

E(7S) 44

Application No. :
Reference No. :
(For official use)

FORM 5

ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE
(CHAPTER 499)
SECTION 13(1)

Application for Variation of an Environmental Permit

PART A PREVIOUS APPLICATIONS

- ☐ No previous application for variation of an environmental permit.
- ☒ The environmental permit was previously amended.

Application No. : FEP-217/2023

PART B DETAILS OF APPLICANT

B1. Name : (person or company)

China Harbour Engineering Company Limited

[Note : In accordance with section 13(1) of the Ordinance, the person holding an environmental permit or a person who assumes responsibility for the designated project may apply for variation of the environmental permit.]

B2. Business Registration No. :

(if applicable)

B3. Correspondence Address :

B4. Name of Contact Person :

B5. Position of Contact Person :

B6. Telephone No. :

B7. Fax No. :

B8. E-mail Address : (if any)

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :

China Harbour Engineering Company Limited

C2. Application No. of the Current Environmental Permit : FEP-217/2023

C3. The Current Environmental Permit was Issued in : month / year

05 / 2023

Important Notes : Please submit the application together with

- (a) 3 copies of this completed form; and
- (b) appropriate fee as stipulated in the Environmental Impact Assessment (Fees) Regulation
- to the Environmental Protection Department at the following address :
- The EIA Ordinance Register Office,
27th floor, Southorn Centre, 130 Hennessy Road,
Wan Chai, Hong Kong.

☐ Tick (✓) the appropriate box



PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1. Condition(s) in the Current Environmental Permit :	D2. Proposed Variation(s) :	D3. Reason for Variation(s) :	D4. Describe the environmental changes arising from the proposed variation(s) :	D5. Describe how the environment and the community might be affected by the proposed variation(s) :	D6. Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7. Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
Under Part B (Descriptions of Designated Project), Scale and Scope of Designated Project: The Project involves the operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of 600 m3 per day	Under Part B (Descriptions of Designated Project), Scale and Scope of Designated Project: The Project involves the construction and operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of 900 m3 per day.	Need: The grease trap waste treatment facility (GTWTF) needs to be upgraded with a greater handling capacity in order to meet the increasing grease trap waste (GTW) generation. Benefits (Refer to Section 2.2 of Environmental Review Report (ERR) for details): - The enhanced GTWTF will help reduce and divert solid waste from entering landfill. - All the existing diesel fuel hot water boilers will be replaced with new electric hot water boilers, reducing potential air quality impacts. - One of the existing air scrubbers will be upgraded with enhanced removal efficiency to reduce the odour impact emitted by the unit.	No adverse environmental impacts are anticipated from the proposed variation. For details refer to Sections 3 to 8 of ERR.	The proposed variation would not adversely affect the environment and community. For details refer to Sections 3 to 8 of ERR.	The environmental performance requirements set out in the Project Profile PP-271/2005 would not be affected by the proposed variation. Please refer to ERR for details.	The ERR demonstrated that there is no material change to the environmental impact of the project with the implementation of the recommended mitigation measures in the Project Profile (PP-271/2005). No additional mitigation measure is required.

PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1. Condition(s) in the Current Environmental Permit :	D2. Proposed Variation(s) :	D3. Reason for Variation(s) :	D4. Describe the environmental changes arising from the proposed variation(s) :	D5. Describe how the environment and the community might be affected by the proposed variation(s) :	D6. Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7. Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
Part B (Descriptions of Designated Project), Nature of Designated Project. Condition 1.4, 1.6, 1.7, 1.12, 1.13, Note 6, Note 7	Revise the text to also include construction of the GTWTF in the conditions.	The grease trap waste treatment facility (GTWTF) needs to be upgraded with a greater handling capacity in order to meet the increasing grease trap waste (GTW) generation.	No adverse environmental impacts are anticipated from the proposed variation. For details refer to Sections 3 to 8 of ERR.	The proposed variation would not adversely affect the environment and community. For details refer to Sections 3 to 8 of ERR.	The environmental performance requirements set out in the Project Profile PP-271/2005 would not be affected by the proposed variation. Please refer to ERR for details.	The ERR demonstrated that there is no material change to the environmental impact of the project with the implementation of the recommended mitigation measures in the Project Profile (PP-271/2005). No additional mitigation measure is required.

PART E DECLARATION BY APPLICANT

E1. I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental permit may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.

[Redacted Signature and Name Area]

Signature of Applicant

Full Name in Block Letters

Position



on behalf of

China Harbour Engineering Company Limited

Company Name and Chop (as appropriate)

8th June 2026

Date

NOTES :

1. A person who constructs or operates a designated project in Part I of Schedule 2 of the Ordinance or decommissions a designated project listed in Part II of Schedule 2 of the Ordinance without an environmental permit or contrary to the permit conditions commits an offence under the Ordinance and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.
2. A person for whom a designated project is constructed, operated or decommissioned and who permits the carrying out of the designated project in contravention of the Ordinance commits an offence and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.

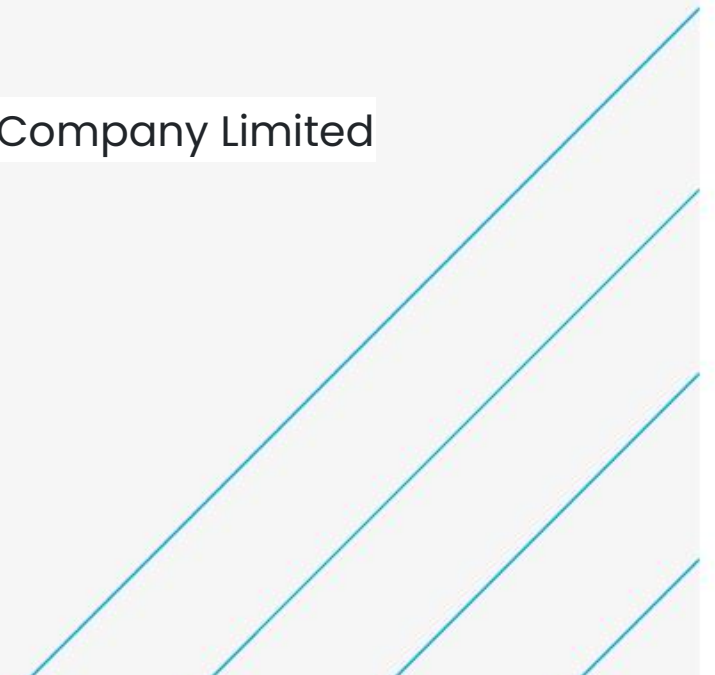


West Kowloon Transfer Station - Grease Trap Waste Treatment Facility

Environmental Review Report (ERR) for
Application for Variation to the Environmental
Permit

China Harbour Engineering Company Limited

June 2026



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1. Introduction

1.1. Project Background

- 1.1.1. The West Kowloon Transfer Station (WKTS) of the Environmental Protection Department (EPD) receives and handles municipal solid waste (MSW) before it is transferred to the West New Territories (WENT) Landfill for disposal. The WKTS was an Exempted Designated Project under the Environmental Impact Assessment Ordinance (EIAO) since it was developed prior to the enactment of the EIAO in 1998.
- 1.1.2. In 2005, the Environmental Infrastructure Division (EID) of EPD proposed to include a grease trap waste treatment facility (GTWTF) at the WKTS for receiving grease trap waste (GTW) from restaurants and food processing establishments for further treatment and recycling. As the additional GTWTF within WKTS would represent a material change to an Exempted Designated Project under the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), an application for an Environmental Permit (EP) was submitted to construct and operate the proposed GTWTF.
- 1.1.3. The scope of the project and its potential environmental impacts were described in the associated Project Profile (Register No. PP-271/2005), the application for directly for permission to apply for the EP was submitted under Application No. DIR-133/2005), and the EP (EP No. EP-247/2006) was subsequently obtained in 2006. The design capacity of the GTWTF indicated in the Project Profile was 400 m³ per day.
- 1.1.4. Since the GTWTF was commissioned in 2008, two separate Variation of an Environmental Permit (VEP) applications and Environmental Review Reports (ERRs) have been submitted to EPD for the proposal to increase the GTWTF throughput capacity to 500 m³ per day and then to 600 m³ per day (VEP application No. VEP-501/2016 and VEP application No. VEP-571/2019). The two VEPs were subsequently granted with EP No. FEP-01/247/2006/A issued in 2016 and EP No. FEP-01/247/2006/B (the current EP) issued in 2019 respectively.
- 1.1.5. The trend of the volume of GTW received by the GTWTF is increasing in recent years, whilst the GTWTF facilities are ageing. In order to meet the expected increasing GTW generation, improvement works are being proposed to upgrade the GTWTF by installing a new GTWTF with an increased throughput capacity to 900 m³ per day in a new dedicated building (hereinafter referred to as “the Project”).
- 1.1.6. Refer to **Figure 1.1** for the existing location plan of the WKTS before the proposed upgrade and **Figure 1.2** for the location plan after the proposed upgrade of the Project.

1.2. Purpose of this Environmental Review

- 1.2.1. The purpose of this ERR is to review the potential environmental impacts arising from the proposed upgrading works and demonstrate that the Project would not constitute a material change to the environmental impact of the GTWTF, in accordance with Section 6.2 of the EIAO-TM.

2. Project Description

2.1. Proposed Scope of Works

- 2.1.1. The GTW received at GTWTF is treated by various processes and facilities, comprising screening, sand grit trap, sedimentation, dissolved air flotation (DAF) and centrifuge units. The primary objective is to recover the oil and fat fraction present in the grease trap waste. Two fat products are produced during the process, namely Concentrated Fat (also referred as Pre-treated GTW) and Recycled Fat (also referred as GTW Recycled Product). They are suitable for various usages such as a potential material or additive for energy resources, biodiesel or other industrial and/or manufacturing process.
- 2.1.2. In order to upgrade the handling capacity of GTW and to improve the GTWTF treatment performance, a new GTWTF housed inside a new Transfer Building B (TBB) is proposed to feature all new operational equipment. The existing GTWTF equipment, housed inside the existing Transfer Building A (TBA), shall be decommissioned and dismantled after the commissioning of the new GTWTF in TBB.
- 2.1.3. The detailed proposed provision of the new GTWTF include the following items:
- Decommissioning and dismantling of all existing GTWTF equipment at the 1/F of the existing TBA;
 - Demolition of existing administration building, maintenance workshop building, open vehicle maintenance areas and storage areas;
 - Construction of new TBB with elevated walkway connecting to TBA;
 - Installation of GTW treatment equipment within TBB to increase the average handling capacity from 600 to 900 m³ per day;
 - Separating Refuse Collection Vehicle (RCV) and GTW tanker traffic at WKTS to reduce queuing time (individual weighbridge will be provided at each unloading bay for GTW tankers); and
 - Installation of two new air scrubber units at TBB in addition to the existing five scrubber units at TBA (which will not be demolished as part of the GTWTF decommissioning work within TBA).
- 2.1.4. The existing location plan of WKTS including the current GTWTF at TBA is shown in **Figure 1.1**, whilst the location plan after the proposed upgrade with the new TBB is shown in **Figure 1.2**. Refer to **Figure 2.1** for details of the proposed decommissioning and construction works, and **Figure 3.2-3.3** for the existing and proposed air scrubber units. Preliminary floor layout plans of GTWTF are provided in **Appendix A** and the proposed waste collection vehicle traffic routes are shown in **Appendix B**.
- 2.1.5. The operational hours for receiving grease trap waste will be maintained as 7:30 am – 8:00 pm throughout the year. The operational hours will be extended to 24 hours for emergency situations on a case-by-case basis as determined by the WKTS operator, such as fire outbreaks, injuries, extreme weather conditions, blockades and the like.

- 2.1.6. The proposed GTWTF will focus on improving GTWTF performance in relation to namely Concentrated Fat (also referred as Pre-treated GTW) and Recycled Fat (also referred as GTW Recycled Product) production, by reducing water content of the GTW and enhancing oil, water and waste solids separation effectiveness and by increasing the grease processing stream throughput capacity.
- 2.1.7. **Figure 2.2** shows the proposed Process Flow Diagram (PFD) for the new GTWTF. As shown in the figure, the new quantities / throughput rates are based on a combination of the anticipated improvements due to the proposed equipment re-provision and the recorded operational parameters of the existing GTWTF.
- 2.1.8. As a result of the provision of a new GTWTF outlined above, the handling capacity of new GTWTF can be enhanced to 900 m³ per day on average (equal to approx. 900 tonnes per day (tpd), for GTW Specific Gravity of around 1.0 tonne per m³).
- 2.1.9. The tentative implementation programme for the GTWTF is provided below in **Table 2-1** below.

Table 2-1 Project Implementation Programme

Task	Tentative timeframe
Design Stage	Q2 2023 to Q4 2025
Construction Stage	Q2 2026 to Q4 2028
Testing and Commission	Q4 2028
Operation Commencement:	Q4 2028

2.2. Needs and Benefits of the Proposed Change

- 2.2.1. With reference to the operational historical records, the volume of grease trap waste received by the GTWTF shows both a weekly and yearly patterns. Typically, the volume received during Monday – Saturday is higher than that received on Sundays. The volume received is also higher in weeks or months coinciding with festivals. The operation of the GTWTF's component equipment is therefore required to cope with the fluctuating pattern of grease trap waste volume.
- 2.2.2. The volume of GTW received by the GTWTF is also increasing in recent years whilst the GTWTF facilities are ageing. If the handling capacity of GTWTF is not enhanced, the extra GTW generated in Hong Kong might not be disposed of properly. Some GTW might thus ended up being discharged illegally without treatment, which would create a significant adverse environmental impact.
- 2.2.3. In order to meet the expected increasing GTW generation and fluctuating demand, further improvement is required. It is proposed to upgrade the GTWTF with a greater GTW handling capacity of 900 m³ per day. Provision of the new GTW treatment equipment would enhance operational efficiency and environmental performance, thereby improving the overall reliability of the GTWTF.

2.2.4. Provision of new GTW treatment equipment will improve facility operability and treatment reliability, enhancing fat / water separation in the GTWTF to generate more recycled fat product and further reduce/divert solid waste from being disposed at landfill.

2.2.5. In terms of air quality, all the existing diesel fuel hot water boilers will be replaced with new electric hot water boilers, which would also reduce potential localized air quality impacts that might arise. Furthermore, the proposed GTWTF upgrade would upgrade an existing air scrubber (unit DO3) from the current one-stage design only capable of treating Hydrogen Sulphide (H_2S) to a two-stage design capable of removing both H_2S and ammonia (NH_3), thereby reducing the odour impact due to the scrubber unit.

2.3. Proposed Variation to the Existing EP

2.3.1. The proposed variation items for the current Environmental Permit (FEP-02/247/2006/B) are listed in **Table 2-2** below. The changes are underlined in bold.

Table 2-2 Proposed Variation Item in EP

EP Condition	Conditions in the current Environmental Permit FEP-02/247/2006/B	Proposed Variation
Part B (Descriptions of Designated Project), Nature of Designated Project:	Operate a grease trap waste treatment facility within West Kowloon Transfer station.	<u>Construct and</u> operate a grease trap waste treatment facility within West Kowloon Transfer station.
Part B (Descriptions of Designated Project), Scale and Scope of Designated Project:	“The Project involves the operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of 600 m ³ per day.	The Project involves the <u>construction and</u> operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of <u>900 m³</u> per day.
Condition 1.4	The Permit Holder shall give a copy of this Permit to the person(s) in charge of the site(s) and ensure that such person(s) fully understands all conditions and all requirements incorporated by the Permit. The site(s) refers to site(s) of operation of the Project and shall mean the same hereafter.	The Permit Holder shall give a copy of this Permit to the person(s) in charge of the site(s) and ensure that such person(s) fully understands all conditions and all requirements incorporated by the Permit. The site(s) refers to site(s) of <u>construction and/or</u> operation of the Project(s) and shall mean the same hereafter.
Condition 1.6	The Permit Holder shall operate the Project in accordance with the project descriptions in Part B of this Permit.	The Permit Holder shall <u>construct and</u> operate the Project in accordance with the project description in Part B of this Permit.
Condition 1.7	The Permit Holder shall ensure that the Project is designed and operated in accordance with the information and recommendations described in the Project Profile (Register No.: PP-271/2005), the application documents for environmental permits, other relevant documents in the Register, the information or mitigation measures described in this Permit, mitigation measures to be recommended in submissions that shall be deposited with or approved by the Director	The Permit Holder shall ensure that the Project is designed, <u>constructed</u> and operated in accordance with the information and recommendations described in the Project Profile (Register No.: PP-271/2005); the application documents for environmental permits, other relevant documents in the Register, the information <u>and</u> mitigation measures described in this Permit, mitigation measures to be recommended in submissions that shall be deposited with or approved

EP Condition	Conditions in the current Environmental Permit FEP-02/247/2006/B	Proposed Variation
	as a result of permit conditions contained in this Permit, and mitigation measures to be recommended under on going surveillance and monitoring activities during all stages of the Project. Where recommendations referred to in the documents of the Register are not expressly referred to in this Permit, such recommendations are nevertheless to be implemented unless expressly excluded in this Permit or otherwise agreed by the Director.	by the Director as a result of permit conditions contained in this Permit, and mitigation measures to be recommended under on going surveillance and monitoring activities during all stages of the Project. Where recommendations referred to in the <u>application</u> documents of the Register are not expressly referred to in this Permit, such recommendations are nevertheless to be implemented unless expressly excluded in this Permit or otherwise agreed by the Director.
Condition 1.12	The Permit Holder shall notify the Director in writing the commencement date of operation of the Project no later than one week prior to the commencement of operation of the Project. The Permit Holder shall notify the Director in writing immediately if there is any change of the commencement date of the operation.	The Permit Holder shall notify the Director in writing the commencement date of <u>construction</u> of the Project no later than one week prior to the commencement of <u>construction</u> of the Project. The Permit Holder shall notify the Director in writing immediately if there is any change of the commencement date of the <u>construction</u> .
Condition 1.13	For the purpose of this Permit, “commencement of operation” does not include works related to site clearance and preparation or other works as agreed by the Director.	For the purpose of this Permit, “commencement of <u>construction</u> ” does not include works related to site clearance and preparation or other works as agreed by the Director.
Notes 6	If this Permit is cancelled or surrendered during operation of the Project, another environmental permit must be obtained under the EIAO before the Project could be continued. It is an offence under Section 26(1) of the EIAO to operate a designated project listed in Schedule 2 of the EIAO without a valid environmental permit.	If this Permit is cancelled or surrendered during <u>construction or</u> operation of the Project, another environmental permit must be obtained under the EIAO before the Project could be continued. It is an offence under Section 26(1) of the EIAO to <u>construct or</u> operate a designated project listed in Schedule 2 of the EIAO without a valid environmental permit.
Notes 7	Any person who operates the Project contrary to the conditions in the Permit, and is convicted of an offence under the EIAO, is liable:	Any person who <u>constructs or</u> operates the Project contrary to the conditions in the Permit, and is convicted of an offence under the EIAO, is liable :

2.4. Potential Interfacing Projects

2.4.1. The potential interfacing project(s) in the vicinity of the proposed development are identified below:

- Foundation Works for Proposed Logistics Development at Kwai Chung (KCTL No.531))

2.4.2. The proposed logistics development is located approximately 230m northwest of the Project Site, as shown in **Figure 3.1**. The construction period of the potentially interfacing project is from 2024 to 2027¹. As the construction period of the proposed improvement works of the GTWTF at the WKTS is from 2025 to 2026, the proposed logistics development is considered a concurrent project. The concurrent project will be qualitatively assessed in the cumulative construction phase impact assessment for air quality and noise in **Section 3.3.12** and **4.1.2** respectively.

2.5. Potential Environmental Impacts

2.5.1. This report reviews whether the proposed GTWTF throughput capacity upgrades at WKTS will result in any environmental changes from the current Environmental Permit (EP No. FEP 02/247/2006/B). The potential environmental impacts are listed in **Table 2-3** below. Detailed discussions are shown in the subsequent sections.

Table 2-3 List of Potential Environmental Issues

Environmental Issues	Potential Issues
Air Quality	Yes
Noise	No
Water Quality	Yes
Waste Management	Yes
Ecology	No
Landscape and Visual	No
Landfill Gas Hazard	No
Land Contamination	Yes

¹ <https://www.chinachemgroup.com/en/news/news-centre/2022/chinachem-and-esr-form-jv-to-develop-prime-cold-storage-and-logistics-facility-in-hong-kong/>

3. Air Quality

3.1. Environmental Legislation, Standards and Guidelines

3.1.1. The relevant legislation, standards and guidelines applicable to the present study for the assessment of air quality impacts include:

- Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM);
- Air Pollution Control Ordinance (APCO) CAP 311;
- Air Pollution Control (Construction Dust) Regulation;
- Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation;
- Air Pollution Control (Fuel Restriction) Regulations;
- Air Pollution Control (Smoke) Regulations;
- Recommended Pollution Control Clauses for Construction Contracts;
- Development Bureau (DEVB) TC No.13/2020, Timely Application of Temporary Electricity and Water Supply for Public Works Contracts and Wider Use of Electric Vehicles in Public Works Contracts; and
- DEVB TC No.1/2015, Emissions Control of NRMM in Capital Works Contracts of Public Works.

3.1.2. The APCO provides a statutory framework for establishing the Air Quality Objectives (AQOs) and stipulating the anti-pollution requirements for air pollution sources. The AQOs stipulate concentration for a range of pollutants, amongst which carbon monoxide (CO), fine suspended particulates (FSP), respirable suspended particulates (RSP), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂) are relevant to this study. The prevailing AQOs have been effective since 11 April 2025.

3.1.3. According to paragraph 12 of the Air Pollution Control (Amendment) Bill 2024 that was passed on 19 March 2025, *“a 36-month transitional period, beginning on the commencement date of the Bill after it is enacted, will be provided to designated projects (“DPs”) with environmental permits (“EPs”) issued under the Environmental Impact Assessment Ordinance (Cap. 499) (“EIAO”) before the updated AQOs come into effect. During the transitional period, the pre-updated AQOs continue to apply to VEP applications.”* Since the current EP for WKTS (No. FEP-02/247/2006/B) was approved in 2023, which is within the 36-month transitional period, the pre-updated AQOs would continue to apply to this VEP application. Refer to **Table 3-1** below for both the pre-updated and prevailing AQOs.

Table 3-1 Prevailing and Proposed Hong Kong Air Quality Objectives

Pollutant	Averaging Time	Pre-updated AQOs (Effective until 10 April 2025)		Prevailing AQOs (Effective since 11 April 2025)	
		Concentration Limit (µg/m ³) ^[1]	Number of Exceedances Allowed per	Concentration Limit (µg/m ³) ^[1]	Number of Exceedances Allowed per

			calendar Year		calendar year
Sulphur Dioxide (SO ₂)	10-minute	500	3	500	3
	24-hour	50	3	40	3
Respirable Suspended Particulates (RSP) ^[2]	24-hour	100	9	75	9
	Annual	50	N/A	30	N/A
Fine Suspended Particulates (FSP) ^[3]	24-hour	50	18 ^[4]	37.5	18
	Annual	25	N/A	15	N/A
Nitrogen Dioxide (NO ₂)	1-hour	200	18	200	18
	24-hour	-	-	120	9
	Annual	40	N/A	40	N/A
Ozone (O ₃)	8-hour	160	9	160	9
	Peak Season	-	-	100	N/A
Carbon Monoxide (CO)	1-hour	30,000	0	30,000	0
	8-hour	10,000	0	10,000	0
	24-hour	-	-	4,000	0
Lead (Pb)	Annual	0.5	N/A	0.5	N/A

Notes:

1. All measurements of the concentration of gaseous air pollutants, i.e. sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.
2. Respirable suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 10 µm or less.
3. Fine suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 2.5 µm or less.
4. The number of allowable exceedances is 18 for government projects, and 35 for non-government projects.

- 3.1.4. For odour impact, Annex 4 of the EIAO-TM has stipulated that the odour level at an ASR should not exceed 5 odour units based on an averaging time of 5 seconds for odour prediction assessment.

3.2. Representative Air Sensitive Receivers

- 3.2.1. The representative ASRs site within 500m of the WKTS site boundary have been identified. They are summarised in **Table 3-2** and their locations are shown in **Figure 3.1**.

Table 3-2 Summary of Representative ASRs

ASRs	Name of ASRs	Use	Distance to Site Boundary (m)	Maximum Assessment Height, mAG ^[1]
ASR1	Kowloon Motor Bus Depot	Industrial	33	30
ASR2	Ocean Shipyard	Industrial	41	20
ASR3	Chu Kong Group Shipyard Building	Industrial	116	15
ASR4	Choy Lee Shipyard Ltd	Industrial	181	30
ASR5	Stonecutters Island Sewage Treatment Works	Industrial	52	15
ASR6	Office at Kwai Chung Container Port	Office	271	50
ASR7	Fire Services Department Diving Base	Industrial	263	20

ASRs	Name of ASRs	Use	Distance to Site Boundary (m)	Maximum Assessment Height, mAG ^[1]
ASR8	New World First Ferry Services Ltd	Industrial	462	15
ASR9	WSD Water Selling Kiosk	Industrial	104	1.5
ASR10	Office of Shun Tak China Travel	Office	233	30
ASR11	Office in Marine Department Dockyard	Office	415	30

Note:

1. The ASR assessment levels at metres above ground (mAG) begin at 1.5mAG up to the maximum height listed, with the interim assessment levels at 5mAG, 10mAG, 15mAG, 20mAG, 30mAG, 40mAG and 50mAG (if applicable).

3.3. Construction Phase Impact

Dust

3.3.1. Construction of the new GTWTF has the potential to cause adverse dust impact if not properly managed. The major potential dust sources of construction activities during the construction phase are identified below:

- Site clearance and demolition of the existing building structures;
- Foundation and excavation works;
- Handling of construction materials;
- Wind erosion of open sites and stockpiling areas; and
- On-site vehicle on haul roads and use of diesel-powered plants.

3.3.2. The major potential source of the air quality impact during the construction phase is expected to be the fugitive dust generated from the demolition and excavation works at the TBB site, construction of the TBB building, construction materials storage and handling. During the construction phase, the WKTS operation at the existing TBA would be maintained. For the removal of the existing GTWTF and other equipment within TBA (refer to **Figure 2.1** for the details of the existing GTWTF), the construction decommissioning sequences will all be conducted indoors and under negative pressure, and the de-odourizing units will be maintained at all times to ensure no untreated odour would escape. Therefore, the odour impact would not change during the construction phase of the upgrading works.

3.3.3. The total site formation and excavation area for the proposed works is approximately 1,120 m². About 5,062 m³ of inert construction and demolition (C&D) materials and 534 m³ of non-inert C&D materials will be excavated.

3.3.4. Dump trucks would be required for transportation of excavated material (both inert and non-inert C&D materials) from site formation works, with a maximum total of 3 dump trucks required per day. Before leaving the Project Site, dump truck loaded with excavated material would be covered entirely to ensure that dusty material would not leak from the dump truck according to the APCO requirement. In case temporary stockpiling of small amount of dusty material is

required, the stockpile will be covered by tarpaulin sheets or placed in an area sheltered on the top and the 3 sides.

3.3.5. Given the small construction works area mentioned above, it is anticipated that less than 20 construction plants would be in operation during each construction activity. Therefore, the potential gaseous emissions from these plants and equipment are expected to be minimal and unlikely to cause adverse air quality impacts.

3.3.6. All potential dust generation works areas would be watered regularly and all vehicles would be washed at the site exit before leaving the site. Exhaust emissions would be generated from on-site vehicles and diesel-powered plants. The exhaust emission would be limited as the intermittent use on-site vehicles and diesel-powered plants would be shut down between work periods or throttled down to a minimum.

3.3.7. The contractor should also implement sufficient dust suppression measures as stipulated under the Air Pollution Control (Construction Dust) Regulation and Recommended Pollution Control Clauses for Construction Contracts, and good site practices wherever applicable, to limit the dust emissions generated. The following mitigation measures would be implemented during the construction phase to minimise impacts on air quality on nearby air sensitive receivers.

- In the process of material handling and demolition works, any material which has the potential to create dust will be treated with water or sprayed with a wetting agent where practicable;
- Any vehicles with an open load compartment used for transferring dusty materials off-site will be properly fitted with side and tail boards and cover;
- Provision of vehicle wheel washing facilities within site area of TBB;
- Stockpiles of sand, aggregate and demolished material will be enclosed on three sides and water sprays will be used to dampen stored materials and when receiving raw material;
- The construction site will be frequently cleaned and watered to minimise fugitive dust emissions;
- Motorised vehicles on the construction site will be restricted to a maximum speed of 15 km/hr and shall be confined to designated haul routes which will be paved with concrete or bituminous materials;
- At locations where scaffolding is to be erected around the perimeter of a building under construction, dust screens, sheeting, netting or a canopy should be provided.
- All skip hoists should be totally enclosed by impervious sheeting.
- Provide electric power supply for on-site machinery as far as practicable and diesel generators and machinery shall be avoided to minimize the gaseous and particulate emissions;
- Use of electric vehicles and timely provision of water supply and electricity for construction site; and

- Consider using cleaner dump trucks (compliant with more stringent emission standards such as Euro V or VI) during the construction.
- 3.3.8. Fuel combustion from the use of Powered Mechanical Equipment (PME) during construction works is also a source of particulates, NO_x, SO₂ and CO. However, the number of such equipment required on-site will be limited under normal operation. Limited smoke and gaseous emissions would be generated from equipment with proper maintenance. In addition, according to DEVB's TC No. 1/2015 Emissions Control of NRMM in Capital Works Contracts of Public Works and the Air Pollution Control (Non-road Mobile Machinery (NRMM)) (Emission) Regulation, starting from 1 December 2015, only approved or exempted NRMMs with a proper label are allowed to be used in specified activities and locations including construction sites. The Contractor is required to ensure the adopted machines or non-road vehicle under the Project could meet the prescribed emission standards and requirement.
- 3.3.9. In addition, legal control is imposed on the types of fuels allowed for use and their sulphur contents in commercial and industrial processes under the Air Pollution Control (Fuel Restriction) Regulations. To control the exhaust emissions from construction plant and equipment, the sulphur content of liquid fuel shall not exceed 0.001%. Hence, with the implementation of the said Regulation, the emissions from PMEs are considered relatively low, no adverse air quality impact to the surrounding ASRs is expected.
- 3.3.10. According to DEVB's TC No. 13/2020 Timely Application of Temporary Electricity and Water Supply for Public Works Contract and Wider Use of Electric Vehicles in Public Works Contracts, timely provision of electricity could help reduce carbon emission arising from operation of diesel generators at the construction sites. At the detailed design stage, project team should timely apply for the temporary electricity with a target that the necessary cables laying works could be completed before the commencement of the works contract. In addition, timely provision of electricity to construction sites can facilitate the use of Electric Vehicles (EVs) in public works contracts. The Project team should specify the use of EV(s) as well as the installation of designated medium-speed charger for each EV as a standard provision at the site accommodation in public works contracts.
- 3.3.11. Furthermore, the Contractor should also adhere to the general requirements under EPD's *Recommended Pollution Control Clauses for Construction Contracts* to further minimize emission of air pollutants from construction plant and fugitive dust emissions from construction activities.
- 3.3.12. The potential concurrent project within the 500m Study Area that will overlap with the construction period of the proposed development is the construction of the proposed logistics facility located about 230m to the northwest. Nevertheless, with the implementation of hourly watering and suppression measures under the APCO, the fugitive dust and gaseous emissions would be minimized. In addition, the contractor for this Project should closely liaise with the contractor of any concurrent project to avoid any dusty activities to take place at the same time to minimise the air quality impact. Scheduling and careful planning of the construction activities would be conducted to avoid overlapping of dusty construction activities. The installation of additional waste compactors in the 1/F area of TBA that is vacated after decommissioning the existing GTWTF will also take place concurrently during the construction of the TBB. However, the installation works would be conducted indoors within the TBA structure under negative pressure as mentioned in **Section 3.3.2**. With suitable mitigation

measures and good site practices, adverse cumulative air quality impacts during the construction phase are not anticipated.

- 3.3.13. In conclusion, the cumulative air quality impacts due to generation of fugitive dust and exhaust emissions from the proposed construction activities are anticipated to be minor.

3.4. Operational Phase Impact

Gaseous Emissions

- 3.4.1. Gaseous emissions will be generated from the biogas flare stack and GTW collection vehicles. Estimated quantities of gaseous emissions to be generated are summarised in **Table 3-3** below.

Table 3-3 Estimated Gaseous Emissions from GTWTF

Parameters	Project Profile, PP-271/2005 ^[1]	Assumption in VEP-501/2016 ^[2]	Assumption in VEP-571/2019 ^[3]	Proposed Value in Current VEP Application ^[4]
Biogas to be Flared (Nm³/h)	100	26.3	26.3	88.0 ^[5]
Diesel Fuel Combustion (L/day)	650	70 to 100	50 to 80	N/A ^[6]
GTW Collection Vehicles (Vehicles/day)	58	58	70	105 ^[7]

Notes:

1. Corresponding GTW quantity: 400 m³ per day.
2. Corresponding GTW quantity: 500 m³ per day.
3. Corresponding GTW quantity: 600 m³ per day.
4. Corresponding GTW quantity: 900 m³ per day.
5. The biogas to be generated and flared will increase as the GTW treatment capacity increases to 900 m³ per day for the new GTWTF. According to the design report for the GTWTF, a maximum of 88 Nm³/h of biogas (CH₄ of 60 – 70%) will be generated based on the design of the internal circulation reactor.
6. All hot water boilers will be fuelled by electricity.
7. Daily maximum arrival of GTW Collection Vehicles is estimated to be proportional to GTW quantity received, i.e. 900m³ per day / 600m³ per day = a factor of 1.5 increased in GTW received, 1.5 x 70 vehicles/day = 105 vehicles/day. Given the GTWTF operating hours from 07:30am-08:00pm, the hourly peak arrival rate for GTW vehicles = 105 / 12.5 hours per day = 9 vehicles per hour.

- 3.4.2. All the biogas generated from the anaerobic Wastewater Treatment Plant (WWTP) reactor during the treatment of GTWTF wastewater is currently flared off. The biogas produced was originally expected to run the micro-turbine electricity generator to generate power for use within the WKTS facility. However, the biogas generated in practice is significantly less than the original expectations. Due to the low volume of biogas generated in practice, operation of the micro-turbine electricity generator has been found to be impracticable and producing minimal amounts of useful power, so the unit is no longer operated.

- 3.4.3. According to the design report for the GTWTF², a maximum of 88 Nm³/h of biogas (60 – 70% CH₄ gas concentration) was estimated to be generated from the anaerobic internal circulation (IC) reactor, based on organic loading of the influent wastewater (5,302 kg/d). In the Project Profile (PP-271/2005), a quantitative assessment based on the combustion of 100 Nm³/h of biogas concluded that no adverse air quality impact was anticipated. In the two subsequent VEP applications to upgrade the GTWTF processing capacity to 500m³/d and 600m³/d respectively (VEP-501/2016, VEP-571/2019), the actual amount of biogas generated was found to be much less and reduced to be no more than 26.3 Nm³/h.
- 3.4.4. Under the proposed GTWTF upgrade from 600 m³/d to 900 m³/d, the influent wastewater flow to the IC reactor, and hence the biogas generation, will increase. However, based on the latest wastewater sampling results, the wastewater strength and overall organic loading (4,395 kg/d) are found to be at least 17% less than the overly conservative value used in the design report (5,302 kg/d). Hence, the maximum possible biogas generation rate after the proposed upgrade shall continue to remain below the 88 Nm³/h used in the design report and the 100 Nm³/h used in the Project Profile application. Furthermore, the location of the biogas flare also remains unchanged (see **Figure 1.1**). Given that there is no change to the biogas flare location and no increase to the maximum biogas generation, no additional air quality impact due to flaring is anticipated.
- 3.4.5. All the existing diesel fuel hot water boilers at WKTS will be replaced by new electric water heaters, so there shall not be any diesel fuel combustion at the new GTWTF.
- 3.4.6. Regarding vehicular emissions, according to Section 4.3.2 of the Project Profile (PP-271/2005), a mechanical ventilation system was installed to maintain the air quality in the tipping hall area of TBA. In order to maintain the air quality for carbon monoxide and nitrogen dioxides within the tipping hall, the minimum ventilation rate of 103,700 m³/hr and 4.4 air changes per hour (ACH) had to be maintained, based on a maximum peak refuse collection vehicles RCV arrival rate of 111 vehicles per hour according to Section 2.2.4 of Environmental Review Report under VEP Application No. VEP-571/2019. With the proposed Project, RCV would continue to operate within the tipping hall of TBA. It is estimated the peak RCV arrival rate would increase to 89 vehicles per hour, which is well within the peak design RCV arrival rate of 111 per hour.
- 3.4.7. For GTW vehicles, they will no longer be received at TBA but instead operate at the GTWTF tipping hall of the new TBB building, which will have a minimum ventilation rate of 30,630 m³/h and 15 ACH to maintain the air quality within the tipping hall. This air change rate of 15 ACH is more than 3 times that of the existing TBA Tipping Hall. Furthermore, the peak GTW vehicle arrival rate is estimated to be 9 per hour under the proposed upgrade as shown in **Table 3-4**, which is much lower than the peak RCV arrival rate of 111 per hour at TBA. Therefore, no additional air quality impact due to the additional vehicular emissions at TBB is anticipated.
- 3.4.8. In view of the above, it is considered that the ventilation system at the existing TBA and new GTWTF inside TBB will be able to maintain the vehicular emission concentrations well within the required air quality standards.

² Design Report (Rev. 2) for the Grease Trap Waste Treatment Facility at West Kowloon Refuse Transfer Station Plant

- 3.4.9. For the non-odorous areas within TBA and TBB (e.g. washrooms, printing areas, offices), a separate mechanical ventilation and air-conditioning system is installed in each building to extract and discharge the air into the atmosphere without any further treatment. There is no air quality impact anticipated from these non-odorous areas.
- 3.4.10. Regarding additional vehicular emissions on the nearby roads due to the proposed upgrade, there is an additional traffic of 2 GTW vehicles and 17 RCV during the peak hour as summarized below in **Table 3-4**. The slight increase in traffic is not anticipated to induce congestion of the nearby roads.

Table 3-4 Peak Vehicular Traffic Flow before and after Proposed Change

Vehicle Type	Existing Scenario (vehicle/hour)	Proposed Scenario (vehicle/hour)	Additional Traffic (vehicle/hour)
Refuse Collection Vehicles	72 ^[1]	89 ^[2]	17
GTW Collection Vehicles	7 ^[3]	9 ^[4]	2

Notes:

- Based on the 2024 operation record and a MSW processing capacity of 2,450 tpd, the highest RCV arrival rate at TBA was found to be 72 per hour.
- It is estimated the peak RCV arrival rate would increase to 89 vehicles per hour.
- In the previous VEP application (VEP-571/2019), the maximum arrival rate for GTW vehicles at TBA is kept at 70 vehicles per day or 7 vehicles per hour.
- The maximum GTW arrival under the Proposed Change is assumed to be proportional to the GTW quantity received (i.e. 900m³ per day / 600m³ per day = a factor of 1.5). Hence the max GTW arrival rate = 1.5 x 70 vehicles/day = 105 vehicles/day. Given the GTWTF operating hours from 07:30am-08:00pm, the peak GTW vehicle arrival rate after the Proposed Change = 105 / 12.5 hours per day = 9 vehicles per hour.

- 3.4.11. Under the Existing Scenario, there are five existing air/odour emission exhausts DO1 to DO5 located at TBA as shown in **Figure 3.2**, whilst there are two additional proposed emission exhausts DO 6 and DO7 in TBB as shown in **Figure 3.3**. Compared to the Existing Scenario, all of the representative ASRs remain the same distance from the closest emission exhausts under the Proposed scenario except for ASR6, for which the closest distance is shortened from 369m to 321m (i.e. due to the proposed exhaust DO6). Nevertheless, the additional exhausts are still more than 320 metres from ASR6. See **Table 3-5** below.

Table 3-5 Separation Distances between Emission Exhausts and Air Sensitive Receivers (Existing vs Proposed Scenario)

ASRs (Table 3-2)	Distance to Closest Emission Exhausts (m) ^[1]	
	Existing Scenario ^[2]	Proposed Scenario ^[3]
ASR1	47 m (DO5)	No change
ASR2	88 m (DO5)	No change
ASR3	160 m (DO5)	No change
ASR4	222 m (DO5)	No change
ASR5	119.0 m (DO1)	No change
ASR6	369 m (DO1)	321 m (DO6)
ASR7	313 m (DO1)	No change

ASRs (Table 3-2)	Distance to Closest Emission Exhausts (m) ^[1]	
	Existing Scenario ^[2]	Proposed Scenario ^[3]
ASR8	509 m (DO5)	No change
ASR9	149 m (DO5)	No change
ASR10	271 m (DO5)	No change
ASR11	492 m (DO1)	No change

Notes:

1. The closest exhaust to the ASR is shown in bracket.
2. Existing Scenario = 5 existing exhausts at TBA (DO1 to DO5, see **Figure 3.2**).
3. Proposed Scenario = 5 existing TBA exhausts plus 2 new exhausts at TBB (DO1 to DO7, see **Figure 3.3**).

Dust

- 3.4.12. There are no dusty activities associated with the GTWTF during operational phase. As such, no adverse operational dust air quality impact is anticipated.

Odour

- 3.4.13. Odour is anticipated during the delivery, unloading and treatment of both MSW and GTW. For the delivery and unloading of MSW and GTW, all MSW and GTW vehicles are delivered to the WKTS by sealed road tankers, with only negligible odour emitted from the vent pipes of the road tankers. Furthermore, as mentioned in **Section 3.4.10**, the proposed upgrade would only bring about an addition of 2 GTW vehicles per hour entering to and from WKTS. Given the minor increase in GTW traffic, the delivery of GTW by sealed road tankers to the WKTS will not cause adverse odour impact to the identified ASRs.
- 3.4.14. Odour emission will also arise from the treatment of MSW and GTW under the existing scenario and the proposed scenario. A quantitative assessment has been conducted below to assess and compare the odour impact from these two scenarios.

Existing Scenario (Odour Emission from TBA)

- 3.4.15. The main sources of odour within the TBA include the wastewater arising from the handling of MSW, onsite wastewater treatment at the WWTP, as well as the delivery, unloading and treatment of GTW. Currently, negative pressure is maintained within the building to prevent leakage of untreated odourous air, whilst the air within the building is treated by an odour control system consisting of 5 air scrubbers (4 duty, 1 standby) before being vented to the atmosphere.
- 3.4.16. As shown in **Table 3-6** below, the existing air scrubbers DO1, DO2, DO4 and DO5 are two-stage wet scrubbers designed to remove 99.9% of Hydrogen Sulphide (H₂S) and 90% of Ammonia (NH₃), unit DO3 is a one-stage unit for removing 99.9% of Hydrogen Sulphide (H₂S), and unit DO5 is a standby unit with two-stage removal of 99.9% H₂S and 90% NH₃. See **Figure 3.2** for the location of the existing air scrubber exhausts.

Table 3-6 Existing Scenario - Air Scrubbers at TBA

Air Scrubber No. (operation mode)	Technology	H ₂ S Removal Efficiency	NH ₃ Removal Efficiency
DO1 (duty)	Two-stage Wet Scrubbing	99.9%	90%

Air Scrubber No. (operation mode)	Technology	H ₂ S Removal Efficiency	NH ₃ Removal Efficiency
DO2 (duty)	Two-stage Wet Scrubbing	99.9%	90%
DO3 (duty)	One-stage Wet Scrubbing	99.9%	-
DO4 (duty)	Two-stage Wet Scrubbing	99.9%	90%
DO5 (standby)	Two-stage Wet Scrubbing	99.9%	90%

Future Scenario (Odour Emission from TBA and new TBB)

- 3.4.17. The GTWTF would be relocated to the new TBB with an increased GTW handling capacity of 900 m³ per day. The MSW handling activities and wastewater treatment would continue within the existing TBA. The onsite WWTP would also be upgraded with additional aeration tanks and other equipment to increase the treatment capacity of up to 1,484 m³ per day. Given that the current wastewater discharge licence granted to the WKTS under the Water Pollution Control Ordinance (WPCO) has a maximum flowrate of 1,000 m³ per day, an application for a new WPCO discharge licence will be made based on the design flowrate of 1,580 m³ per day.
- 3.4.18. It is also proposed to upgrade air scrubber DO3 into a two-stage wet scrubber with the same removal efficiency as other units and have all five scrubbers operate in duty mode simultaneously. See **Table 3-7** below for details. As confirmed with design engineer, negative pressure will be maintained at all times even during maintenance/ downtime of any of the scrubbers whilst the remaining scrubber units in service will continue to operate. Therefore, no untreated odour will be released into the atmosphere in the case of any scrubbers being out of order.
- 3.4.19. For the new TBB, the three existing designated GTW unloading bays inside the Tipping Hall of TBA will be relocated to the Vehicle Reception Area of the new GTWTF at TBB. The mode of GTW delivery to WKTS shall remain unchanged as to current practice and GTW will be delivered by sealed GTW collection vehicles.
- 3.4.20. Malfunction / emergency can be minimised through regular inspection and maintenance works performed during operation. Furthermore, at least one of the two scrubbers will be kept in operation at all times to maintain negative pressure at TBB, whilst the shut-down time for the scrubber under maintenance will be kept to a minimum with the required resources made available beforehand. In the event where both scrubbers at TBB are forced to be shut down due to malfunction, the incoming grease trap waste will be temporarily diverted to TBA where the odourous air is treated by the TBA scrubbers, until at least one of the TBB scrubbers returns to normal service.
- 3.4.21. With the unloading and screening operations undertaken in a sealed system that is maintained under negative pressure, odour emissions arising from the delivery, unloading and treatment of GTW will be effectively alleviated. All air extracted from the GTWTF will pass through the odour control system consisting of two two-stage air scrubbers designed to remove H₂S and NH₃ before discharging to the atmosphere via two separate vents (DO6, DO7) at the roof of TBB.

