAND with GRAVELS. (FILL)			
	5.18		(2/2)	S			5.18				
							5.49			97	0
						5.92	5.92			0	0
							6	Grey, greenish grey & pink, Medium grained, Moderately widely to closely spaced joints. GRANITE. Slightly weathered to fresh.		98	37
							6.45				
							7.46			91	41
							8				
							8.13			92	0
							8.92			99	50
							9.91			100	92
29-3-80							10				
							10.85			100	94
							11.46			100	56
							12	Operation stopped at 11.46m as instructed.			
							14				
							16				
							18				
							20				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
—: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
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Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CH7 Sheet 1 of 1

Client/Consultant ATS
Job No./Tender No. 836
Location LAMMA ISLAND POWER STATION.
Ex. Ground Level/Sea Bed Level +6.6 m P.D.
Coordinates N 8996 E 29109

Orientation VERTICAL
Method ROTARY
Machine D8D
Core Barrel 76/101 Flushing Medium WATER
Date From 22-3-80 To 25-3-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
22-3-1980						100	0.74	Brown SANDY SILT with BOULDERS (FILL)		100	0
							1.75	Grey, pink & dark grey, coarse grained. Moderately widely to closely spaced joints. GRANITE slight weathered to fresh.		99	71
							2			95	83
						2.97	2.97			92	100
23-3-1980							3.45	Grey, pink & dark grey, coarse grained, closely to very closely spaced joints GRANITE. Slightly weathered to fresh.		99	13
							4				
							4.17			100	35
							5.03			100	0
							5.67				
							6	Grey, pink & dark grey, coarse grained. Moderately widely to closely spaced joints GRANITE. Slightly weathered.		100	71
							6.98			100	66
							7.24			100	66
							8			100	0
							8.03			100	13
25-3-1980							8.53	Pinkish grey & grey fine grained. Moderately widely to closely spaced joints GRANITE Slightly weathered.		100	0
							9.50			100	0
							9.93				
							10.51				
							12	Grey, pink & dark grey, coarse grained. closely spaced joints GRANITE. Slightly weathered.			
							14	Brownish grey, pink & dark grey coarse grained. closely spaced joints GRANITE. Moderately weathered.			
							16				
							18	Operation stopped at 10.5m as instructed.			
							20				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ):N Value/305 mm.
—: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

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CIVIL ENGINEERS & CONTRACTORS
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REPORT ON DRILLHOLE/BOREHOLE No. CT29 Sheet 1 of 1

Client/Consultant ATS
Job No./Tender No. E36
Location LAMMA POWER STATION
Ex. Ground Level/Sea Bed Level +4.2 m P.D.
Coordinates N 8944 E 08797

Orientation VERTICAL
Method ROTARY
Machine D25
Core Barrel TWIN Flushing Medium WATER
Date From 2-5-80 To 7-5-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
2-5-1980						NX	2	Brown & grey silty sand (FILL)			
							4				
							6				
							8				
							8.99				
							9.59	BOULDERS (FILL)		100	0
							9.00	Brown sand silt (FILL)			
							9.23	BOULDERS (FILL)		100	0
							9.59	Brown & grey silt sand (FILL)			
5-5-80							10.0	Brown sandy silt with gravels			
								Brown & grey silty sand (FILL)			
7-5-80						11.80m	11.90				
							12	Operation stopped at 11.80m as instructed			
							14				
							18				
							20				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
–: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

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REPORT ON DRILLHOLE/BOREHOLE No. CT30 Sheet 1 of 1

Client/Consultant ATS
Job No./Tender No. R36
Location LAMMA POWER STATION
Ex. Ground Level/Sea Bed Level +3.8 m P.D.
Coordinates N 8909 E 28996

Orientation VERTICAL
Method ROTARY
Machine SH2
Core Barrel ____ Flushing Medium WATER
Date From 2-5-80 To 7-5-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
2-5-80						PX	2				
3-5-1980							4	Brown & grey silty sand (FILL)			
6-5-1980							6				
							8				
							10				
						10.67/106	12				
						12.83	12.83				
							14	Operation stopped at 12.83m as instructed			
							18				
							20				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
—: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

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REPORT ON DRILLHOLE/BOREHOLE No. CT 31 Sheet 1 of 3

Client/Consultant ATS
Job No./Tender No. E 36
Location LAMMA POWER STATION.
Ex. Ground Level/Sea Bed Level +3.7 m P.D.
Coordinates N 8900 E 28997