- 3.4.22. The historical monitoring data for the existing air scrubbers at TBA from July 2023 to September 2025 has been reviewed in **Appendix C**. The historical data showed that the H₂S and NH₃ average outlet concentrations were all below 0.05 ppm and 0.5 ppm respectively.
- 3.4.23. Based on the above design requirement, the maximum outlet concentration at the scrubber exhaust is 0.05ppm for H₂S and 0.5 ppm for NH₃ respectively. See **Table 3-7** below for details. The location of the air emission outlets at TBB is shown in **Figure 3.3**.

Table 3-7 Future Scenario - Proposed Odour Mitigation Measures at TBA and TBB

Odour Mitigation Technology (operation mode)	Technology	H ₂ S Outlet Design Concentration (ppm)	NH ₃ Outlet Design Concentration (ppm)
TBA			
Air Scrubber DO1 (duty)	Two-stage Wet Scrubbing	< 0.05	< 0.5
Air Scrubber DO2 (duty)	Two-stage Wet Scrubbing	< 0.05	< 0.5
Air Scrubber DO3 (duty)	Two-stage Wet Scrubbing	< 0.05	< 0.5
Air Scrubber DO4 (duty)	Two-stage Wet Scrubbing	< 0.05	< 0.5
Air Scrubber DO5 (duty)	Two-stage Wet Scrubbing	< 0.05	< 0.5
TBB			
Air Scrubber DO6 (duty)	Two-stage Wet Scrubbing	< 0.05	< 0.5
Air Scrubber DO7 (duty)	Two-stage Wet Scrubbing	< 0.05	< 0.5

Operational Phase Quantitative Odour Impact Assessment

- 3.4.24. In accordance with Annex 4 of EIAO-TM, odour impact assessment for both Existing and Future Scenarios (i.e. before and after the proposed GTWTF upgrade) shall be conducted for H₂S and NH₃ emission, with the assessment criteria based on the limit of 5 odour units (OU) per an averaging time of 5 seconds at the identified ASRs. The dispersion modelling approach and emission rate calculations are further presented below.
- 3.4.25. The historical monitoring data for the existing air scrubbers at TBA from July 2023 to September 2025 has been reviewed in **Appendix C**. The historical data showed that the H₂S and NH₃ average outlet concentrations were all below their respective design concentrations of 0.05 ppm and 0.5 ppm. For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), the minimum historical outlet concentrations at the five existing DO units will be adopted for the Existing Scenario. Scrubber unit DO5, which is a standby unit as discussed in **Section 3.4.16**, will be modelled as zero emission under the Existing Scenario. For scrubber unit DO3, it is currently a 1-stage scrubber that only removes H₂S, hence it is modelled to emit the minimum untreated NH₃ under the Existing Scenario. Refer to **Appendix C** for the minimum historical outlet concentrations.

- 3.4.26. For the Future Scenario, all seven air scrubber units (DO1 to DO5 at TBA, DO6 to DO7 at TBB) will be 2-stage units that remove both H₂S and NH₃. For the worst-case assumption, they will be modelled to operate at the same time with the maximum design outlet concentration of 0.05 ppm and 0.5 ppm for H₂S and NH₃ respectively.
- 3.4.27. The USEPA approved model, AERMOD version 24142, is employed to simulate the dispersion of H₂S emission from the air scrubber emission exhaust stacks, which will be modelled as Point Sources according to EPD's *Technical Note for Modelling Industrial Emissions*. Building downwash option has also been included to account for the additional turbulence that may occur due to Transfer Buildings A and B. For conservative purpose, a 24-hour continuous operating scenario has been assumed in AERMOD.
- 3.4.28. Under the EPD guideline *Guidelines on Choice of Models and Model Parameters*, the surface characteristics parameters of albedo, Bowen ratio and surface roughness has been determined by AERMET version 23132, which is the meteorological pre-processor of AERMOD. The albedo and Bowen ratio are determined according to its land use characteristics for the 10km x 10km area centered on the representative ASRs, whilst surface roughness is determined based on the 1 km area centered on the representative ASRs. For the hourly meteorological input to AERMET, the Year 2019 data for each relevant grid cell from the WRF Meteorological model under PATH v3.0 is adopted. The minimum wind speed is capped at 0.5 metres per second, whilst the mixing height is capped by the minimum and maximum values recorded at Hong Kong Observatory (HKO) at the reference year 2019 (i.e. 119 m and 2009 m respectively).
- 3.4.29. The EPD online Smart Air Modelling Platform (SAMP) tool (version 2.1) has been used to generate the above site-specific AERMOD-ready AERMET output files. The urban option will be selected in AERMOD according to EPD guideline *Guidelines on Choice of Models and Model Parameters*, with the population of 431,090 taken from the latest 2021 census for the Sham Sui Po District where the Project is located. The ELEVATED mode was also applied as the default AERMOD setting with the base elevation for all sources and receptors, expressed as metres above Principal Datum (mPD), taken from the SAMP tool and ib1000 digital topographic map.

Evaluation of Model Prediction Results

- 3.4.30. The predicted highest cumulative 5-second average odour impact at the representative ASRs near WKTS (ASR1 to ASR11) in both Existing and Future Scenarios are summarized in **Table 3-8** below. As shown in the table below, both scenarios meet the EIAO-TM odour assessment criteria of 5 OU at all ASRs. Therefore, no adverse odour impact due to the Project is anticipated.
- 3.4.31. Note that the maximum cumulative impact is the sum of the two pollutants' maximum predicted hourly concentrations instead of a sequential hour-by-hour addition of the two pollutants' odour concentrations. Therefore, the cumulative impact presented in the table is considered conservative. The modelling assumptions, emission calculations and detailed model results are provided in **Appendix D**. The contour plots of cumulative odour impact under Future Scenario at the worst hit assessment levels of 1.5mAG, 5mAG and 15mAG are also shown in the appendix.

Table 3-8 Predicted Maximum Odour Impact under Existing and Future Scenarios

ASR ID (Range of assessment heights, mAG)	H ₂ S (Odour Unit) ^[1]		NH ₃ (Odour Unit) ^[1]		Cumulative Odour Impact (Odour Unit) ^[2]	
	Existing Scenario	Future Scenario	Existing Scenario	Future Scenario	Existing Scenario	Future Scenario
Odour Criterion: 5 Odour Units ^[3]						
ASR1 (1.5-30)	0.049 (20mAG)	1.358 (1.5mAG)	1.9×10^{-6} (20mAG)	0.173 (1.5mAG)	0.049 (20mAG)	1.531 (1.5mAG)
ASR2 (1.5-20)	0.015 (20mAG)	1.306 (15mAG)	7.8×10^{-7} (20mAG)	0.166 (15mAG)	0.015 (20mAG)	1.472 (15mAG)
ASR3 (1.5-15)	0.007 (15mAG)	0.550 (5mAG)	4.5×10^{-7} (15mAG)	0.070 (5mAG)	0.007 (15mAG)	0.620 (5mAG)
ASR4 (1.5-30)	0.008 (30mAG)	0.590 (1.5mAG)	4.2×10^{-7} (30mAG)	0.075 (1.5mAG)	0.008 (30mAG)	0.666 (1.5mAG)
ASR5 (1.5-15)	0.013 (1.5mAG)	0.753 (15mAG)	7.7×10^{-7} (1.5mAG)	0.096 (15mAG)	0.013 (1.5mAG)	0.849 (15mAG)
ASR6 (1.5-50)	0.008 (1.5mAG)	0.475 (1.5mAG)	4.2×10^{-7} (1.5mAG)	0.060 (1.5mAG)	0.008 (1.5mAG)	0.535 (1.5mAG)
ASR7 (1.5-20)	0.005 (20mAG)	0.487 (5mAG)	3.1×10^{-7} (20mAG)	0.062 (5mAG)	0.005 (20mAG)	0.550 (5mAG)
ASR8 (1.5-15)	0.004 (15mAG)	0.240 (5mAG)	2.8×10^{-7} (15mAG)	0.031 (5mAG)	0.004 (15mAG)	0.271 (5mAG)
ASR9 (1.5)	0.008 (1.5mAG)	0.669 (1.5mAG)	4.4×10^{-7} (1.5mAG)	0.085 (1.5mAG)	0.008 (1.5mAG)	0.754 (1.5mAG)
ASR10 (1.5-30)	0.007 (30mAG)	0.534 (1.5mAG)	3.7×10^{-7} (30mAG)	0.068 (1.5mAG)	0.007 (30mAG)	0.601 (1.5mAG)
ASR11 (1.5-30)	0.005 (1.5mAG)	0.289 (1.5mAG)	2.6×10^{-7} (30mAG)	0.037 (1.5mAG)	0.005 (1.5mAG)	0.326 (1.5mAG)
Notes: 1. Refer to Appendix D Table 4 for the conversion of hourly averaged concentration (g/m ³) into 5-second averaged odour units (OU). The assessment height with the maximum odour impact is shown in bracket. 2. Cumulative odour impact is the sum of the highest 5-second odour impact for the respective pollutant at the corresponding assessment height. The assessment height with the maximum odour impact is shown in bracket. 3. According to Annex 4 of EIAO-TM, the criterion for odour impact is 5 odour units based on 5-second averaging time.						

3.5. EM&A Requirements

- 3.5.1. With the implementation of dust mitigation measures recommended in the Project Profile (Register No.: PP-271/2005) in accordance with the Air Pollution Control Ordinance, no additional mitigation measure or monitoring is considered necessary. Therefore, the mitigation measures recommended in the Project Profile remain valid, and there is no material change to the air quality impact during the construction phase of the Project.
- 3.5.2. Under Condition 2.1 of the VEP No. FEP01/247/2006/B, the EP Permit Holder shall employ a qualified odour panelist to patrol and monitor the odour level at the Project site boundary three times per day to ensure compliance with the odour limit of 2 Odour Units. Under the existing WKTS contract, daily odour patrolling is performed by a qualified odour panelist at the site boundary of the WKTS at a time randomly scheduled during the operating hours between 07:30 and 20:00.
- 3.5.3. According to the odour patrol results from July 2023 to October 2025 (refer to Appendix C), odour intensity at the detection locations was on the majority of occasions recorded as “Not Detected”, with only occasional “Slight” odour levels detected. Odour levels were never detected at Moderate intensity or above. The odour performance can therefore reasonably be taken as complying with the odour requirement under the EP of 2 OU within the site boundary with the existing odour control system. There is no change to the EM&A requirements for the new proposed upgrade.

- 3.5.4. With the adoption of good site practice and the existing environmental and management plan (including environmental monitoring) recommended in the Project Profile (Register No.: PP-271/2005), as well as the application of mitigation measures such as air scrubber system and enclosure of treatment facilities, no additional mitigation measures or monitoring will be required. Therefore, there is no material change to the air quality impact during the operation phase of the Project.

4. Noise Impact

4.1. Environmental Legislations, Standards and Guidelines

4.1.1. The relevant legislations, standards and guidelines applicable for the assessment of noise impacts include:

- Technical Memorandum on Environmental Impact Assessment Process;
- TM on Noise from Construction Work other than Percussive Piling (GW-TM);
- TM for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites (IND-TM);
- ETWB TCW 13/2003 – Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals; and
- Practice Note for Professional Persons on Minimizing Noise from Construction Activities (ProPECC PN 1/24)

4.1.2. No existing Noise Sensitive Receiver (NSR) is identified within 300m radius of WKTS. Also, according to the Stonecutters Island Outline Zoning Plan (S/SC/10), there are no noise sensitive uses planned within the 300m assessment area of WKTS. The nearest NSR (residential development at Grand Victoria) is located more than 500m away to the east of the Project Site and is separated by industrial buildings and shipyards in between. For the concurrent project mentioned in **Section 2.4**, it is located further away from Grand Victoria with a separation distance of at least 850m. Hence, no cumulative noise impact is anticipated from this concurrent project.

4.2. Construction Phase Impact

4.2.1. Construction works including drilling, piling, excavation and demolition works will be required for the construction of the new TBB and provision of the new GTWTF. Also, the existing GTWTF located inside the current TBA would be demolished and improvement works would be carried out within TBA, providing noise shielding for the demolition and improvement works within TBA. With no existing and planned NSR identified within 300m radius of WKTS there will be no construction noise impact. Nonetheless, the construction works will follow the guidelines in *the Recommended Pollution Control Clauses for Construction Contracts*.

4.3. Operational Phase Impact

Fixed Plant Noise

4.3.1. Most of the fixed noise sources (i.e. pumps and centrifuges) will be located inside an enclosed building. The wet scrubber system will have 2 exhaust fans which will be installed on the rooftop of TBB without enclosure. It is not anticipated that there will be any adverse noise impact as the additional noise generated by the

exhaust fans of the wet scrubber system will be negligible. Furthermore, there are no existing and planned NSR identified within 300m assessment area of WKTS. The nearest NSR is located more than 500m away, which has a distance attenuation of 62 dB(A). Therefore, there will be no off-site fixed noise impact.

Road Traffic Noise Impact

- 4.3.2. The number of RCV and GTW collection vehicles visiting WKTS may increase along with the upgrade. With the proposed Project, GTW vehicles would unload in the new TBB, whilst RCV would continue to operate at TBA.
- 4.3.3. According to the VEP in 2019, there shall be around 70 GTW truck trips per day. Based on the estimated scenario, there will be about 105 GTW trucks trips per day visiting the GTWTF after the re-provision works. This averages at less than 3 additional GTW truck trips per hour after the upgrading works (i.e. 35 additional trucks per day divided by 12.5 daily operating hours = 2.8 trucks per hour), which can be considered as a minor change. Besides, the Environmental Review Report for the 2019 VEP (Application No. VEP- 571/2019) concluded that traffic noise impacts associated with the GTW collection vehicles are insignificant compared with the background industrial and traffic noise.
- 4.3.4. The highest RCV arrival rate to TBA was 72 per hour based on recent operation record in 2024. It is estimated the peak RCV arrival rate would increase to 89 vehicles per hour after the re-provision works, which means there will be 17 additional RCV truck trips per hour equating to less than 3 additional vehicles every 10 minutes. Therefore, it is also considered a minor change.
- 4.3.5. Compared with the background industrial and traffic noise, adverse traffic noise impact associated with the operation of the upgraded GTWTF is not anticipated.

4.4. EM&A Requirements

- 4.4.1. No additional mitigation measure or monitoring is considered necessary as no adverse noise impact is anticipated due to the proposed change of the Project. Therefore, there is no material change to noise impact during the construction and operation phases of the Project.

5. Water Quality

5.1. Environmental Legislations, Standards and Guidelines

5.1.1. The relevant legislations, standards and guidelines applicable for the assessment of water quality impacts include:

- Water Pollution Control Ordinance (WPCO) (Cap. 358);
- Technical Memorandum for Effluents Discharged into Drainage and Sewerage System Inland and Coastal Waters (TM-DSS);
- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499);
- Technical Memorandum on EIA Process (EIAO-TM), Annex 6 and Annex 14;
- Hong Kong Planning Standards and Guidelines (HKPSG);
- Professional Persons Environmental Consultative Committee Practice Note (ProPECC) PN 2/24 “Construction Site Drainage”; and
- Professional Persons Environmental Consultative Committee Practice Note (ProPECC) PN 1/23 “Drainage Plans subject to Comment by the EPD”.

5.2. Construction Phase Impact

5.2.1. The construction phase of the proposed upgrade would involve dismantling of the existing GTWF within TBA and the construction of TBB. All the construction works will be land-based, where the main sources of potential water quality impact include construction site runoff, sewage from onsite workforce and accidental spillage of chemicals.

5.2.2. The new GTWTF in the new TBB will be constructed first before the existing GTWTF equipment in TBA is decommissioned, such that any remaining GTW within the existing GTWTF system will be transferred to the new GTWTF. Hence there will be no potential for wastewater leakage from the dismantling of the existing GTW.

5.2.3. Any effluent discharge from the construction works is subject to the control of the WPCO discharge licence. Wastewater shall be properly treated to meet the discharge standards set out in the discharge licence. No direct discharge of site runoff into any surrounding water bodies shall be allowed. Site runoff and drainage shall be controlled and minimized by the mitigation measures stipulated in the ProPECC PN2/24 guideline, including but not limited to the followings:

- At the start of construction site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works.

- Design of the temporary on-site drainage should prevent runoff from going through site surface, construction machinery and equipment in order to avoid or minimise polluted runoff.
- Implement dikes or embankments for flood protection and provide temporary ditches to facilitate the runoff discharge into the existing drainage system, through a silt/sediment trap.
- Design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 2/24.
- Schedule construction works to minimise surface excavation works during the wet season (April to September) wherever practicable. Take precautions at any time of year when rainstorms are likely. The actions to be taken should make reference to the guidelines in Appendix A2 of ProPECC PN 2/24. Complete and vegetate all exposed earth areas as soon as possible upon completion of earthworks.
- Portable chemical toilets and suitable sewage collection system would be provided on site to hold the sewage generated by construction workforce. The stored sewage should be collected and disposed of by a licensed waste collector on a regular basis.

5.2.4. With the implementation of the proposed mitigation measure above, no adverse water quality impact during the construction phase is anticipated.

5.3. Operational Phase Impact

5.3.1. The quantities of effluents associated with the operation of GTWTF are summarized in **Table 5-1** and **Table 5-2** below.

5.3.2. According to the design specification, the WWTP shall be upgraded to have a treatment capacity of at least 1,580 m³ per day. It is estimated that a total of up to 1,484 m³ per day of wastewater, which includes the vehicle wash water for both RCVs and GTW vehicles, will be discharged from WKTS. The value consists of sewage flow from WKTS staff and visiting drivers as well as wastewater generation from WKTS, including vehicle washing and floor cleansing from TBA and TBB (i.e. new GTWTF).

5.3.3. Given that the current wastewater discharge licence granted to the WKTS under the Water Pollution Control Ordinance (WPCO) has a maximum flowrate of 1,000 m³ per day, an application for a new WPCO discharge licence will be made based on the design flowrate of 1,580 m³ per day. The wastewater will be discharged to the public sewer, through Manhole No. FMH4018438, and ultimately to Stonecutters Island Sewage Treatment Works (SISTW).

5.3.4. The detailed sewage impact assessment (SIA) is provided in **Appendix E**. Based on the SIA results, the capacity of existing public sewerage system is sufficient to cater for the additional sewage flow. Therefore, no adverse impact on the receiving sewer system is anticipated.

5.3.5. Regarding existing measures for preventing pollution of the storm-drain system due to potential spillage of wastewater or oily / greasy matter from GTW processing, storage tank and biological effluent treatment areas, all spillages will be collected and diverted to the existing WWTP at TBA.

- 5.3.6. The new GTWTF will be located within TBB, which has a contained foul water / GTW wastewater system discharging to the WWTP at WKTS. In addition, the existing anaerobic WWTP are located outdoors within bunded areas, so any spillages would also be contained and discharged to the WKTS foul water drainage system. There is therefore negligible risk of spillage and pollution entering the storm-drain system.
- 5.3.7. No enhancement of the existing measures to prevent pollution of storm-drain system due to the proposed variation are therefore required.

5.4. EM&A Requirements

- 5.4.1. No additional mitigation measure or monitoring is considered necessary as no adverse water quality impact is anticipated due to the proposed change of the Project. Therefore, there is no material change to water quality impact during the construction and operation phases of the Project.

Table 5-1 Estimation of Wastewater Generation from WKTS (Except the GTW Treatment Process Wastewater)

Source of Leachate Generation	Operation Record in Aug 2023 – June 2024 (m ³ per day)	Proposed Value in Current VEP Application (m ³ per day)
Wastewater generated from MSW Handling, Vehicle Washing and Floor Cleansing	301 ^[1]	311 ^[2]
Note: - Leachate generated from MSW handling, Vehicle Washing and Floor Cleansing is based on average total daily wastewater minus GTW treatment process wastewater. The average total wastewater daily flowrate is based on monitoring data between August 2023 and June 2024, whilst leachate generated from GTW treatment is based on the incoming GTW tonnage minus pre-treated GTW tonnage (based on EPD record of 450 tpd of GTW as of 2023). - The 2023-2024 operation record for wastewater generation (for MSW and GTW handling, vehicle washing and floor cleansing) is 301 m³/day for a handling capacity of 2,450 tpd of MSW and 450 tpd of GTW within TBA. For the proposed upgrade, the TBA will only treat MSW whilst the GTWTF is housed inside TBB. Hence the wastewater generation at TBA after the upgrade (for MSW handling, vehicle washing and floor cleansing) is equal to 311 m³/d.		

Table 5-2 Estimated Effluents Generation from WKTS

Parameters (all m ³ per day)	Project Profile, PP-271/2005 ^[1]	Assumption in VEP-501/2016 ^[2]	Assumption in VEP-571/2019 ^[3]	Proposed Value in Current VEP Application ^[4]
Leachate from WKTS / (i.e. floor cleansing/ vehicle washing)	120	350	250	311 ^[5]
GTW Treatment Process Wastewater	386	483	583	1,162 ^[6]
Overall Wastewater Generation	506	833	833	1,473 ^[7]
Note: - Corresponding GTW quantity: 400 m³ per day. - Corresponding GTW quantity: 500 m³ per day. - Corresponding GTW quantity: 600 m³ per day. - Corresponding GTW quantity: 900 m³ per day. - Refer to Table 5-1 above for the estimated amount of wastewater from WKTS based on the GTW handling capacity of 900 m³/day. - GTW Treatment Process Wastewater of 1,065 m³ per day and 1,162 m³ per day is estimated based on mass balance of GTWTF process capacity with Average and Peak Influent Flow Scenarios respectively. It includes wastewater generated by vehicle washing and other drains within GTWTF. - Overall Wastewater Generation = 311 m³ per day + 1,065 m³ per day = 1,376 m³ per day (based on average influent flow) or 311 m³ per day + 1,162 m³ per day = 1,473 m³ per day (based on peak influent flow). Due to the latest design, this peak flow (1,473 m³/day) is further reduced from 1484 m³/day indicated in the previously approved SIA (Appendix E). This has no impact on the SIA conclusion finding since the worst-case design flow capacity of 1580 m³/day was used for the sewage impact calculation.				

6. Waste Management

6.1. Environmental Legislations, Standards and Guidelines

6.1.1. The relevant legislations, standards and guidelines applicable for the assessment of waste management implications include:

- Technical Memorandum on EIA Process (EIAO-TM), Annex 7 and 15;
- Waste Disposal Ordinance (WDO) (Cap 354);
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C);
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N);
- Land (Miscellaneous Provisions) Ordinance (Cap 28);
- Public Health and Municipal Service Ordinance (Cap 132) - Public Cleansing and Prevention of Nuisances Regulation; and
- Dumping at Sea Ordinance (Cap. 466).

6.1.2. Other relevant circulars / guidelines that are applicable to waste management practices of the Project include:

- Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC(W)) No. 19/2005 Environmental Management on Construction Site;
- Project Administration Handbook (PAH) for Civil Engineering Works (2022 Edition) – Section 4.1.3 of Chapter 4 - Construction and Demolition Materials;
- Project Administration Handbook (PAH) for Civil Engineering Works (2022 Edition) – Section 4.2.1 of Chapter 4 – Management of Dredged/Excavated Sediment;
- Works Branch Technical Circular (WBTC) No. 2/93, Public Dumps;
- WBTC No. 12/2000 Fill Management;
- DEVB TC(W) No. 6/2010, Trip-ticket System for Disposal of Construction and Demolition Materials;
- DEVB TCW No. 08/2010 Enhanced Specification for Site Cleanliness and Tidiness;
- CEDD Technical Circular (TC) No. 11/2019 Management of Construction and Demolition Materials;

- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992); and
- A Guide to the Chemical Waste Control Scheme.

6.2. Construction Phase Impact

6.2.1. Major construction activities that will potentially result in generation of waste include the following. Refer to **Figure 2.1** for the proposed demolition of the existing TBB admin building and the existing GTWTF equipment at TBA.

- Site clearance;
- Site formation works and soil/rock excavation;
- Decommissioning and dismantling of all existing GTWTF equipment at the 1/F of the existing TBA;
- Demolition of existing administration building, maintenance workshop (covered and open area), ex-dangerous goods storerooms, fire bay, covered storage area and open storage bay at part of TBB;
- Superstructure works and installation works for the new GTWTF at the proposed site within TBB; and
- Construction of TBB with an elevated walkway to connect TBA and TBB.

6.2.2. The Project Site is situated on reclaimed land. Based on the latest ground investigation records, a small amount of land-based sediment is anticipated in the excavated materials. Refer to **Figure 2.1** and **Appendix G** for the anticipated excavation location and details.

6.2.3. The typical waste types associated with these activities include:

- Inert construction and demolition (C&D) materials from construction of TBB and minor site formation as well as excavation works;
- Non-inert C&D waste from equipment installation works at the new GTWTF comprising equipment packaging and minor installation waste such as cable cuttings, as well as from site clearance, decommissioning and dismantling of existing GTWTF equipment and demolition of the existing structures;
- Excavated sediments during pile drilling works;
- Chemical waste from decommissioning of existing GTWTF, maintenance of construction plant and equipment, and commissioning of new units; and
- General refuse from construction workforce comprising food scraps, waste paper, empty containers, etc.

Inert C&D Materials

- 6.2.4. C&D materials would be generated from the proposed excavation and construction works. The C&D materials generated comprise inert C&D materials and non-inert C&D materials. Based on the current latest design information, a total of 5,062 m³ of inert C&D materials is anticipated to be generated, which include 1,667 m³ from the demolition of the existing GTWTF at TBA and existing TBB admin building and construction of the new TBB as well as 3,395 m³ of excavated materials (i.e. 1,208 m³ for pile drilling plus 2,469 m³ for site excavation plus 64m³ for elevated walkway pile cap minus land-based sediments of 346 m³ as discussed in **Section 6.2.17**). The estimated quantities are shown in **Table 6-1**. Refer to the calculation behind the numbers in **Appendix G**. It should be noted that the quantities are estimated based on the best available information and will be updated at the detailed design stage.
- 6.2.5. The inert C&D materials (e.g. fill, rocks and concrete, etc.) will be reused on-site as much as possible to minimise the amount of net inert C&D materials generated from the Project, whilst the rest of the inert C&D materials will be delivered to public fill reception facility (Tuen Mun Area 38 Fill Bank) for beneficial reuse in other projects. Assuming a capacity of 7m³ per truck, bulk factor of 1.4, 25 working days a month and the works will not be conducted simultaneously (i.e. covering 33 months from Q2 2026 to Q4 2028 as mentioned in **Table 2-1**), it is estimated that a maximum of 2 truck trips per day would be required for the delivery of inert C&D materials to Tuen Mun Area 38 Fill Bank. The delivery site of inert C&D materials is subject to the designation by the PFC according to the *DEVB TC(W) No.6/2010*.
- 6.2.6. According to the Project Administrative Handbook for Civil Engineering Works (PAH) and CEDD TC No. 11/2019, the project office is required to draw up a Construction and Demolition Material Management Plan (C&DMMP) at the feasibility study or preliminary design stage of each project, which generates more than 50,000 m³ of C&D materials. For projects with more than 300,000 m³ of surplus inert C&D materials, a C&DMMP should be prepared and submitted to the Public Fill Committee (PFC) for in-principle approval prior to commencement of the detailed design. Given that this Project is anticipated to generate less than 50,000 m³ of C&D materials, as demonstrated in **Table 6-1**, no C&DMMP is required.

Non-inert C&D Materials

- 6.2.7. It is estimated that about 250 m³ of non-inert C&D materials (e.g. yard waste, vegetation, glass, metal, plastics, paper and timber/woody materials) would be generated. The majority of the non-inert C&D materials is generated during construction of the new TBB including equipment packaging and minor installation waste (e.g. cable fittings and fixing debris), with a small amount of non-inert materials generated from site clearance and demolition of the existing buildings. Such materials shall be segregated from general refuse and considered first for reuse/recycling as far as practicable before disposal.
- 6.2.8. Timber/woody materials will be sent to the Yard Waste Recycling Centre in Y-Park for recycling as far as possible. Surplus non-inert C&D materials are proposed to be disposed at West New Territories (WENT) Landfill at Tuen Mun. The designated disposal site of non-inert C&D materials shall be confirmed with the EPD. Since the works will not be conducted simultaneously, it is estimated that a maximum of 1 truck trip per day would be required for the disposal at WENT Landfill.

6.2.9. Specifically, to minimize the generation of yard waste, the project proponent shall:

- Avoid unnecessary removal or excessive pruning of trees. Preserve trees in their original locations and implement tree transplanting when on-site preservation is not feasible.
- Segregate various types of yard waste and shred wood to facilitate reuse and recycling.
- Reuse yard waste on-site for a variety of purposes (e.g., decomposition and composting, recreational and decorative uses, and mulching in planting areas, etc.).
- Identify recycling options (e.g. delivery to Y-Park) for yard waste that cannot be directly reused on-site.

6.2.10. Where yard waste generation is unavoidable, sorting of yard waste for recycling and reuse on-site should always be prioritized. Yard waste shall be separated from C&D material to facilitate recycling, such as delivering them to Y Park so as to minimize the quantity of waste to be disposed of at the landfill site. Where appropriate, the Contractor should cut and shred the yard waste to meet the collection requirement of the recycling outlet for processing. Disposal of yard waste directly at landfills should only be regarded as the last resort when no alternatives are available.

Chemical Waste

6.2.11. Materials classified as chemical waste are listed in the Waste Disposal (Chemical Waste) (General) Regulation and shall require special handling and storage arrangements by the Contractor. Without appropriate disposal and/ or storage, chemical waste may pose cause toxic effects to works, adverse effects on water quality due to spills and fire hazards.

6.2.12. Storage, handling, transport and disposal of chemical waste should be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste published by the EPD. All chemical waste shall be collected by a licensed chemical waste collector and recycled by a licensed facility or disposed of at a licensed chemical waste treatment and disposal facility such as Chemical Waste Treatment Centre (CWTC) at Tsing Yi. Unused chemical or those with remaining functional capacity will be reused and recycled on site or by licensed companies. Provided that the handling, storage and disposal of chemical wastes are to be in accordance with these requirements, adverse environmental impacts (including potential hazard, air and odour emissions, noise and wastewater discharges) or public transport impact would not be expected.

6.2.13. The maintenance and servicing of construction plants and vehicles would generate a negligibly small amount of chemical wastes, for instance, oil / grease, cleaning fluids, solvents, lubrication oil and fuel, used oil filter and scrap batteries. It is difficult to quantify the amount of chemical waste that would arise from the construction activities as it would be highly dependent on the Contractor's on-site maintenance activities and the quantity of plant and equipment utilised.

6.2.14. Nevertheless, it is anticipated that the quantity of chemical waste will be in the order of few hundred litres per month, as shown in **Table 6-1**. The amount of

chemical waste to be generated shall be quantified in the Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) to be prepared by the Contractor in the subsequent construction stage.

Land-based Sediment

- 6.2.15. The Project Site is situated on reclaimed land. Ground investigation (GI) was conducted in July 1995 at the Site under Contract No. GE/93/06. According to the Ground Investigation Report under Agreement No. CE 18/92 for West Kowloon Transfer Station, boreholes were constructed by rotary drilling to reveal the geological features of the Site. As shown in **Appendix F**, no drillholes in this 1995 GI report fall within the excavation footprint of the Project Site (i.e. proposed TBB). For the two drillholes closest to the Project Site (i.e. borehole: D1, D2, which are about 11m away from the excavation extent for TBB), potential MARINE DEPOSIT was encountered at 17.0-17.5 to 19.0-20.0 metres below ground.
- 6.2.16. Ground investigation was also conducted recently in November 2023 at the Site under Contract No. EP/SP/170/20 (see **Appendix F** for records). There are four boreholes (i.e. WK-BH1 to WK-BH4) that fall within the proposed excavation footprint of this Project Site and hence considered relevant to this ERR. According to the borehole records for these four boreholes, MARINE DEPOSIT was encountered at 11.0 to 24.0 metres below ground in borehole location WK-BH1, which is located near the existing maintenance workshop. No marine deposits were encountered on the other three boreholes.
- 6.2.17. Given that the proposed excavation for the proposed TBB and elevated walkway pile cap involves pile drilling works with an average drill depth of 47 m and 30 m respectively, marine deposit is likely to be anticipated from the proposed drilling works. Assuming a marine deposit depth of 13 metres from the 2023 GI record (i.e. for WK-BH1), and a total of 91 drilled piles (88 for TBB and 3 for elevated walkway pile cap, using 610mm diameter piles), a total of about 346 m³ of land-based sediments is anticipated. See **Appendix G** for excavation details.
- 6.2.18. Whenever feasible, the excavated land-based sediment should be reused within the Project Site before disposal is considered. Subject to the availability of a suitable location and a review of the backfilling method, part or all of the land-based marine sediment may be reused on site. To minimize off-site disposal, the excavated land-based sediment is proposed to be reused on-site as part of the Project, such as for backfilling. Before reuse, the sediment will undergo treatment using the stabilization/solidification (S/S) technique, where it will be mixed with cement (e.g. Portland cement). The criteria for reuse of treated sediments are proposed with reference to the Unconfined Compressive Strength (UCS), which is a test of material strength, and the Universal Treatment Standard (UTS) under US 40 CFR 268.48, which specifies the Toxicity Characteristics Leaching Procedure (TCLP) test limits for hazardous chemicals. If the treated sediment does not meet these standards, it will be re-treated and re-tested until compliance is achieved.
- 6.2.19. The marine disposal option for the land-based marine sediment should only be considered as a last resort after all reuse options have been exhausted. In this case, the handling and disposal of these excavated materials shall be conducted in accordance with Chapter 4, Section 4.2.1 of PAH and Dumping at Sea Ordinance (Cap.466), including the submission of the Sediment Sampling and Testing Plan (SSTP) and Sediment Quality Report (SQR) to the Marine Dumping Control Section of EPD for approval.

General Refuse

- 6.2.20. General refuse comprises general site wastes, such as packaging and container waste from materials and equipment used on the site, and refuse generated by workforce. It is estimated that around 100 workers would be working on site per day during the construction phase. Based on a generation rate of 0.65kg per worker per day, the daily general refuse generated during the construction period will be about 65 kg. Estimated quantity of general refuse generated during construction phase is shown in **Table 6-1** below.
- 6.2.21. The general refuse will be collected on-site on a daily basis and separately from C&D materials by an appropriate waste collector to be employed by the Contractor. Prior to disposal off-site, such refuse will be temporarily stored in suitably covered storage areas/ bins, sorted (e.g. metal, paper and plastic) and recycled as appropriate. The general refuse will also have to be regularly cleaned and maintained to avoid attracting vermin and pests. With proper on-site handling and storage as well as regular disposal of the waste, no unacceptable environmental impact (including potential hazard, air and odour emissions, noise and wastewater discharges) or public transport impact would be anticipated.

Table 6-1 Summary of Estimated Quantities of Construction Waste Generated

Construction Waste Type	Estimated Quantity (m ³)			Proposed Final Treatment Method
	Generated	Re-use onsite	Final Treatment	
Inert C&D Materials (e.g. fill, rock, concrete)	5,062	51	5,011	Reuse onsite subject to site conditions prior to delivery to public fill reception facility (Tuen Mun Area 38 Fill Bank) as last resort.
Non-Inert C&D Materials (e.g. vegetation, timber, papers, plastics, metal)	250	0	250	Recycle subject to site conditions (e.g. recycle timber and woody materials at Y-Park) prior to disposal to WENT Landfill as last resort.
Excavated Sediments	346	346	-	In-situ treatment by S/S and reuse on site afterwards (e.g. backfilling)
Chemical Waste	Few hundred litres per month	Recycle subject to site conditions		Recycle subject to site conditions prior to collection by a licensed chemical waste collector to be disposed of at the CWTC as last resort.
General Refuse	65 kg per day	Recycle subject to site conditions		Recycle onsite subject to site conditions prior to disposal to WENT Landfill as last resort.

Mitigation Measures

- 6.2.22. The mitigation measures for the construction phase are recommended based on the waste management hierarchy principles in descending order of preference, i.e. avoidance, minimisation, reuse, recycling, treatment and disposal. Recommendations of good site practices, waste reduction measures as well as the waste transportation, storage and collection are described in following sub-sections.

General – Good Site Practice and Waste Reduction Measures

6.2.23. Unacceptable waste management implications are not expected, provided that good site practices are strictly implemented. The following recommendations will be implemented during the construction phase. With the appropriate implementation of these proposed mitigation measures, no waste management implication in general is envisaged.

- Obtain relevant waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and the subsidiary regulations, the Land (Miscellaneous Provision) Ordinance (Cap.28);
- Prepare a Waste Management Plan approved by the Engineer / Supervising Officer of the Project based on current best practice on Construction Sites;
- Licensed waste collector to collect waste;
- Implementation of trip ticket system with reference to DEVB TC(W) No. 6/2010 Trip Ticket System for Disposal of Construction & Demolition Materials;
- Provide staff training for proper waste management and chemical waste handling procedures;
- Separation of chemical waste for special handling and dispose to licensed facility for treatment;
- Sufficient waste disposal points and regular collection programme setup; and
- Recording system for waste generation, recycle and disposal.

6.2.24. The ETWB TCW No.19/2005 “Environmental Management on Construction” includes procedures on waste management requiring contractors to reduce the C&D material to be disposed of during construction. Under ETWB TCW No.19/2005, the Contractor is required to prepare and implement an Environmental Management Plan (EMP) and the Waste Management Plan (WMP) should be part of the EMP.

C&D Materials

6.2.25. Prior to disposal of C&D waste, the following practices should be implemented.

- Wood, steel and other materials should be separated for reuse and recycling to minimize the quantity of waste to be disposed of at the landfill;
- Minimize use of wood and reuse non-timber formwork to reduce C&D waste;
- Segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; and

- Designated areas for different materials storage should be assigned for segregation.

- 6.2.26. In managing and disposing of removed trees and vegetation, sorting of yard waste for recycling and reuse on-site should always be prioritized. Yard waste shall be separated from C&D material to facilitate recycling, such as delivering them to Y Park so as to minimize the quantity of waste to be disposed of at the landfill site. Where appropriate, the Contractor should cut and shred the yard waste to meet the collection requirement of the recycling outlet for processing. Disposal of yard waste directly at landfills should only be regarded as the last resort when no alternatives are available.
- 6.2.27. Well-planned design and good site management can minimize over-loading and generation of waste materials such as concrete and cement grouts. Wooden frame should be replaced by metals. Plastic fencing and reusable site office structure can reduce C&D waste generation.
- 6.2.28. Under the Construction Waste Disposal Charging Scheme, construction waste producers such as construction and renovation contractors and premises owners, prior to using government waste disposal facilities, need to prepare a billing account with EPD and pay for construction waste disposal.
- 6.2.29. A trip-ticket system will be implemented for surplus C&D materials disposal in accordance with DEVB TC(W) No. 6/2010 and the Construction Waste Disposal Charging Scheme. Waste should be delivered to a public fill reception facility. Copies or counterfoils of trip tickets will be kept for record purpose.
- 6.2.30. With the appropriate implementation of these proposed mitigation measures, no waste management implication in C&D wastes during construction is envisaged.

Excavated Sediments

- 6.2.31. To minimize exposure to the excavated sediments, workers shall, if necessary, wear appropriate personal protective equipment (PPE) when handling the sediments, if necessary. Adequate washing and cleaning facilities shall also be provided on-site.
- 6.2.32. Stockpiling of sediments should be avoided whenever possible. If temporary stockpiling is necessary, the excavated sediment must be covered with tarpaulin, and the area should be enclosed with earth bunds or sandbags to prevent leachate from entering the ground, nearby drains, or surrounding water bodies. The stockpiles must be fully paved or lined to prevent contamination of underlying soil or groundwater. Separate, clearly defined areas should be designated for stockpiling the excavated sediments. Any leachate generated must be collected and discharged in accordance with the Water Pollution Control Ordinance (WPCO).
- 6.2.33. Whenever possible, excavated land-based sediment should be reused on the Project Site before considering disposal, such as for backfilling purposes. As discussed in **Section 6.2.18**, the sediments will undergo treatment through cement stabilization/solidification (S/S) technique by mixing with cement. The treated material will then be tested for chemical toxicity test (via UTS) and material strength (via UCS) prior to backfilling. If the treated sediment does not comply with these standards, it will undergo re-treatment and re-testing until it achieves compliance.

- 6.2.34. To reduce potential odor and dust emissions during excavation and transportation, excavated sediments must be kept moist during excavation and handling. Additionally, sediments should be properly covered when loaded onto trucks or barges. When loading onto barges, precautions must be taken to prevent sediment slurry from splashing or overflowing into surrounding waters.
- 6.2.35. If marine disposal of sediment becomes unavoidable after all reuse options have been exhausted, the project proponent will submit proposals for sampling and chemical testing of the sediments to DEP for approval, with reference to the sediment quality criteria in Appendix 4.8 of PAH. Subsequent submissions of Sediment Sampling and Testing Plan (SSTP) and Sediment Quality Report (SQR) shall be made to the EPD's Marine Dumping Control Section / Territorial Control Office for approval if a dumping permit under DASO is required. The rationale for sediment removal or disposal must also be submitted to the Marine Fill Committee (MFC) / CEDD for approval.

Chemical Waste

- 6.2.36. During the planning stage, alternatives should be explored for the processes that generate chemical waste to eliminate the use of chemicals, reduce the generation quantities or to select a chemical type of less impact on environment, health and safety.
- 6.2.37. The Contractor should register with EPD as chemical waste producers. Storage, handling, transport and disposal of chemical waste should be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste published by the EPD. Chemical wastes should be stored in a suitable area close to the source of waste generation for temporary storage and in appropriate containers for collection by a licensed chemical waste collector for disposal at licensed facilities in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. The containers used for storage of chemical waste should be:
- Suitable for substance holding, resistant to corrosion, maintained in good condition and securely closed;
 - Capacity of less than 450 litres unless the specifications have been approved by the EPD; and
 - Displaying a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation.
- 6.2.38. With the appropriate implementation of these proposed mitigation measures, no waste management implication in chemical waste during construction is envisaged.

General Refuse

- 6.2.39. General refuse should be stored in enclosed bins or compaction units separated from C&D materials and chemical wastes. Recycling bins will be provided for sorting of general refuse. A waste collector should be employed by the Contractor to minimize odour, pest and litter impacts. Open burning of refuse on the construction site is prohibited by law.

- 6.2.40. The Contractor should carry out an education programme for workers relating to avoiding, reducing, reusing and recycling general waste. This should include provision of three-colour recycling bins and on site and posters and leaflets reminding of the use of recycling bins. It is expected that such arrangements would minimise potential environmental impacts from waste generation.
- 6.2.41. With the appropriate implementation of these proposed mitigation measures, no waste management implication in general refuse during construction is envisaged.

6.3. Operational Phase Impact

- 6.3.1. During the operation phase, the major types of wastes to be generated include the following:
- Screenings/Dewatered sludge;
 - Chemical waste generated from plant, equipment and machinery maintenance and servicing; and
 - General refuse from staff during daily operation.

Screenings/Dewatered sludge

- 6.3.2. With the increase in GTW throughput capacity from 600 to 900 m³ per day, additional screenings/dewatered sludge shall be generated. As advised by the system design engineer, depending on the GTWTF process capacity, the GTWTF will generate a total of 41 to 107 tonnes per day of screenings (average and peak capacity) and 10 to 29 tonnes per day of dewatered sludge (average and peak capacity). For the WWTP, after the proposed upgrade, a total of around 11 tonnes per day of screenings and 27 tonnes per day of dewatered sludge will be generated and sent to T-PARK for treatment if deemed suitable, with the surplus sludge to be disposed of at WENT Landfill as a last resort. The total disposal tonnage of screenings and dewatered sludge at landfill will therefore be around 89 to 174 tonnes per day, depending on the average and peak GTWTF process capacity. Refer to **Table 6-2** for the summary of the quantity of screenings and sludge before and after the proposed upgrading works for GTWTF.
- 6.3.3. For the proposed provision of a new GTWTF treatment process under this VEP application, around 89 to 174 tonnes per day of waste will be generated (as noted above), alongside a potential 60 tonnes per day recycled fat product (depending on market demand). The dewatered sludge shall be sent to the T-PARK for treatment if deemed suitable, with the surplus sludge to be disposed of at WENT Landfill as a last resort. Assuming a waste truck with a gross vehicle weight rating (GVWR) of 30,000kg and an approximate carrying weight of 50%, it is estimated that 6 to 12 truck trips per day would be required for the disposal of 89 to 174 tonnes of waste to WENT Landfill, in the worst-case where all dewatered sludge is deemed unsuitable for treatment at T-PARK and have to be landfilled. Refer to **Table 6-3** for details.
- 6.3.4. The increase in waste generation is a result of increased solids-liquid separation of received GTW by the addition of new treatment units to the proposed treatment process including screens, grit traps and sedimentation tanks, as well as new DAF and centrifuge units to be reprovisioned in the upgraded GTWTF.

The improved dewatering performance of new centrifuges also increase amount of high-grade recycled fat product with higher market and recycle value.

- 6.3.5. It should be noted that the proposed upgrade in GTWTF handling capacity allows the possibility to reuse the recovered oil and grease, and hence reduces the amount of solid residues to be otherwise disposed of at landfills. Therefore, it is not anticipated that the increase in quantity for the disposal of screenings, dewatered sludge and excessive recycled fat products at landfills will have significant adverse impact on the operation of the landfills.
- 6.3.6. While the WKTS Contractor will exercise his best efforts in marketing and selling the fat products, a portion of the fat product may not be absorbed by the market given the latest market situation. Therefore, once the on-site product storage has been exhausted and the buyer has confirmed that they could not collect the product, the unsold portion would be treated to a minimum of 30% dry solids content to meet the requirements from landfill authority in parallel with the specifications of the WKTS Contract. However, typically (e.g. with reference to approved EIA reports) waste delivered for landfill disposal should contain no free water and the liquid content should not exceed 70% by weight (i.e. 30% dry solids, also as per the WKTS Follow-on Contract (FOC) specification for landfill disposal).
- 6.3.7. The GTWTF will continue to meet its objective under the original Project Profile by reducing landfill disposal and recycling GTW as recycled fat product. The proposed provision of new GTWTF under the current VEP application will also further enhance the grease trap waste treatment and oil and grease recycling efficiency of the facility.

Chemical Waste

- 6.3.8. Chemical waste is anticipated to be generated from regular plant and equipment maintenance activities, including spent lubrication oils, organic solvents and hydraulic fluids, etc. It is anticipated that the total quantity of chemical waste produced would be insignificant with only up to a few tens of litres per month.
- 6.3.9. To minimise potential environmental impact due to waste handling, drum-type containers with proper labelling should be used to collect chemical wastes for storage at the designated areas. The collected chemical waste shall be transported off-site for treatment by a licensed chemical waste collector. The Contractor for the construction works will need to register with EPD as a chemical waste producer.

General Refuse

- 6.3.10. The amount of general refuse generated by the staff during daily operation of the WKTS including the new GTWTF will not be substantial and is expected to be less than a tonne per month. With the implementation of a proper waste handling system, the potential environmental impacts arising from the handling and disposal of the general refuse would be negligible and would not cause any major environmental concerns.

Mitigation Measures

- 6.3.11. The mitigation measures for the operational phase are recommended based on the waste management hierarchy principles in descending order of preference, i.e. avoidance, minimisation, recycling/ reuse, treatment and disposal.

Recommendations of good site practices, waste reduction measures as well as the waste transportation, storage and collection are described in following sub-sections.

General – Good Site Practice and Waste Reduction Measures

6.3.12. Unacceptable waste management implications are not expected, provided that good site practices are strictly implemented. The following recommendations will be implemented during the construction. With the appropriate implementation of these proposed mitigation measures, no waste management implication in general is envisaged.

- Obtain relevant waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and the subsidiary regulations, the Land (Miscellaneous Provision) Ordinance (Cap.28);
- Licensed waste collector to collect waste;
- Staff training in proper waste management and chemical waste handling procedures;
- Separation of chemical wastes for special handling and appropriate treatment at a licensed facility;
- Routine cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
- Provision of sufficient waste disposal points and regular collection for disposal;
- Adoption of appropriate measures to minimize windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containers; and
- Implementation of a recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites).

Chemical Waste

6.3.13. Plant/ equipment maintenance should be scheduled to optimise maintenance activities and thereby minimise the generation of chemical wastes. Chemical waste that is collected will be transported off-site for treatment by a licensed chemical waste collector. The Contractor for the construction works will need to register with EPD as a chemical waste producer.

6.3.14. Solid and liquid chemical wastes that cannot be recycled (or re-refined in the case of waste lubricants) should be disposed of at an appropriate facility, such as EPD Chemical Waste Treatment Centre on Tsing Yi. Copies/ counterfoils from collection receipts issued by the licensed chemical waste collector (showing the quantities and types of chemical waste taken off-site, and details of the treatment facility) shall be kept for a record purpose.

6.3.15. With the appropriate implementation of these proposed mitigation measures, no waste management implication in chemical waste during operational phase is envisaged.

General Refuse

- 6.3.16. Good management and control can prevent the generation of significant amounts of waste. It is recommended that the following good operational practices should be adopted to ensure waste reduction:
- Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; and
 - Encourage collection of aluminium cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by collectors. Separate labelled bins should be provided to help segregate this waste from other general refuse generated by the work force.
- 6.3.17. With the appropriate implementation of these proposed mitigation measures, no waste management implication in general during operational phase is envisaged.

6.4. EM&A Requirements

- 6.4.1. The mitigation measures discussed above and outlined in the Project Profile (Register No.: PP-271/2005) shall be followed and implemented accordingly. No additional mitigation measures or monitoring are considered necessary as no adverse waste impact is anticipated due to the proposed change of the Project. Therefore, there is no material change to waste impact during the construction and operation phases of the Project.

Table 6-2 Estimated Waste Generation of Screenings and Dewatered Sludge Before and After Proposed Upgrade

	Before Proposed Upgrade			After Proposed Upgrade		
Parameters (tonnes per day) ^[1]	GTWTF (Throughput capacity 600m ³ /day) ^[2]	WWTP (Throughput capacity 860m ³ /day) ^[2]	Total Waste Generation	GTWTF (Throughput capacity 900m ³ /day) ^[3]	WWTP (Throughput capacity 1,560m ³ /day) ^[3]	Total Waste Generation
Screenings	6	0	6	41 to 107	11	52 to 118
Dewatered Sludge	8 to 10	12	20 to 22	10 to 29	27	37 to 56
Total	-	-	26 to 28	-	-	89 to 174
Notes: 1. Assuming a GTW density of 1.0 tonne per m ³ . 2. Throughput capacity based on VEP-571/2019. 3. Proposed throughout capacity in this ERR.						

Table 6-3 Estimated Waste Generation from GTWTF

Parameters (tonnes per day) ^[1]	Project Profile, PP-271/2005 ^[2]	Assumption in VEP-501/2016 ^[3]	Assumption in VEP-571/2019 ^[4]	Proposed Value in Current VEP Application ^[5, 8]
Recycled Fat Product	14.0	5.0	44.0	60.0 ^[6]
Excess Recycled Fat Product	13.0	Nil		
Screenings/ Dewatered Sludge	31.5	23.0	31.5 (Value in Project Profile, PP-271/2005)	89 to 174 ^[7]
Notes: 1. Assuming a GTW density of 1.0 tonne per m³. 2. Corresponding GTW quantity: 400 m³ per day. 3. Corresponding GTW quantity: 500 m³ per day. 4. Corresponding GTW quantity: 600 m³ per day. 5. Corresponding GTW quantity: 900 m³ per day. 6. The actual sales of Recycled Fat Products will depend on market demand. 7. Screenings and sludge quantities will increase compared to VEP 2019 case with increase in GTW processed at the facility. As advised by the system design engineer, the total quantity of screenings/ dewatered sludge to be generated from the new GTWTF shall range between 89 and 174 tonnes per day, depending on the average/peak GTWTF treatment capacity. Details can be referred to PFD in Figure 2.2. 8. Besides increase in treatment capacity of the upgraded GTWTF, the increase in quantity of screenings and dewatered sludge is due to increased solids-liquid separation of received GTW by the addition of new treatment units to the proposed treatment process including screens, grit traps and sedimentation tanks, as well as new DAF and centrifuge units to be reprovisioned in the upgraded GTWTF.				

7. Land Contamination

7.1. Assessment Methodology

- 7.1.1. A stand-alone land contamination assessment, in the form of a Contamination Assessment Plan (CAP), had been conducted to identify potential sources of soil and/or groundwater contamination due to past and present operations at WKTS.
- 7.1.2. The assessment scope of the CAP is based on the nature and location of each proposed works, and whether land contamination is likely to result from them. Refer to **Table 7-1** below for a summary of the proposed works and the CAP assessment scope.

Table 7-1 Summary of Proposed Works and CAP Assessment Scope

Proposed Works	Location (See Figure 2.1)	CAP Assessment Scope (Rationale)
Decommission Existing GTWTF equipment	Existing GTWTF area at 1/F of TBA (no excavation required)	No (no soil excavation, no direct contact with soil)
Demolition Existing administration building, maintenance workshop and office, open storage and maintenance area, ex-dangerous goods storerooms, fire bay, open storage bay and covered storage	Existing admin building, maintenance workshop, etc.	Yes (soil excavation)
Construction New TBB, with elevated walkway connecting TBB to existing TBA	Proposed TBB site, and northwestern façade of TBA	Yes (soil excavation)
Installation New GTWTF at new TBB	Proposed TBB site	No (No soil excavation)

The assessment is undertaken based on the following:

- Guidance Note for Contaminated Land Assessment and Remediation (RBRG Guidance Note) issued by EPD (Revised in April 2023);
- Practice Guide for Investigation and Remediation of Contaminated Land (Practice Guide) issued by EPD (Revised in April 2023);
- Guidance Manual for use of Risk-Based Remediation Goals for Contaminated Land Management (Guidance Manual) issued by EPD (Revised in April 2023); and
- Legislative Council Panel on Environmental Affairs Information Note on Land Contamination Policy.

- 7.1.3. According to Section 2 of the RBRG Guidance Note, the future land use of the Project Site and the corresponding set of Risk-Based Remediation Goals (RBRGs) for the land use scenarios should be determined before the site appraisal. Since the future land use of the Project Site will continue to be industrial, the RBRGs conceptual site model for industrial land use scenarios will

be applied. Therefore, the RBRGs for industrial land use will be used in this Project.

7.1.4. As part of the assessment methodology to identify potentially contaminated areas, a desktop study had been conducted to review the current and historical land uses and identify any potential contaminated land uses, if any, within the Site. Site walkovers had also been conducted to identify the existing land uses and confirm the general environmental conditions of the Site. In addition, the following information was collected and reviewed:

- Historical aerial photographs obtained from the Lands Department (LD) and taken between 1964 and 2023;
- Information pertinent to the Site related to potential land contamination, from EPD and the Fire Services Department (FSD);
- Information of any registered Chemical Waste Producers from the EPD Regional Office;
- Previous ground investigation (GI) records within the Project boundary; and
- Records and photographs taken during site walkover within the Site boundary.

7.2. Site Appraisal Findings

7.2.1. Historical aerial photographs in the years between 1964 and 2023 were obtained from the Surveys and Mapping Office of the Lands Department (LandsD). Based on the review of historical aerial photos, no past land use with potential to cause land contamination was identified.

7.2.2. Enquiries were made to FSD on chemical waste producer record and historical spillage and leakage records at the Site, respectively. According to FSD, six dangerous goods (DG) licenses have been issued to the WKTS since 1990, but only the sodium hypochlorite storage room located near the fire bay is located within the scope of this Project, where potential land contamination risks as a result of long-term usage could not be ruled out.

7.2.3. As confirmed with FSD, there have been 12 recorded incidents related to fire alarm and traffic accidents, with no chemicals or dangerous goods involved. No fire alarms occurred within the scope of this Project. It has also been confirmed with CHEC that there have been no internal incident record of spillage/leakage incidents involving chemical or dangerous goods since CHEC became the WKTS operator in 2023. No other internal incident records were identified.

7.2.4. According to EPD, an incident of diesel spillage was recorded in 2015 near the Boiler Room at TBA and the spillage area was cleaned up immediately upon discovery. As confirmed via site visit conducted on 23 December 2024, there were no visible stains found at the spillage location indicated in the 2015 incident report (i.e. internal of Boiler Room, external wall of the Boiler Room, ground surface outside Electrical Sub-station directly below Boiler Room, access road from Boiler Room to Tank Farm), and the concrete floor slabs of the associated area were found to be in good condition. Hence no potential land contamination is anticipated. Regarding Chemical Waste Producers (CWP) registry with EPD,

there is one active CWP registered to CHEC at the Site. As confirmed via site visit, although the chemical wastes are stored in the designated cabinet within the covered storage area, potential land contamination risks as a result of long-term usage could not be ruled out.

7.2.5. In terms of site geology, the Site is located within the new West Kowloon Reclamation Area and is generally underlain by fill material comprising hydraulically placed sand. According to past ground investigation (GI) records, potential marine deposits were encountered near the proposed excavation extent for TBB as well as the existing maintenance workshop. Whenever feasible, any land-based sediment excavated from the proposed drilling works should be reused within the Project Site before disposal is considered. Before reuse, the sediment will undergo cement-mixing treatment using the stabilization/solidification (S/S) technique. The marine disposal option should only be considered as a last resort and shall be conducted in accordance with "Project Administrative Handbook Chapter 4, Section 4.2.1 (2024 Edition)" and "Dumping at Sea Ordinance (Cap.466)".

7.2.6. Based on the site walkover, the Project site is divided into the following areas based on their structure types and equipment installed. Site walkover observations and findings for various land uses at the areas of concern are summarised in **Table 7-2**.

Table 7-2 Summary of Site Walkover Observations at Areas of Concern [Note 1]

Facility and Works Area (Refer to Figure 1-1)	Description of Site Walkover Findings	Contaminant of Concern (COC)	Recommended for Further Investigation	Reason for Further Investigation
Administration Building	It is a two-storey concrete structure used as office for on-site staff. Ground floor of the building was mainly used as open plan office and meeting room. No source of land contamination was identified, and no land contamination potential is anticipated.	N/A	No	NA
Storage and Maintenance Workshop Office	It is a one-storey office located within the maintenance workshop for onsite staff, adjacent a number of storage rooms for equipment maintenance parts. The office is solely for storage purposes and office use. No source of land contamination was identified, and no land contamination potential is anticipated.	N/A	No	NA
Maintenance Workshop (Covered Area)	Maintenance of vehicles and plant equipment were carried out in the covered Maintenance Workshop area. The floor was paved with intact concrete in good conditions and suspected stains were observed during the site walkover. Potential oil leakage could not be ruled out as a result of potential leakage of the spill containment platform, maintenance of vehicles and plant equipment, spillage from oil-lubricated air compressors and the storage of oil drums and chemical containers. As the building will be demolished and excavated prior to construction of TBB, it is recommended for further site investigation.	Metals, Petroleum Carbon Ranges (PCRs), Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs)	Yes	Land Use, Identified Contamination Hotspots
Maintenance Workshop (Open Area)	Based on the site walkover, the area was used for storage of construction material, equipment / vehicles to be maintained. The open area was	Metals, PCRs, VOCs and SVOCs	Yes	Land Use

Facility and Works Area (Refer to Figure 1-1)	Description of Site Walkover Findings	Contaminant of Concern (COC)	Recommended for Further Investigation	Reason for Further Investigation
	paved with intact concrete in good conditions and no oil stain was observed during the site walkover. Nevertheless, potential oil leakage as a result of long-term usage of open maintenance activities could not be ruled out. As the area will be demolished and excavated prior to construction of TBB, it is recommended for further site investigation.			
Storerooms	The Ex-Dangerous Goods Storeroom 2 is currently listed as a D.G. storeroom by FSD for storing 1,120L of sodium hypochlorite, but was observed to be a storeroom for construction materials during the site visit. The adjacent storeroom is the Ex-Dangerous Goods Storeroom 1 was previously listed as a D.G. storeroom for 1,120L of sodium hydroxide, and was found to be empty during the site visit. The third storeroom had not been used for DG storage and was confirmed with site staff to have been used for storing gas cylinders. According to site occupier, all three storerooms had not been used previously for the storage of any hydrocarbon-containing chemicals or dangerous goods. All three storerooms were paved with intact concrete in good conditions, whilst stains were observed at the Ex-DG Storeroom 2 entrance during the site walkover. Potential oil leakage at the suspected stain location in Ex-DG Storeroom2 could not be ruled out. As the area will be demolished and excavated prior to construction of TBB, it is recommended for further site investigation.	Metals, PCRs, VOCs and SVOCs	Yes	Identified Contamination Hotspots
Covered Storage Area	The covered area was observed to be storage area for PVC pipes, construction equipment, a chemical storage cabinet and a chemical waste storage cabinet. There were a few chemical containers found on the ground without spill containment tray. Spent lubrication oil drum was observed to be stored in the chemical waste storage cabinet pending collection by licenced chemical waste collector for disposal. As confirmed with the site occupier, no fuel transfer or re-fuelling activities would take place within this area. Potential oil/chemical leakage could not be ruled out as a result of the chemical containers left on the floor and the long-term usage of chemical waste storage cabinet. As the area will be demolished and excavated prior to construction of TBB, it is recommended for further site investigation.	Metals, PCRs, VOCs and SVOCs	Yes	Identified Contamination Hotspots
Fire Bay ^[Note 1]	The open topped Fire Bay was observed to be vacant. It was paved with intact concrete in good conditions and no oil stain was observed during the site walkover. It was also confirmed with site staff that no firefighting activities had been conducted there. No source of land contamination was	N/A	No	NA

Facility and Works Area (Refer to Figure 1-1)	Description of Site Walkover Findings	Contaminant of Concern (COC)	Recommended for Further Investigation	Reason for Further Investigation
	identified, and no land contamination potential is anticipated.			
Open Storage Bay	The open storage bay was observed to be storage for construction material and metal beams/planks. It was paved with intact concrete in good condition and no oil stain was observed during the site walkover. No source of land contamination was identified, and no land contamination potential is anticipated.	N/A	No	NA
Elevated Walkway Pile Cap	The location for the proposed elevated walkway pile cap and foundation is an open area near the weighbridge control office on the northwestern side of TBA. The ground is paved with concrete and appeared to be in good condition. No activities were conducted at the location and no oil stain was observed. No source of land contamination was identified, and no land contamination potential is anticipated.	N/A	No	NA

7.3. Sampling Methodology

- 7.3.1. According to Table 2.1 of the Practice Guide, a grid sampling approach with specified grid size will be adopted for the sampling methodology for the Site. For the Project Site, a total of five (5) grid sampling locations with a square grid size of 13m and six (6) hotspot sampling locations are proposed to investigate further any potential land contamination at the identified concerned areas. Three or more soil samples, disturbed or undisturbed, shall be taken at each sampling location to verify the vertical distribution of contaminants. The detailed sampling plan is enclosed in the separately submitted CAP.
- 7.3.2. The soil and groundwater sampling shall be carried out by an experienced sampling technician (to be provided by the ground investigation contractor) and appropriate procedures shall be strictly adhered to at all times. The sampling methodologies shall be based on the technologies developed by USEPA. These methods include decontamination procedures, sample location, preparation and preservation, and chain-of-custody documentation.
- 7.3.3. Borehole drilling will be conducted via dry rotary drilling method to avoid cross-contamination without the use of a flushing medium as far as practicable. If rocks/ large boulders are encountered during the drilling, adjustment to the sampling locations will be considered. At each proposed sampling location, a groundwater sampling well should be installed if groundwater is encountered, to be agreed with the land contamination specialist.
- 7.3.4. The sampling program will be executed with strict adherence to protocols to minimize the risk of cross-contamination between sampling locations.

7.4. Analytical Programme

7.4.1. Soil and groundwater samples collected should be analysed for parameters in accordance with the sampling and testing schedule as shown in **Table 7-3** and analysed by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory or one of its Mutual Recognition Arrangement partners. The contaminants of concern are taken from the Practice Guide and are considered to comprise:

- Metals: antimony, arsenic, barium, cadmium, chromium (III), chromium (VI), cobalt, copper, lead, manganese, mercury, molybdenum, nickel, tin and zinc;
- VOCs: acetone, benzene, bromodichloromethane, 2-butanone, chloroform, ethylbenzene, methyl tert-butyl ether (MTBE), methylene chloride, styrene, tetrachloroethene (TCE), toluene, trichloroethene and xylenes (total);
- SVOCs: 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; and
- PCRs: carbon ranges C6 - C8, C9 - C16 and C17 - C35.

7.4.2. A HOKLAS accredited testing laboratory shall be appointed to conduct the chemical analysis of the soil and groundwater samples outlined in. All laboratory test methods shall be accredited by the HOKLAS or one of its Mutual Recognition Arrangement Partners.

Table 7-3 Sampling and Testing Schedule

Sampling Location ID	Potential Contaminating Land Uses / Activities	Testing Parameter ¹			
		VOCs	SVOCs	Metals	PCRs
For soil sample					
BH1 to BH5, HS1-HS5	Material and chemical storage	✓	✓	✓	✓
For groundwater sample ²					
BH1 to BH5, HS1-HS5	Material and chemical storage	✓	✓	Mercury only	✓
Note: 1. ✓ refers to full list of the testing parameters as shown in Table 2.1 – RBRGs for Soil & Soil Saturation Limit and Table 2.2 – RBRGs for Groundwater and Solubility Limit under VOCs, SVOCs, metals and PCRs in the <i>Guidance Manual</i> . 2. Samples will only be collected if groundwater is encountered during SI works.					

7.5. Interpretation of Results for Site Investigation

7.5.1. The laboratory results will be interpreted with reference to the Guidance Note and Guidance Manual. Soil and groundwater samples collected for this study will be referenced to the corresponding RBRGs.

- 7.5.2. Relevant soil and groundwater RBRGs level for this land contamination study including the Soil Saturation Limit and Solubility Limit will be provided in the subsequent Contamination Assessment Report (CAR).
- 7.5.3. In case if the test results of the soil samples collecting from the proposed sampling locations exceed the respective RBRGs, a Remediation Action Plan (RAP) will be developed in conjunction with the CAR.

7.6. Results from Contamination Assessment Report

- 7.6.1. Site investigation works at WKTS were carried out between 16 July 2025 to 23 January 2026 in accordance with the agreed CAP. A total number of 45 soil samples, including three (3) duplicates, and thirteen (13) groundwater samples, including two (2) duplicates, were collected from eleven (11) locations at the Project Site. Quality assurance / quality control (QA/QC) procedures were adopted appropriately. The testing results for QA/QC procedures indicated there was no cross contamination from the on-site environment, sampling equipment and transportation.
- 7.6.2. Laboratory testing of the collected samples was conducted by a HOKLAS accredited testing laboratory. All soil samples collected at the Project Site did not exceed the relevant RBRGs for “Industrial” land use nor soil saturation limits. In addition, no signs of NAPL were identified on-site. Soil remediation is therefore not required for the area.
- 7.6.3. All groundwater samples collected at the Project Site did not exceed the relevant RBRGs for “Industrial” land use nor the solubility limits of the respective parameters, except for two (2) groundwater samples exceeded the solubility limits of PCRs C17 – C35 Fraction. However, as no observations of stained, unnaturally colored, or wet soil above the water table; petroleum or solvent odors in soil or groundwater samples; and presence of sheen on water samples or bailer, or oily residual on soil samples, no signs of NAPL were identified. In-situ measurement of groundwater by ALS also confirmed light NAPL is not detected. Remediation for groundwater is therefore not required.

8. Other Possible Impacts on the Environment

- 8.1.1. The key potential impacts in air quality, noise, water quality and waste management have been addressed in the above sections. Other possible impacts on the environment as identified in the Project Profile PP-271/2005 (such as ecology, landscape and visual, land contamination, etc.) have also been reviewed and no change from the Project Profile PP-271/2005 has been identified. No adverse environmental impacts caused by the subject project are anticipated.

9. Conclusion

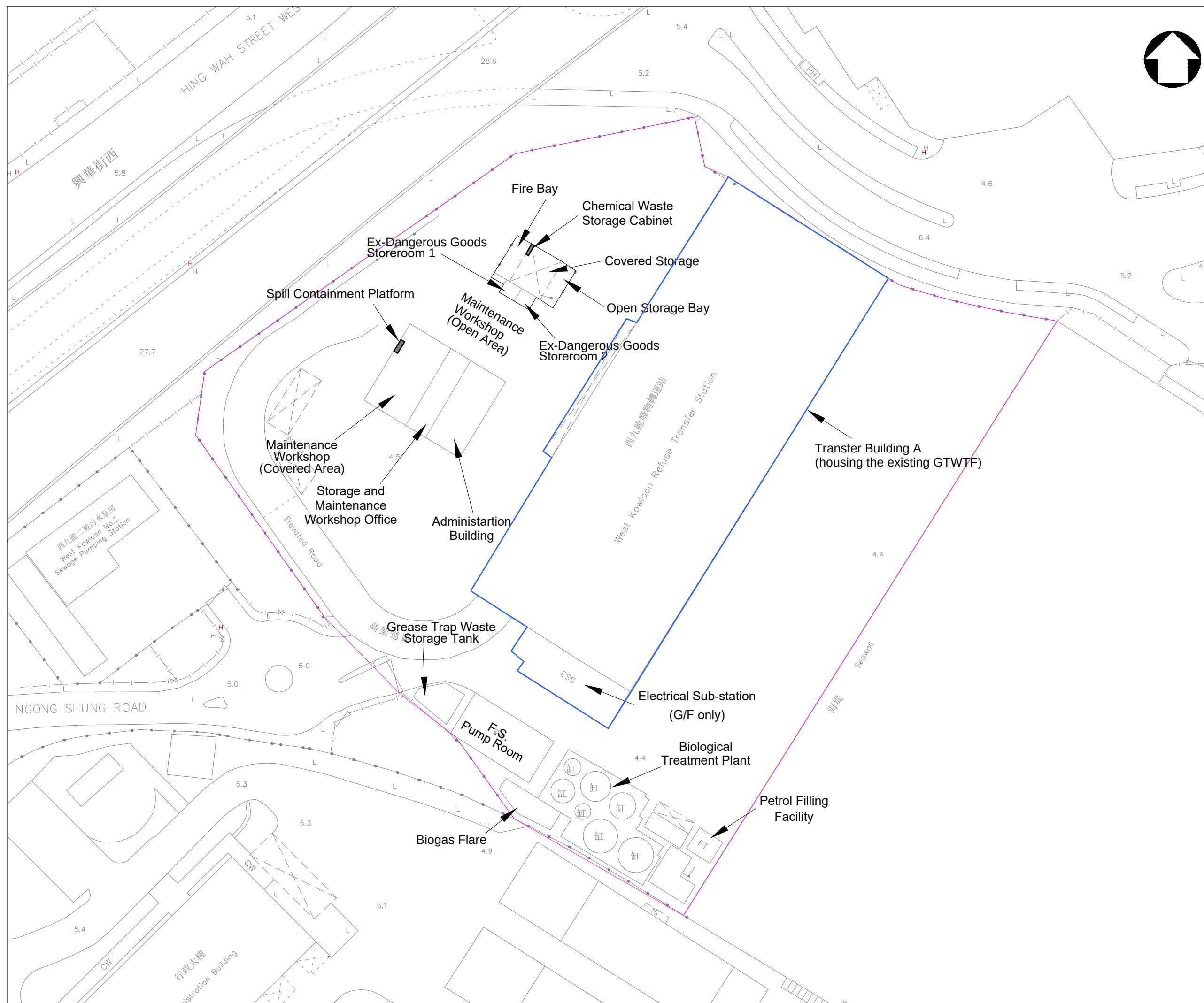
- 9.1.1. An environmental review has been conducted for the proposed upgrade of the GTWTF handling capacity from 600 m³ per day to 900 m³ per day.
- 9.1.2. The potential environmental issues pertinent to the proposed change have been assessed. With the implementation of the recommended mitigation measures, it is concluded that the proposed variation would not result in material change to the environmental impacts during both construction and operation phases. Therefore, the project still complies with the requirements described in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

Figures

Figure 1.1

Existing Site Location Plan





LEGEND:

West Kowloon Refuse Transfer Station

 Existing Transfer Building A

Rev.	Date	Description			
Drawing Status				Suitability	



Client	
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China Harbour Engineering
Company Limited

Project Title	
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Application for Variation to the
Environmental Permit for the Grease Trap Waste
Treatment Facility at West Kowloon Transfer Station
and Technical Design of Enhancement Works

Report Title

Drawing Title

Existing Site Location Plan

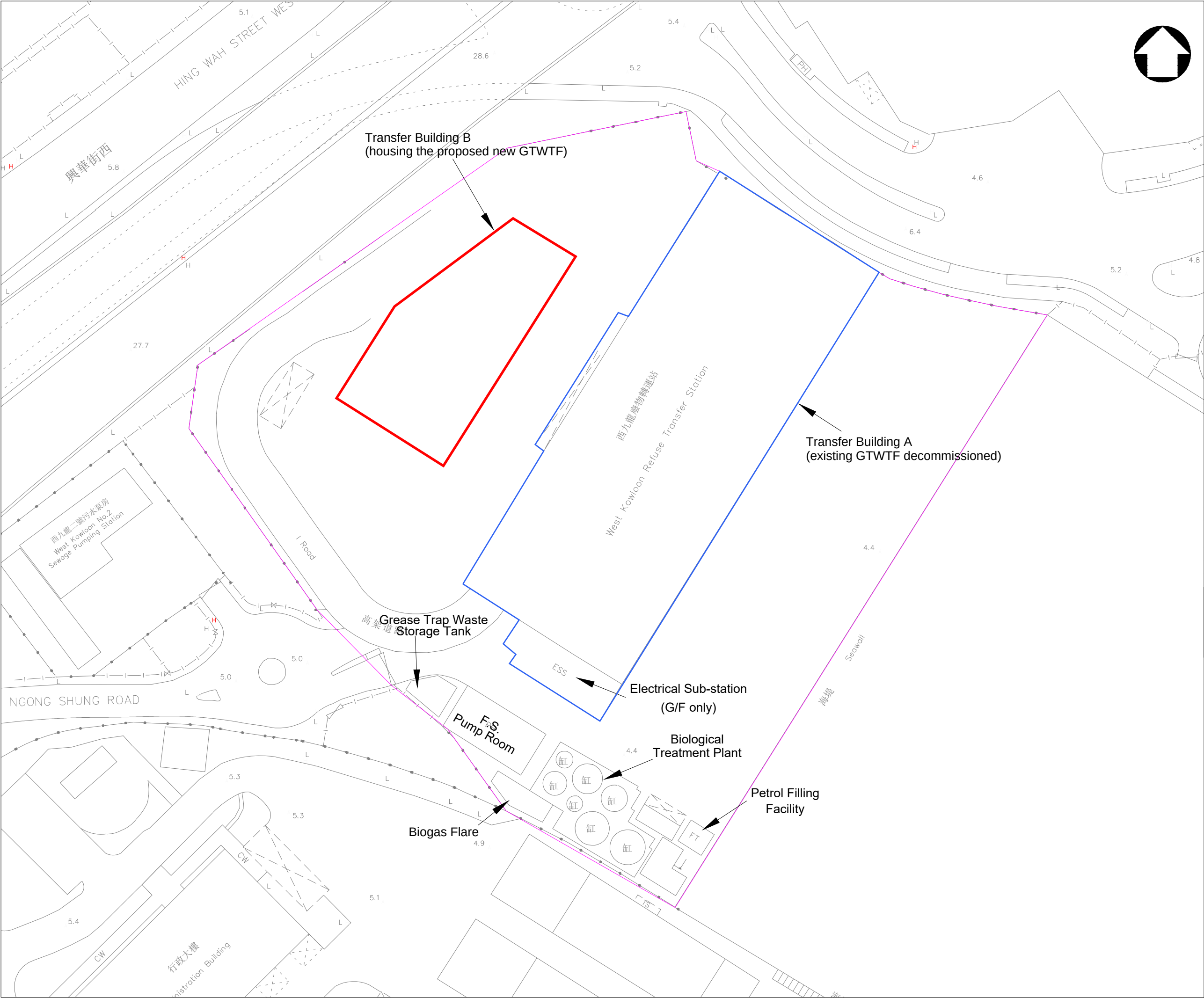
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Figure 1.1

Figure 1.2

Site Location Plan with Proposed Project





- LEGEND:
- West Kowloon Refuse Transfer Station
 - Existing Transfer Building A
 - Proposed Transfer Building B

Rev.	Date	Description			
Drawing Status				Suitability	
=				=	



Client


China Harbour Engineering Company Limited

Project Title

Application for Variation to the Environmental Permit for the Grease Trap Waste Treatment Facility at West Kowloon Transfer Station and Technical Design of Enhancement Works

Report Title

Drawing Title

Site Location Plan with Proposed Project

Drawing Number

Figure 1.2

Figure 2.1

Location of Proposed Works





- LEGEND:
- West Kowloon Transfer Station
 - Existing GTWTF to be Decommissioned
 - Existing Structures to be Demolished
 - Proposed Extent of Excavation Works
 - Areas of Concern

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status			Suitability		

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中国港湾
CHINA HARBOUR

China Harbour Engineering Company Limited

Project Title

Application for Variation to the Environmental Permit for the Grease Trap Waste Treatment Facility at West Kowloon Transfer Station and Technical Design of Enhancement Works

Drawing Title

Location of Proposed Works

Scale	Designed	Drawn	Checked	Authorised
Original Size A3	Date	Date	Date	Date
Drawing Number				Revision

Figure 2.1

Figure 2.2

Proposed GTWTF Process Flow Diagram



Figure 2.2 – Proposed GTWTF Process Flow Diagram

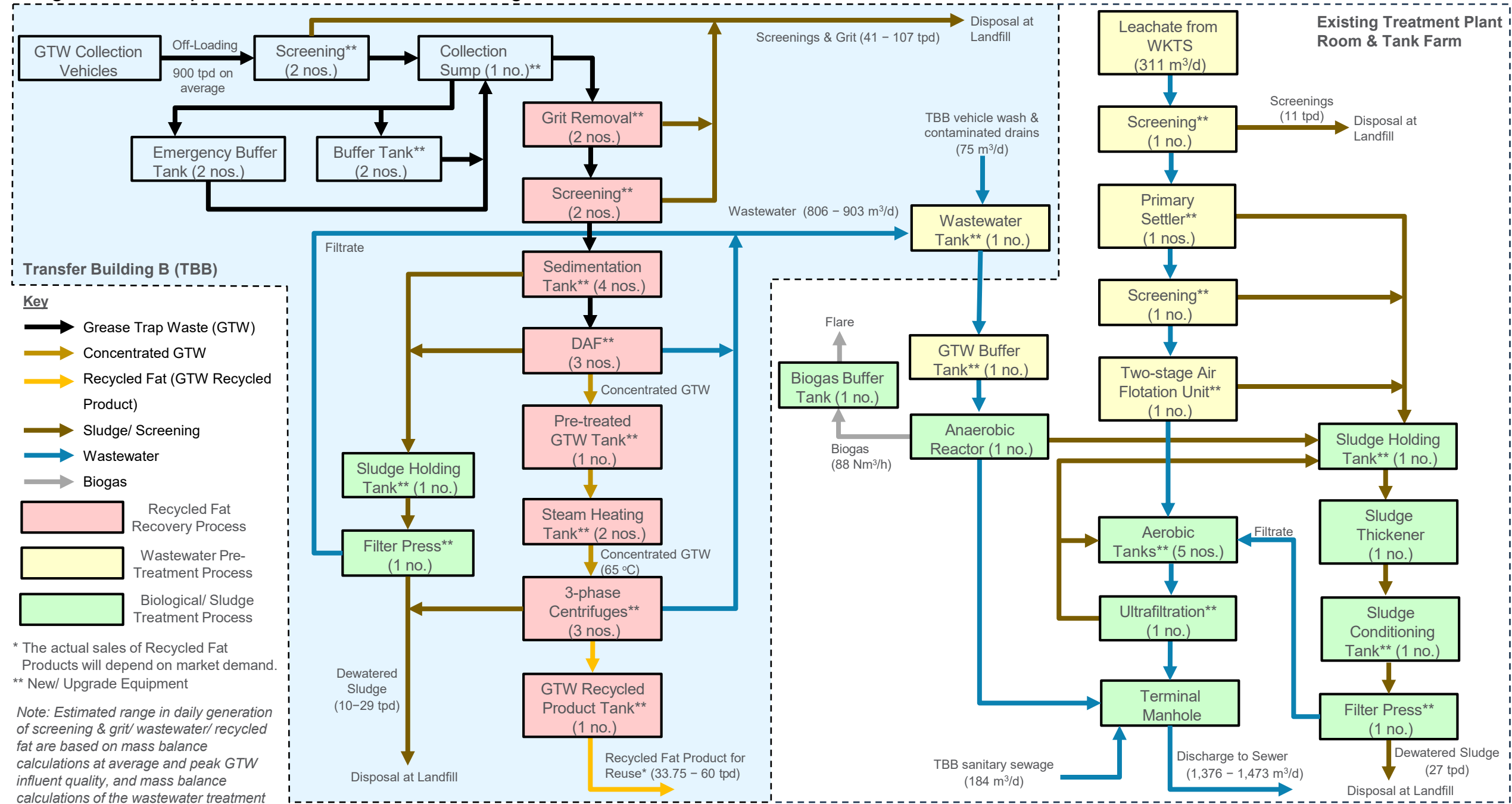
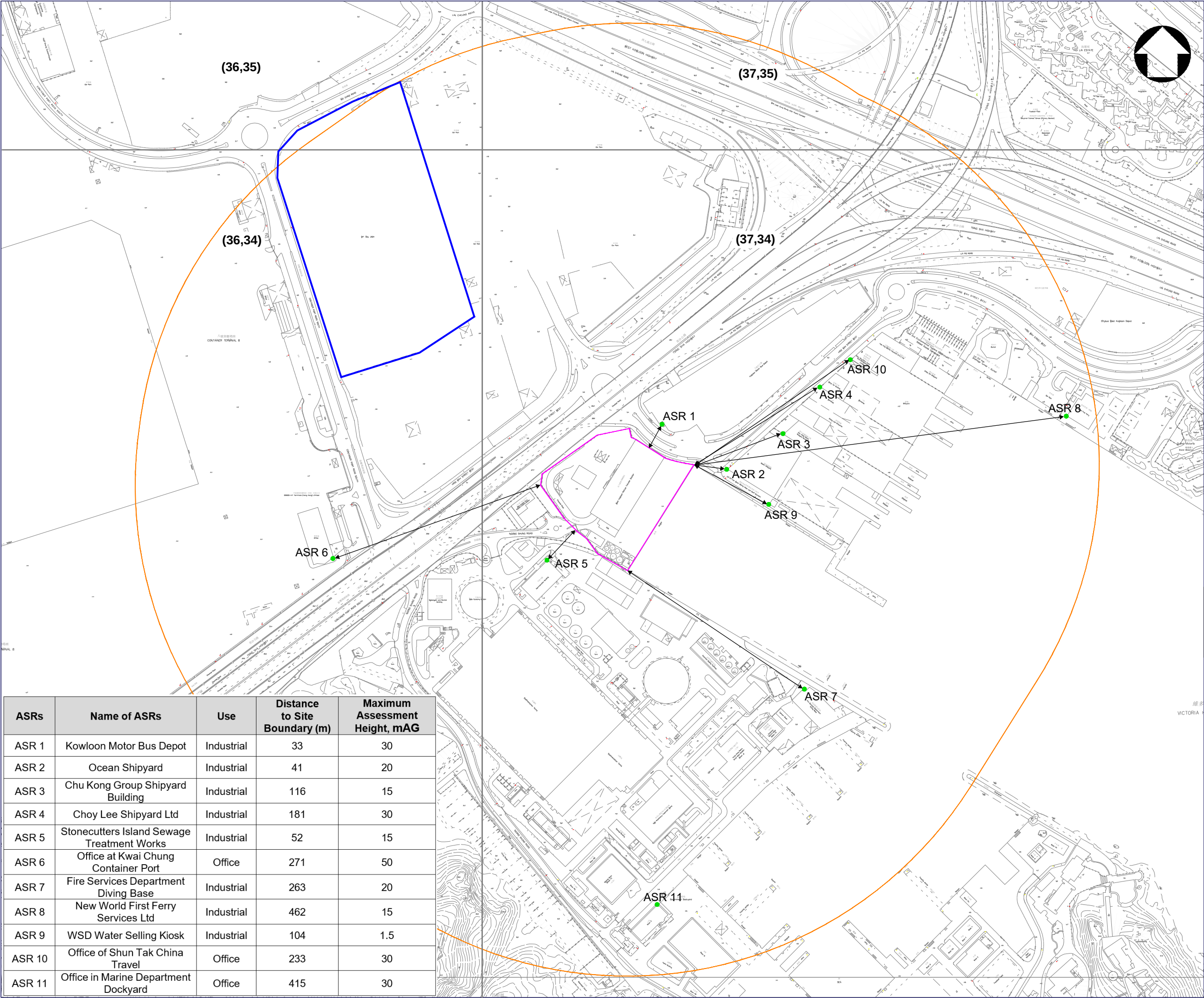


Figure 3.1

Air Sensitive Receivers in the Vicinity of WKTS





- LEGEND:
- Project Site Boundary - West Kowloon Transfer Station
 - Concurrent Project: Foundation Works for Proposed Logistics Development at Kwai Chung (KCTL No.531))
 - Locations of ASR
 - 500m Study Area
 - Shortest horizontal distance between ASR and Project Site Boundary
 - PATH Grid (X,Y)

ASRs	Name of ASRs	Use	Distance to Site Boundary (m)	Maximum Assessment Height, mAG
ASR 1	Kowloon Motor Bus Depot	Industrial	33	30
ASR 2	Ocean Shipyard	Industrial	41	20
ASR 3	Chu Kong Group Shipyard Building	Industrial	116	15
ASR 4	Choy Lee Shipyard Ltd	Industrial	181	30
ASR 5	Stonecutters Island Sewage Treatment Works	Industrial	52	15
ASR 6	Office at Kwai Chung Container Port	Office	271	50
ASR 7	Fire Services Department Diving Base	Industrial	263	20
ASR 8	New World First Ferry Services Ltd	Industrial	462	15
ASR 9	WSD Water Selling Kiosk	Industrial	104	1.5
ASR 10	Office of Shun Tak China Travel	Office	233	30
ASR 11	Office in Marine Department Dockyard	Office	415	30

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Application for Variation to the Environmental Permit for the Grease Trap Waste Treatment Facility at West Kowloon Transfer Station and Technical Design of Enhancement Works

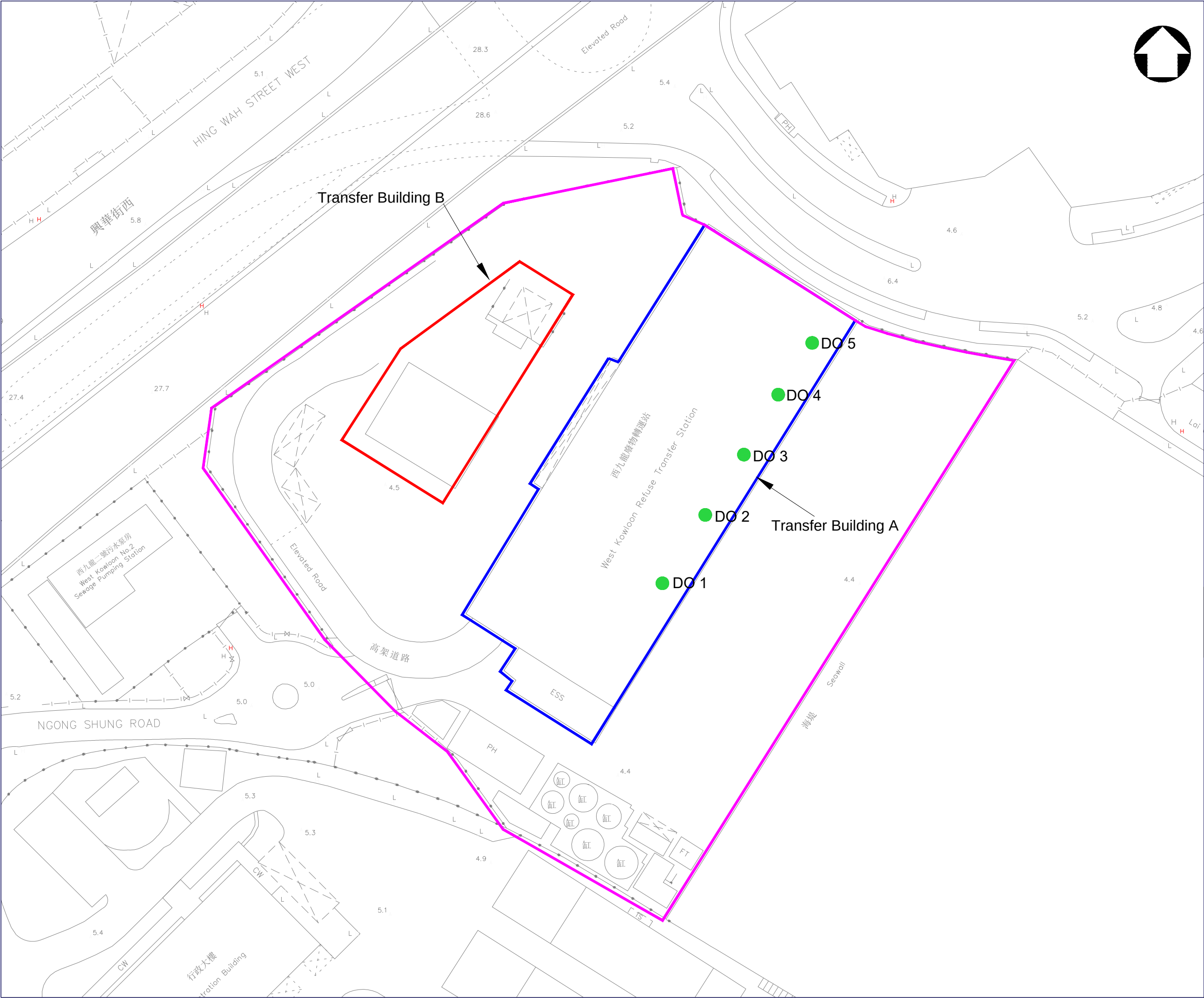
Air Sensitive Receivers in the Vicinity of WKTS