Orientation VERTICAL
Method ROTARY
Machine D 69
Core Barrel TWN Flushing Medium WATER
Date From 9-5-80 To 15-5-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
9-5-1980						PX	2 4 6 8 10 12	Brown & grey fine SAND (FILL)			
10-5-1980							12.19 14	Dark grey SILTY SAND (MARINE DEPOSIT)			
12-5-1980						17.37/106	17.37 18 20	Brown SANDY SILT			

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
–: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG.
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CT31 Sheet 2 of 3

Client/Consultant ATS
Job No./Tender No. 856
Location LAMMA POWER STATION
Ex. Ground Level/Sea Bed Level +3.7 m P.D.
Coordinates N 8900 E 28997

Orientation VERTICAL
Method ROTARY
Machine D69
Core Barrel TWW Flushing Medium WATER
Date From 9-5-90 To 15-5-90

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
12-5-90						106					
							22				
							24				
							26	Brown SANDY SILT			
							28				
13-5-1990							30				
							32				
							34	Brown SANDY SILT with GRAVELS			
							36				
14-5-90						38.0 NX	38.0	Grey, brown & pink, fine grained. Very closely spaced joints GRANITE. Slightly weathered.		100	0
							38.71			99	0
15.5.90						40.0	39.62 40			92	0

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
–: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG.
Tel: 5 265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CT31 Sheet 3 of 3

Client/Consultant ATS
Job No./Tender No. 836
Location LAMMA POWER STATION.
Ex. Ground Level/Sea Bed Level +3.7 m P.D.
Coordinates N 8900 E 28997

Orientation VERTICAL
Method ROTARY
Machine D66
Core Barrel TWN Flushing Medium WATER
Date From 8-5-80 To 15-5-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
15.5.80						NX 40.57	40.57	Grey, brown & pink, fine grained closely spaced joints GRANITE. Slightly weathered		100	0
							42				
							44	Operation stopped at 40.57m as instructed			
							46				
							48				
							50				
							52				
							54				
							56				
							58				
							60				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sample.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
—: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

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REPORT ON DRILLHOLE/BOREHOLE No. CT32 Sheet 1 of 1

Client/Consultant ATS
Job No./Tender No. 636
Location LAMMA POWER STATION
Ex. Ground Level/Sea Bed Level +4.1 m P.D.
Coordinates N 8952 E 28993

Orientation VERTICAL
Method ROTARY
Machine D 25
Core Barrel TNW Flushing Medium WATER
Date From 12-5-80 To 12-5-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
12-5-80						5X	0.30			91	0
							0.55			26	0
						1.0 PX	1.0			90	0
							1.25			91	0
							1.55			82	0
13-5-80							2.0	GRANITE BOULDERS (FILL)		72	0
							2.52			90	6
							2.70			32	0
							2.85			27	0
14-5-80							3.30			91	0
							4			28	0
						WX	4.15				
							4.70			70	0
							5.00				
							5.56			87	0
15-5-1980							5.70 6	Brown SANDY SILT with GRANITE BOULDERS (FILL) ?			
							7.01			57	0
							7.20			83	0
							7.30				
							7.85				
16-5-80							7.80			50	0
							8.10				
						8.66	8.55	Brown SANDY SILT.			
							9.21	Grey, pink & greenish grey. Medium grained, closely spaced joints GRANITE slightly weathered		92	56
							9.67			90	38
							10			92	57
							10.91			97	51
17-5-1980							11.51	Grey, pink & greenish grey. Medium grained, Moderately widely to closely spaced joints GRANITE slightly weathered		98	76
							12				
18.5.80							12.36			88	52
							12.69	Operation stopped at 12.69m as instructed.			
							14				
							16				
							18				
							20				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ):N Value/305 mm.
—: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG.
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REPORT ON DRILLHOLE/BOREHOLE No. CT42 Sheet 1 of 2

Client/Consultant A.T.S.
Job No./~~Tender No.~~ 436
Location LAMMA ISLAND POWER STATION
Ex. Ground Level/~~Sea Bed Level~~ +4.1 m P.D.
Coordinates N 8811 E 29088