Scale	Designed	Drawn	Checked	Authorised
Original Size A3	Date	Date	Date	Date
Drawing Number	Figure 3.1			Revision

Figure 3.2

Location of Emission Sources under Existing Scenario





LEGEND:

- West Kowloon Transfer Station
- Existing Transfer Building A
- Proposed Transfer Building B (GTWTF)
- Air Emission Outlet from Air Scrubbing System

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	
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Drawing Title

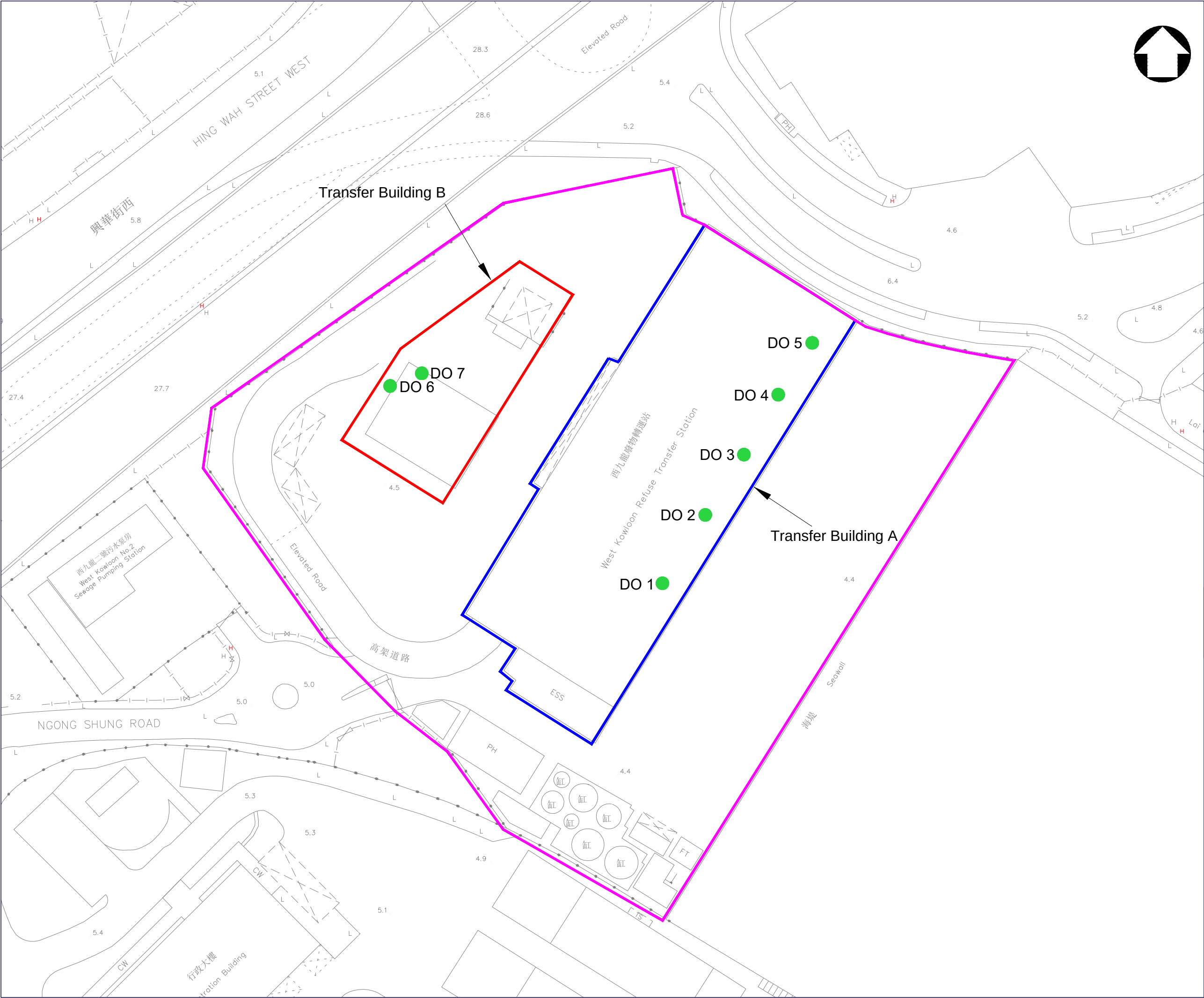
Location of Emission Sources under Existing Scenario

Scale	Designed	Drawn	Checked	Authorised
Original Size A3	Date	Date	Date	Date
Drawing Number				Revision
Figure 3.2				

Figure 3.3

Location of Emission Sources under Future Scenario





LEGEND:

- West Kowloon Transfer Station
- Existing Transfer Building A
- Proposed Transfer Building B (GTWTF)
- Air Emission Outlet from Air Scrubbing System

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	
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Application for Variation to the Environmental Permit for the Grease Trap Waste Treatment Facility at West Kowloon Transfer Station and Technical Design of Enhancement Works

Drawing Title

Location of Emission Sources under Future Scenario

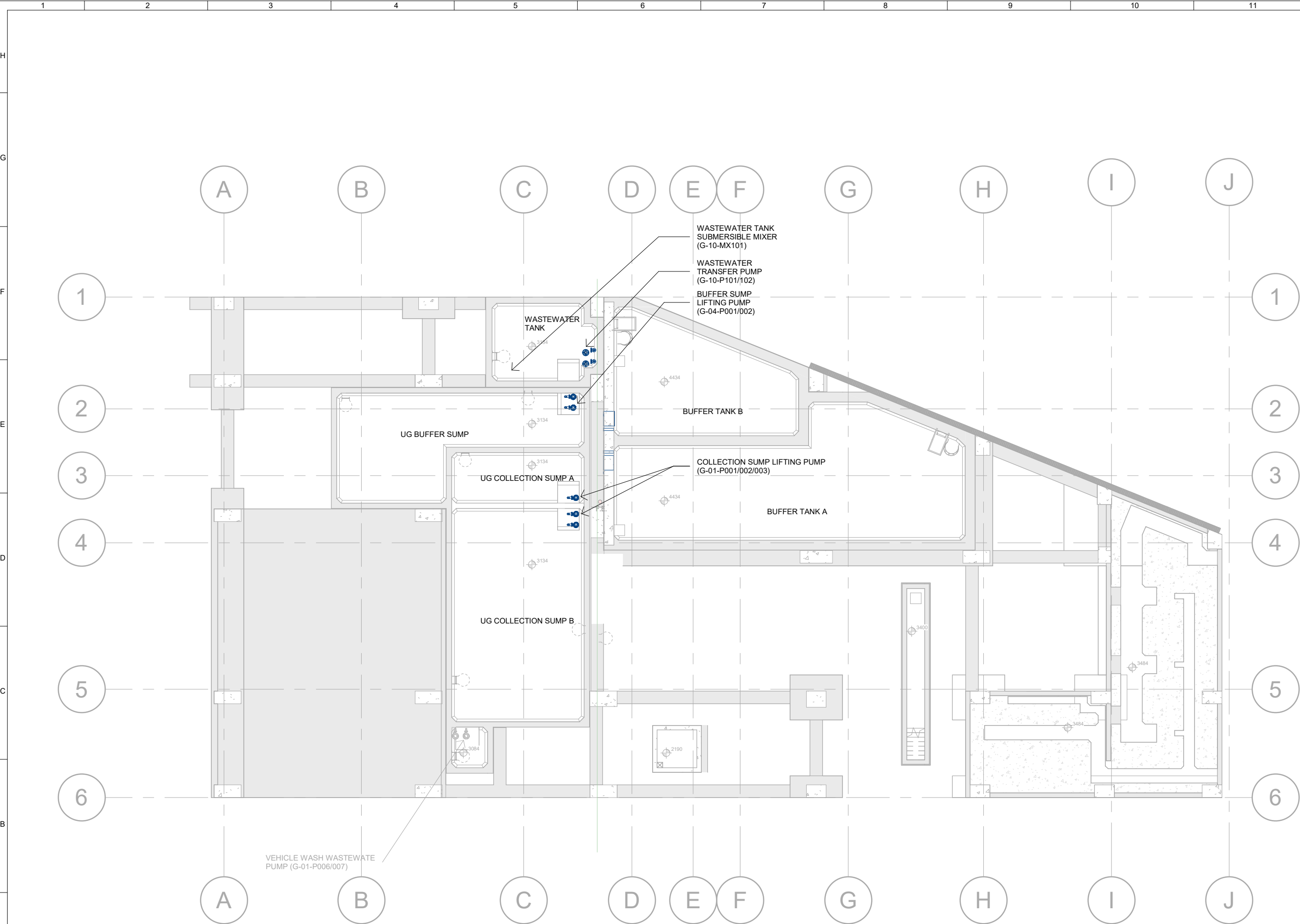
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Figure 3.3				

Appendices

Appendix A

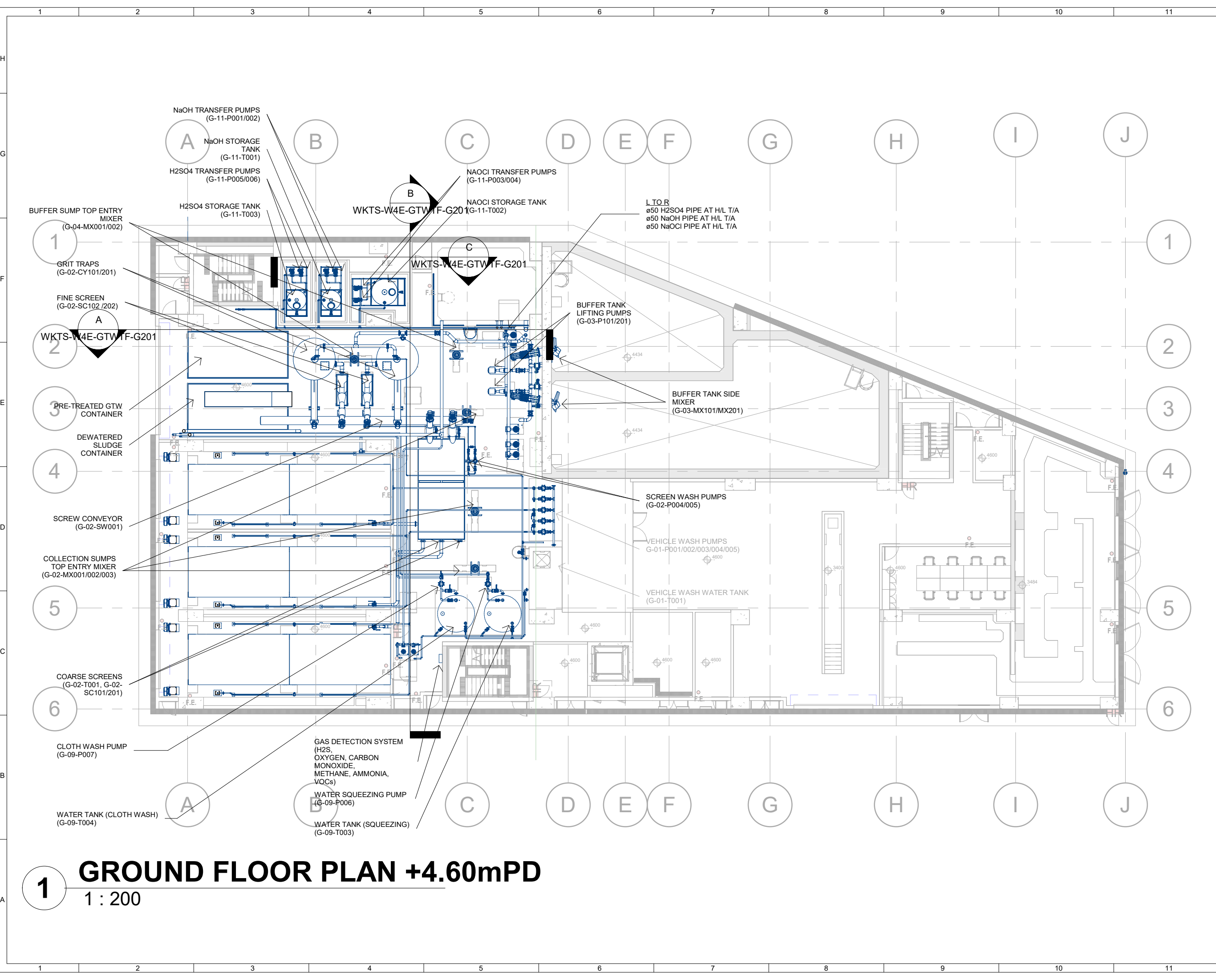
Preliminary Floor Plans for GTWTF at TBB of WKTS





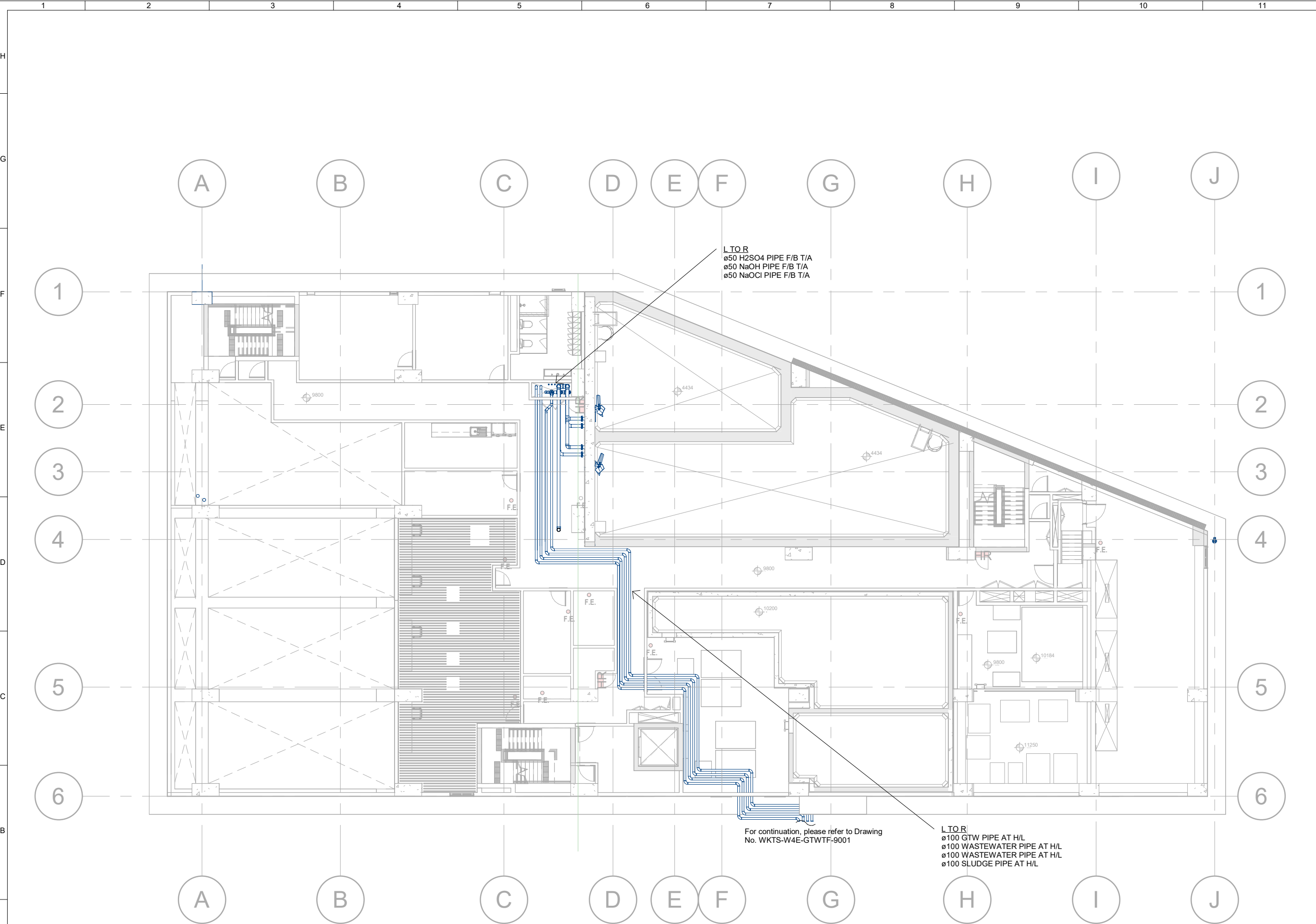
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1	06/12/2024	DDA SUBMISSION
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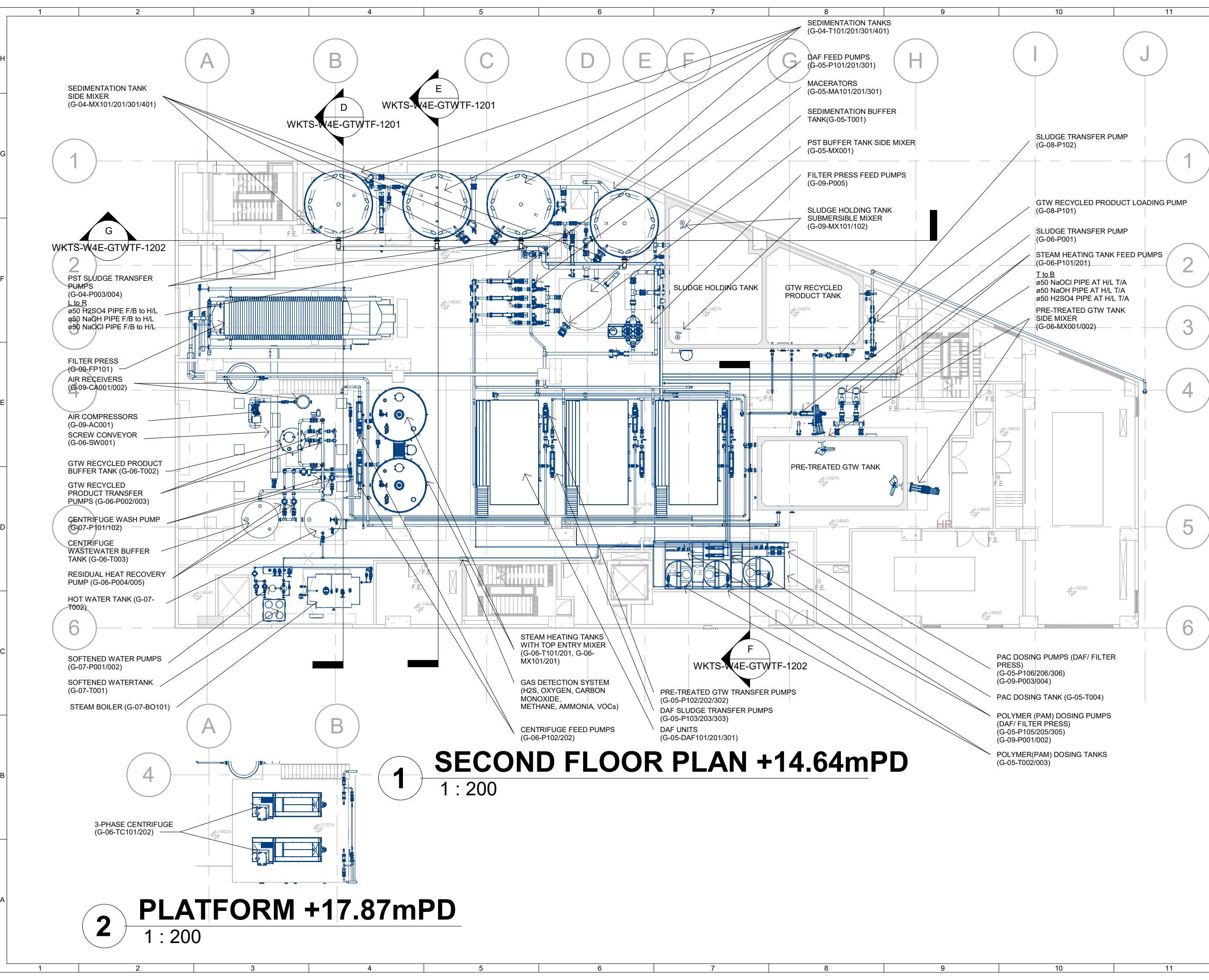
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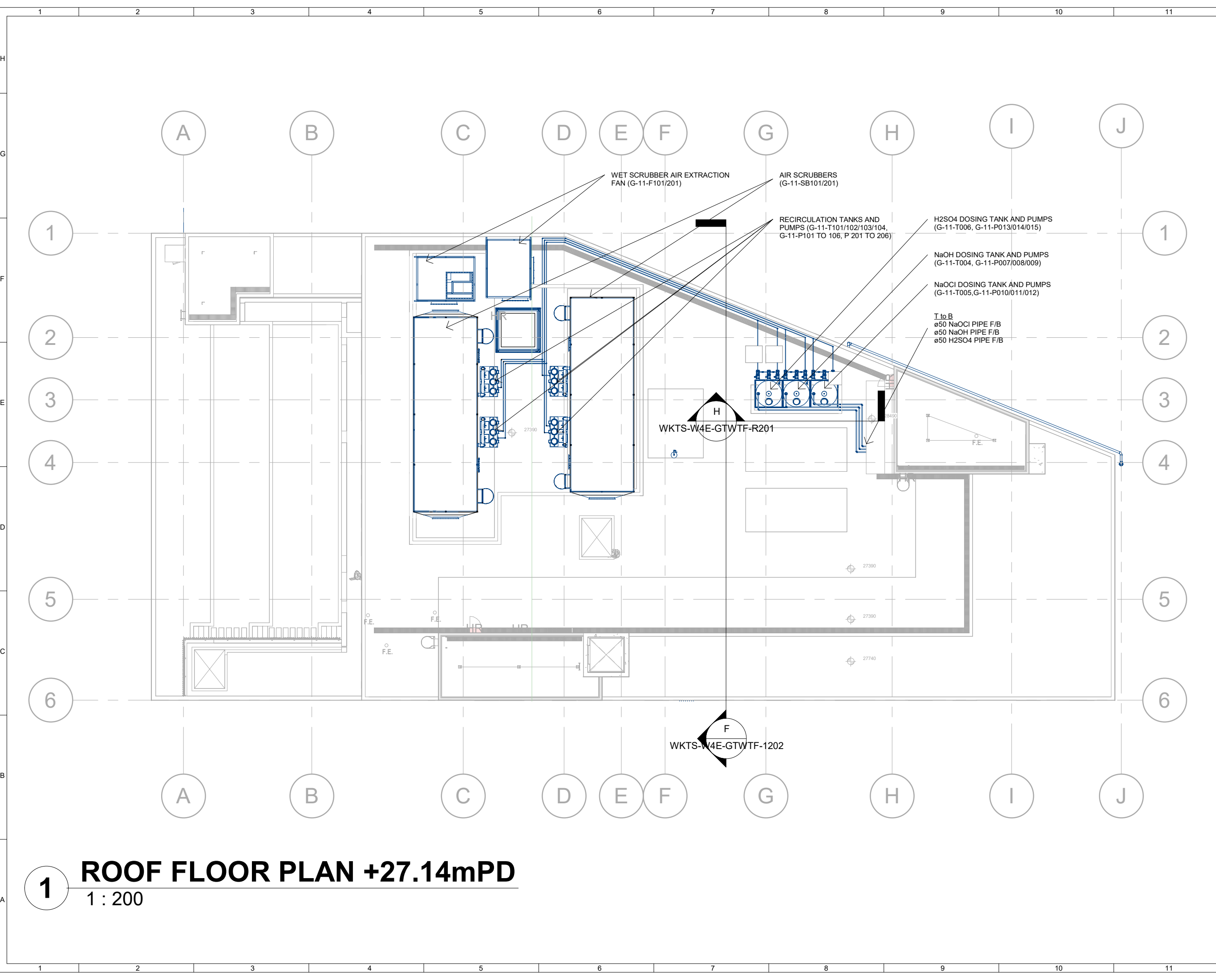
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SECOND FLOOR PLAN +14.64mPD
1 : 200

PLATFORM +17.87mPD
1 : 200

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Design Package		
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1 ROOF FLOOR PLAN +27.14mPD
1 : 200

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Project Name
Contract No. EP/SP/170/20
West Kowloon Transfer Station
Second Follow-On Contract

Design Package
WKTS-EPSP17020-DDA-13-1

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FACILITY – GENERAL ARRANGEMENT
(ROOF FLOOR)

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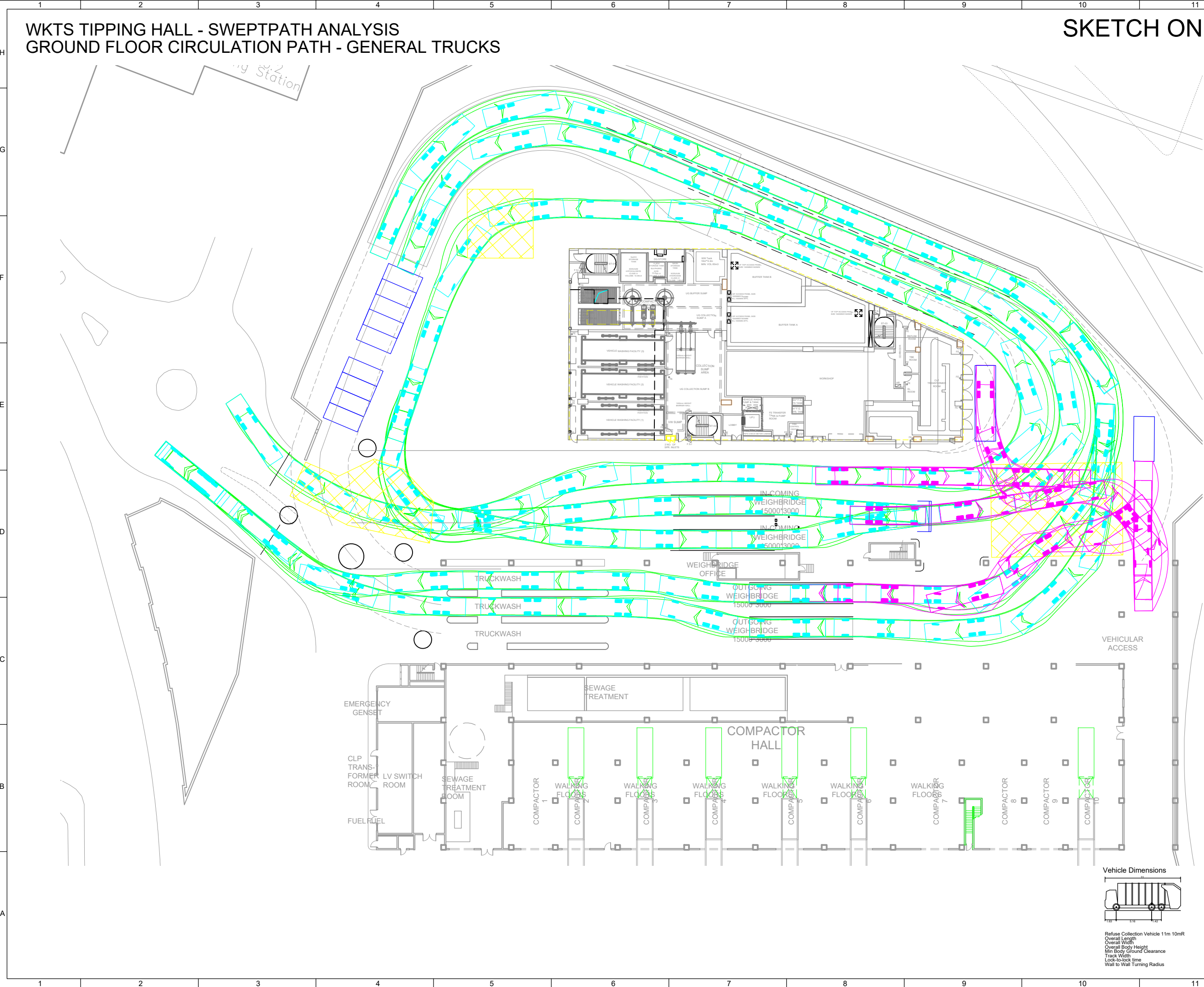
Appendix B

Proposed Traffic Routes for RCV and GTW tankers

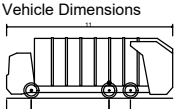


WKTS TIPPING HALL - SWEPTPATH ANALYSIS
GROUND FLOOR CIRCULATION PATH - GENERAL TRUCKS

SKETCH ONLY



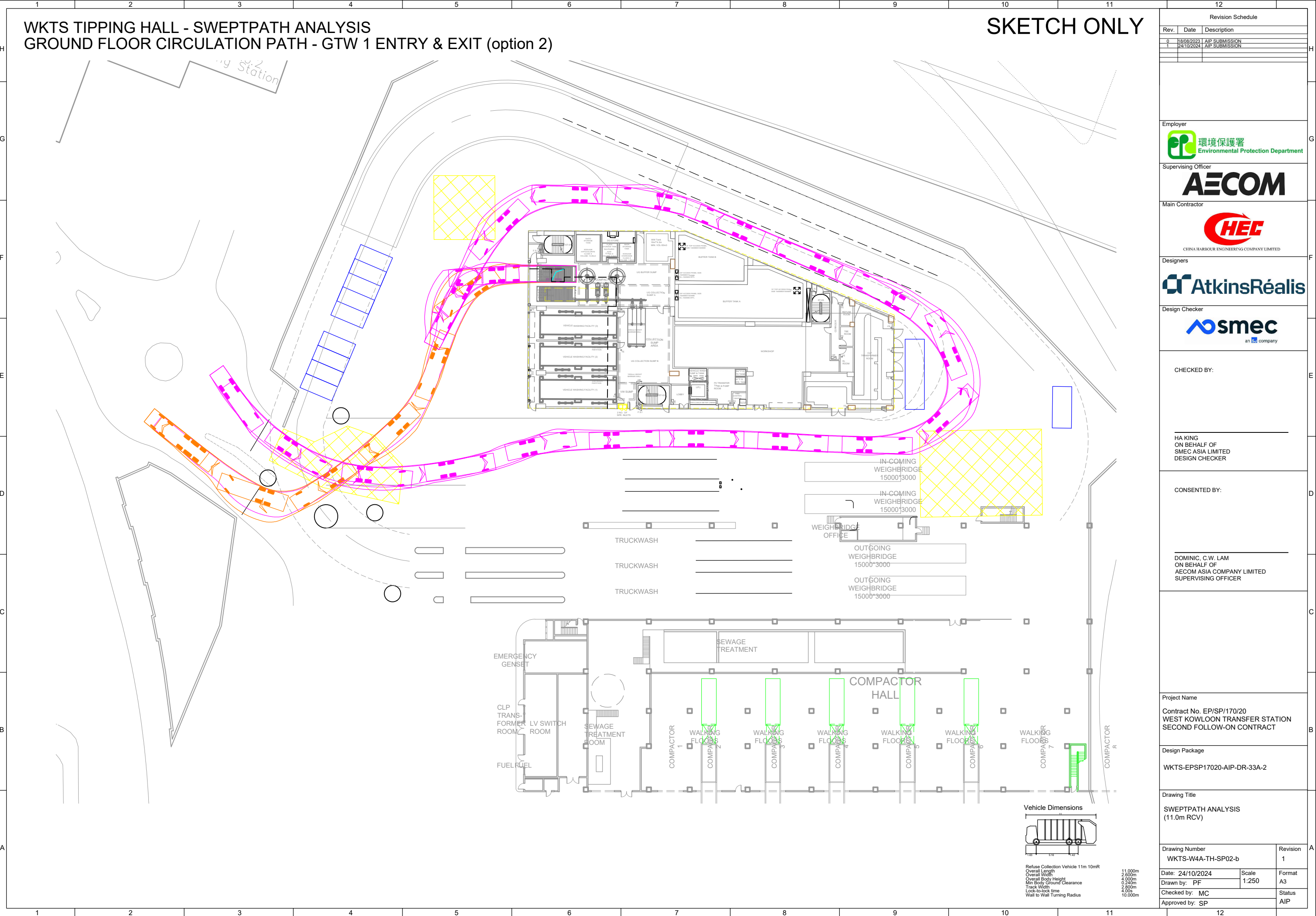
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Project Name		
Contract No. EP/SP/170/20 WEST KOWLOON TRANSFER STATION SECOND FOLLOW-ON CONTRACT		
Design Package		
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Drawn by: PF	Checked by: MC	Status: AIP
Approved by: SP		



Refuse Collection Vehicle 11m 10mR
Overall Length 11.000m
Overall Width 2.800m
Overall Body Height 4.000m
Min Body Ground Clearance 0.240m
Track Width 2.800m
Lock-to-lock time 4.00s
Wait to Wait Turning Radius 10.000m

WKTS TIPPING HALL - SWEPTPATH ANALYSIS
GROUND FLOOR CIRCULATION PATH - GTW 1 ENTRY & EXIT (option 2)

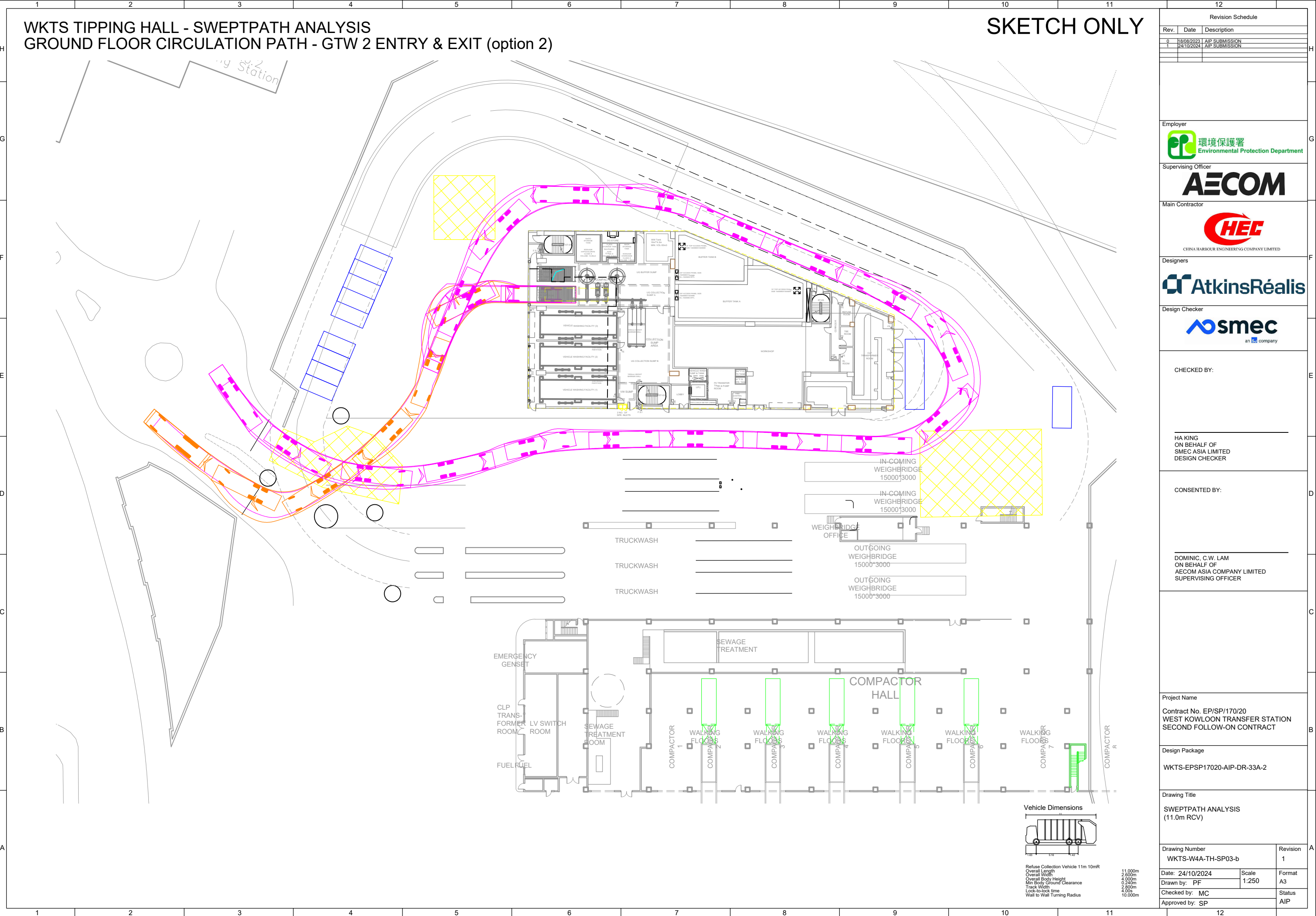
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DOMINIC, C.W. LAM ON BEHALF OF AECOM ASIA COMPANY LIMITED SUPERVISING OFFICER		
Project Name		
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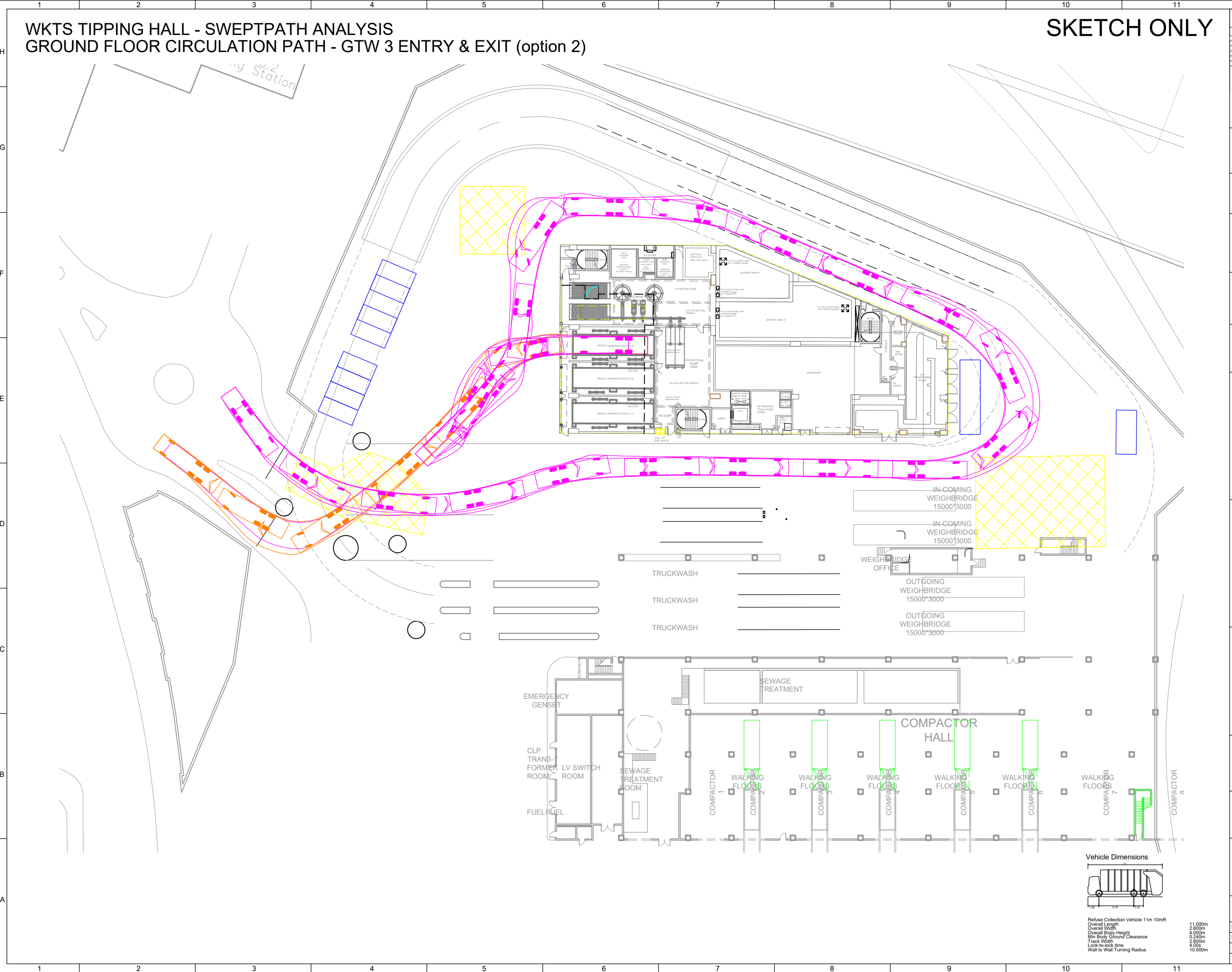
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DOMINIC, C.W. LAM ON BEHALF OF AECOM ASIA COMPANY LIMITED SUPERVISING OFFICER		
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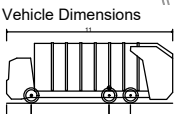
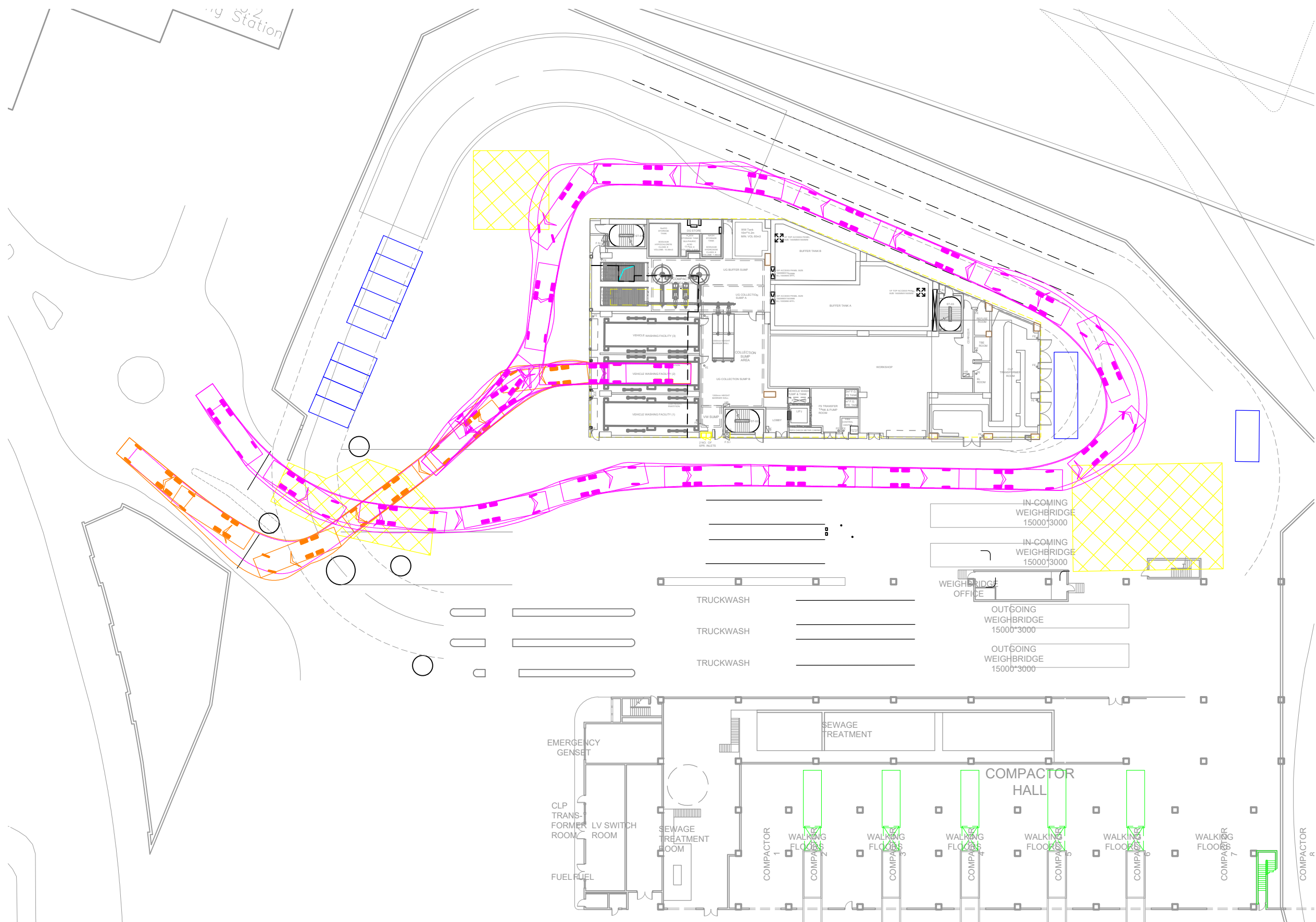
WKTS TIPPING HALL - SWEPTPATH ANALYSIS
GROUND FLOOR CIRCULATION PATH - GTW 3 ENTRY & EXIT (option 2)

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Project Name		
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Drawn by: PF	Checked by: MC	Status: AIP
Approved by: SP		

SKETCH ONLY



Refuse Collection Vehicle 11m 10mR	
Overall Length	11.000m
Overall Width	2.600m
Overall Body Height	4.000m
Min Body Ground Clearance	0.240m
Track Width	2.800m
Lock-to-lock time	4.00s
Wall to Wall Turning Radius	10.000m

Revision Schedule		
Rev.	Date	Description
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Project Name

Contract No. EP/SP/170/20
WEST KOWLOON TRANSFER STATION
SECOND FOLLOW-ON CONTRACT

Design Package

WKTS-EPSP17020-AIP-DR-33A-2

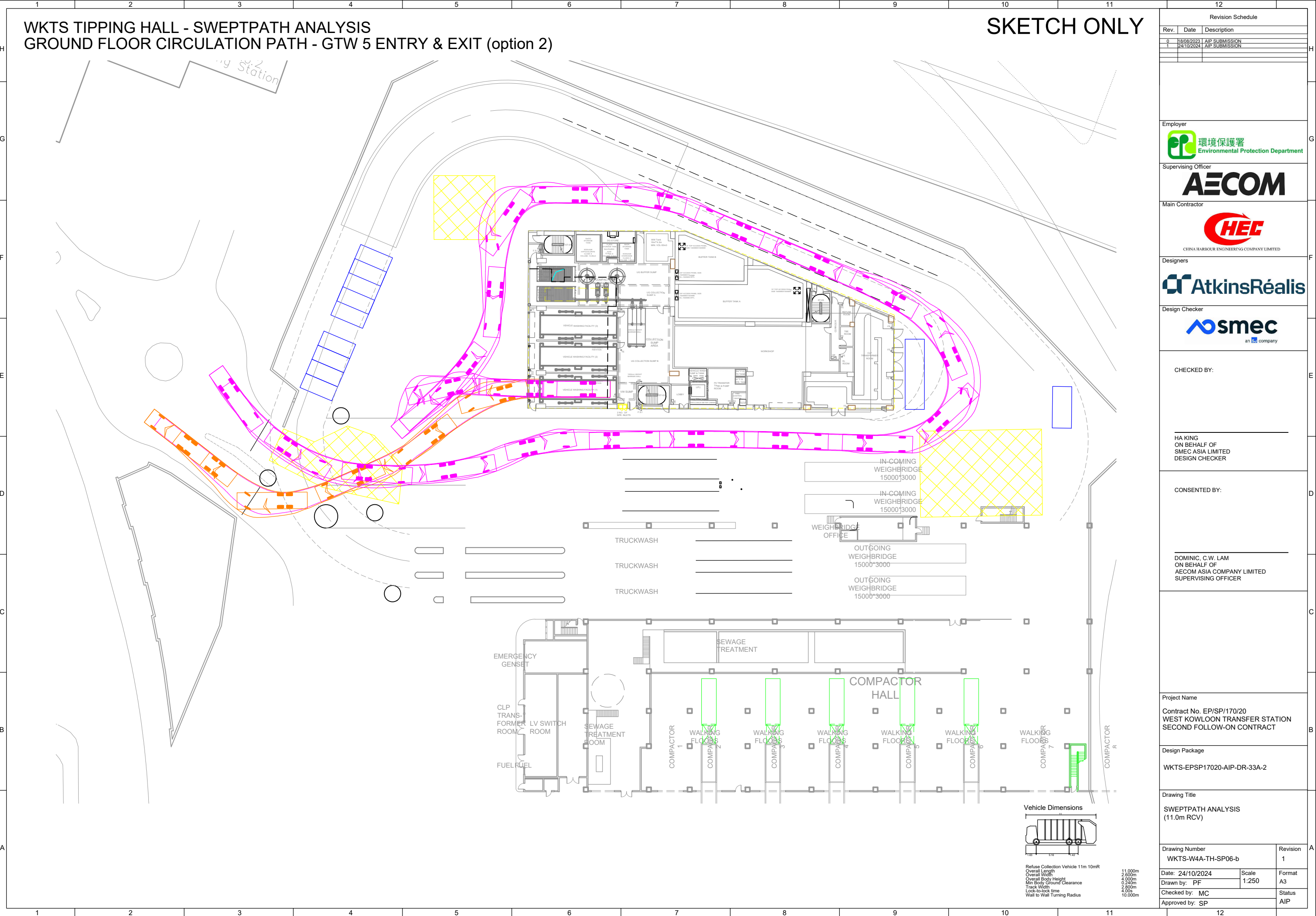
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WKTS TIPPING HALL - SWEPTPATH ANALYSIS
GROUND FLOOR CIRCULATION PATH - GTW 5 ENTRY & EXIT (option 2)

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Environmental Protection Department

Supervising Officer
AECOM

Main Contractor
HEC
CHINA HARBOUR ENGINEERING COMPANY LIMITED

Designers
AtkinsRéalis

Design Checker
smec
an AECOM company

CHECKED BY:

HA KING
ON BEHALF OF
SMEC ASIA LIMITED
DESIGN CHECKER

CONSENTED BY:

DOMINIC, C.W. LAM
ON BEHALF OF
AECOM ASIA COMPANY LIMITED
SUPERVISING OFFICER

Project Name
Contract No. EP/SP/170/20
WEST KOWLOON TRANSFER STATION
SECOND FOLLOW-ON CONTRACT

Design Package
WKTS-EPSP17020-AIP-DR-33A-2

Drawing Title
SWEPTPATH ANALYSIS
(11.0m RCV)

Drawing Number WKTS-W4A-TH-SP06-b		Revision 1
Date: 24/10/2024	Scale 1:250	Format A3
Drawn by: PF	Checked by: MC	Status AIP
Approved by: SP		

WKTS TIPPING HALL - SWEPTPATH ANALYSIS
GROUND FLOOR CIRCULATION PATH - GTW 1&2 LOADING / UNLOADING

SKETCH ONLY

Revision Schedule

Rev.	Date	Description
0	18/08/2023	AIP SUBMISSION
1	24/10/2024	AIP SUBMISSION

Employer

 環境保護署
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WKTS-EPSP17020-AIP-DR-33A-2

Drawing Title

SWEPTPATH ANALYSIS
(11.0m RCV)

Drawing Number

WKTS-W4A-TH-SP07

Revision

1

Date: 24/10/2024

Scale: 1:250

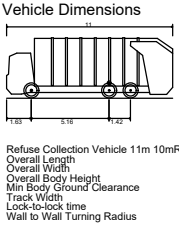
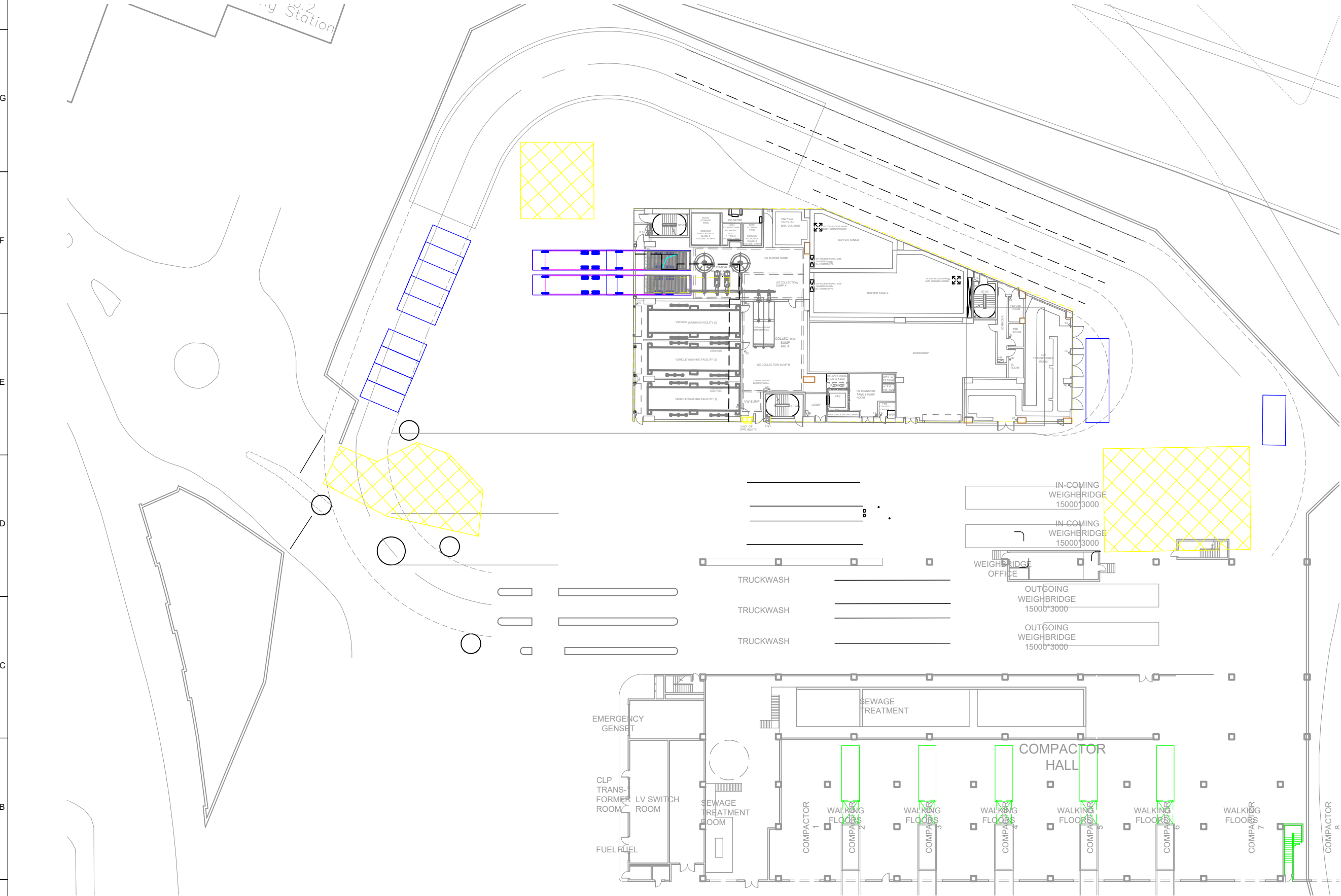
Format: A3

Drawn by: PF

Checked by: MC

Status: AIP

Approved by: SP



Appendix C

Pollutants Concentration Monitoring Records and Odour Patrol Records

Pollutants Concentration Monitoring Records at Gas Inlet (July 2023 to September 2025)

	H₂S Average Concentration (ppm)	NH₃ Average Concentration (ppm)
July 2023	0.896	1.208
August 2023	0.899	1.203
September 2023	0.900	1.380
October 2023	0.920	1.140
November 2023	0.912	1.094
December 2023	0.903	1.041
January 2024	0.957	1.042
February 2024	0.973	1.039
March 2024	1.108	1.309
April 2024	1.178	1.598
May 2024	1.181	1.365
June 2024	1.248	1.875
July 2024	1.221	1.714
August 2024	0.734	0.763
September 2024	1.252	1.860
October 2024	1.124	1.557
November 2024	1.124	1.555
December 2024	1.112	1.518
January 2025	1.119	1.551
February 2025	1.230	1.444
March 2025	1.188	1.635
April 2025	1.194	1.568
May 2025	1.163	1.608
June 2025	1.203	1.600
July 2025	1.278	1.662
August 2025	1.195	1.678
September 2025	1.211	1.629

	H₂S Average Concentration (ppm)	NH₃ Average Concentration (ppm)
Average	1.090	1.431
Note: Refer to Figure 2.1 for location of the 5 scrubber units.		

Pollutants Concentration Monitoring Records at Gas Outlet (July 2023 to September 2025)

	H₂S Average Concentration (ppm)	NH₃ Average Concentration (ppm)
July 2023	0.029	0.007
August 2023	0.022	0.006
September 2023	0.014	0.006
October 2023	0.011	0.006
November 2023	0.008	0.005
December 2023	0.004	0.005
January 2024	0.003	0.006
February 2024	0.024	0.006
March 2024	0.022	0.007
April 2024	0.004	0.007
May 2024	0.003	0.009
June 2024	0.006	0.009
July 2024	0.005	0.010
August 2024	0.007	0.010
September 2024	0.017	0.010
October 2024	0.012	0.008
November 2024	0.012	0.008
December 2024	0.010	0.008
January 2025	0.004	0.009
February 2025	0.005	0.014
March 2025	0.009	0.014
April 2025	0.011	0.009
May 2025	0.017	0.010
June 2025	0.018	0.011
July 2025	0.021	0.013
August 2025	0.024	0.010
September 2025	0.026	0.009

	H₂S Average Concentration (ppm)	NH₃ Average Concentration (ppm)
Average	0.013	0.009
Design Concentration	< 0.05	< 0.5

Note: The H₂S and NH₃ concentration averaged over the five scrubber outlets (DO1 to DO5) comply with the design concentration after treatment by the odour control system. Refer to Figure 2.1 for location of the 5 scrubber units.

Minimum Pollutants Concentration Monitoring Records at Gas Outlet (July 2023 to September 2025)

	Minimum H ₂ S Concentration (ppm)	Minimum NH ₃ Concentration (ppm)
DO 1	3.13×10^{-6}	3.13×10^{-5}
DO 2	2.00×10^{-4}	1.37×10^{-6}
DO 3	1.00×10^{-2}	1.38×10^{-5} [1]
DO 4	3.07×10^{-8}	2.72×10^{-6}
DO 5	3.47×10^{-5} [2]	2.00×10^{-5} [2]
Note: - Currently DO3 is a 1-stage scrubber that only treats H₂S, hence untreated NH₃ will be emitted from DO3. For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), the lowest recorded NH₃ inlet concentration at the scrubber inlets (i.e. 1.38×10^{-5} ppm at DO4) is adopted as the minimum outlet concentration for the air model in the quantitative impact assessment. Refer to Section 3.4.25 of main report for details. - DO5 is currently used as standby unit. For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), DO5 is assumed to emit 0 ppm of H₂S and NH₃ under the Existing Scenario in the air model for the quantitative impact assessment. Refer to Section 3.4.25 of main report for details.		

Daily Odour Patrol Record (July 2023 to September 2025)

Note 1: OD1 to OD5 refer to the patrol locations along the site perimeter.
Note 2: Classification of odour intensity: Not detected = 0, Slight = 1, Moderate = 2, Strong = 3, Extreme = 4

Date	Time	OD1	OD2	OD3	OD4	OD5
1/7/2023	8:10*	NA	NA	NA	NA	NA
	11:00	0	0	0	0	0
	19:35	0	0	0	0	0
2/7/2023	08:45	0	0	0	0	0
	14:00	0	0	0	0	0
	16:30	0	0	0	0	0
3/7/2023	08:10	0	0	0	0	0
	12:00	0	0	0	0	0
	20:10	0	0	0	0	0
4/7/2023	08:50	0	0	0	0	0
	10:18	0	0	0	0	0
	19:40	0	0	0	0	0
5/7/2023	08:15	0	0	0	0	0
	13:56	0	0	0	0	0
	19:30	0	0	0	0	0
6/7/2023	08:45	0	0	0	0	0
	10:30	0	0	0	0	0
	19:30	0	0	0	0	0
7/7/2023	08:05	0	0	0	0	0
	10:00	0	0	0	0	0
	19:45	0	0	0	0	0
8/7/2023	08:45	0	0	0	0	0
	14:35	0	0	0	0	0
	19:30	0	0	0	0	0
9/7/2023	08:45	0	0	0	0	0
	14:00	0	0	0	0	0
	16:15	0	0	0	0	0
10/7/2023	08:30	0	0	0	0	0
	10:42	0	0	0	0	0
	19:50	0	0	0	0	0
11/7/2023	08:10	1	0	0	0	0
	15:42	0	0	0	0	0
	19:30	0	0	0	0	0
12/7/2023	08:10	0	0	0	0	0
	14:05	0	0	0	0	0
	19:30	0	0	0	0	0
13/7/2023	08:40	0	0	0	0	0
	15:33	0	0	0	0	0
	19:40	0	0	0	0	0
14/7/2023	08:00	0	0	0	0	0
	10:45	0	0	0	0	0
	19:30	0	0	0	0	0
15/7/2023	08:40	0	0	0	0	0
	14:40	0	0	0	0	0
	19:35	0	0	0	0	0
16/7/2023	09:25	0	0	0	0	0
	14:15	0	0	0	0	0
	16:35	0	0	0	0	0
17/7/2023	09:25*	NA	NA	NA	NA	NA
	14:00*	NA	NA	NA	NA	NA
	19:25	0	0	0	0	0
18/7/2023	08:40	0	0	0	0	0
	11:00	0	0	0	0	0
	19:30	0	0	0	0	0
19/7/2023	08:15	0	0	0	0	0
	10:48	0	0	0	0	0
	15:44	0	0	0	0	0
20/7/2023	08:00	0	0	0	0	0
	16:14	0	0	0	0	0
	19:40	0	0	0	0	0
21/7/2023	08:05	0	0	0	0	0
	15:00	0	0	0	0	0
	19:30	0	0	0	0	0
22/7/2023	08:15	0	0	0	0	0
	10:25	0	0	0	0	0
	20:00	0	0	0	0	0
23/7/2023	08:35	0	0	0	0	0
	10:00	0	0	0	0	0
	16:00	0	0	0	0	0
24/7/2023	08:40	0	0	0	0	0
	15:12	0	0	0	0	0
	19:30	0	0	0	0	0
25/7/2023	08:45	0	0	0	0	0
	14:00	0	0	0	0	0
	19:40	0	0	0	0	0
26/7/2023	08:30	1	0	0	0	1
	15:48	0	0	0	0	0
	19:50	0	0	0	0	0
27/7/2023	08:15	0	0	0	0	0
	14:15	0	0	0	0	0
	19:30	0	0	0	0	0
28/7/2023	08:10	0	0	0	0	0
	15:30	0	0	0	0	0
	19:45	0	0	0	0	0
29/7/2023	08:10	0	0	0	0	0
	10:15	0	0	0	0	0
	19:30	0	0	0	0	0
30/7/2023	09:00	0	0	0	0	1
	14:15	0	0	0	0	0
	16:50	0	0	0	0	0
31/7/2023	10:41	0	0	0	0	0
	14:45	0	0	0	0	0
	19:45	0	0	0	0	0

*: Cancel Due To Rain



Date	Time	OD1	OD2	OD3	OD4	OD5
1/8/2023	08:52	0	0	0	0	1
	11:00	0	0	0	0	0
	19:50	0	0	0	0	0
2/8/2023	08:10	0	0	0	0	0
	10:11	0	0	0	0	0
	19:30	0	0	0	0	0
3/8/2023	08:10	0	0	0	0	0
	10:05	0	0	0	0	0
	19:40	0	0	0	0	0
4/8/2023	09:00	0	0	0	0	0
	14:00	0	0	0	0	0
	19:45	0	0	0	0	0
5/8/2023	08:05	0	0	0	0	0
	14:05	0	0	0	0	0
	19:30	0	0	0	0	0
6/8/2023	08:45	0	0	0	0	0
	10:30	0	0	0	0	0
	16:15	0	0	0	0	0
7/8/2023	09:17	0	0	0	0	0
	14:45	0	0	0	0	0
	19:30	0	0	0	0	0
8/8/2023	09:00	0	0	0	0	0
	15:12	0	0	0	0	0
	19:30	0	0	0	0	0
9/8/2023	08:20	0	0	0	0	0
	10:50	0	0	0	0	0
	20:00	0	0	0	0	0
10/8/2023	08:00	0	0	0	0	0
	14:15	0	0	0	0	0
	19:45	0	0	0	0	0
11/8/2023	08:00	0	0	0	0	0
	14:15	0	0	0	0	0
	19:45	0	0	0	0	0
12/8/2023	08:30	0	0	0	0	0
	14:00	0	0	0	0	0
	19:15	0	0	0	0	0
13/8/2023	09:45	0	0	0	0	0
	14:00	0	0	0	0	0
	16:30	0	0	0	0	0
14/8/2023	09:30	0	0	0	0	0
	15:27	0	0	0	0	0
	19:30	0	0	0	0	0
15/8/2023	08:00	0	0	0	0	0
	14:30	0	0	0	0	0
	19:45	0	0	0	0	0
16/8/2023	08:50	0	0	0	0	0
	16:07	0	0	0	0	0
	19:30	0	0	0	0	0
17/8/2023	08:15	0	0	0	0	0
	15:55	0	0	0	0	0
	19:30	0	0	0	0	0
18/8/2023	08:00	0	0	0	0	0
	14:30	0	0	0	0	0
	19:35	0	0	0	0	0
19/8/2023	08:30	0	0	0	0	0
	14:30	0	0	0	0	0
	20:00	0	0	0	0	0
20/8/2023	09:38	0	0	0	0	0
	14:00	0	0	0	0	0
	16:05	0	0	0	0	0
21/8/2023	08:15	0	0	0	0	0
	10:26	0	0	0	0	0
	20:00	0	0	0	0	0
22/8/2023	08:35	0	0	0	0	0
	14:50	0	0	0	0	0
	19:45	1	0	0	0	0
23/8/2023	08:15	0	0	0	0	0
	14:32	0	0	0	0	0
	19:35	0	0	0	0	0
24/8/2023	08:30	0	0	0	0	0
	15:26	0	0	0	0	0
	19:30	0	0	0	0	0
25/8/2023	08:05	0	0	0	0	0
	14:15	0	0	0	0	0
	19:35	0	0	0	0	0
26/8/2023	08:00	0	0	0	0	0
	14:00	0	0	0	0	0
	19:30	0	0	0	0	0
27/8/2023	09:40	0	0	0	0	0
	14:15	0	0	0	0	0
	16:35	0	0	0	0	0
28/8/2023	08:15	0	0	0	0	0
	15:45	0	0	0	0	0
	19:39	0	0	0	0	0
29/8/2023	08:05	0	0	0	0	0
	16:30	0	0	0	0	0
	19:30	0	0	0	0	0
30/8/2023	08:35	0	0	0	0	0
	15:53	0	0	0	0	0
	19:25	0	0	0	0	0
31/8/2023	10:41	0	0	0	0	0
	14:45	0	0	0	0	0
	19:15	0	0	0	0	0

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5
1/9/2023	#	NA	NA	NA	NA	NA
	#	NA	NA	NA	NA	NA
	#	NA	NA	NA	NA	NA
2/9/2023	#	NA	NA	NA	NA	NA
	#	NA	NA	NA	NA	NA
	#	NA	NA	NA	NA	NA
3/9/2023	19:15	0	0	0	0	0
	09:30	0	0	0	0	1
	14:30	0	0	0	0	0
	16:45	0	0	0	0	0
4/9/2023	08:15	0	0	0	0	0
	10:30	0	0	0	0	0
	19:00	0	0	0	0	0
5/9/2023	08:40	0	0	0	0	0
	11:21	0	0	0	0	0
	18:00	0	0	0	0	0
6/9/2023	08:00	0	0	0	0	0
	11:34	0	0	0	0	0
	18:40	0	0	0	0	0
	08:15	0	0	0	0	0
7/9/2023	11:15	0	0	0	0	0
	18:30	0	0	0	0	0
	08:00*	NA	NA	NA	NA	NA
8/9/2023	14:00*	NA	NA	NA	NA	NA
	19:30	0	0	0	0	0
	08:45	0	0	0	0	0
9/9/2023	14:30	1	0	0	0	0
	18:45	0	0	0	0	0
	08:40*	NA	NA	NA	NA	NA
10/9/2023	14:10	0	0	0	0	0
	16:10	0	0	0	0	0
	08:50	0	0	0	0	0
11/9/2023	14:15	0	0	0	0	0
	19:37	0	0	0	0	0
	08:15	0	0	0	0	0
12/9/2023	16:00	0	0	0	0	0
	20:00	0	0	0	0	0
	08:00	0	0	0	0	0
13/9/2023	16:39	0	0	0	0	0
	19:30	0	0	0	0	0
	08:15	0	0	0	0	0
14/9/2023	16:38	0	0	0	0	0
	20:10	0	0	0	0	0
	08:15	0	0	0	0	0
15/9/2023	14:55	0	0	0	0	0
	19:15	0	0	0	0	0
	09:05	0	0	0	0	0
16/9/2023	14:30	0	0	0	0	0
	19:45	0	0	0	0	0
	08:45	0	0	0	0	0
17/9/2023	14:00	0	0	0	0	0
	17:00	0	0	0	0	0
	09:10	0	0	0	0	0
18/9/2023	14:33	0	0	0	0	0
	19:45	0	0	0	0	0
	08:40	0	0	0	0	0
19/9/2023	15:47	0	0	0	0	0
	19:30	0	0	0	0	0
	08:50	0	0	0	0	0
20/9/2023	13:34	0	0	0	0	0
	19:45	0	0	0	0	0
	08:15	0	0	0	0	0
21/9/2023	14:30	0	0	0	0	0
	19:55	0	0	0	0	0
	08:00	0	0	0	0	0
22/9/2023	10:45	0	0	0	0	0
	19:45	0	0	0	0	0
	08:35	0	1	0	0	0
23/9/2023	14:30	0	0	0	0	0
	19:40	0	0	0	0	0
	08:40	0	0	0	0	0
24/9/2023	10:00	0	0	0	0	0
	16:20	0	0	0	0	0
	08:15	0	0	0	0	0
25/9/2023	16:14	0	0	0	0	0
	19:30	0	0	0	0	0
	08:15	0	0	0	0	0
26/9/2023	16:14	0	0	0	0	0
	19:30	0	0	0	0	0
	10:09	0	0	0	0	0
27/9/2023	14:50	0	0	0	0	0
	21:15	1	0	0	0	0
	08:30	0	0	0	0	0
28/9/2023	14:15	0	0	0	0	0
	19:40	0	0	0	0	0
	09:00	0	0	0	0	0
29/9/2023	11:31	0	0	0	0	0
	19:40	0	0	0	0	0
	07:55	0	0	0	0	0
30/9/2023	14:00	0	0	0	0	0
	19:30	0	0	0	0	0

*: Cancel Due To Rain

#: Cancel Due To Typhoon

Date	Time	OD1	OD2	OD3	OD4	OD5
1/10/2023	09:40	0	0	0	0	0
	14:15	0	0	0	0	0
	16:35	0	0	0	0	0
2/10/2023	08:00	0	0	0	0	0
	14:00	0	0	0	0	0
	19:35	0	0	0	0	0
3/10/2023	08:42	0	0	0	0	0
	10:51	0	0	0	0	0
	19:45	0	0	0	0	0
4/10/2023	09:00	0	0	0	0	0
	10:35	0	0	0	0	0
	19:32	0	0	0	0	0
5/10/2023	08:15	0	0	0	0	0
	15:52	0	0	0	0	0
	19:30	0	0	0	0	0
6/10/2023	08:10	0	0	0	0	0
	14:10	0	0	0	0	0
	19:45	0	0	0	0	0
7/10/2023	09:00	0	0	0	0	0
	14:00	0	0	0	0	0
	19:30	0	0	0	0	0
8/10/2023	08:40#	NA	NA	NA	NA	NA
	14:00#	NA	NA	NA	NA	NA
	19:30#	NA	NA	NA	NA	NA
9/10/2023	07:45*	NA	NA	NA	NA	NA
	16:39*	NA	NA	NA	NA	NA
	19:30	0	0	0	0	0
10/10/2023	08:30	0	0	0	0	0
	14:35	1	0	0	0	0
	19:30	0	0	0	0	0
11/10/2023	08:50	0	0	0	0	0
	14:20	0	1	0	0	0
	19:30	0	0	0	0	0
12/10/2023	08:15	0	0	0	0	0
	15:25	0	0	0	0	0
	19:45	0	0	0	0	0
13/10/2023	08:15	0	0	0	0	0
	13:50	0	0	0	0	0
	19:45	0	0	0	0	0
14/10/2023	08:15	0	0	0	0	0
	14:15	0	0	0	0	0
	19:35	0	0	0	0	0
15/10/2023	08:45	0	0	0	0	0
	10:15	0	0	0	0	0
	16:00	0	0	0	0	0
16/10/2023	08:15	0	0	0	0	0
	14:44	0	0	0	0	0
	19:30	0	0	0	0	0
17/10/2023	08:42	0	0	0	0	0
	14:30	0	0	0	0	0
	19:30	0	0	0	0	0
18/10/2023	09:14	0	0	0	0	0
	14:15	0	0	0	0	0
	19:30*	NA	NA	NA	NA	NA
19/10/2023	08:15	0	0	0	0	0
	14:35	0	0	0	0	0
	19:45	0	0	0	0	0
20/10/2023	08:15	0	0	0	0	0
	14:01	0	0	0	0	0
	19:45	0	1	0	0	0
21/10/2023	08:15	0	1	0	0	0
	14:21	0	0	0	0	0
	19:45	0	0	0	0	0
22/10/2023	08:30	0	0	0	0	0
	13:45	0	0	0	0	0
	16:00	0	0	0	0	0
23/10/2023	08:40	0	1	0	0	0
	14:35	0	0	0	0	0
	19:40	0	0	0	0	0
24/10/2023	08:15	0	0	0	0	0
	11:49	1	0	0	0	0
	19:50	0	0	0	0	0
25/10/2023	08:15	0	0	0	0	0
	14:28	0	0	0	0	0
	19:45	0	0	0	0	0
26/10/2023	08:15	0	0	0	0	0
	11:17	0	0	0	0	0
	19:30	0	0	0	0	0
27/10/2023	08:30	0	0	0	0	0
	10:30	0	0	0	0	0
	19:55	0	0	0	0	0
28/10/2023	08:35	0	0	0	0	0
	14:32	0	0	0	0	0
	19:45	0	0	0	0	0
29/10/2023	09:30	0	1	0	0	0
	14:45	0	0	0	0	0
	16:45	0	0	0	0	0
30/10/2023	08:50	0	0	0	0	0
	14:00	0	0	0	0	0
	19:20	0	0	0	0	0
31/10/2023	08:46	0	0	0	0	0
	14:00	0	0	0	0	0
	19:45	0	0	0	0	0