Orientation VERTICAL
Method ROTARY
Machine D69
Core Barrel TNW Flushing Medium WATER
Date From 24-7-80 To 28-7-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.	DEPTH (m)
24-7-80						106mm	2					
							4			78	0	
							6	BROKEN BOULDERS WITH SOIL		75	0	4.57
							8			80	0	6.10
							10			70	0	9.45
25-7-80							12	(FILL)		60	0	10.67
							14					12.19
							16			45	0	
26/7	19.20	1		Ws.			18	DARK GREY, CLAYEY SILTY SAND. (MARINE DEPOSITE)				19.20
							20					

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
–: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CT42 Sheet 2 of 2

Client/Consultant A.T.S. Orientation VERTICAC
Job No./~~Tender~~ No. 436 Method ROTARY
Location LAMMA ISLAND POWER STATION Machine D69
Ex. Ground Level/~~Sea Bed Level~~ +4.1 m P.D. Core Barrel TNW Flushing Medium WATER
Coordinates N 8811 E 29088 Date From 24-7-80 To 28-7-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.	Depth (m)
26-7-80						106mm	22	DARK GREY, CLAYEY SILTY SAND.				
	25.91	2		Ws.			24					
	26.82	3		Ws.			26	(MARINE DEPOSITE)				
							28	BOULDER		100	100	27.51 27.81
	29.00	4	(54)	S.D.				GREYISH BROWN, SILTY COARSE SAND. (C.W.G.)				
	30.50	5	(54)	S.D.			30					
28-7-80							32	GREYISH BROWN AND PINKISH GREY WITH BLACK SPOTS, COARSE GRAINED, CLOSELY SPACED JOINTS, SLIGHTLY WEATHERED GRANITE.		100 100 100 100 100 100	50 0 0 70 75 70	31.39 32.00 32.31 32.92 33.64 35.17 35.83
							34					
							36					
							36.83			100	72	
							38	OPERATION STOPPED AT 36.83 m AS INSTRUCTED.				
							40					

U: Undisturbed Sample. S: S.P.T.
L: Liner Sample ( ): N Value/305 mm.
M: Mazier Sample —: Hole Depth
P: Piston Sample Ws: Washed Sample
D: Disturbed Sampe. W: Water Sample.
(A numerical figure after a symbol designates the size of sample in mm)

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
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REPORT ON DRILLHOLE/BOREHOLE No. CT46 Sheet 1 of 3

~~Client~~/Consultant A.T.S.
Job No./Tender No. 436
Location LAMMA ISLAND POWER STATION
Ex. Ground Level/~~Sea Bed Level~~ +4.2 m P.D.
Coordinates N 8774 E 29075

Orientation VERTICAL
Method ROTARY
Machine D69
Core Barrel TNW Flushing Medium WATER
Date From 17-7-80 To 23-7-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.	DEPTH (m)
17-7-80						106mm	1.52			85	0	1.52
18-7-80							10.67	BROKEN BOULDERS WITH SOIL (FILL)		78	0	10.67
19-7-80							19.81			60	0	19.81
										70	0	
										75	0	

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
--: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CT46 Sheet 2 of 3

~~Client~~/Consultant A.T.S. Orientation VERTICAL
Job No./~~Tender No.~~ 436 Method ROTARY
Location LAMMA ISLAND POWER STATION Machine D69
Ex. Ground Level/~~Sea Bed Level~~ +4.2 m P.D. Core Barrel TNW Flushing Medium WATER
Coordinates N 8774 E 29075 Date From 17-7-80 To 23-7-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.	DEPTH (m)
19-7-80						106mm	22			75	0	
							22.86	BROKEN BOULDERS WITH SOIL (FILL)				22.86
							24					
							26			80	0	
							28					
							30					30.00
21-7-80	30.50	1		Ws.			32	DARK GREY, CLAYEY SILTY SAND. (MARINE DEPOSITE)				
							34					
							36					
							38					
							40					

U: Undisturbed Sample. S: S.P.T.
L: Liner Sample ( ): N Value/305 mm.
M: Mazier Sample —: Hole Depth
P: Piston Sample Ws: Washed Sample
D: Disturbed Sampe. W: Water Sample.
(A numerical figure after a symbol designates the size of sample in mm)

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG.
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON ~~DRILLHOLE~~/BOREHOLE No. CT46 Sheet 3 of 3.