*: Cancel Due To Rain

#: Cancel Due To Typhoon

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/11/2023	08:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:58	0	0	0	0	0	
2/11/2023	08:15	0	0	0	0	0	
	15:12	0	0	0	0	0	
	19:30	0	0	0	0	0	
3/11/2023	08:15	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:50	0	0	0	0	0	
4/11/2023	09:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
5/11/2023	09:40	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:47	0	0	0	0	0	
6/11/2023	08:00	0	0	0	0	0	
	11:22	0	0	0	0	0	
	19:45	0	0	0	0	0	
7/11/2023	08:10	0	0	0	0	0	
	15:04	0	0	0	0	0	
	19:46	0	0	0	0	0	
8/11/2023	08:45	0	0	0	0	0	
	15:08	0	0	0	0	0	
	19:15	0	0	0	0	0	
9/11/2023	08:15	0	0	0	0	0	
	15:53	1	1	0	0	0	
	19:58	0	0	0	0	0	
10/11/2023	08:40	0	0	0	0	0	
	14:30	0	0	0	0	0	Sludge from DSD
	20:00	0	0	0	0	0	
11/11/2023	08:15	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
12/11/2023	08:40	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:10	0	0	0	0	0	
13/11/2023	08:25	0	0	0	0	0	
	14:57	0	0	0	0	0	
	19:45	0	0	0	0	0	
14/11/2023	08:35	0	0	0	0	0	
	14:56	0	0	0	0	0	
	19:48	0	0	0	0	0	
15/11/2023	09:12	0	0	0	0	0	
	14:25	0	0	0	0	0	DSD Sludge
	19:20	0	0	0	0	0	
16/11/2023	08:15	0	0	0	0	0	
	16:40	0	1	0	0	0	
	19:30	0	0	0	0	0	
17/11/2023	08:00	0	0	0	0	0	
	10:33	0	0	0	0	0	
	19:45	0	0	0	0	0	
18/11/2023	08:47	0	0	0	0	0	
	14:25	0	0	0	0	0	
	17:40	0	0	0	0	0	
19/11/2023	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:30	0	0	0	0	0	
20/11/2023	08:40	0	0	0	0	0	
	15:04	0	0	0	0	0	
	19:45	0	0	0	0	0	
21/11/2023	08:10	0	0	0	0	0	
	17:46	0	0	0	0	0	
	19:58	0	0	0	0	0	
22/11/2023	08:45	0	0	0	0	0	
	15:42	0	0	0	0	0	
	19:30	0	0	0	0	0	
23/11/2023	08:35	0	0	0	0	0	
	15:29	0	0	0	0	0	
	19:30	0	0	0	0	0	
24/11/2023	08:15	0	0	0	0	0	
	11:01	0	1	0	0	0	Sludge
	19:50	0	0	0	0	0	
25/11/2023	08:15	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
26/11/2023	08:45	0	0	0	0	0	
	13:50	0	0	0	0	0	
	16:15	0	0	0	0	0	
27/11/2023	08:38	0	0	0	0	0	
	11:12	0	0	0	0	0	
	19:15	0	0	0	0	0	
28/11/2023	08:35	0	1	0	0	0	
	14:32	0	0	0	0	0	
	19:50	0	0	0	0	0	
29/11/2023	10:00	0	0	0	0	0	
	15:41	0	0	0	0	0	
	19:45	0	0	0	0	0	
30/11/2023	08:15	0	0	0	0	0	
	11:50	0	0	0	0	0	
	19:45	0	1	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
1/12/2023	08:15	0	0	0	0	0	
	10:30	0	1	0	0	0	
	19:50	0	0	0	0	0	
2/12/2023	08:05	0	0	0	0	0	
	13:55	0	0	0	0	0	
	19:25	0	0	0	0	0	
3/12/2023	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
4/12/2023	08:38	0	0	0	0	0	
	14:44	0	0	0	0	0	
	19:15	0	0	0	0	0	
5/12/2023	08:15	0	0	0	0	0	
	10:21	0	0	0	0	0	
	19:45	0	0	0	0	0	
6/12/2023	08:50	0	0	0	0	0	
	16:09	0	0	0	0	0	
	19:15	0	0	0	0	0	
7/12/2023	09:47	0	0	0	0	0	
	14:25	0	0	0	0	0	
	20:00	0	0	0	0	0	
8/12/2023	08:40	0	0	0	0	0	
	11:00	0	0	0	0	0	
	19:45	0	0	0	0	0	
9/12/2023	08:40	0	0	0	0	0	
	15:55	0	0	0	0	0	
	19:35	0	0	0	0	0	
10/12/2023	09:15	0	0	0	0	0	
	14:30	0	0	0	0	0	Sludge from DSD
	16:35	0	0	0	0	0	
11/12/2023	08:45	0	0	0	0	0	
	10:21	0	0	0	0	0	
	19:30	0	0	0	0	0	
12/12/2023	08:40	0	0	0	0	0	
	12:17	0	0	0	0	0	
	20:00	0	0	0	0	0	
13/12/2023	08:45	0	0	0	0	0	
	12:10	0	1	0	0	1	
	19:45	0	0	0	0	0	
14/12/2023	09:41	0	0	0	0	0	
	15:00	0	0	0	0	0	
	19:50	0	0	0	0	0	
15/12/2023	08:40	0	0	0	0	0	
	14:00	0	0	0	0	0	
	20:00	0	0	0	0	0	
16/12/2023	08:05	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:25	0	0	0	0	0	
17/12/2023	08:45	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:15	0	0	0	0	0	
18/12/2023	08:35	0	0	0	0	0	
	14:53	0	0	0	0	0	
	19:30	0	0	0	0	0	
19/12/2023	08:40	0	0	0	0	0	
	10:23	0	0	0	0	0	
	19:45	0	1	0	0	0	
20/12/2023	08:47	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:50	0	0	0	0	0	
21/12/2023	09:34	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:20	0	0	0	0	0	
22/12/2023	08:35	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:45	0	0	0	0	0	
23/12/2023	09:04	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
24/12/2023	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
25/12/2023	08:15	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:45	0	0	0	0	0	
26/12/2023	08:20	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:30	0	0	0	0	0	
27/12/2023	08:15	0	0	0	0	0	
	10:35	0	0	0	0	0	
	20:00	0	0	0	0	0	
28/12/2023	10:35	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:20	0	0	0	0	0	
29/12/2023	08:50	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
30/12/2023	09:06	0	0	0	0	0	
	14:09	0	0	0	0	0	
	19:42	0	0	0	0	0	
31/12/2023	08:45	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:00	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
1/1/2024	08:40	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:45	0	0	0	0	0	
2/1/2024	08:56	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:52	0	0	0	0	0	
3/1/2024	09:01	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:20	0	0	0	0	0	
4/1/2024	08:15	0	0	0	0	0	
	10:34	0	0	0	0	0	
	20:00	0	0	0	0	0	
5/1/2024	08:30	0	1	0	0	0	
	14:35	0	0	0	0	0	
	19:50	0	0	0	0	0	
6/1/2024	08:00	0	0	0	0	0	
	10:07	0	0	0	0	0	
	19:20	0	0	0	0	0	
7/1/2024	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:20	0	0	0	0	0	
8/1/2024	08:10	0	0	0	0	0	
	14:55	0	0	0	0	0	
	19:40	0	0	0	0	0	
9/1/2024	08:00	0	0	0	0	0	
	14:58	0	0	0	0	0	
	19:50	0	1	0	0	0	
10/1/2024	08:50	0	0	0	0	0	
	14:41	0	0	0	0	0	Sludge from DSD
	19:30	0	0	0	0	0	
11/1/2024	08:15	0	0	0	0	0	
	11:47	0	0	0	0	0	
	19:20	0	0	0	0	0	
12/1/2024	08:42	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:50	0	0	0	0	0	
13/1/2024	08:15	0	0	0	0	0	
	14:15	0	0	0	0	0	
	18:30	0	0	0	0	0	
14/1/2024	08:45	0	0	0	0	0	
	10:45	0	0	0	0	0	
	14:45	0	0	0	0	0	
15/1/2024	08:42	0	0	0	0	0	
	09:46	0	0	0	0	0	
	19:30	0	0	0	0	0	
16/1/2024	09:22	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:58	0	0	0	0	0	
17/1/2024	08:10	0	0	0	0	0	
	14:43	1	0	0	0	0	
	19:40	0	0	0	0	0	
18/1/2024	08:05	0	0	0	0	0	
	15:30	0	0	0	0	0	
	19:15	0	0	0	0	0	
19/1/2024	08:15	0	0	0	0	0	
	10:50	0	0	0	0	0	
	19:25	0	0	0	0	0	
20/1/2024	08:45	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:50	0	0	0	0	0	
21/1/2024	08:50	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:10	0	0	0	0	0	
22/1/2024	08:10	0	0	0	0	0	
	10:43	0	0	0	0	0	
	19:50	0	0	0	0	0	
23/1/2024	08:35	0	0	0	0	0	
	12:12	*	*	*	*	*	
	19:45	0	1	0	0	0	
24/1/2024	08:45	0	0	0	0	0	
	09:56	0	0	0	0	0	
	19:45	0	0	0	0	0	
25/1/2024	08:35	0	0	0	0	0	
	10:13	0	0	0	0	0	
	19:30	0	0	0	0	0	
26/1/2024	08:00	0	0	0	0	0	
	10:55	0	0	0	0	0	
	19:40	0	0	0	0	0	
27/1/2024	08:15	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
28/1/2024	09:20	0	0	0	0	0	
	14:45	0	0	0	0	0	
	16:39	0	0	0	0	0	
29/1/2024	08:35	0	0	0	0	0	
	10:39	0	0	0	0	0	
	19:30	0	0	0	0	0	
30/1/2024	08:15	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:30	0	0	0	0	0	
31/1/2024	10:00	0	0	0	0	0	
	14:58	0	0	0	0	0	
	19:45	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
1/2/2024	09:13	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:50	0	0	0	0	0	
2/2/2024	08:50	0	0	0	0	0	
	10:40	0	0	0	0	0	
	19:45	0	0	0	0	0	
3/2/2024	08:40	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:55	0	0	0	0	0	
4/2/2024	08:45	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:30	0	0	0	0	0	
5/2/2024	08:05	0	0	0	0	0	
	15:05	0	0	0	0	0	
	19:50	0	0	0	0	0	
6/2/2024	08:15	0	0	0	0	0	
	15:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
7/2/2024	08:50	0	0	0	0	0	
	15:35	0	0	0	0	0	Drizzle
	19:45	0	0	0	0	0	
8/2/2024	08:35	0	0	0	0	0	
	16:27	0	0	0	0	0	
	20:00	0	0	0	0	0	
9/2/2024	08:15	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:30	0	0	0	0	0	
10/2/2024	08:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
11/2/2024	09:30	0	0	0	0	0	
	14:35	0	0	0	0	0	
	16:40	0	0	0	0	0	
12/2/2024	08:35	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:55	0	0	0	0	0	
13/2/2024	08:15	0	0	0	0	0	
	16:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
14/2/2024	08:40	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:45	0	0	0	0	0	
15/2/2024	09:10	0	0	0	0	0	
	14:55	0	0	0	0	0	
	20:00	0	1	0	0	0	
16/2/2024	08:15	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
17/2/2024	09:10	0	0	0	0	0	
	14:00	1	0	0	0	0	
	19:30	0	0	0	0	0	
18/2/2024	09:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:50	0	0	1	0	0	
19/2/2024	08:10	0	1	0	0	0	
	10:12	0	0	0	0	0	
	19:45	0	0	0	0	0	
20/2/2024	09:10	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:25	0	0	0	0	0	
21/2/2024	08:45	0	0	0	0	0	
	10:28	0	0	0	0	0	
	19:35	0	0	0	0	0	
22/2/2024	09:20	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:52	0	0	0	0	0	
23/2/2024	08:00	0	0	0	0	0	
	14:25	0	0	0	0	0	
	18:30	0	0	0	0	0	
24/2/2024	09:03	0	0	0	0	0	
	14:20	0	0	0	0	0	
	20:02	0	0	0	0	0	
25/2/2024	08:45	0	0	0	0	0	
	10:45	0	0	0	0	0	
	16:00	0	0	0	0	0	
26/2/2024	09:05	0	0	0	0	0	
	14:40	0	0	0	0	0	sludge
	19:45	0	0	0	0	0	
27/2/2024	09:10	0	0	0	0	0	
	14:25	0	1	0	0	0	
	20:00	0	0	0	0	0	
28/2/2024	08:30	0	0	0	0	0	
	15:11	0	0	0	0	0	
	20:00	0	0	0	0	0	
29/2/2024	08:05	0	0	0	0	0	
	15:00	0	0	0	0	0	
	19:30	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
1/3/2024	08:40	0	0	0	0	0	
	10:00	0	0	0	0	0	
	19:45	0	0	0	0	0	
2/3/2024	08:10	0	0	0	0	0	
	09:35	0	0	0	0	0	
	19:30	0	0	0	0	0	
3/3/2024	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:00	0	0	0	0	0	
4/3/2024	09:30	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:40	0	0	0	0	0	
5/3/2024	09:10	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
6/3/2024	08:10	0	0	0	0	0	
	14:15	0	0	0	0	0	
	20:00	0	0	0	0	0	
7/3/2024	08:15	0	0	0	0	0	
	10:20	0	0	0	0	0	
	19:30	0	0	0	0	0	
8/3/2024	08:40	0	0	0	0	0	Drizzle
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
9/3/2024	10:00	0	0	0	0	0	Drizzle
	14:25	0	0	0	0	0	
	19:55	0	0	0	0	0	
10/3/2024	09:15	0	1	0	0	0	
	14:10	0	0	0	0	0	
	16:45*	NA	NA	NA	NA	NA	
11/3/2024	08:30	0	0	0	0	0	
	10:52	0	0	0	0	0	
	19:45	0	0	0	0	0	
12/3/2024	08:40	0	0	0	0	0	
	14:15	0	0	0	0	0	
	20:00	0	0	0	0	0	
13/3/2024	09:20	0	0	0	0	0	
	14:45	0	0	0	0	0	
	20:02	0	0	0	0	0	
14/3/2024	09:20	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
15/3/2024	08:05	0	0	0	0	0	
	10:13	0	0	0	0	0	
	19:45	0	0	0	0	0	
16/3/2024	08:15	0	0	0	0	0	
	11:18	0	0	0	0	0	
	19:45	0	0	0	0	0	
17/3/2024	09:40	0	0	0	0	0	
	14:20	0	0	0	0	0	
	16:40	0	0	0	0	0	
18/3/2024	08:15	0	0	0	0	0	
	11:25	0	0	0	0	0	
	19:55	0	0	0	0	0	
19/3/2024	09:35	0	0	0	0	0	
	14:10	0	1	0	0	0	
	19:45	0	0	0	0	0	
20/3/2024	09:20	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:35	0	0	0	0	0	
21/3/2024	11:44	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
22/3/2024	08:45	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:30	0	0	0	0	0	
23/3/2024	09:35	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:15	0	0	0	0	0	
24/3/2024	09:20	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:50	0	0	0	0	0	
25/3/2024	08:05	0	0	0	0	0	
	11:31	0	0	0	0	0	
	19:30	0	0	0	0	0	
26/3/2024	08:10	0	0	0	0	0	
	11:29	0	0	0	0	0	sludge
	17:5	0	0	0	0	0	
27/3/2024	08:35	0	0	0	0	0	
	11:27	0	0	0	0	0	
	19:30	0	0	0	0	0	
28/3/2024	08:15	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:30	0	0	0	0	0	
29/3/2024	08:10	0	0	0	0	0	
	11:30	0	0	0	0	0	
	19:20	0	0	0	0	0	
30/3/2024	08:55	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:40	0	0	0	0	0	
31/3/2024	08:50	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:10	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/4/2024	08:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
2/4/2024	08:50	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:35	0	0	0	0	0	
3/4/2024	08:15	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:20	0	0	0	0	0	
4/4/2024	08:45	0	0	0	0	0	
	16:35	0	0	0	0	0	
	19:30	0	0	0	0	0	
5/4/2024	09:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:20	0	0	0	0	0	
6/4/2024	09:07	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:20	0	0	0	0	0	
7/4/2024	08:45	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:45	0	0	0	0	0	
8/4/2024	10:11	0	0	0	0	0	Drizzle
	14:00	0	0	0	0	0	
	19:15	0	0	0	0	0	
9/4/2024	08:05	0	0	0	0	0	Drizzle
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
10/4/2024	09:20	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
11/4/2024	09:15	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:32	0	0	0	0	0	
12/4/2024	09:25	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:30	0	0	0	0	0	
13/4/2024	09:19	0	0	0	0	0	
	14:25	0	0	0	0	0	
	20:00	0	0	0	0	0	
14/4/2024	08:45	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:30	0	0	0	0	0	
15/4/2024	09:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:45	0	0	0	0	0	
16/4/2024	09:04	0	0	0	0	0	
	14:40	0	0	0	0	0	
	20:52	0	0	0	0	0	
17/4/2024	08:45	0	0	0	0	0	
	14:28	0	0	0	0	0	
	19:30	0	0	0	0	0	
18/4/2024	08:00	0	0	0	0	0	
	13:30	0	1	0	0	0	
	21:30	0	0	0	0	0	
19/4/2024	09:22	0	0	0	0	0	
	14:15	0	1	0	0	0	
	19:15	0	0	0	0	0	
20/4/2024	09:07	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:45*	NA	NA	NA	NA	NA	
21/4/2024	08:45	0	0	0	0	0	
	14:00*	NA	NA	NA	NA	NA	
	16:05	0	0	0	0	0	
22/4/2024	08:45	0	0	0	0	0	
	14:15*	NA	NA	NA	NA	NA	
	19:30	0	0	0	0	0	
23/4/2024	09:07*	NA	NA	NA	NA	NA	
	14:00	0	0	0	0	0	
	19:40	0	0	0	0	0	
24/4/2024	08:15	0	0	0	0	0	
	10:40	0	0	0	0	0	
	19:53	0	0	0	0	0	
25/4/2024	09:41	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:00	0	0	0	0	0	
26/4/2024	08:50	0	0	0	0	0	Drizzle
	10:20*	NA	NA	NA	NA	NA	
	19:45	0	0	0	0	0	
27/4/2024	08:15	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:35	0	0	0	0	0	
28/4/2024	09:45	0	0	0	0	0	
	14:50	0	0	0	0	0	
	16:45	0	0	0	0	0	
29/4/2024	09:18	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:45	0	0	0	0	0	
30/4/2024	09:20	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:35	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/5/2024	08:40	0	0	0	0	0	Drizzle
	14:25	0	0	0	0	0	Drizzle
	19:50	0	0	0	0	0	
2/5/2024	08:50	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
3/5/2024	09:05	0	0	0	0	0	
	14:15	0	0	0	0	0	
	20:00	0	0	0	0	0	
4/5/2024	09:10*	NA	NA	NA	NA	NA	
	14:10*	NA	NA	NA	NA	NA	
	19:25*	NA	NA	NA	NA	NA	
5/5/2024	09:30	0	0	0	0	0	
	14:35	0	0	0	0	0	
	16:40	0	0	0	0	0	
6/5/2024	08:54	0	0	0	0	0	
	14:45	0	0	0	0	0	
	20:00	0	0	0	0	0	
7/5/2024	09:10	0	0	0	0	0	
	14:55	0	0	0	0	0	
	19:45	0	0	0	0	0	
8/5/2024	08:40	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
9/5/2024	09:18	0	0	0	0	0	
	14:00	0	0	0	0	0	
	18:40	0	0	0	0	0	
10/5/2024	08:45	0	0	0	0	0	
	11:23	0	0	0	0	0	
	20:15	0	0	0	0	0	
11/5/2024	08:00	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:30	0	0	0	0	0	
12/5/2024	08:50	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:45	0	0	0	0	0	
13/5/2024	09:26	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:55	0	0	0	0	0	
14/5/2024	09:40	0	0	0	0	0	
	14:20	0	0	0	0	0	
	18:45	0	0	0	0	0	
15/5/2024	08:15	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:15	0	0	0	0	0	
16/5/2024	08:45	0	0	0	0	0	
	11:11	0	0	0	0	0	
	19:30	0	0	0	0	0	
17/5/2024	08:50	0	0	0	0	0	
	09:59	0	0	0	0	0	
	19:45	0	0	0	0	0	
18/5/2024	08:15	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:20	0	0	0	0	0	
19/5/2024	09:30	0	1	0	0	0	
	14:45	0	0	0	0	0	
	16:55	0	0	0	0	0	
20/5/2024	08:40	0	0	0	0	0	
	14:57	0	0	0	0	0	
	19:35	0	0	0	0	0	
21/5/2024	08:20	0	0	0	0	0	
	11:03*	0	0	0	0	0	
	20:05	0	0	0	0	0	
22/5/2024	08:30	0	0	0	0	0	
	14:24	0	0	0	0	0	
	20:20	0	0	0	0	0	
23/5/2024	09:41	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:30	0	0	0	0	0	
24/5/2024	09:32	0	0	0	0	0	
	14:50	0	0	0	0	0	Drizzle
	19:45	0	0	0	0	0	
25/5/2024	08:35	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:30	0	0	0	0	0	
26/5/2024	09:50	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:45	0	0	0	0	0	
27/5/2024	08:15	0	0	0	0	0	
	15:39	0	0	0	0	0	
	19:20	0	0	0	0	0	
28/5/2024	08:15	0	0	0	0	0	
	11:38	0	0	0	0	0	
	20:05	0	0	0	0	0	
29/5/2024	08:40	0	0	0	0	0	
	10:55	0	0	0	0	0	
	19:45	0	0	0	0	0	
30/5/2024	09:25	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
31/5/2024	08:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:40	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/6/2024	08:15	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
2/6/2024	09:40	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:58	0	0	0	0	0	
3/6/2024	08:35	0	0	0	0	0	
	14:15	0	0	0	0	0	
	20:07	0	0	0	0	0	Drizzle
4/6/2024	10:0	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:55	0	0	0	0	0	
5/6/2024	08:29	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
6/6/2024	09:40	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
7/6/2024	09:14	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:55	0	0	0	0	0	
8/6/2024	08:48	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:59	0	0	0	0	0	
9/6/2024	09:30	0	0	0	0	0	
	14:35	0	0	0	0	0	
	16:45	0	0	0	0	0	
10/6/2024	09:00	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:40	0	0	0	0	0	
11/6/2024	09:10	0	0	0	0	0	
	14:15	0	0	0	0	0	
	20:05	0	0	0	0	0	
12/6/2024	11:32	0	0	0	0	0	
	14:03	0	0	0	0	0	
	19:45	0	0	0	0	0	
13/6/2024	08:15	0	0	0	0	0	Pouring rain
	11:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
14/6/2024	08:35	0	0	0	0	0	
	10:01	0	0	0	0	0	Drizzle
	19:45	0	0	0	0	0	
15/6/2024	08:35	0	0	0	0	0	Drizzle
	14:35	0	0	0	0	0	Drizzle
	19:48	0	0	0	0	0	Drizzle
16/6/2024	08:35	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:10	0	0	0	0	0	
17/6/2024	08:27	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:45	0	0	0	0	0	
18/6/2024	08:10	0	0	0	0	0	
	15:48	0	0	0	0	0	
	20:08	0	0	0	0	0	
19/6/2024	08:00	0	0	0	0	0	
	11:02	0	0	0	0	0	
	19:45	0	0	0	0	0	
20/6/2024	08:20	0	0	0	0	0	
	12:07	0	0	0	0	0	
	19:35	0	0	0	0	0	
21/6/2024	08:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:45	0	0	0	0	0	
22/6/2024	08:00	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:45	0	0	0	0	0	
23/6/2024	09:30	0	0	0	0	0	
	14:45	0	0	0	0	0	
	16:35	0	0	0	0	0	
24/6/2024	07:15	0	0	0	0	0	
	11:28	0	0	0	0	0	
	19:30	0	0	0	0	0	
25/6/2024	08:03	0	0	0	0	0	
	09:24	0	0	0	0	0	
	20:08	0	0	0	0	0	
26/6/2024	07:15	0	0	0	0	0	
	11:26	0	0	0	0	0	
	19:30	0	0	0	0	0	
27/6/2024	07:15	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:05	0	0	0	0	0	
28/6/2024	09:37	0	0	0	0	0	
	14:20	0	0	0	0	0	
	20:00	0	0	0	0	0	
29/6/2024	08:00	0	0	0	0	0	
	13:55	0	0	0	0	0	
	19:20	0	0	0	0	0	
30/6/2024	08:40	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:00	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/7/2024	08:10	0	0	0	0	0	
	14:28	0	0	0	0	0	
	19:59	0	0	0	0	0	
2/7/2024	08:00	0	0	0	0	0	
	14:16	0	0	0	0	0	
	19:45	0	0	0	0	0	
3/7/2024	08:00	0	0	0	0	0	
	14:52	0	0	0	0	0	
	20:05	0	0	0	0	0	
4/7/2024	08:00	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:40	0	0	0	0	0	
5/7/2024	11:24	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:40	0	0	0	0	0	
6/7/2024	09:11	0	0	0	0	0	
	14:00	0	0	0	0	0	Smell of sludge
	19:30	0	0	0	0	0	
7/7/2024	08:35	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:20	0	0	0	0	0	
8/7/2024	08:25	0	0	0	0	0	
	13:48	0	0	0	0	0	
	19:30	0	0	0	0	0	
9/7/2024	08:00	0	0	0	0	0	
	11:46	0	0	0	0	0	
	19:35	0	0	0	0	0	
10/7/2024	08:15	0	0	0	0	0	
	11:00	0	0	0	0	0	
	19:40	0	0	0	0	0	
11/7/2024	09:01	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:27	0	0	0	0	0	
12/7/2024	08:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:50	0	0	0	0	0	
13/7/2024	08:20	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:45	0	0	0	0	0	
14/7/2024	09:50	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:50	0	0	0	0	0	
15/7/2024	08:00	0	0	0	0	0	
	16:33	0	1	0	0	0	
	19:45	0	0	0	0	0	
16/7/2024	08:00	0	0	0	0	0	
	11:55	0	0	0	0	0	
	19:30	0	0	0	0	0	
17/7/2024	08:40	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:50	0	0	0	0	0	
18/7/2024	08:15	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:30	0	0	0	0	0	
19/7/2024	8:10*	NA	NA	NA	NA	NA	
	14:10*	NA	NA	NA	NA	NA	
	19:45	0	0	0	0	0	
20/7/2024	08:00	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:10	0	0	0	0	0	
21/7/2024	10:02	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:58	0	0	0	0	0	
22/7/2024	08:00	0	0	0	0	0	
	11:49	0	0	0	0	0	
	19:45	0	0	0	0	0	
23/7/2024	08:00	0	0	0	0	0	
	12:03	0	0	0	0	0	
	19:30	0	0	0	0	0	
24/7/2024	08:15	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:45	0	0	0	0	0	
25/7/2024	08:00	0	0	0	0	0	
	16:10	0	0	0	0	0	
	19:30	0	0	0	0	0	
26/7/2024	08:15	0	0	0	0	0	
	10:51	0	0	0	1	0	
	19:40	0	0	0	0	0	
27/7/2024	08:00	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:35	0	0	0	0	0	
28/7/2024	8:45*	NA	NA	NA	NA	NA	
	14:10	0	0	0	0	0	
	16:10	0	0	0	0	0	
29/7/2024	08:20	0	0	0	0	0	
	15:29	0	0	0	0	0	
	19:20	0	0	0	0	0	
30/7/2024	08:01	0	0	0	0	0	
	10:01	0	0	0	0	0	
	19:30	0	0	0	0	0	
31/7/2024	8:15*	NA	NA	NA	NA	NA	
	11:24*	NA	NA	NA	NA	NA	
	20:03	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/8/2024	08:30	0	0	0	0	0	
	11:26	0	0	0	0	0	
	19:40	0	0	0	0	0	
2/8/2024	08:00	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:30	0	0	0	0	0	
3/8/2024	08:00	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:30	0	0	0	0	0	
4/8/2024	08:45	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:15	0	0	0	0	0	
5/8/2024	08:00	0	0	0	0	0	
	15:39	0	0	0	0	0	
	19:30	0	0	0	0	0	
6/8/2024	08:20	0	0	0	0	0	
	11:56	0	0	0	0	0	
	19:45	0	0	0	0	0	
7/8/2024	07:20	0	0	0	0	0	
	14:35	0	1	0	0	0	
	19:55	0	1	0	0	0	
8/8/2024	08:10	0	0	0	0	0	
	11:48	0	0	0	0	0	
	19:45	0	0	0	0	0	
9/8/2024	08:00	0	0	0	0	0	
	15:10	0	0	0	0	0	
	19:30	0	0	0	0	0	
10/8/2024	08:35	0	0	0	0	0	
	14:35	0	1	0	0	0	
	19:50	0	1	0	0	0	
11/8/2024	08:40	0	0	0	0	0	
	10:10	0	0	0	0	0	
	16:10	0	0	0	0	0	
12/8/2024	08:25*	NA	NA	NA	NA	NA	
	16:38	0	0	0	0	0	
	19:40	0	0	0	0	0	
13/8/2024	08:02	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:15	1	0	0	0	0	
14/8/2024	07:40	0	0	0	0	0	
	15:07	0	0	0	0	0	
	19:45	0	0	0	0	0	
15/8/2024	08:41	1	0	0	0	0	
	14:00	0	0	0	0	0	
	19:40	0	0	0	0	0	
16/8/2024	08:15	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:30	0	0	0	0	0	
17/8/2024	08:10*	NA	NA	NA	NA	NA	
	14:10	0	0	0	0	0	
	19:30	0	0	0	0	0	
18/8/2024	08:40	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:30	0	0	0	0	0	
19/8/2024	08:00	0	0	0	0	0	
	15:28*	NA	NA	NA	NA	NA	
	19:45	0	0	0	0	0	
20/8/2024	08:05	0	0	0	0	0	
	11:51	1	1	0	0	0	
	19:30	0	0	0	0	0	
21/8/2024	08:15	0	0	0	0	0	
	11:16*	NA	NA	NA	NA	NA	
	19:45	0	0	0	0	0	
22/8/2024	07:50	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:40	0	0	0	0	0	
23/8/2024	08:25	0	0	0	0	0	
	11:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
24/8/2024	08:40	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
25/8/2024	09:05	0	1	0	0	0	
	14:10	0	0	0	0	0	
	16:40	0	0	0	0	0	
26/8/2024	09:19	0	0	0	0	0	
	14:35	0	1	0	0	0	
	19:45	0	0	0	0	0	
27/8/2024	09:11	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:40	0	1	0	0	0	
28/8/2024	08:35	0	0	0	0	0	
	10:42	0	0	0	0	0	
	20:03	0	0	0	0	0	
29/8/2024	08:15	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:37	0	0	0	0	0	
30/8/2024	08:00	0	0	0	0	0	
	15:39	0	0	0	0	0	
	19:50	0	0	0	0	0	
31/8/2024	08:10	0	0	0	0	0	
	14:30	0	0	0	0	0	
	08:15	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/9/2024	08:45	0	0	0	0	0	
	15:15	0	0	0	0	0	
	16:45	0	0	0	0	0	
2/9/2024	08:05	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:45	0	0	0	0	0	
3/9/2024	09:02	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
4/9/2024	08:15	0	0	0	0	0	
	10:05	0	0	0	0	0	
	20:00*	NA	NA	NA	NA	NA	Raining, Typhoon No.3
5/9/2024	09:10	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
6/9/2024	08:05	0	0	0	0	0	
	14:10	0	1	0	0	0	Dead Fish
	19:40	0	0	0	0	0	
7/9/2024	09:13	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
8/9/2024	09:20	0	0	0	0	0	
	14:35	0	0	0	0	0	
	16:55	0	0	0	0	0	
9/9/2024	09:51	0	0	0	0	0	
	14:45	0	1	0	0	0	
	19:45	0	0	0	0	0	
10/9/2024	09:37	0	0	0	0	0	
	14:40	0	0	0	0	0	
	20:00	0	0	0	0	0	
11/9/2024	08:25	0	0	0	0	0	
	09:51	0	0	0	0	0	
	19:20	0	0	0	0	0	
12/9/2024	09:07	0	0	0	0	0	
	14:10	0	0	0	0	0	
	20:01	0	0	0	0	0	
13/9/2024	08:00	0	0	0	0	0	
	14:24	0	0	0	0	0	
	19:40	0	0	0	0	0	
14/9/2024	08:10	0	0	0	0	0	
	14:15	0	0	0	0	0	
	20:01	0	0	0	0	0	
15/9/2024	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:30	0	0	0	0	0	
16/9/2024	08:20	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:45	0	0	0	0	0	
17/9/2024	08:00	0	0	0	0	0	
	14:29	0	0	0	0	0	
	20:10	0	0	0	0	0	
18/9/2024	08:22	0	0	0	0	0	
	14:25	0	0	0	0	0	
	20:05	0	0	0	0	0	
19/9/2024	08:54	0	0	0	0	0	
	14:20	0	0	0	0	0	
	20:10	0	0	0	0	0	
20/9/2024	08:00	0	0	0	0	0	
	10:38	0	0	0	0	0	
	19:00	0	0	0	0	0	
21/9/2024	07:50	0	0	0	0	0	
	10:30*	NA	NA	NA	NA	NA	
	20:00	0	0	0	0	0	
22/9/2024	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
23/9/2024	08:20*	NA	NA	NA	NA	NA	
	14:10	0	0	0	0	0	
	19:55	0	0	0	0	0	
24/9/2024	08:00	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:59	0	0	0	0	0	
25/9/2024	09:25	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:30	0	0	0	0	0	
26/9/2024	08:15	0	0	0	0	0	
	10:05	0	0	0	0	0	
	19:30	0	0	0	0	0	
27/9/2024	09:40	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:25	0	0	0	0	0	
28/9/2024	08:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
29/9/2024	08:40	0	0	0	0	0	
	13:50	0	0	0	0	0	
	16:10	0	0	0	0	0	
30/9/2024	08:15	0	0	0	0	0	
	10:48	0	0	0	0	0	
	20:00	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/10/2024	08:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
2/10/2024	08:00	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:40	0	0	0	0	0	
3/10/2024	09:32	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:02	0	0	0	0	0	
4/10/2024	08:15	0	0	0	0	0	
	14:24	0	0	0	0	0	
	20:20	0	0	0	0	0	
5/10/2024	09:07	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:40	0	0	0	0	0	
6/10/2024	09:00	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:20	0	0	0	0	0	
7/10/2024	09:03	0	0	0	0	0	
	14:09	0	0	0	0	0	
	20:00	0	0	0	0	0	
8/10/2024	08:10	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:15	0	0	0	0	0	
9/10/2024	09:02	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:00	0	0	0	0	0	
10/10/2024	09:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
11/10/2024	08:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:40	0	0	0	0	0	
12/10/2024	09:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:15	0	0	0	0	0	
13/10/2024	08:35	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
14/10/2024	09:32	1	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
15/10/2024	08:15	0	0	0	0	0	
	14:52	0	0	0	0	0	
	19:30	0	0	0	0	0	
16/10/2024	08:15	0	0	0	0	0	
	14:23	0	0	0	0	0	
	19:10	0	0	0	0	0	
17/10/2024	09:15	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:40	0	0	0	0	0	
18/10/2024	08:35	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
19/10/2024	08:15	0	0	0	0	0	
	14:35	0	0	0	0	0	
	20:15	0	0	0	0	0	
20/10/2024	08:40	0	0	0	0	0	
	10:15	0	0	0	0	0	
	16:05	0	0	0	0	0	
21/10/2024	09:21	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:05	0	0	0	0	0	
22/10/2024	09:21	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:20	0	0	0	0	0	
23/10/2024	08:55	0	0	0	0	0	
	12:01	0	0	0	0	0	
	19:30	0	0	0	0	0	
24/10/2024	08:00	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:50	0	0	0	0	0	
25/10/2024	09:51	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
26/10/2024	07:50	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
27/10/2024	09:05	0	0	0	0	0	
	14:30	0	0	0	0	0	
	16:45	0	0	0	0	0	
28/10/2024	08:00	0	0	0	0	0	
	14:42	0	0	0	0	0	
	19:35	0	1	0	0	0	
29/10/2024	09:11	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:10	0	0	0	0	0	
30/10/2024	09:06	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:30	0	0	0	0	0	
31/10/2024	08:40	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:50	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/11/2024	08:00	0	0	0	0	0	
	14:06	0	0	0	0	0	
	19:15	0	0	0	0	0	
2/11/2024	08:00	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:10	0	0	0	0	0	
3/11/2024	09:03	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
4/11/2024	08:35	0	0	0	0	0	
	14:06	0	0	0	0	0	
	19:40	0	0	0	0	0	
5/11/2024	09:26	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
6/11/2024	10:15	0	0	0	0	0	
	14:13	0	0	0	0	0	
	19:30	0	0	0	0	0	
7/11/2024	09:24	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:40	0	0	0	0	0	
8/11/2024	09:40	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
9/11/2024	08:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
10/11/2024	09:20	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
11/11/2024	08:00	0	0	0	0	0	
	09:58	0	0	0	0	0	
	19:45	0	0	0	0	0	
12/11/2024	08:00	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:30	0	0	0	0	0	
13/11/2024	08:47	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:20	0	0	0	0	0	
14/11/2024	07:45*	NA	NA	NA	NA	NA	Cancel Due to typhoon signal No. 8
	12:20*	NA	NA	NA	NA	NA	Cancel Due to typhoon signal No. 8
	19:55	0	0	0	0	0	
15/11/2024	09:14	0	0	0	0	0	
	14:37	0	0	0	0	0	
	19:45	0	0	0	0	0	
16/11/2024	07:50	0	0	0	0	0	
	16:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
17/11/2024	08:45	0	0	0	0	0	
	14:25	0	0	0	0	0	
	16:05	0	0	0	0	0	
18/11/2024	09:02	0	0	0	0	0	
	14:05	0	0	0	0	0	
	20:05	0	0	0	0	0	
19/11/2024	08:00	0	0	0	0	0	
	09:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
20/11/2024	09:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:15	0	0	0	0	0	
21/11/2024	09:45	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:10	0	0	0	0	0	
22/11/2024	10:45	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
23/11/2024	08:32	0	0	0	0	0	
	14:33	0	0	0	0	0	
	20:05	0	0	0	0	0	
24/11/2024	09:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:00	0	0	0	0	0	
25/11/2024	09:17	0	0	0	0	0	
	14:40	0	0	0	0	0	
	20:05	0	0	0	0	0	
26/11/2024	08:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:20	0	0	0	0	0	
27/11/2024	09:47	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:05	0	0	0	0	0	
28/11/2024	09:08	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:50	0	1	0	0	0	
29/11/2024	08:50	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:20	0	0	0	0	0	
30/11/2024	08:50	0	0	0	0	0	
	14:35	0	0	0	0	0	
	20:15	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/12/2024	09:35	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:15	0	0	0	0	0	
2/12/2024	09:14	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:30	0	0	0	0	0	
3/12/2024	08:01	0	0	0	0	0	
	14:13	0	0	0	0	0	
	19:45	0	0	0	0	0	
4/12/2024	08:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:36	0	0	0	0	0	
5/12/2024	08:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:15	0	0	0	0	0	
6/12/2024	08:00	0	0	0	0	0	
	15:15	0	0	0	0	0	
	19:55	0	0	0	0	0	
7/12/2024	08:00	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:20	0	0	0	0	0	
8/12/2024	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
9/12/2024	08:20	0	0	0	0	0	
	14:13	0	0	0	0	0	
	20:08	0	0	0	0	0	
10/12/2024	08:10	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:11	0	0	0	0	0	
11/12/2024	08:08	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:50	0	0	0	0	0	
12/12/2024	08:28	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:15	0	0	0	0	0	
13/12/2024	09:10	0	0	0	0	0	
	14:02	0	0	0	0	0	
	19:15	0	0	0	0	0	
14/12/2024	08:42	1	0	0	0	0	
	14:28	0	0	0	0	0	
	20:03	0	0	0	0	0	
15/12/2024	09:30	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:00	0	0	0	0	0	
16/12/2024	08:00	0	0	0	0	0	
	14:26	0	0	0	0	0	
	19:30	0	0	0	0	0	
17/12/2024	09:06	0	0	0	0	0	
	14:32	0	0	0	0	0	
	19:20	0	0	0	0	0	
18/12/2024	08:40	0	0	0	0	0	
	14:27	0	0	0	0	0	
	19:30	0	0	0	0	0	
19/12/2024	08:28	0	0	0	0	0	
	16:18	0	0	0	0	0	
	19:30	0	0	0	0	0	
20/12/2024	08:15	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:40	0	0	0	0	0	
21/12/2024	08:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
22/12/2024	08:40	0	0	0	0	0	
	10:30	0	0	0	0	0	
	16:18	0	0	0	0	0	
23/12/2024	08:25	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:15	0	0	0	0	0	
24/12/2024	08:00	0	0	0	0	0	
	14:09	0	0	0	0	0	
	19:25	0	0	0	0	0	
25/12/2024	07:40	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:50	0	0	0	0	0	
26/12/2024	08:15	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:30	0	0	0	0	0	
27/12/2024	08:10	0	0	0	0	0	
	09:36	0	0	0	0	0	
	19:15	0	0	0	0	0	
28/12/2024	08:00	0	0	0	0	0	
	10:01	0	0	0	0	0	
	19:40	0	1	0	0	0	
29/12/2024	08:45	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:05	0	0	0	0	0	
30/12/2024	09:02	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:50	0	0	0	0	0	
31/12/2024	08:00	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/1/2025	08:45	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:45	0	0	0	0	0	
2/1/2025	08:45	0	0	0	0	0	
	11:50	0	0	0	0	0	
	20:00	0	0	0	0	0	
3/1/2025	08:00	0	0	0	0	0	
	11:40	0	0	0	0	0	
	20:05	0	0	0	0	0	
4/1/2025	10:48	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
5/1/2025	09:50	0	0	0	0	0	
	14:24	0	0	0	0	0	
	16:30	0	0	0	0	0	
6/1/2025	10:46	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
7/1/2025	08:00	0	0	0	0	0	
	11:50	0	0	0	0	0	
	19:55	0	0	0	0	0	
8/1/2025	08:00	0	0	0	0	0	
	11:14	0	0	0	0	0	
	19:40	0	0	0	0	0	
9/1/2025	09:32	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:50	0	0	0	0	0	
10/1/2025	10:55	0	0	0	0	0	
	14:38	0	0	0	0	0	
	19:45	0	0	0	0	0	
11/1/2025	08:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
12/1/2025	08:46	0	0	0	0	0	
	14:30	0	0	0	0	0	
	16:45	0	0	0	0	0	
13/1/2025	09:08	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
14/1/2025	10:15	0	0	0	0	0	
	13:58	0	0	0	0	0	
	20:00	0	0	0	0	0	
15/1/2025	08:35	0	0	0	0	0	
	15:00	0	0	0	0	0	
	19:45	0	0	0	0	0	
16/1/2025	08:40	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:35	0	0	0	0	0	
17/1/2025	08:15	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:56	0	0	0	0	0	
18/1/2025	08:00	0	0	0	0	0	
	14:38	0	0	0	0	0	
	19:15	0	0	0	0	0	
19/1/2025	08:40	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:30	0	0	0	0	0	
20/1/2025	09:14	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:59	0	0	0	0	0	
21/1/2025	08:05	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
22/1/2025	08:00	0	0	0	0	0	
	14:32	0	0	0	0	0	
	19:00	0	0	0	0	0	
23/1/2025	09:42	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:35	0	0	0	0	0	
24/1/2025	08:40	0	0	0	0	0	
	10:36	0	0	0	0	0	
	19:30	0	0	0	0	0	
25/1/2025	08:00	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
26/1/2025	08:40	0	0	0	0	0	
	13:50	0	0	0	0	0	
	16:35	0	0	0	0	0	
27/1/2025	08:15	0	0	0	0	0	
	14:28	0	0	0	0	0	
	20:00	0	0	0	0	0	
28/1/2025	09:40	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:30	0	0	0	0	0	
29/1/2025	08:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
30/1/2025	08:00	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
31/1/2025	11:30	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:40	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
1/2/2025	08:00	0	0	0	0	0	
	11:32	0	0	0	0	0	
	19:35	0	0	0	0	0	
2/2/2025	09:00	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:10	0	0	0	0	0	
3/2/2025	09:16	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:20	0	0	0	0	0	
4/2/2025	09:28	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:48	0	0	0	0	0	
5/2/2025	09:26	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
6/2/2025	08:00	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:30	0	0	0	0	0	
7/2/2025	08:10	0	0	0	0	0	
	10:15	0	0	0	0	0	
	20:05	0	0	0	0	0	
8/2/2025	08:00	0	0	0	0	0	
	14:10	0	0	0	0	0	
	20:00	0	0	0	0	0	
9/2/2025	09:40	0	0	0	0	0	
	14:30	0	0	0	0	0	
	16:15	0	0	0	0	0	
10/2/2025	09:35	0	0	0	0	0	
	14:25	0	0	0	0	0	
	20:10	0	0	0	0	0	
11/2/2025	08:00	0	0	0	0	0	
	14:06	0	0	0	0	0	
	19:40	0	0	0	0	0	
12/2/2025	08:03	0	0	0	0	0	
	14:01	0	0	0	0	0	
	19:30	0	0	0	0	0	
13/2/2025	08:15	0	0	0	0	0	
	14:20	0	0	0	0	0	
	20:10	0	0	0	0	0	
14/2/2025	08:40	0	0	0	0	0	
	10:44	0	0	0	0	0	
	19:35	0	0	0	0	0	
15/2/2025	08:00	0	0	0	0	0	
	14:38	0	0	0	0	0	
	19:30	0	0	0	0	0	
16/2/2025	09:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:00	0	0	0	0	0	
17/2/2025	08:00	0	0	0	0	0	
	11:19	0	0	0	0	0	
	19:30	0	0	0	0	0	
18/2/2025	09:31	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
19/2/2025	08:18	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:55	0	0	0	0	0	
20/2/2025	09:18	0	0	0	0	0	
	14:20	0	0	0	0	0	
	20:09	0	0	0	0	0	
21/2/2025	08:05	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:30	0	0	0	0	0	
22/2/2025	10:03	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:50	0	0	0	0	0	
23/2/2025	09:15	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:20	0	0	0	0	0	
24/2/2025	08:38	0	0	0	0	0	
	14:03	0	0	0	0	0	
	19:30	0	0	0	0	0	
25/2/2025	09:21	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:35	0	0	0	0	0	
26/2/2025	09:09	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:45	0	0	0	0	0	
27/2/2025	08:20	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:10	0	0	0	0	0	
28/2/2025	08:00	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:40	0	0	0	0	0	
*: Cancel Due To Rain							

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
1/3/2025	09:05	0	0	0	0	0	
	14:38	0	0	0	0	0	
	19:57	0	0	0	0	0	
2/3/2025	08:40	0	0	0	0	0	
	14:40	0	0	0	0	0	
	16:55	0	0	0	0	0	
3/3/2025	08:00	0	0	0	0	0	
	10:19	0	0	0	0	0	
	19:45	0	0	0	0	0	
4/3/2025	08:03	0	0	0	0	0	
	10:50	0	0	0	0	0	
	20:00	0	0	0	0	0	
5/3/2025	09:01	0	0	0	0	0	
	14:22	0	0	0	0	0	
	19:55	0	0	0	0	0	
6/3/2025	09:34	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:40	0	0	0	0	0	
7/3/2025	08:40	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:59	0	0	0	0	0	
8/3/2025	08:15	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:15	0	0	0	0	0	
9/3/2025	08:45	0	0	0	0	0	
	10:58	0	0	0	0	0	
	16:48	0	0	0	0	0	
10/3/2025	09:51	0	0	0	0	0	
	14:33	0	0	0	0	0	
	20:00	0	0	0	0	0	
11/3/2025	08:20	0	0	0	0	0	
	10:02	0	0	0	0	0	
	19:30	0	0	0	0	0	
12/3/2025	08:15	0	0	0	0	0	
	14:22	0	0	0	0	0	
	20:01	0	0	0	0	0	
13/3/2025	08:33	0	0	0	0	0	
	14:15	0	0	0	0	0	
	20:30	0	0	0	0	0	
14/3/2025	08:15	0	0	0	0	0	
	14:33	0	0	0	0	0	
	19:49	0	0	0	0	0	
15/3/2025	08:35	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:40	0	0	0	0	0	
16/3/2025	08:45	0	0	0	0	0	
	10:20	0	0	0	0	0	
	16:35	0	0	0	0	0	
17/3/2025	08:00	0	0	0	0	0	
	14:28	0	0	0	0	0	
	19:25	0	0	0	0	0	
18/3/2025	09:15	0	0	0	0	0	
	14:07	0	0	0	0	0	
	19:30	0	0	0	0	0	
19/3/2025	09:26	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:40	0	0	0	0	0	
20/3/2025	08:01	0	0	0	0	0	
	10:00	0	0	0	0	0	
	19:10	0	0	0	0	0	
21/3/2025	08:38	0	0	0	0	0	
	14:08	0	0	0	0	0	
	19:50	0	0	0	0	0	
22/3/2025	08:00	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:30	0	0	0	0	0	
23/3/2025	08:37	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:03	0	0	0	0	0	
24/3/2025	08:50	0	0	0	0	0	
	14:32	0	0	0	0	0	
	19:30	0	0	0	0	0	
25/3/2025	08:32	0	0	0	0	0	
	14:15	0	0	0	0	0	
	18:45	0	0	0	0	0	
26/3/2025	09:40	0	0	0	0	0	
	13:59	0	0	0	0	0	
	20:00	0	0	0	0	0	
27/3/2025	08:15	0	0	0	0	0	
	13:59	0	0	0	0	0	
	19:40	0	0	0	0	0	
28/3/2025	08:51	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:42	0	0	0	0	0	
29/3/2025	07:50	0	0	0	0	0	
	16:00	0	0	0	0	0	
	20:00	0	0	0	0	0	
30/3/2025	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:05	0	0	0	0	0	
31/3/2025	08:03	0	0	0	0	0	
	10:32	0	0	0	0	0	
	19:30	0	0	0	0	0	
*: Cancel Due To Rain							

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
01/04/2025	08:35	0	0	0	0	0	
	14:00	0	0	0	0	0	
	21:30	0	0	0	0	0	
02/04/2025	08:40	0	0	0	0	0	
	10:50	0	0	0	0	0	
	19:15	0	0	0	0	0	
03/04/2025	09:26	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
04/04/2025	09:30	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:35	0	0	0	0	0	
05/04/2025	08:30	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:40	0	0	0	0	0	
06/04/2025	08:44	0	0	0	0	0	
	14:30	0	0	0	0	0	
	16:15	0	0	0	0	0	
07/04/2025	08:05	0	0	0	0	0	
	10:55	0	0	0	0	0	
	19:15	0	0	0	0	0	
08/04/2025	10:10	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:25	0	0	0	0	0	
09/04/2025	08:56	0	0	0	0	0	
	11:13	0	0	0	0	0	
	19:30	0	0	0	0	0	
10/04/2025	09:23	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:42	0	0	0	0	0	
11/04/2025	08:38	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:20	0	0	0	0	0	
12/04/2025	08:05	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:20	0	0	0	0	0	
13/04/2025	09:03	1	0	0	0	0	
	11:30	0	0	0	0	0	
	16:00	0	0	0	0	0	
14/04/2025	09:24	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:30	0	0	0	0	0	
15/04/2025	08:43	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
16/04/2025	08:25	0	0	0	0	0	
	10:53	0	0	0	0	0	
	19:30	0	0	0	0	0	
17/04/2025	10:31	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:23	0	0	0	0	0	
18/04/2025	08:15	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:30	0	0	0	0	0	
19/04/2025	08:15	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:00	0	0	0	0	0	
20/04/2025	08:54	0	0	0	0	0	
	11:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
21/04/2025	08:00	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:15	0	0	0	0	0	
22/04/2025	07:49	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:15	0	0	0	0	0	
23/04/2025	08:15	0	0	0	0	0	
	14:04	0	0	0	0	0	
	19:30	0	0	0	0	0	
24/04/2025	09:06	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:02	0	0	0	0	0	
25/04/2025	08:00	0	0	1	0	0	
	10:16	0	0	0	0	0	
	19:30	0	0	0	0	0	
26/04/2025	08:00	0	0	0	0	0	
	15:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
27/04/2025	08:45	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:38	0	0	0	0	0	
28/04/2025	09:00*	NA	NA	NA	NA	NA	
	14:15	0	0	0	0	0	
	19:40	0	0	0	0	0	
29/04/2025	09:17	0	0	0	0	0	
	14:50	0	0	0	0	0	
	19:27	0	0	0	0	0	
30/04/2025	08:00	0	1	0	0	0	
	14:23	0	0	0	0	0	
	19:40	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
01/05/2025	08:10	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
02/05/2025	08:41	0	0	0	0	0	
	11:15	0	0	0	0	0	
	20:00	0	0	0	0	0	
03/05/2025	08:40	0	0	0	0	0	
	14:09	0	0	0	0	0	
	19:42	0	0	0	0	0	
04/05/2025	09:10	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:05	0	0	0	0	0	
05/05/2025	10:00	0	0	0	0	0	
	16:22	0	0	0	0	0	
	19:50	0	0	0	0	0	
06/05/2025	10:04	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:40	0	0	0	0	0	
07/05/2025	08:05*	NA	NA	NA	NA	NA	
	10:20*	NA	NA	NA	NA	NA	
	19:39	0	0	0	0	0	
08/05/2025	08:30	0	0	0	0	0	
	14:48	0	0	0	0	0	
	19:44	1	1	0	1	0	
09/05/2025	08:42	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
10/05/2025	08:00	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:30	0	0	0	0	0	
11/05/2025	08:45	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:30	0	0	0	0	0	
12/05/2025	09:37	0	0	0	0	0	
	14:25	0	0	0	0	0	
	18:57	1	0	0	1	0	
13/05/2025	08:49	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:06	0	0	0	0	0	
14/05/2025	08:30	0	0	0	0	0	
	11:18	0	0	0	0	0	
	19:30	0	0	0	0	0	
15/05/2025	08:45	0	0	0	0	0	
	14:12	0	0	0	0	0	
	19:50	0	0	0	0	0	
16/05/2025	08:50	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:35	0	0	0	0	0	
17/05/2025	08:30	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:20	0	0	0	0	0	
18/05/2025	08:47	0	1	0	0	1	
	10:59	0	0	0	0	0	
	16:35	0	0	0	0	0	
19/05/2025	08:39	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:40	0	0	0	0	0	
20/05/2025	08:52	0	0	0	0	0	
	11:01	0	0	0	0	0	
	20:00	0	0	0	0	0	
21/05/2025	08:05	0	0	0	0	0	
	14:17	0	0	0	0	0	
	19:45	0	0	0	0	0	
22/05/2025	08:15	0	0	0	0	0	
	15:16	0	0	0	0	0	
	19:23	0	1	0	0	0	
23/05/2025	08:56	0	0	0	0	0	
	14:45	0	0	0	0	0	
	19:05	0	0	0	0	0	
24/05/2025	08:00	0	0	0	0	0	
	14:30	0	0	0	0	0	
	20:00	0	0	0	0	0	
25/05/2025	08:41	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:05	0	0	0	0	0	
26/05/2025	08:10	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:10	0	0	0	0	0	
27/05/2025	08:47	0	0	0	0	0	
	14:12	0	0	0	0	0	
	19:05	0	0	0	0	0	
28/05/2025	09:38	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:30	0	0	0	0	0	
29/05/2025	08:02	0	1	0	0	0	
	10:45	0	0	0	0	0	
	19:06	0	0	0	0	0	
30/05/2025	08:30	0	0	0	0	0	
	11:08	0	0	0	0	0	
	19:25	0	0	0	0	0	
31/05/2025	08:15	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:15	0	0	0	0	0	

Date	Time	OD1	OD2	OD3	OD4	OD5
01/06/2025	09:10	0	0	0	0	0
	14:00	0	0	0	0	0
	16:05	0	0	0	0	0
02/06/2025	09:31	0	0	0	0	0
	14:15	0	0	0	0	0
	19:30	0	0	0	0	0
03/06/2025	09:01	0	0	0	0	0
	10:51	0	0	0	0	0
	19:15	0	0	0	0	0
04/06/2025	08:03	0	0	0	0	0
	14:29	0	0	0	0	0
	19:30*	NA	NA	NA	NA	NA
05/06/2025	09:30	0	0	0	0	0
	14:15	0	0	0	0	0
	19:08	0	0	0	0	0
06/06/2025	08:15	0	0	0	0	0
	10:42	0	0	0	0	0
	19:15	0	0	0	0	0
07/06/2025	08:25	0	0	0	0	0
	14:10	0	0	0	0	0
	19:35	0	0	0	0	0
08/06/2025	08:45	0	0	0	0	0
	14:00	0	0	0	0	0
	16:15	0	0	0	0	0
09/06/2025	08:03	0	0	0	0	0
	14:28	0	0	0	0	0
	18:58	0	0	1	0	0
10/06/2025	09:08	0	0	0	0	0
	11:08	0	0	0	0	0
	19:10	0	0	0	0	0
11/06/2025	08:40*	NA	NA	NA	NA	NA
	11:15	1	1	0	1	0
	19:15	0	0	0	0	0
12/06/2025	09:32	0	0	0	0	0
	14:50	0	0	0	0	0
	19:38	0	0	0	0	0
13/06/2025	10:01	0	0	0	0	0
	14:05	0	0	0	0	0
	19:40*	NA	NA	NA	NA	NA
14/06/2025	08:50	0	0	0	0	0
	14:10	0	0	0	0	0
	19:40	0	0	0	0	0
15/06/2025	09:44*	NA	NA	NA	NA	NA
	14:50	0	0	0	0	0
	16:30	0	0	0	0	0
16/06/2025	08:30	0	0	0	0	0
	14:43	0	0	0	0	0
	19:15	0	0	0	0	0
17/06/2025	08:30*	NA	NA	NA	NA	NA
	10:00*	NA	NA	NA	NA	NA
	19:30*	NA	NA	NA	NA	NA
18/06/2025	08:40	0	0	0	0	1
	14:40	0	0	0	0	0
	19:42	0	0	0	0	0
19/06/2025	08:01	0	0	0	0	0
	14:41	0	0	0	0	0
	19:20	0	0	0	0	0
20/06/2025	09:17	0	0	0	0	0
	14:05	0	0	0	0	0
	19:03	0	0	1	1	0
21/06/2025	08:15	0	0	0	0	0
	14:30	0	0	0	0	0
	19:15	0	0	0	0	0
22/06/2025	09:35	0	0	0	0	0
	14:05	0	0	0	0	0
	16:32	0	0	0	0	0
23/06/2025	08:00	0	0	0	0	0
	11:05	0	0	0	0	0
	19:15	0	0	0	0	0
24/06/2025	09:01	0	0	0	0	0
	14:20	0	0	0	0	0
	19:30	0	0	0	0	0
25/06/2025	11:00	0	0	0	0	0
	14:25	0	0	0	0	0
	19:42	0	0	0	0	0
26/06/2025	10:15	0	0	0	0	0
	14:15	0	0	0	0	0
	19:52	0	0	0	0	0
27/06/2025	08:20	0	0	0	0	0
	14:00	0	0	0	0	0
	19:12	0	0	0	0	0
28/06/2025	08:00	0	0	0	0	0
	14:32	0	0	0	0	0
	19:15	0	0	0	0	0
29/06/2025	08:49	0	0	0	0	0
	14:00	0	0	0	0	0
	16:30	0	0	0	0	0
30/06/2025	08:40	0	0	0	0	0
	14:10	0	0	0	0	0
	19:15	0	0	0	0	0