~~Client~~/Consultant A.T.S. Orientation VERTICAL
Job No./~~Tender No.~~ 436 Method ROTARY
Location LAMMA ISLAND POWER STATION Machine D69
Ex. Ground Level/~~Sea Bed Level~~ +4.2 m P.D. Core Barrel TNW Flushing Medium WATER
Coordinates N 8774 E 29075 Date From 17-7-80 To 23-7-80

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.	DEPTH (m)
22-7-80						106mm	42	GREYISH BROWN SILTY COARSE SAND.				
	42.50	2		Ws.			44					
							46					
							47.85	(C. W. G.)				
							48	GREYISH BROWN, COARSE GRAINED WEATHERED GRANITE BOULDER.		100	0	47.85
										100	0	48.21
							48.92			100	0	48.67
												48.92
							50	GREYISH BROWN, SILTY COARSE SAND. (M. W. G.)				
							50.83					50.83
23-7-80							52	BROWN AND GREYISH PINK, COARSE GRAINED, slightly fractured, VERY closely SPACED JOINTS. MODERATELY WEATHERED GRANITE.		100	0	51.36
										100	80	51.82
										100	0	52.43
										100	0	52.73
							54			100	0	53.34
										100	0	53.95
										100	0	54.51
										100	0	
							55.91			100	0	55.91
							58	OPERATION STOPPED AT 55.91 m AS INSTRUCTED.				
							60					

U: Undisturbed Sample. S: S.P.T.
L: Liner Sample ( ): N Value/305 mm.
M: Mazier Sample —: Hole Depth
P: Piston Sample Ws: Washed Sample
D: Disturbed Sampe. W: Water Sample.
(A numerical figure after a symbol designates the size of sample in mm)

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG.
Tel. 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CT 47 Sheet 1 of 2

Client/Consultant ATS
Job No./Tender No. 236
Location LANTAU CANCA STATION
Ex. Ground Level/Sea Bed Level +4.3 m P.D.
Coordinates N 8864 E 29087

Orientation VERTICAL
Method ROTARY
Machine 068
Core Barrel TWN Flushing Medium WATER
Date From 10.7.90 To 16.7.90

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
10.7.1990						106	2	Brown SANDY SILT with BOULDERS. (FILL)			
11.7.1990	9.50	7006	(26)	50			4				
	11.00	7007	(26)	50			6				
							8.0				
12.7.1990						12.0 HX	10	Brown SANDY SILT (CONTAINING WEATHERED GRANITE)			
							12				
							14				
							16				
13.7.1990							18				
						20.0	20				

U: Undisturbed Sample.
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sampe.
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
—: Hole Depth
Ws: Washed Sample
W: Water Sample.

Remarks : -

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
Gammon House, 2nd Floor, 12 Harcourt Road, HONG KONG
Tel: 5-265221 Cables: GAMMONCO Telex: HX73826

REPORT ON DRILLHOLE/BOREHOLE No. CZ47 Sheet 2 of 2

Client/Consultant SPS
Job No./Tender No. 826
Location CHAIWAN POWER STATION
Ex. Ground Level/Sea Bed Level +4.3 m P.D.
Coordinates N 8864 E 29087

Orientation VERTICAL
Method ROTARY
Machine XCP
Core Barrel TRIPLE Flushing Medium WATER
Date From 10.2.90 To 16.2.90

Progress	Sample Depth (m)	Sample No.	Sample Blows/305 mm	Sample Type	Water Level	Depth (m) Casing Size	Depth (m)	Description of Strata	Symbolic Log	Core Rec'y (%)	R.Q.D.
15-2-1990						NX		Brown sandy silt (completely weathered granite)			
							21.81				
							22	Greenish grey & light pink, fine grained, closely spaced joints granite. Highly weathered.		96	41
							22.38			91	21
							22.81				
							24			96	27
							24.23				
							24.84			91	0
16-2-1990							25.35			93	0
							25.65			93	0
							26			96	0
							26.37				
										97	30
							27.56				
							28	Operation stopped at 27.56m as instructed.			
							30				
							32				
							34				
							36				
							38				
							40				

U Undisturbed Sample. S: S.P.T.
L: Liner Sample ( ): N Value/305 mm.
M: Mazier Sample —: Hole Depth
P Piston Sample Ws: Washed Sample
D: Disturbed Sampe. W: Water Sample.
(A numerical figure after a symbol designates the size of sample in mm)

Remarks : -

ANNEX G RISK-BASED REMEDIATION GOALS (RBRGS) CRITERIA

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.