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
01/07/2025	08:05	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:35	0	0	0	0	0	
02/07/2025	07:56	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:15	0	0	0	0	0	
03/07/2025	09:10	0	0	0	0	0	
	14:30	0	0	1	0	0	
	19:15	0	0	0	0	0	
04/07/2025	09:11	0	0	0	0	0	
	14:22	0	0	0	0	0	
	19:20	0	0	0	0	0	
05/07/2025	10:29	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:30	0	0	0	0	0	
06/07/2025	08:45	0	0	0	0	0	
	14:01	0	0	0	0	0	
	16:03	0	0	0	0	0	
07/07/2025	09:27	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:32	0	0	0	0	0	
08/07/2025	09:10	0	0	0	0	0	
	14:14	1	0	0	0	0	
	19:20	0	0	0	0	0	
09/07/2025	08:25	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:25	0	0	0	0	0	
10/07/2025	08:25	0	0	0	0	0	
	14:43*	NA	NA	NA	NA	NA	
	19:05	0	0	0	0	0	
11/07/2025	08:30	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:10	0	0	0	1	1	
12/07/2025	08:43	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:45	0	0	0	0	0	
13/07/2025	08:50	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:15	0	0	0	0	0	
14/07/2025	08:02	0	0	0	0	0	
	11:00	0	0	0	0	0	
	19:20	0	0	0	0	0	
15/07/2025	08:45	0	0	0	0	0	
	14:40	0	0	0	0	0	
	19:30	0	0	0	0	0	
16/07/2025	09:24	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:42	0	0	0	0	0	
17/07/2025	07:42	1	0	0	0	0	
	14:05	0	0	0	0	0	
	19:15	0	0	0	0	0	
18/07/2025	08:30	0	0	0	0	1	
	11:10*	NA	NA	NA	NA	NA	
	19:32	0	0	0	0	0	
19/07/2025	08:30	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
20/07/2025	07:49*	NA	NA	NA	NA	NA	
	14:05*	NA	NA	NA	NA	NA	
	19:05*	NA	NA	NA	NA	NA	
21/07/2025	08:55	0	0	0	0	0	
	14:25*	NA	NA	NA	NA	NA	
	19:05*	NA	NA	NA	NA	NA	
22/07/2025	08:55	0	0	0	0	0	
	11:16	0	0	0	0	0	
	19:25*	NA	NA	NA	NA	NA	
23/07/2025	09:00	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:43	0	0	0	0	0	
24/07/2025	08:00	0	0	0	0	0	
	11:02	0	0	0	0	0	
	19:35	0	0	0	0	0	
25/07/2025	08:02	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:26*	NA	NA	NA	NA	NA	
26/07/2025	08:26	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:15	0	0	0	0	0	
27/07/2025	08:45	0	0	0	0	0	
	10:05	0	0	0	0	0	
	16:03	0	0	0	0	0	
28/07/2025	08:30	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:20	0	0	0	0	0	
29/07/2025	08:15	0	0	0	0	0	
	16:42	0	0	0	0	0	
	19:15	0	0	0	0	0	
30/07/2025	08:40	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:09	0	1	0	0	0	
31/07/2025	09:08	0	0	0	0	0	
	14:36	0	0	0	0	0	
	19:30	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remarks
01/08/2025	09:10	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:10	0	0	0	0	0	
02/08/2025	08:45*	NA	NA	NA	NA	NA	
	14:05*	NA	NA	NA	NA	NA	
	19:30	0	0	0	0	0	
03/08/2025	08:55*	NA	NA	NA	NA	NA	
	14:00	0	0	0	0	0	
	16:30	0	0	0	0	0	
04/08/2025	09:00*	NA	NA	NA	NA	NA	
	11:05*	NA	NA	NA	NA	NA	
	19:35	0	0	0	0	0	
05/08/2025	09:00*	NA	NA	NA	NA	NA	
	14:30*	NA	NA	NA	NA	NA	
	19:30	0	0	0	0	0	
06/08/2025	09:15	0	0	0	0	0	
	14:32	0	0	0	0	0	
	19:15	0	0	0	0	0	
07/08/2025	09:12	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:47	0	0	0	0	0	
08/08/2025	08:01	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:52	1	0	0	0	0	
09/08/2025	08:49	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:52	0	0	0	0	0	
10/08/2025	08:42	0	1	1	0	0	OD2: OD3: unknown
							OD1: rubbish OD2: sewage OD3: unknown
	11:06	1	1	1	0	0	
11/08/2025	16:02	0	0	0	0	0	
	08:42	0	0	0	0	0	
	11:40	0	0	0	0	0	
12/08/2025	19:10	0	0	0	0	0	
	08:15	0	0	0	0	0	
	10:25	0	0	0	0	0	
13/08/2025	19:47	0	0	0	0	0	
	08:10	0	0	0	0	0	
	16:29	0	0	0	0	0	
14/08/2025	19:52	0	0	0	0	0	
	09:27*	NA	NA	NA	NA	NA	
	14:10	0	0	0	0	0	
15/08/2025	19:20	0	0	0	0	0	
	08:30	0	0	0	0	0	
	14:17	0	0	0	0	0	
16/08/2025	18:35	0	0	0	0	0	
	08:10	0	0	0	0	0	
	14:36	0	1	0	0	0	
17/08/2025	19:15	0	0	0	0	0	
	09:25*	NA	NA	NA	NA	NA	
	14:05*	NA	NA	NA	NA	NA	
18/08/2025	16:05	0	0	0	0	0	
	08:38	0	0	0	0	0	
	11:20	0	0	0	0	0	
19/08/2025	19:29	0	0	0	0	0	
	11:20*	NA	NA	NA	NA	NA	
	14:50	0	0	0	0	0	
20/08/2025	19:20	0	0	0	0	0	
	08:05	0	0	0	0	0	
	13:28	0	0	0	0	0	
21/08/2025	19:45	0	0	0	0	0	
	08:10	0	0	0	0	0	
	10:40	0	0	0	0	0	
22/08/2025	19:25	0	0	0	0	0	
	10:45	0	0	0	0	0	
	14:50	0	0	0	0	0	
23/08/2025	19:20	0	0	0	0	0	
	08:15	0	0	0	0	0	
	14:17	0	0	0	0	0	
24/08/2025	19:30	0	1	0	0	0	
	09:20	0	0	0	0	0	
	14:05	0	0	0	0	0	
25/08/2025	16:20	0	0	0	0	0	
	09:05	0	0	0	0	0	
	14:18	0	0	0	0	0	
26/08/2025	19:15	0	0	0	0	0	
	08:48	0	0	0	0	0	
	14:30	0	0	0	0	0	
27/08/2025	19:57	0	0	0	0	0	
	08:49	0	0	0	0	0	
	14:14	0	0	0	0	0	
28/08/2025	19:12	0	1	0	0	0	
	08:05	0	0	0	0	0	
	14:10	0	0	0	0	0	
29/08/2025	19:30	0	0	0	0	0	
	09:01	0	0	0	0	0	
	14:30	0	0	0	0	0	
30/08/2025	19:25	0	0	0	0	0	
	08:00	0	0	0	0	0	
	14:25	0	0	0	0	0	
31/08/2025	19:00	0	0	0	0	0	
	08:40	0	0	0	0	0	
	14:15	0	0	0	0	0	
	16:30	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
01/09/2025	08:43	0	0	0	0	0	
	14:13	0	0	0	0	0	
	16:20	0	0	0	0	0	
02/09/2025	08:15	0	0	0	0	0	
	14:32	0	0	0	0	0	
	19:37	0	0	0	0	0	
03/09/2025	08:40	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:52	0	0	0	0	0	
04/09/2025	07:59	0	0	0	0	0	
	14:17	0	0	0	0	0	
	19:15	0	0	0	0	0	
05/09/2025	08:00	0	0	0	0	0	
	09:51	0	0	0	0	0	
	20:01	0	0	0	0	0	
06/09/2025	08:15	0	0	0	0	0	
	14:30	0	0	0	0	0	
	19:30	0	0	0	0	0	
07/09/2025	08:45	0	0	0	0	0	
	14:31*	NA	NA	NA	NA	NA	
	19:33*	NA	NA	NA	NA	NA	
08/09/2025	07:45*	NA	NA	NA	NA	NA	
	13:10*	NA	NA	NA	NA	NA	
	19:10	0	0	0	0	0	
09/09/2025	08:00*	NA	NA	NA	NA	NA	
	10:00	0	0	0	0	0	
	19:10	0	0	0	0	0	
10/09/2025	08:40	0	0	0	0	0	
	11:19	0	0	0	0	0	
	19:43	0	0	0	0	0	
11/09/2025	08:12	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:20	0	0	0	0	0	
12/09/2025	08:42	0	0	0	0	0	
	10:45	0	0	0	0	0	
	19:32	0	0	0	0	0	
13/09/2025	08:00	0	0	0	0	0	
	14:37	0	0	0	0	0	
	19:26	0	0	0	0	0	
14/09/2025	09:10	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:15	0	0	0	0	0	
15/09/2025	08:15	0	0	0	0	0	
	10:45	0	0	0	0	0	
	19:10	0	0	0	0	0	
16/09/2025	08:00	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:15	0	0	0	0	0	
17/09/2025	09:30	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:30	0	0	0	0	0	
18/09/2025	08:05	0	0	0	0	0	
	14:09	0	0	0	0	0	
	19:15	0	0	0	0	0	
19/09/2025	09:25	0	0	0	0	0	
	14:20	0	0	0	0	0	
	19:30	0	0	0	0	0	
20/09/2025	08:00	0	0	0	0	0	
	14:00*	NA	NA	NA	NA	NA	
	19:20	0	0	0	0	0	
21/09/2025	08:47	0	0	0	0	0	
	14:00*	NA	NA	NA	NA	NA	
	16:00*	NA	NA	NA	NA	NA	
22/09/2025	07:37	1	0	0	0	0	rubbish
	10:20	0	0	0	0	0	
	19:29	0	0	0	0	0	
23/09/2025	08:42	0	0	0	0	0	
	14:12	0	0	0	0	0	
	19:00*	NA	NA	NA	NA	NA	
24/09/2025	07:00*	NA	NA	NA	NA	NA	
	14:00*	NA	NA	NA	NA	NA	
	19:15*	NA	NA	NA	NA	NA	
25/09/2025	09:08	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:35	0	0	0	0	0	
26/09/2025	09:12	0	0	0	0	0	
	14:17	0	0	0	0	0	
	19:30	0	0	0	0	0	
27/09/2025	08:29	0	0	0	0	0	
	14:48	0	0	0	0	0	
	20:42	0	0	0	0	0	
28/09/2025	09:10	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:10	0	0	0	0	0	
29/09/2025	09:01	0	0	0	0	0	
	14:35	0	0	0	0	0	
	19:10	0	0	0	0	0	
30/09/2025	08:10	0	0	0	0	0	
	14:10	0	0	0	0	0	
	19:20	0	0	0	0	0	

*: Cancel Due To Rain

Date	Time	OD1	OD2	OD3	OD4	OD5	Remakrs
01/10/2025	08:30	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:18	0	0	0	0	0	
02/10/2025	09:25	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
03/10/2025	08:47	0	0	0	0	0	
	10:12	0	0	0	0	0	
	19:00	0	0	0	0	0	
04/10/2025	08:40	0	0	0	0	0	
	14:37	0	0	0	0	0	
	19:40	0	0	0	0	0	
05/10/2025	09:00	0	0	0	0	0	
	14:00	0	0	0	0	0	
	16:05	0	0	0	0	0	
06/10/2025	09:15	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:43	0	0	0	0	0	
07/10/2025	08:10	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:30	0	0	0	0	0	
08/10/2025	08:00	0	0	0	0	0	
	14:09	0	0	0	0	0	
	19:30	0	0	0	0	0	
09/10/2025	08:35	0	0	0	0	0	
	13:33	0	0	0	0	0	
	19:04	0	0	0	0	0	
10/10/2025	08:32	0	0	0	0	0	
	14:01	0	0	0	0	0	
	19:20	0	0	0	0	0	
11/10/2025	08:02	0	0	0	0	0	
	14:05	0	0	0	0	0	
	19:02	1	0	0	0	0	garbage
12/10/2025	09:15*	NA	NA	NA	NA	NA	
	14:00	0	0	0	0	0	
	16:10	0	0	0	0	0	
13/10/2025	07:47	0	1	0	0	0	
	14:18	0	0	0	0	0	source from DSD
	19:20	0	0	0	0	0	
14/10/2025	08:40	0	0	0	0	0	
	14:08	0	0	0	0	0	
	19:00	0	0	0	0	0	
15/10/2025	09:08	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:42	0	0	0	0	0	
16/10/2025	09:30	0	0	0	0	0	
	14:25	0	0	0	0	0	
	19:22	0	0	0	0	0	
17/10/2025	08:42	0	0	0	0	0	
	10:15	0	0	0	0	0	
	19:00	0	0	0	0	0	
18/10/2025	08:05	0	0	0	0	0	
	14:00	0	0	0	0	0	
	19:30	0	0	0	0	0	
19/10/2025	09:12	0	0	0	0	0	
	14:05	0	0	0	0	0	
	16:03	0	0	0	0	0	
20/10/2025	09:18	0	0	0	0	0	
	14:22	0	0	0	0	0	
	19:15	0	0	0	0	0	
21/10/2025	08:32	0	0	0	0	0	
	14:09	0	0	0	0	0	
	19:20	0	0	0	0	0	
22/10/2025	08:00	0	0	0	0	0	
	10:15*	NA	NA	NA	NA	NA	
	19:32*	NA	NA	NA	NA	NA	
23/10/2025	08:05	0	0	0	0	0	
	14:42	0	0	0	0	0	
	19:10	0	0	0	0	0	
24/10/2025	08:42	0	0	0	0	0	
	14:56	0	0	0	0	0	
	19:15	0	0	0	0	0	
25/10/2025	08:42	0	0	0	0	0	
	10:39	0	0	0	0	0	
	19:32	0	0	0	0	0	
26/10/2025	09:00	0	0	0	0	0	
	14:10	0	0	0	0	0	
	16:20	0	0	0	0	0	
27/10/2025	07:17	0	0	0	0	0	
	14:15	0	0	0	0	0	
	19:15	0	0	0	0	0	
28/10/2025	08:15	0	0	0	0	0	
	10:20	0	0	0	0	0	
	18:57	0	0	0	0	0	
29/10/2025	09:09	0	0	0	0	0	
	14:10**	0	0	0	0	0	
	19:15	0	0	0	0	0	
30/10/2025	08:05	0	0	0	0	0	
	10:11	0	0	0	0	0	
	19:40	0	0	0	0	0	
31/10/2025	08:50	0	0	0	0	0	
	10:11	0	0	0	0	0	
	19:35	0	0	0	0	0	

*: Cancel Due To Rain

Appendix D

Quantitative Odour Impact Assessment and Contour Plots

Table 1 - H₂S Emission Rates Calculation

Deodouriser	Remarks	X-Coordinate	Y-Coordinate	Base Elevation (mPD)	Outlet Concentration (ppm) ^[1]	Correction factor ^[2]	Concentration at Actual Condition (g/m ³) ^[2]	Emission Rate at Actual Condition (g/s)	Stack Height (mAG) ^[3]	Exhaust Temperature (K) ^[3]	Stack Velocity (m/s) ^[4]	Stack Diameter (m) ^[4]	Flow Rate (m3/s) ^[4]	Vertical or Capped Stack
Existing Scenario														
DO1	TBA 2-stage scrubber. Duty	832525	820925	4.60	3.13E-06	1.39E-04	4.37E-10	8.73E-09	17.89	298	17.7	1.2	20.0	Vertical
DO2	TBA 2-stage scrubber. Duty	832535	820941	4.60	2.00E-04	1.39E-04	2.79E-08	5.58E-07	17.89	298	17.7	1.2	20.0	Vertical
DO3	TBA 1-stage scrubber. Duty	832544	820955	4.60	1.00E-02	1.39E-04	1.39E-06	2.65E-05	18.50	298	16.8	1.2	19.0	Vertical
DO4	TBA 2-stage scrubber. Duty	832552	820969	4.60	3.07E-08	1.39E-04	4.28E-12	8.56E-11	17.50	298	17.7	1.2	20.0	Vertical
DO5 ^[5]	TBA 2-stage scrubber. Standby	832560	820981	4.60	0.00E+00	1.39E-04	0.00E+00	0.00E+00	17.89	298	17.7	1.2	20.0	Capped
Future Scenario														
DO1	TBA 2-stage scrubber. Duty	832525	820925	4.60	0.05	1.39E-04	6.97E-06	1.39E-04	17.89	298	17.7	1.2	20.0	Vertical
DO2	TBA 2-stage scrubber. Duty	832535	820941	4.60	0.05	1.39E-04	6.97E-06	1.39E-04	17.89	298	17.7	1.2	20.0	Vertical
DO3	TBA 2-stage scrubber. Duty	832544	820955	4.60	0.05	1.39E-04	6.97E-06	1.32E-04	18.50	298	16.8	1.2	19.0	Vertical
DO4	TBA 2-stage scrubber. Duty	832552	820969	4.60	0.05	1.39E-04	6.97E-06	1.39E-04	17.50	298	17.7	1.2	20.0	Vertical
DO5 ^[5]	TBA 2-stage scrubber. Duty	832560	820981	4.60	0.05	1.39E-04	6.97E-06	1.39E-04	17.89	298	17.7	1.2	20.0	Capped
DO6	TBB 2-stage scrubber. Duty	832460.2	820970.3	4.60	0.05	1.39E-04	6.97E-06	1.74E-04	27.54	298	22.1	1.2	25.0	Capped
DO7	TBB 2-stage scrubber. Duty	832468.5	820972.9	4.60	0.05	1.39E-04	6.97E-06	1.74E-04	27.54	298	22.1	1.2	25.0	Capped

- Notes:
- For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), the minimum recorded outlet concentration is adopted for each scrubber unit under Existing Scenario. Under Future Scenario, the design outlet concentration of 0.05ppm (at standard condition of 0 degrees C, 1 atm, dry) is adopted at the outlet.
 - Correction factor is applied to convert gas concentration from ppmv at standard condition (273K, 1 atm, 20.9% oxygen,dry) into g/m³ at actual condition (298K, 1 atm, 20.9% oxygen, 90% moisture). To convert H₂S ppmvd to g/m³ at standard condition (dry), multiply the ppm concentration by [Molecular Mass of H₂S (i.e. 34.1 g)/22.4/1000]. Then apply the correction factor for temperature, pressure, moisture and oxygen as shown in Table 3 to convert to g/m³ under actual condition.
 - Exhaust temperature (at ambient temp) and stack height are provided by design engineer.
 - Stack flow rate is provided by design engineer. Stack velocity are based on Flow Rate divided by stack cross-sectional area.
 - DO5 is currently used as standby unit. For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), DO5 is assumed to be 0ppm under the Existing Scenario, and 0.05ppm under Future Scenario.

Table 2 - NH₃ Emission Rates Calculation

Deodouriser	Remarks	X-Coordinate	Y-Coordinate	Base Elevation (mPD)	Outlet Concentration (ppm) ^[1]	Correction factor ^[2]	Concentration at Actual Condition (g/m ³) ^[2]	Emission Rate at Actual Condition (g/s)	Stack Height (mAG) ^[3]	Exhaust Temperature (K) ^[3]	Stack Velocity (m/s) ^[4]	Stack Diameter (m) ^[4]	Flow Rate (m3/s) ^[4]	Vertical or Capped Stack
Existing Scenario														
DO1	TBA 2-stage scrubber. Duty	832525	820925	4.60	3.13E-05	6.95E-05	2.18E-09	4.35E-08	17.89	298	17.7	1.2	20.0	Vertical
DO2	TBA 2-stage scrubber. Duty	832535	820941	4.60	1.37E-06	6.95E-05	9.53E-11	1.91E-09	17.89	298	17.7	1.2	20.0	Vertical
DO3 ^[5]	TBA 1-stage scrubber. Duty	832544	820955	4.60	1.38E-05	6.95E-05	9.59E-10	1.82E-08	18.50	298	16.8	1.2	19.0	Vertical
DO4	TBA 2-stage scrubber. Duty	832552	820969	4.60	2.72E-06	6.95E-05	1.89E-10	3.78E-09	17.50	298	17.7	1.2	20.0	Vertical
DO5 ^[6]	TBA 2-stage scrubber. Standby	832560	820981	4.60	0.00E+00	6.95E-05	0.00E+00	0.00E+00	17.89	298	17.7	1.2	20.0	Capped
Future Scenario														
DO1	TBA 2-stage scrubber. Duty	832525	820925	4.60	0.5	6.95E-05	3.48E-05	6.95E-04	17.89	298	17.7	1.2	20.0	Vertical
DO2	TBA 2-stage scrubber. Duty	832535	820941	4.60	0.5	6.95E-05	3.48E-05	6.95E-04	17.89	298	17.7	1.2	20.0	Vertical
DO3 ^[5]	TBA 2-stage scrubber. Duty	832544	820955	4.60	0.5	6.95E-05	3.48E-05	6.60E-04	18.50	298	16.8	1.2	19.0	Vertical
DO4	TBA 2-stage scrubber. Duty	832552	820969	4.60	0.5	6.95E-05	3.48E-05	6.95E-04	17.50	298	17.7	1.2	20.0	Vertical
DO5 ^[6]	TBA 2-stage scrubber. Duty	832560	820981	4.60	0.5	6.95E-05	3.48E-05	6.95E-04	17.89	298	17.7	1.2	20.0	Capped
DO6	TBB 2-stage scrubber. Duty	832460.2	820970.3	4.60	0.5	6.95E-05	3.48E-05	8.69E-04	27.54	298	22.1	1.2	25.0	Capped
DO7	TBB 2-stage scrubber. Duty	832468.5	820972.9	4.60	0.5	6.95E-05	3.48E-05	8.69E-04	27.54	298	22.1	1.2	25.0	Capped

- Notes:
- For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), the minimum recorded outlet concentration is adopted for each scrubber unit under Existing Scenario. Under Future Scenario, the design outlet concentration of 0.5ppm (at standard condition of 0 degrees C, 1 atm, dry) is adopted at the outlet.
 - Correction factor is applied to convert gas concentration from ppmv at standard condition (273K, 1 atm, 20.9% oxygen,dry) into g/m³ at actual condition (298K, 1 atm, 20.9% oxygen, 90% moisture). To convert NH₃ ppm to g/m³ at standard condition (dry), multiply the ppm concentration by [Molecular Mass of NH₃ (i.e. 17 g)/22.4/1000]. Then apply the correction factor for temperature, pressure, moisture and oxygen as shown in Table 3 to convert to g/m³ under actual condition.
 - Exhaust temperature (at ambient temp) and stack height are provided by design engineer.
 - Stack flow rate is provided by design engineer. Stack velocity are based on Flow Rate divided by stack cross-sectional area.
 - Under Existing Scenario, DO3 is a 1-stage scrubber that only treats H2S, hence untreated NH3 will be emitted from DO3. For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), the lowest recorded NH3 inlet concentration amongst scrubber units DO1, 2, 4, 5 is adopted as the minimum outlet concentration under Existing Scenario. Under Future Scenario, DO5 is duty unit and will be modelled for NH3 impact.
 - DO5 is currently used as standby unit. For a conservative assessment of the incremental air quality impact due to the Project (i.e. Existing vs Future Scenario), DO5 is assumed to be 0ppm under the Existing Scenario, and 0.5ppm under Future Scenario.

Table 3 - Concentration Correction for Exhaust Gas at Actual Condition

Parameters	Standard Condition (0 degrees, 1atm, dry)	Actual Condition ^[1]	Correction factor	Conversion Formula ^[2, 3]
a. Oxygen (%)	20.9	20.9	1.00	Assume no change in O ₂ content
b. Moisture (%)	0	90	0.10	C ₂ = C ₁ *(100 - Moisture%)/100
c. Pressure (kPA)	101.325	101.325	1.00	C ₂ = C ₁ *Pressure ₂ /Pressure ₁
d. Temp (K)	273	298	0.92	C ₂ = C ₁ *Temp ₁ /Temp ₂
Correction factor (from Standard to Actual condition) -->			0.092	= a x b x c x d

- Notes
- As confirmed by design engineer, the wet scrubber exhaust is assumed to have high moisture content (90%), with oxygen level similar to ambient air (20.9%) and at ambient temperature (25 C).
 - Suffix 1 = Standard Condition, suffix 2 = Actual Condition. C1 = Concentration at Stadnard Condition, C2 = Concentration at Actual Condition
 - To convert gas concentration from standard condition to actual condition, apply the correction for moisture, pressure and temperature according to the conversion formula. No oxygen correction is required since ambient oxygen (20.9%) is assumed for both conditions (oxygen is not consumed by the scrubbing process).

Table 4. Predicted Odour Impact at Represenative Air Sensitive Receivers

ASR ID		Assessment Height (mAG)	Hydrogen Sulphide (H ₂ S)						Ammonia (NH ₃)						Cumulative Odour Impact of H ₂ S + NH ₃ (Criteria: 5 OU) ^[4]			
			1-hour Concentration (ug/m ³)		Conversion Factor from Concentration (ug/m ³) to Odour Unit ^[1]	1-hour to 5- sec Conversion Factor ^[3]	5-second Odour Impact (Odour Unit, OU) ^[4]		Change in OU (Future minus Existing Scenario)	1-hour Concentration (ug/m ³)		Conversion Factor from Concentration (ug/m ³) to Odour Unit ^[2]	1-hour to 5- sec Conversion Factor ^[3]	5-second Odour Impact (Odour Unit, OU) ^[4]				Change in OU (Future minus Existing Scenario)
			Existing Scenario	Future Scenario			Existing Scenario	Future Scenario		Existing Scenario	Future Scenario			Existing Scenario	Future Scenario	Existing Scenario	Future Scenario	
A01	1.5	4.40E-03	3.90E-01	1.52	2.3	1.53E-02	1.36E+00	1.343	1.17E-05	1.95E+00	0.04	2.3	1.04E-06	1.73E-01	0.173	0.0153	1.5314	1.516
A01	5	3.90E-03	3.51E-01	1.52	2.3	1.36E-02	1.22E+00	1.210	1.02E-05	1.75E+00	0.04	2.3	9.02E-07	1.56E-01	0.156	0.0136	1.3789	1.365
A01	10	6.82E-03	3.37E-01	1.52	2.3	2.38E-02	1.17E+00	1.151	1.26E-05	1.69E+00	0.04	2.3	1.12E-06	1.50E-01	0.150	0.0238	1.3245	1.301
A01	15	1.13E-02	3.65E-01	1.52	2.3	3.94E-02	1.27E+00	1.232	1.84E-05	1.82E+00	0.04	2.3	1.63E-06	1.62E-01	0.162	0.0395	1.4331	1.394
A01	20	1.39E-02	3.17E-01	1.52	2.3	4.86E-02	1.10E+00	1.056	2.19E-05	1.58E+00	0.04	2.3	1.94E-06	1.41E-01	0.141	0.0486	1.2451	1.197
A01	30	5.52E-03	1.99E-01	1.52	2.3	1.92E-02	6.93E-01	0.674	1.45E-05	9.94E-01	0.04	2.3	1.29E-06	8.83E-02	0.088	0.0192	0.7810	0.762
A02	1.5	2.45E-03	2.33E-01	1.52	2.3	8.54E-03	8.12E-01	0.804	5.51E-06	1.16E+00	0.04	2.3	4.90E-07	1.03E-01	0.103	0.0085	0.9156	0.907
A02	5	2.60E-03	2.44E-01	1.52	2.3	9.06E-03	8.51E-01	0.842	6.20E-06	1.22E+00	0.04	2.3	5.51E-07	1.08E-01	0.108	0.0091	0.9595	0.950
A02	10	3.16E-03	2.78E-01	1.52	2.3	1.10E-02	9.70E-01	0.959	7.24E-06	1.39E+00	0.04	2.3	6.43E-07	1.24E-01	0.124	0.0110	1.0931	1.082
A02	15	4.01E-03	3.75E-01	1.52	2.3	1.40E-02	1.31E+00	1.292	8.52E-06	1.87E+00	0.04	2.3	7.56E-07	1.66E-01	0.166	0.0140	1.4724	1.458
A02	20	4.19E-03	3.06E-01	1.52	2.3	1.46E-02	1.07E+00	1.052	8.81E-06	1.53E+00	0.04	2.3	7.83E-07	1.36E-01	0.136	0.0146	1.2020	1.187
A03	1.5	1.52E-03	1.54E-01	1.52	2.3	5.30E-03	5.36E-01	0.531	4.96E-06	7.68E-01	0.04	2.3	4.40E-07	6.82E-02	0.068	0.0053	0.6041	0.599
A03	5	1.81E-03	1.58E-01	1.52	2.3	6.31E-03	5.50E-01	0.543	4.88E-06	7.88E-01	0.04	2.3	4.33E-07	7.00E-02	0.070	0.0063	0.6197	0.613
A03	10	1.97E-03	1.54E-01	1.52	2.3	6.87E-03	5.37E-01	0.530	4.86E-06	7.69E-01	0.04	2.3	4.32E-07	6.83E-02	0.068	0.0069	0.6049	0.598
A03	15	2.06E-03	1.51E-01	1.52	2.3	7.18E-03	5.27E-01	0.520	5.09E-06	7.56E-01	0.04	2.3	4.52E-07	6.71E-02	0.067	0.0072	0.5939	0.587
A04	1.5	1.43E-03	1.69E-01	1.52	2.3	4.98E-03	5.90E-01	0.585	4.74E-06	8.47E-01	0.04	2.3	4.21E-07	7.52E-02	0.075	0.0050	0.6655	0.661
A04	5	1.44E-03	1.64E-01	1.52	2.3	5.02E-03	5.71E-01	0.566	4.64E-06	8.19E-01	0.04	2.3	4.12E-07	7.27E-02	0.073	0.0050	0.6439	0.639
A04	10	1.68E-03	1.47E-01	1.52	2.3	5.85E-03	5.13E-01	0.507	4.40E-06	7.35E-01	0.04	2.3	3.91E-07	6.53E-02	0.065	0.0059	0.5778	0.572
A04	15	1.78E-03	1.24E-01	1.52	2.3	6.20E-03	4.33E-01	0.427	4.25E-06	6.21E-01	0.04	2.3	3.77E-07	5.51E-02	0.055	0.0062	0.4882	0.482
A04	20	1.80E-03	1.01E-01	1.52	2.3	6.27E-03	3.53E-01	0.346	4.27E-06	5.06E-01	0.04	2.3	3.80E-07	4.49E-02	0.045	0.0063	0.3974	0.391
A04	30	2.28E-03	7.06E-02	1.52	2.3	7.95E-03	2.46E-01	0.238	4.74E-06	3.53E-01	0.04	2.3	4.21E-07	3.13E-02	0.031	0.0079	0.2774	0.269
A05	1.5	3.64E-03	1.31E-01	1.52	2.3	1.27E-02	4.58E-01	0.445	5.84E-06	6.57E-01	0.04	2.3	5.18E-07	5.83E-02	0.058	0.0127	0.5162	0.503
A05	5	3.41E-03	1.53E-01	1.52	2.3	1.19E-02	5.34E-01	0.522	6.21E-06	7.66E-01	0.04	2.3	5.51E-07	6.80E-02	0.068	0.0119	0.6019	0.590
A05	10	2.90E-03	1.87E-01	1.52	2.3	1.01E-02	6.53E-01	0.643	7.45E-06	9.37E-01	0.04	2.3	6.62E-07	8.32E-02	0.083	0.0101	0.7365	0.726
A05	15	3.40E-03	2.16E-01	1.52	2.3	1.18E-02	7.53E-01	0.741	8.72E-06	1.08E+00	0.04	2.3	7.74E-07	9.59E-02	0.096	0.0118	0.8492	0.837
A06	1.5	2.41E-03	1.36E-01	1.52	2.3	8.40E-03	4.75E-01	0.466	4.69E-06	6.81E-01	0.04	2.3	4.17E-07	6.05E-02	0.060	0.0084	0.5352	0.527
A06	5	2.35E-03	1.35E-01	1.52	2.3	8.19E-03	4.71E-01	0.463	4.62E-06	6.75E-01	0.04	2.3	4.10E-07	6.00E-02	0.060	0.0082	0.5310	0.523
A06	10	2.16E-03	1.28E-01	1.52	2.3	7.53E-03	4.47E-01	0.439	4.41E-06	6.41E-01	0.04	2.3	3.92E-07	5.69E-02	0.057	0.0075	0.5038	0.496
A06	15	1.93E-03	1.16E-01	1.52	2.3	6.73E-03	4.05E-01	0.398	4.18E-06	5.81E-01	0.04	2.3	3.71E-07	5.16E-02	0.052	0.0067	0.4565	0.450
A06	20	1.75E-03	1.01E-01	1.52	2.3	6.10E-03	3.52E-01	0.345	4.01E-06	5.04E-01	0.04	2.3	3.56E-07	4.48E-02	0.045	0.0061	0.3963	0.390
A06	30	1.54E-03	7.27E-02	1.52	2.3	5.37E-03	2.53E-01	0.248	3.97E-06	3.63E-01	0.04	2.3	3.52E-07	3.23E-02	0.032	0.0054	0.2857	0.280
A06	40	1.53E-03	6.82E-02	1.52	2.3	5.33E-03	2.38E-01	0.232	4.12E-06	3.41E-01	0.04	2.3	3.66E-07	3.03E-02	0.030	0.0053	0.2678	0.262
A06	50	1.59E-03	6.23E-02	1.52	2.3	5.54E-03	2.17E-01	0.212	4.30E-06	3.11E-01	0.04	2.3	3.82E-07	2.76E-02	0.028	0.0055	0.2447	0.239
A07	1.5	1.19E-03	1.36E-01	1.52	2.3	4.15E-03	4.75E-01	0.471	2.42E-06	6.81E-01	0.04	2.3	2.15E-07	6.05E-02	0.060	0.0041	0.5353	0.531
A07	5	1.21E-03	1.40E-01	1.52	2.3	4.22E-03	4.87E-01	0.483	2.82E-06	6.99E-01	0.04	2.3	2.50E-07	6.21E-02	0.062	0.0042	0.5495	0.545
A07	10	1.25E-03	1.35E-01	1.52	2.3	4.36E-03	4.70E-01	0.466	3.02E-06	6.74E-01	0.04	2.3	2.68E-07	5.98E-02	0.060	0.0044	0.5298	0.525
A07	15	1.35E-03	1.22E-01	1.52	2.3	4.70E-03	4.25E-01	0.420	2.97E-06	6.10E-01	0.04	2.3	2.64E-07	5.41E-02	0.054	0.0047	0.4793	0.475
A07	20	1.57E-03	1.05E-01	1.52	2.3	5.47E-03	3.67E-01	0.361	3.54E-06	5.26E-01	0.04	2.3	3.14E-07	4.67E-02	0.047	0.0055	0.4134	0.408
A08	1.5	9.40E-04	6.68E-02	1.52	2.3	3.28E-03	2.33E-01	0.230	3.11E-06	3.34E-01	0.04	2.3	2.76E-07	2.96E-02	0.030	0.0033	0.2625	0.259
A08	5	9.50E-04	6.89E-02	1.5														

Transfer Building A - Elevation Drawing and Scrubber Location

Revision Schedule		
Rev.	Date	Description
0	23/08/2024	DDA SUBMISSION
1	29/10/2024	DDA SUBMISSION
2	27/02/2025	DDA SUBMISSION

Employer
 環境保護署
Environmental Protection Department

Supervising Officer
 **AECOM**

Main Contractor
 **HEC**
CHINA HARBOUR ENGINEERING COMPANY LIMITED

Designers
 **AtkinsRéalis**

Design Checker
 **smec**
an  company

CHECKED BY:

ON BEHALF OF
SMEC ASIA
LIMITED
DESIGN CHECKER

CONSENTED BY:

ON BEHALF OF
AECOM ASIA COMPANY
LIMITED
SUPERVISING OFFICER

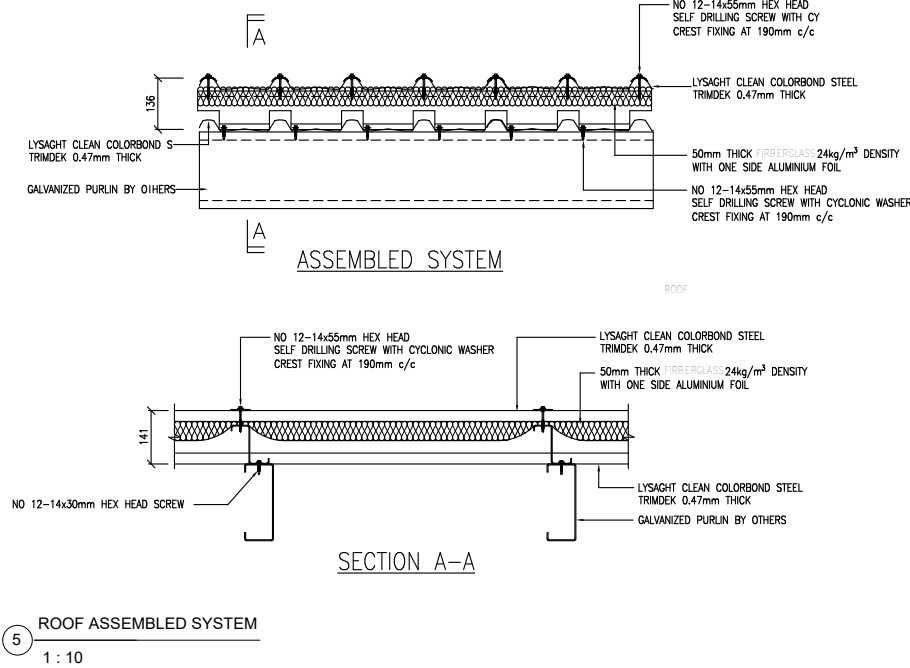
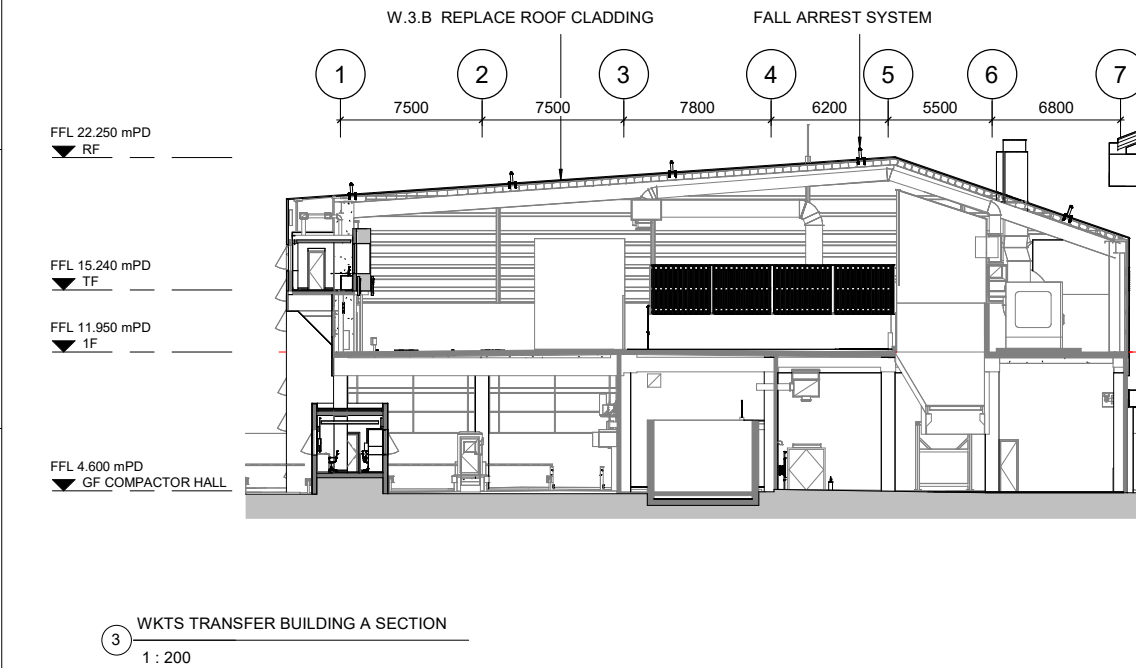
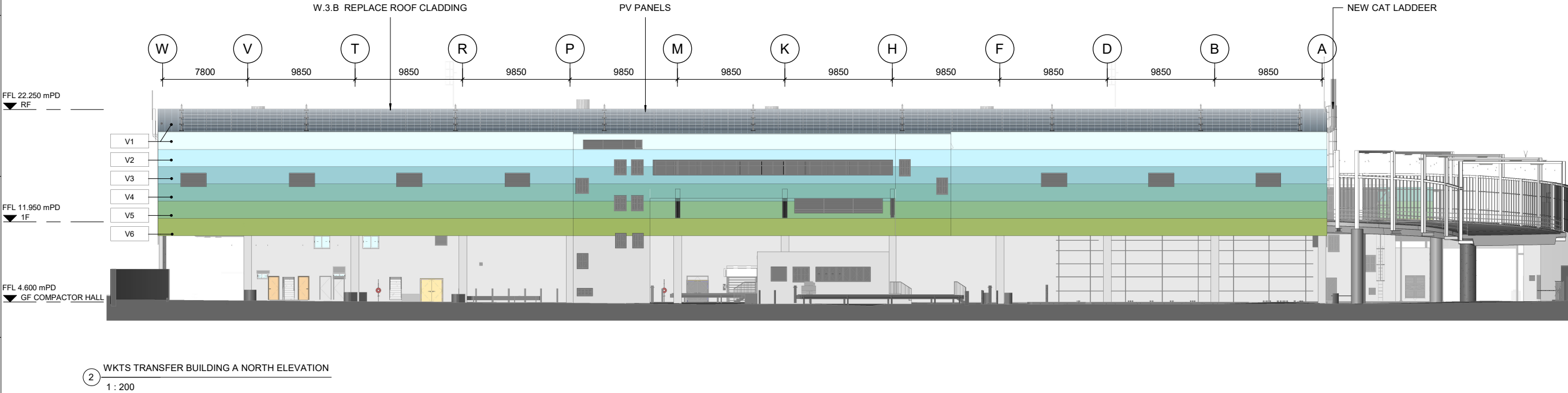
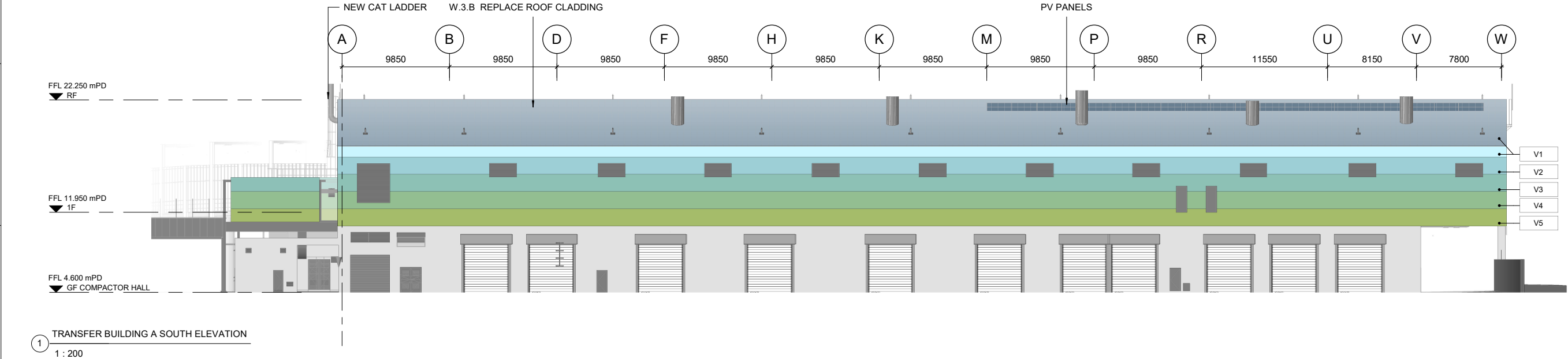
Project Name
Contract No. EP/SP/170/20
West Kowloon Transfer Station
Second Follow-On Contract

Design Package
WKTS-EPSP17020-DDA-26-1

Drawing Title
ROOF REPLACEMENT ELEVATIONS & SECTION

Drawing Number
WKTS-W3B-AR-0002

Date: 27/02/2025	Scale: As indicated	Format: A1
Drawn by: PF	Checked by: ML	Status: -
Approved by: SP		



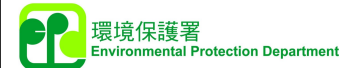
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	V2	Hexadecimal color #98C1D3 RGB 152,192,212
	V3	Hexadecimal color #6D9CA2 RGB 109,157,163
	V4	Hexadecimal color #5C8E83 RGB 093,143,133
	V5	Hexadecimal color #628D62 RGB 098,140,098
	V6	Hexadecimal color #748A3E RGB 116,138,062

Transfer Building B - Scrubber Exhaust Location

Revision Schedule

Rev.	Date	Description
0	10/12/2024	DDA SUBMISSION
1	18/06/2025	DDA SUBMISSION

Employer

環境保護署
Environmental Protection Department

Supervising Officer

AECOM

Main Contractor

CHINA HARBOUR ENGINEERING COMPANY LIMITED

Designers

AtkinsRéalis

Design Checker

smec
an  company

CHECKED BY:

HA KING
ON BEHALF OF
SMEC ASIA LIMITED
DESIGN CHECKER

CONSENTED BY:

DOMINIC, C.W. LAM
ON BEHALF OF
AECOM ASIA COMPANY LIMITED
SUPERVISING OFFICER

Project Name

Contract No. EP/SP/170/20
West Kowloon Transfer Station
Second Follow-On Contract

Design Package

WKTS-EPSP17020-DDA-33E-Part 1-1

Drawing Title

WKTS - TRANSFER BUILDING B -
MVAC SERVICES
ROOF FLOOR LAYOUT

Drawing Number

WKTS-W4CD-MVAC-R101

Revision

1

Date: 18/06/2025

Scale

Format

Drawn by: RP

1 : 200

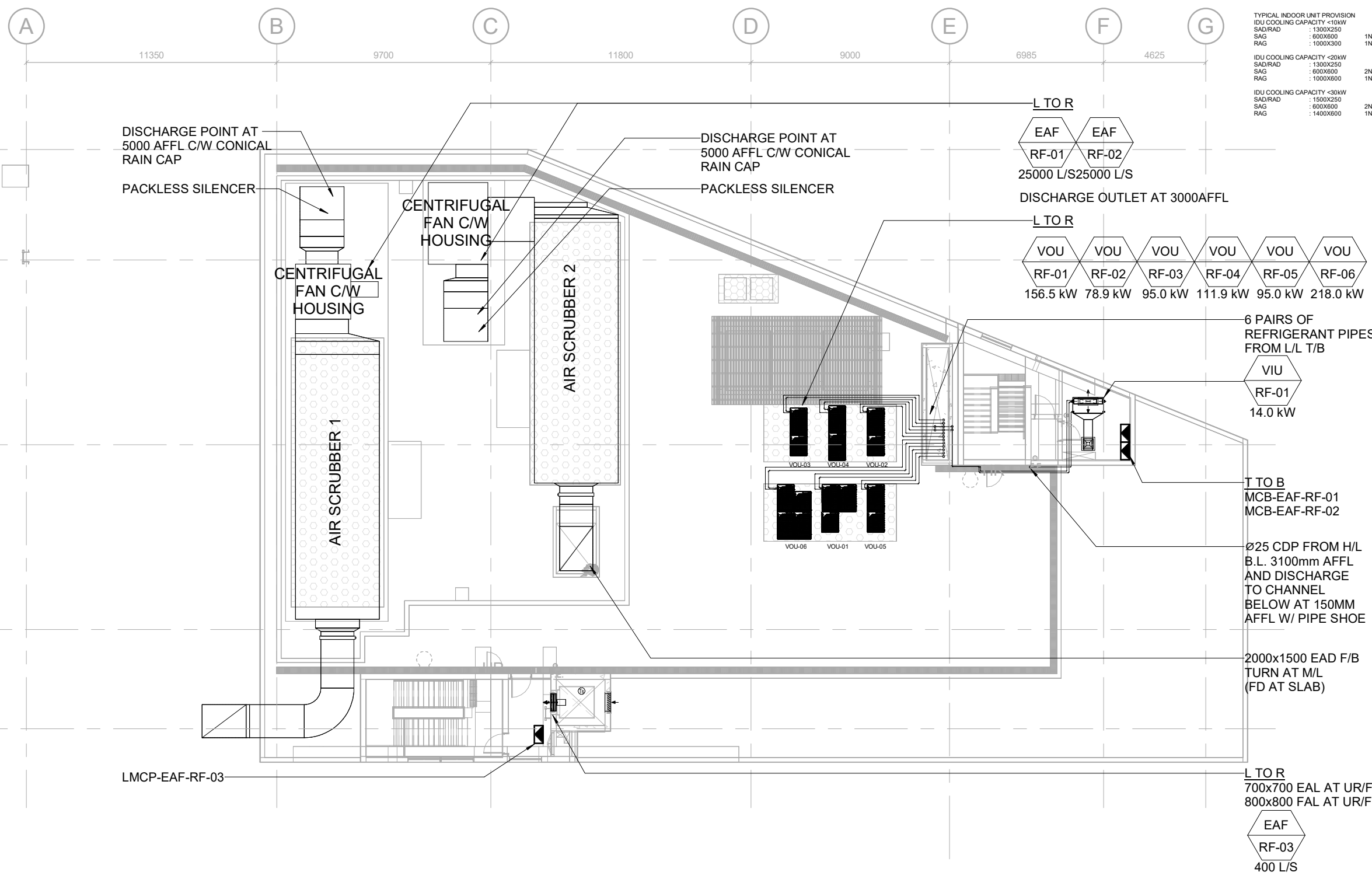
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Checked by: GC

Status

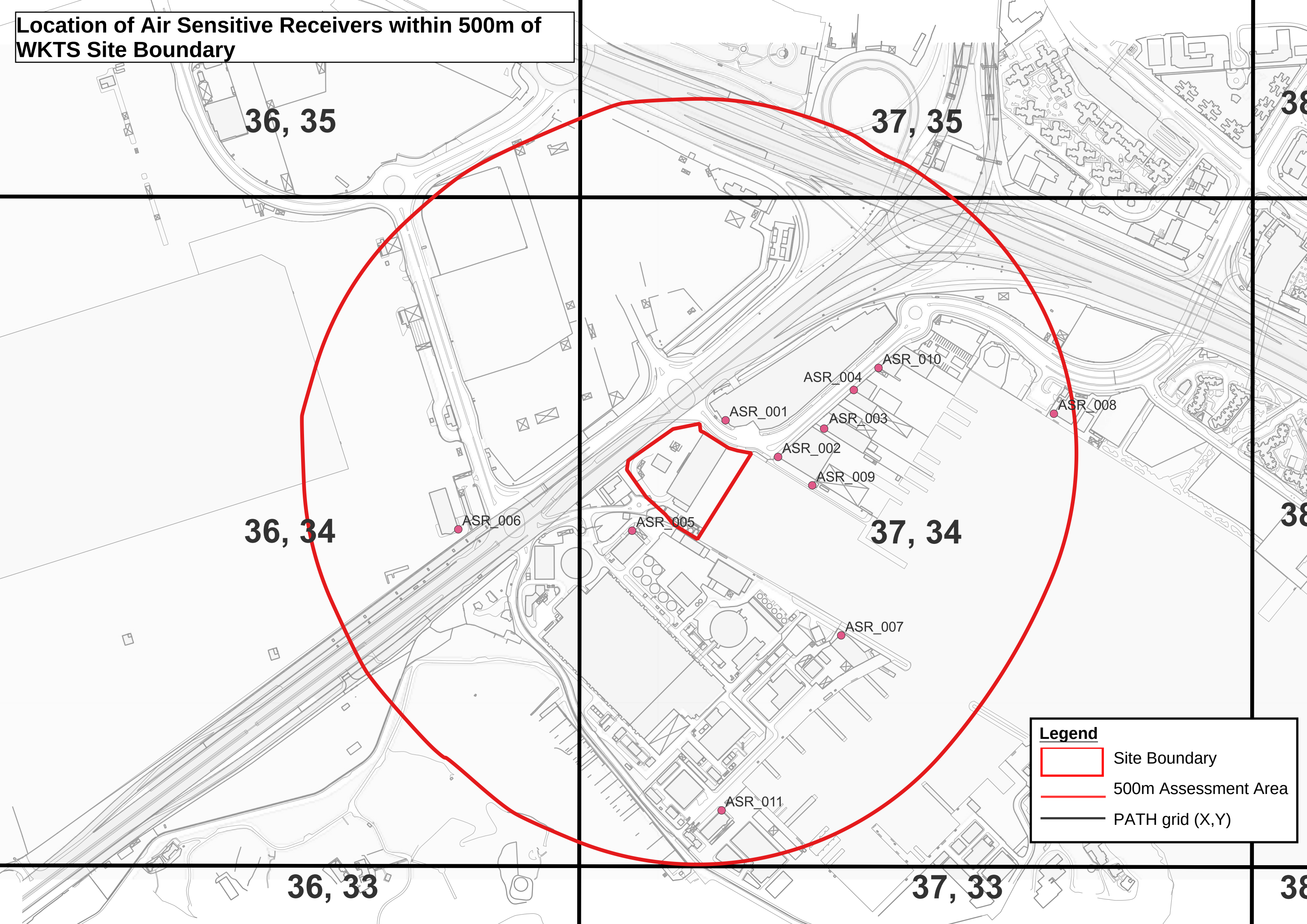
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DDA



1 ROOF FLOOR
1 : 200

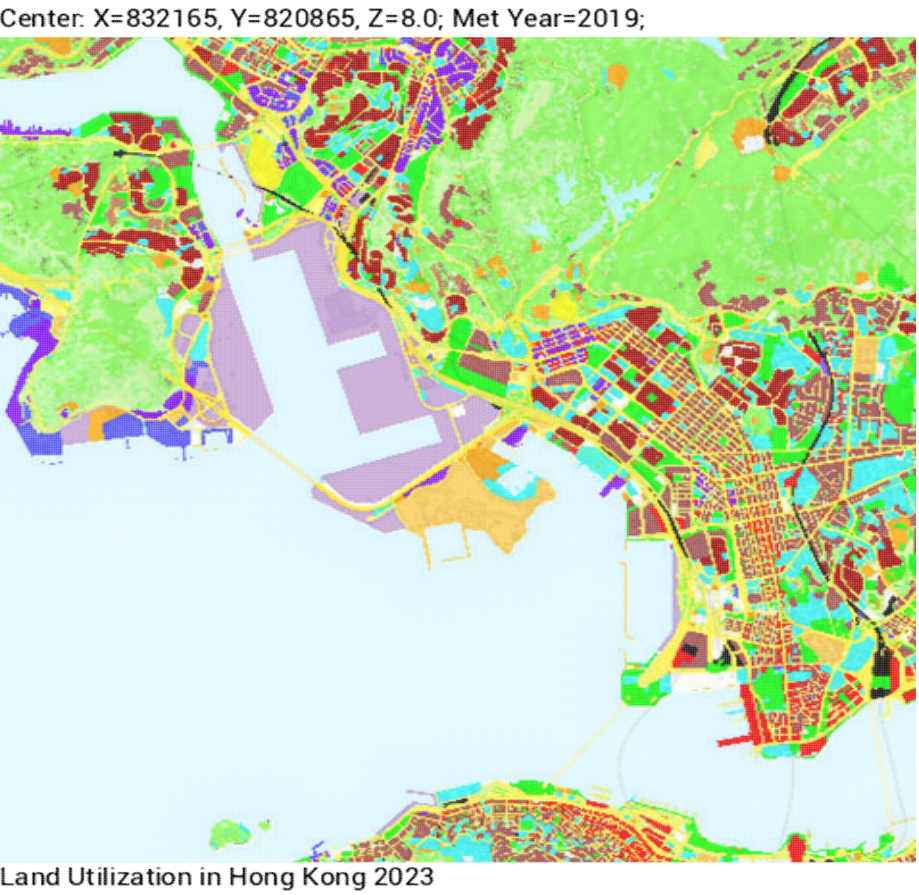
Location of Air Sensitive Receivers within 500m of WKTS Site Boundary



AERMET Characteristics for PATH Grid 36,34 (produced by SAMP v2.1)

Code	Co	Hong Kong Planning Department Classification	Roughness	Albedo	Bowen Ratio	Grid Count	Percent	Albedo x Perce	b^n/Sn
1		Private Residential	1	0.18	1.5	52155	5.22%	0.0093879	1.021372216
2		Public Residential	1	0.18	1.5	34530	3.45%	0.0062154	1.014099179
3		Rural Settlement	0.375	0.165	0.9	3923	0.39%	0.000647295	0.999586756
11		Commercial/Business and Office	1	0.18	1.5	14506	1.45%	0.00261108	1.005899008
21		Industrial Land	0.7	0.18	1.5	12814	1.28%	0.00230652	1.005209151
22		Industrial Estates/Science and Technology Parks	0.7	0.18	1.5	132	0.01%	0.00002376	1.000053523
23		Warehouse and Open Storage	0.7	0.18	1.5	7635	0.76%	0.0013743	1.003100523
31		Government, Institutional and Community Facilities	0.7	0.18	1.5	43388	4.34%	0.00780984	1.017747976
32		Open Space and Recreation	0.04	0.15	1	39251	3.93%	0.00588765	1
41		Roads and Transport Facilities	0.7	0.18	1.5	106243	10.62%	0.01912374	1.044019147
42		Railways	0.7	0.18	1.5	5071	0.51%	0.00091278	1.002058229
43		Airport	0.07	0.18	1.5	0	0.00%	0	1
44		Port Facilities	0.7	0.18	1.5	37945	3.79%	0.0068301	1.015504338
51		Cemeteries/Funeral Facilities	0.7	0.18	1.5	2936	0.29%	0.00052848	1.001191154
52		Utilities	0.7	0.18	1.5	12450	1.25%	0.002241	1.005060803
53		Vacant Land/Construction in Progress	0.2	0.18	1	11540	1.15%	0.0020772	1
54		Others	0.2	0.18	1	14298	1.43%	0.00257364	1
61		Agricultural Land	0.1575	0.18	0.55	2009	0.20%	0.00036162	0.998799666
62		Fish Ponds/Gei Wais	0.001	0.1	0.1	0	0.00%	0	1
71		Woodland	1.05	0.1625	0.75	127219	12.72%	0.020673088	0.964063008
72		Shrubland	0.3	0.18	1.25	35982	3.60%	0.00647676	1.008061471
73		Grassland	0.065	0.185	0.8	30725	3.07%	0.005684125	0.993167364
74		Mangrove/Swamp	0.065	0.14	0.225	4	0.00%	0.00000056	0.999994033
81		Badland	0.15	0.1625	0.75	0	0.00%	0	1
83		Rocky Shore	0.05	0.2	4.75	34	0.00%	0.0000068	1.000052978
91		Reservoirs	0.001	0.1	0.1	3678	0.37%	0.0003678	0.991566852
92		Streams and Nullahs	0.001	0.1	0.1	68	0.01%	0.0000068	0.999843436
99		SZ Residential *	1	0.18	1.5	0	0.00%	0	1
0		Open Sea *	0.001	0.1	0.1	401464	40.15%	0.0401464	0.396767417
				0.144275	0.433311	1000000			

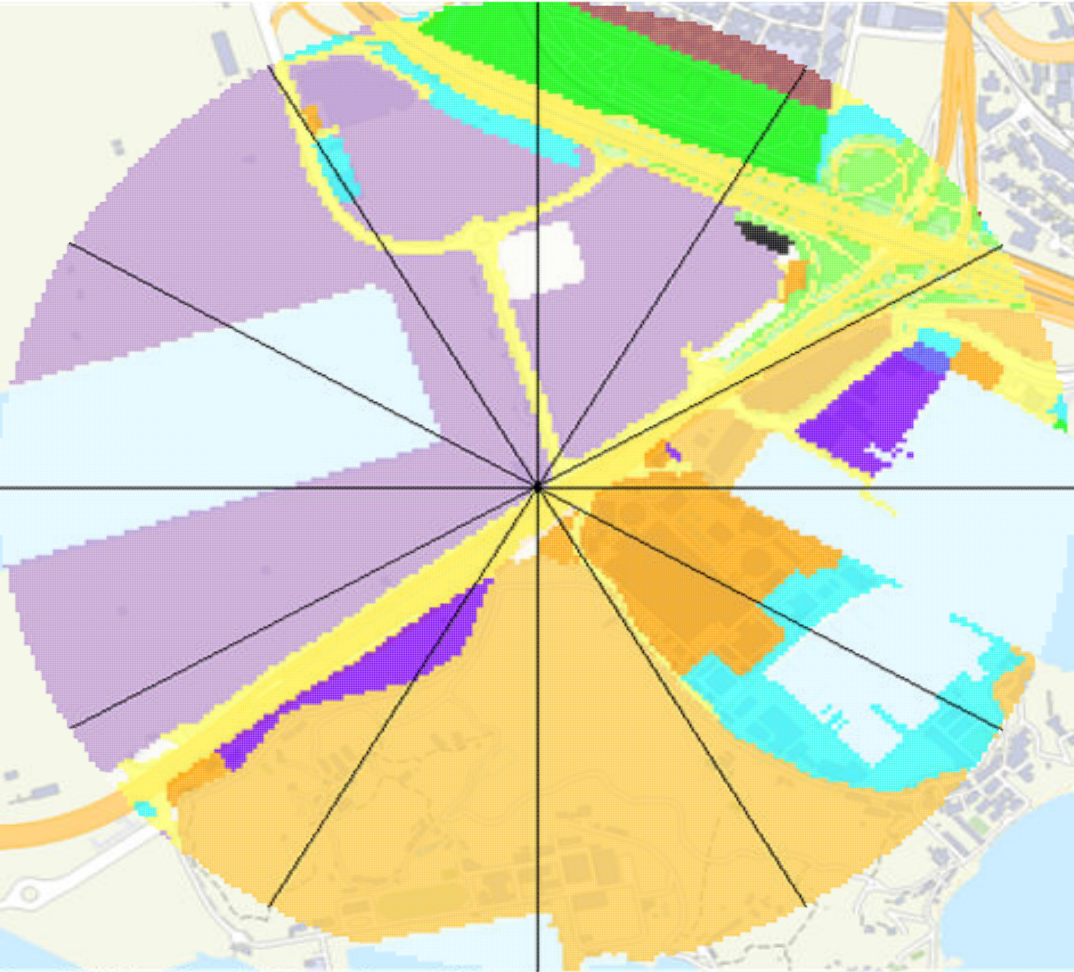
* Non-PlanD Land Utilization categories



AERMET Characteristics for PATH Grid 36,34 (produced by SAMP v2.1)

Angle	Group	Inverse-distanc	Roughness
0	0 - 30	5.176452751	0.405469
30	30 - 60	5.31768931	0.592444
60	60 - 90	5.176452751	0.142422
90	90 - 120	5.176452751	0.043255
120	120 - 150	5.31768931	0.260941
150	150 - 180	5.176452751	0.220178
180	180 - 210	5.176452751	0.196453
210	210 - 240	5.31768931	0.527583
240	240 - 270	5.176452751	0.353157
270	270 - 300	5.176452751	0.013311
300	300 - 330	5.31768931	0.154096
330	330 - 360	5.176452751	0.582093

Center: X=832165, Y=820865, Z=8.0; Met Year=2019;



Land Utilization in Hong Kong 2023

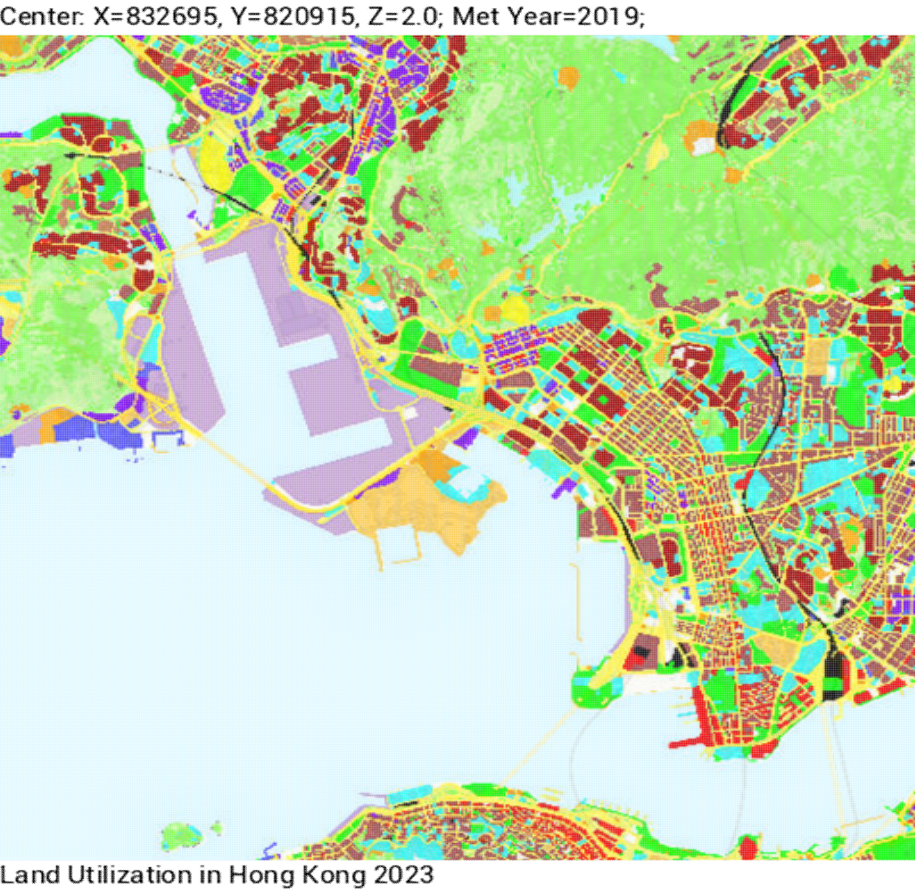
Code	Co	Hong Kong Planning Department Classification	Roughness	Albedo	Bowen Ratio
1		Private Residential	1	0.18	1.5
2		Public Residential	1	0.18	1.5
3		Rural Settlement	0.375	0.165	0.9
11		Commercial/Business and Office	1	0.18	1.5
21		Industrial Land	0.7	0.18	1.5
22		Industrial Estates/Science and Technology Parks	0.7	0.18	1.5
23		Warehouse and Open Storage	0.7	0.18	1.5
31		Government, Institutional and Community Facilities	0.7	0.18	1.5
32		Open Space and Recreation	0.04	0.15	1
41		Roads and Transport Facilities	0.7	0.18	1.5
42		Railways	0.7	0.18	1.5
43		Airport	0.07	0.18	1.5
44		Port Facilities	0.7	0.18	1.5
51		Cemeteries/Funeral Facilities	0.7	0.18	1.5
52		Utilities	0.7	0.18	1.5
53		Vacant Land/Construction in Progress	0.2	0.18	1
54		Others	0.2	0.18	1
61		Agricultural Land	0.1575	0.18	0.55
62		Fish Ponds/Gei Wais	0.001	0.1	0.1
71		Woodland	1.05	0.1625	0.75
72		Shrubland	0.3	0.18	1.25
73		Grassland	0.065	0.185	0.8
74		Mangrove/Swamp	0.065	0.14	0.225
81		Badland	0.15	0.1625	0.75
83		Rocky Shore	0.05	0.2	4.75
91		Reservoirs	0.001	0.1	0.1
92		Streams and Nullahs	0.001	0.1	0.1
99		SZ Residential *	1	0.18	1.5
0		Open Sea *	0.001	0.1	0.1

* Non-PlanD Land Utilization categories

AERMET Characteristics for PATH Grid 37,34 (produced by SAMP v2.1)

Code	Co	Hong Kong Planning Department Classification	Roughness	Albedo	Bowen Ratio	Grid Count	Percent	Albedo x Perce	b^n/Sn
1		Private Residential	1	0.18	1.5	57326	5.73%	0.01031868	1.023515933
2		Public Residential	1	0.18	1.5	40255	4.03%	0.0072459	1.016455929
3		Rural Settlement	0.375	0.165	0.9	4605	0.46%	0.000759825	0.999514933
11		Commercial/Business and Office	1	0.18	1.5	15298	1.53%	0.00275364	1.006222082
21		Industrial Land	0.7	0.18	1.5	11185	1.12%	0.0020133	1.004545426
22		Industrial Estates/Science and Technology Parks	0.7	0.18	1.5	132	0.01%	0.00002376	1.000053523
23		Warehouse and Open Storage	0.7	0.18	1.5	5429	0.54%	0.00097722	1.002203695
31		Government, Institutional and Community Facilities	0.7	0.18	1.5	45823	4.58%	0.00824814	1.018753303
32		Open Space and Recreation	0.04	0.15	1	43926	4.39%	0.0065889	1
41		Roads and Transport Facilities	0.7	0.18	1.5	112324	11.23%	0.02021832	1.046596492
42		Railways	0.7	0.18	1.5	5116	0.51%	0.00092088	1.002076512
43		Airport	0.07	0.18	1.5	0	0.00%	0	1
44		Port Facilities	0.7	0.18	1.5	37945	3.79%	0.0068301	1.015504338
51		Cemeteries/Funeral Facilities	0.7	0.18	1.5	3248	0.32%	0.00058464	1.001317818
52		Utilities	0.7	0.18	1.5	12682	1.27%	0.00228276	1.005155352
53		Vacant Land/Construction in Progress	0.2	0.18	1	12319	1.23%	0.00221742	1
54		Others	0.2	0.18	1	14225	1.42%	0.0025605	1
61		Agricultural Land	0.1575	0.18	0.55	2012	0.20%	0.00036216	0.998797875
62		Fish Ponds/Gei Wais	0.001	0.1	0.1	0	0.00%	0	1
71		Woodland	1.05	0.1625	0.75	130420	13.04%	0.02119325	0.96317564
72		Shrubland	0.3	0.18	1.25	36350	3.64%	0.006543	1.008144254
73		Grassland	0.065	0.185	0.8	30251	3.03%	0.005596435	0.993272417
74		Mangrove/Swamp	0.065	0.14	0.225	4	0.00%	0.00000056	0.999994033
81		Badland	0.15	0.1625	0.75	0	0.00%	0	1
83		Rocky Shore	0.05	0.2	4.75	34	0.00%	0.0000068	1.000052978
91		Reservoirs	0.001	0.1	0.1	4040	0.40%	0.000404	0.99074069
92		Streams and Nullahs	0.001	0.1	0.1	59	0.01%	0.0000059	0.999864157
99		SZ Residential *	1	0.18	1.5	0	0.00%	0	1
0		Open Sea *	0.001	0.1	0.1	374992	37.50%	0.0374992	0.421704271
				0.146155	0.462972	1000000			

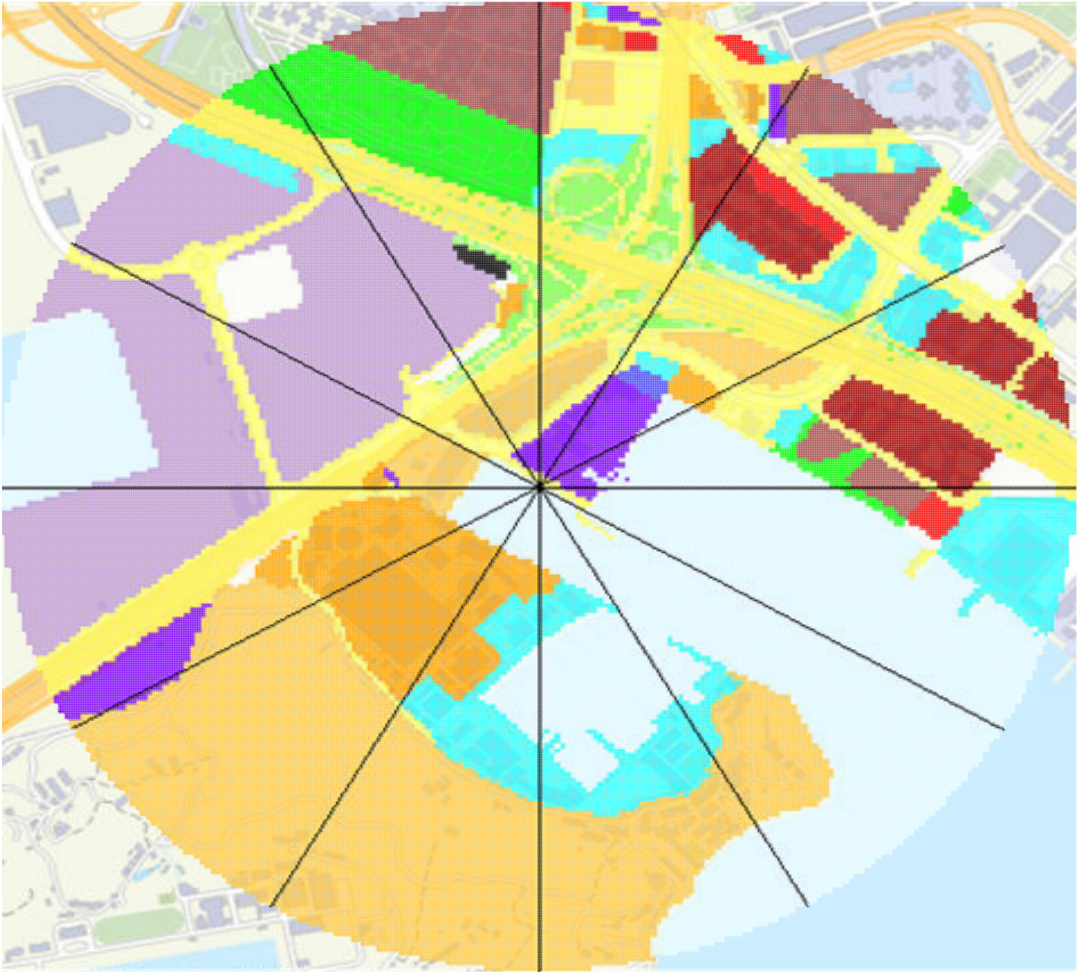
* Non-PlanD Land Utilization categories



AERMET Characteristics for PATH Grid 37,34 (produced by SAMP v2.1)

Angle	Group	Inverse-distance	Roughness
0	0 - 30	5.176452751	0.597967
30	30 - 60	5.31768931	0.471856
60	60 - 90	5.176452751	0.106818
90	90 - 120	5.176452751	0.004845
120	120 - 150	5.31768931	0.002654
150	150 - 180	5.176452751	0.013396
180	180 - 210	5.176452751	0.118280
210	210 - 240	5.31768931	0.128794
240	240 - 270	5.176452751	0.212038
270	270 - 300	5.176452751	0.091249
300	300 - 330	5.31768931	0.372418
330	330 - 360	5.176452751	0.346688

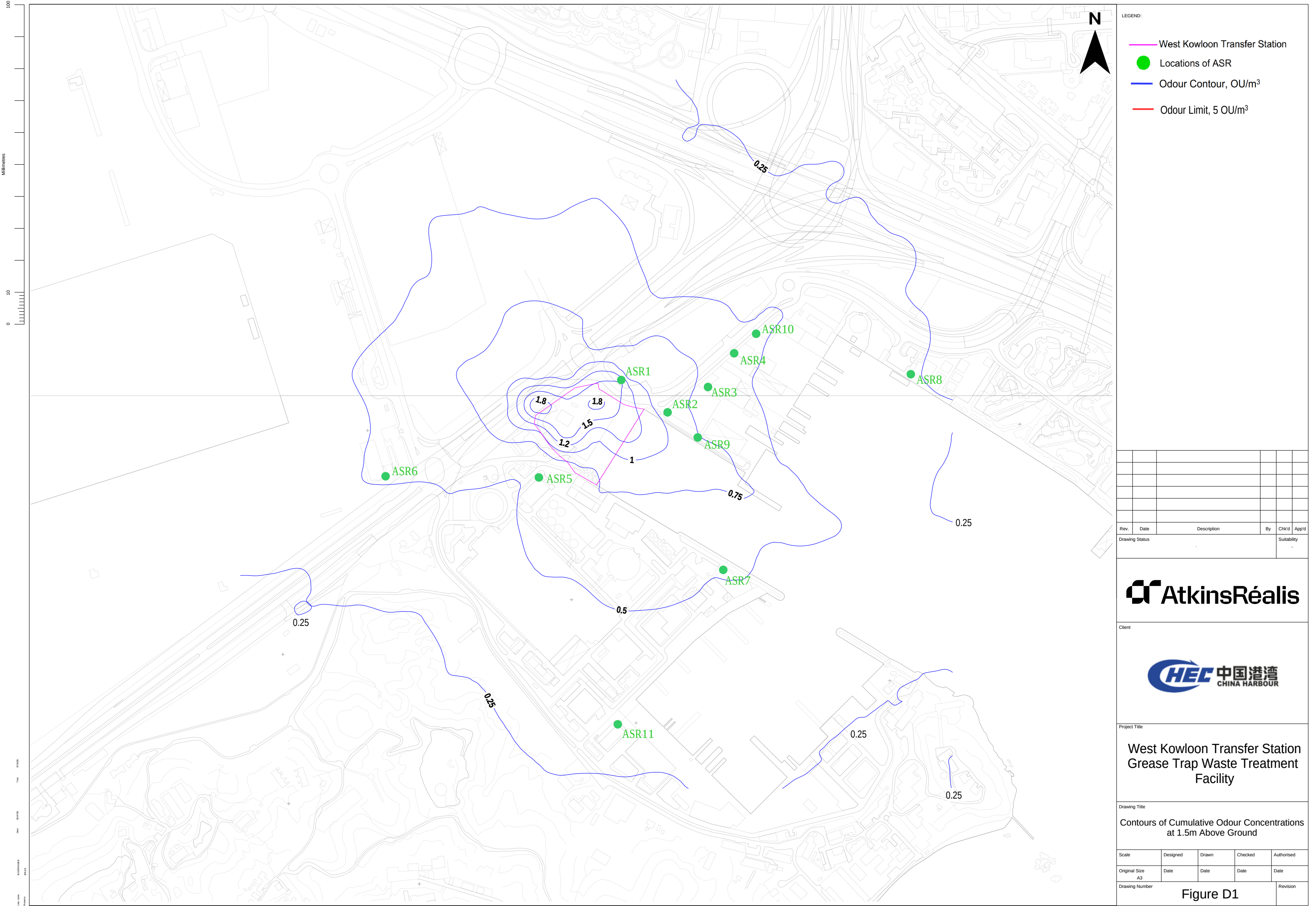
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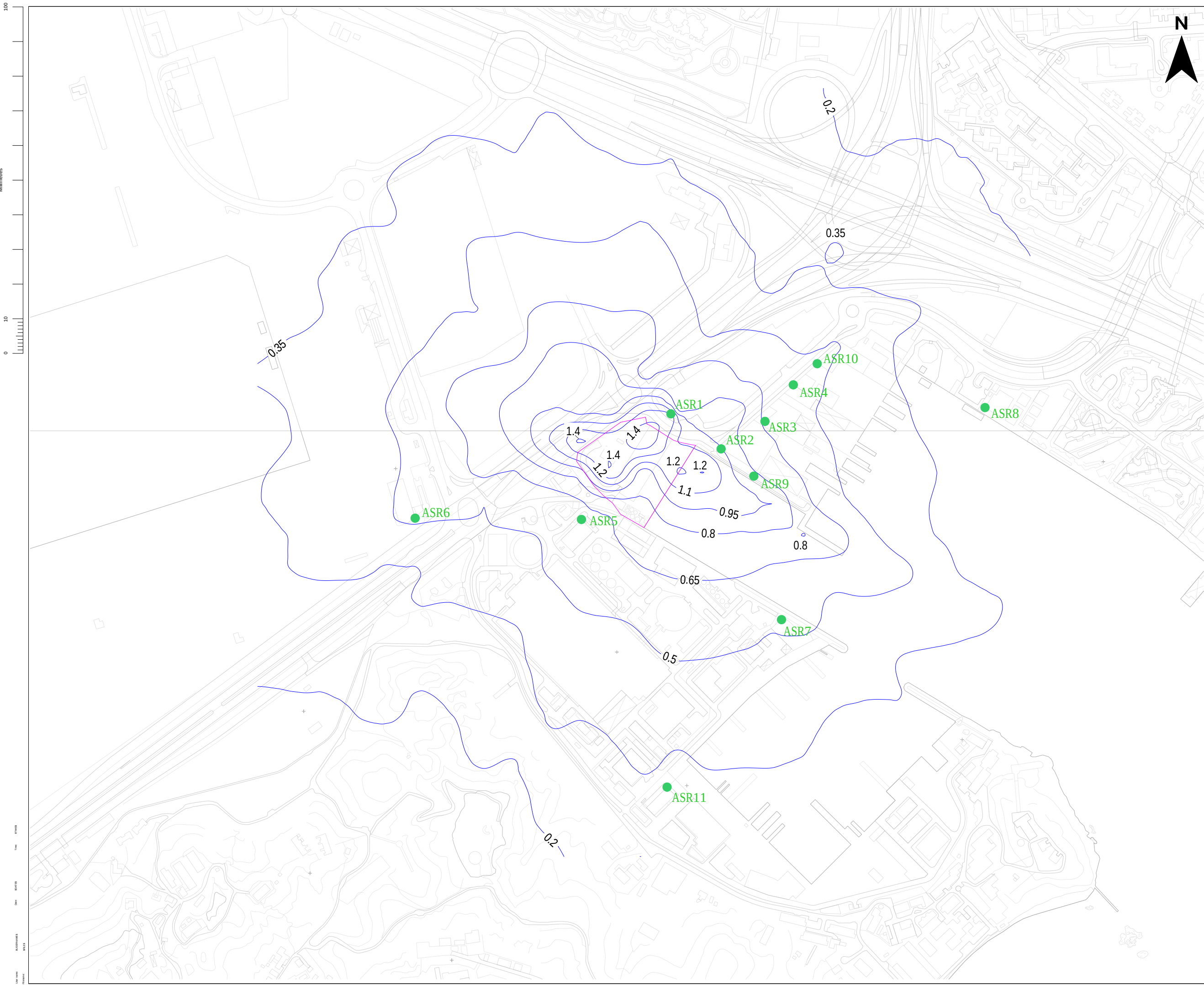


Land Utilization in Hong Kong 2023

Code	Co	Hong Kong Planning Department Classification	Roughness	Albedo	Bowen Ratio
1		Private Residential	1	0.18	1.5
2		Public Residential	1	0.18	1.5
3		Rural Settlement	0.375	0.165	0.9
11		Commercial/Business and Office	1	0.18	1.5
21		Industrial Land	0.7	0.18	1.5
22		Industrial Estates/Science and Technology Parks	0.7	0.18	1.5
23		Warehouse and Open Storage	0.7	0.18	1.5
31		Government, Institutional and Community Facilities	0.7	0.18	1.5
32		Open Space and Recreation	0.04	0.15	1
41		Roads and Transport Facilities	0.7	0.18	1.5
42		Railways	0.7	0.18	1.5
43		Airport	0.07	0.18	1.5
44		Port Facilities	0.7	0.18	1.5
51		Cemeteries/Funeral Facilities	0.7	0.18	1.5
52		Utilities	0.7	0.18	1.5
53		Vacant Land/Construction in Progress	0.2	0.18	1
54		Others	0.2	0.18	1
61		Agricultural Land	0.1575	0.18	0.55
62		Fish Ponds/Gei Wais	0.001	0.1	0.1
71		Woodland	1.05	0.1625	0.75
72		Shrubland	0.3	0.18	1.25
73		Grassland	0.065	0.185	0.8
74		Mangrove/Swamp	0.065	0.14	0.225
81		Badland	0.15	0.1625	0.75
83		Rocky Shore	0.05	0.2	4.75
91		Reservoirs	0.001	0.1	0.1
92		Streams and Nullahs	0.001	0.1	0.1
99		SZ Residential *	1	0.18	1.5
0		Open Sea *	0.001	0.1	0.1

* Non-PlanD Land Utilization categories





LEGEND:

- West Kowloon Transfer Station
- Locations of ASR
- Odour Contour, OU/m³
- Odour Limit, 5 OU/m³

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	



Project Title

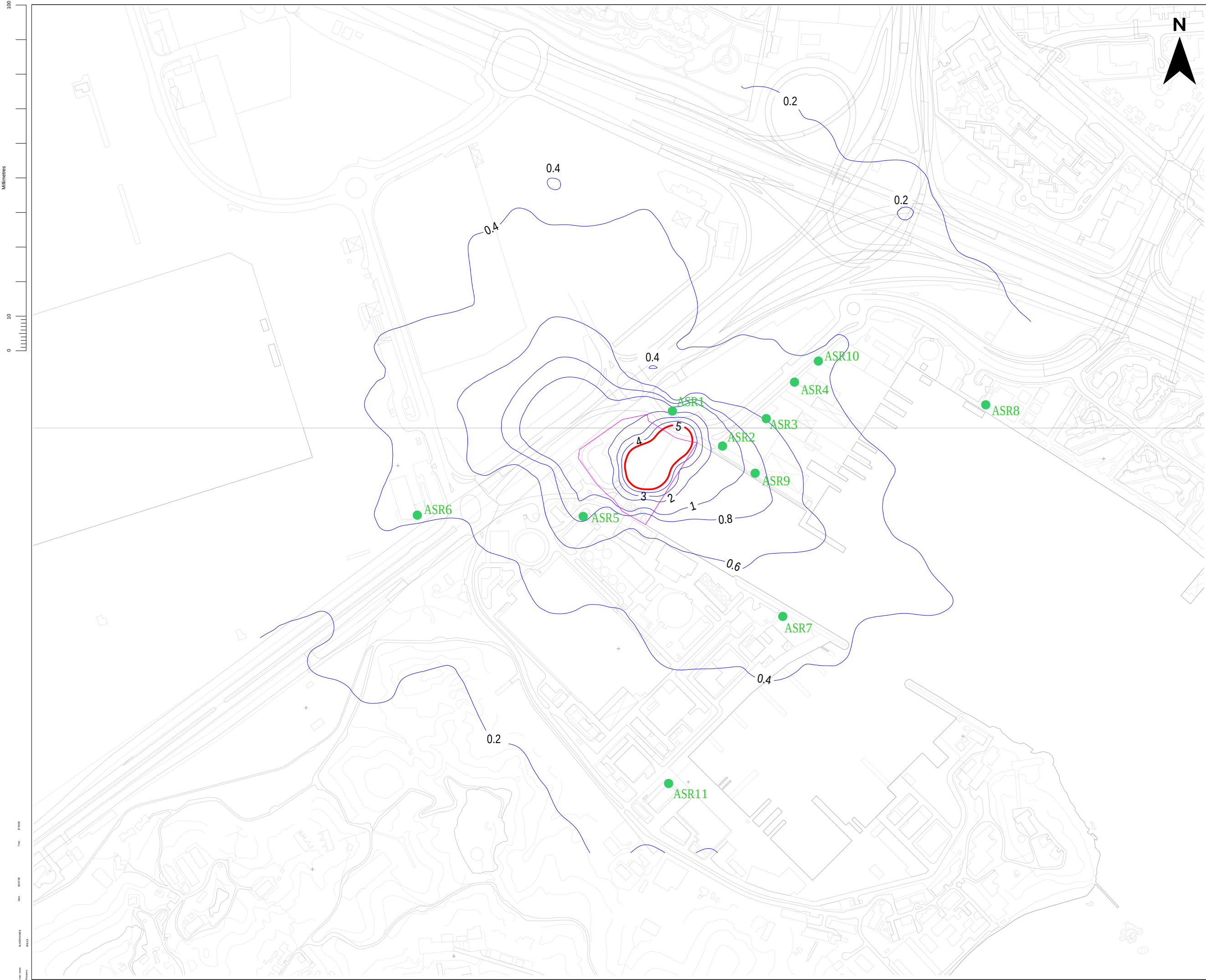
West Kowloon Transfer Station
Grease Trap Waste Treatment
Facility

Drawing Title

Contours of Cumulative Odour Concentrations
at 5m Above Ground

Scale	Designed	Drawn	Checked	Authorised
Original Size A3	Date	Date	Date	Date
Drawing Number				Revision

Figure D2



LEGEND:

- West Kowloon Transfer Station
- Locations of ASR
- Odour Contour, OU/m³
- Odour Limit, 5 OU/m³

Note: No fresh air intake and openable window of air sensitive uses fall within the exceedance zone.

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	

Client

Project Title

West Kowloon Transfer Station
Grease Trap Waste Treatment
Facility

Drawing Title

Contours of Cumulative Odour Concentrations
at 15m Above Ground

Scale	Designed	Drawn	Checked	Authorised
Original Size A3	Date	Date	Date	Date
Drawing Number	Figure D3			Revision

Appendix E

Sewage Impact Assessment

West Kowloon Transfer Station -Grease Trap Waste Treatment Facility

Appendix E – Sewerage Impact Assessment

China Harbour Engineering Company Limited

April 2025

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Appendix 3-2	Calculation of Flow Capacity of Existing Sewers
Appendix 4-1	Response from DSD on the Design Capacity and Daily Flow Record
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1. Introduction

1.1. Project Background

- 1.1.1. The West Kowloon Transfer Station (WKTS) of the Environmental Protection Department (EPD) receives and handles municipal solid waste (MSW) before it is transferred to the West New Territories (WENT) Landfill for disposal.
- 1.1.2. WKTS was an Exempted Designated Project under the Environmental Impact Assessment Ordinance (EIAO) since it was developed prior to the enactment of the EIAO in 1998.
- 1.1.3. In 2005, EPD proposed to include a grease trap waste treatment facility (GTWTF) at the WKTS for receiving grease trap waste (GTW) from restaurants and food processing establishments for further treatment and recycling.
- 1.1.4. It was considered that setting up the GTWTF within WKTS would represent a material change to an Exempted Designated Project, which requires an application for an Environmental Permit (EP) to construct and operate the proposed GTWTF. The scope of the project and its potential environmental impacts were described in the associated Project Profile (Register No. PP-271/2005), the application for the EP was submitted under EP (DIR) (Application No. DIR-133/2005), and the EP (EP No. EP-247/2006) was subsequently obtained in 2006.
- 1.1.5. The GTWTF was installed at WKTS and commissioned in 2008. An application for variation of an EP (VEP) (Application No. VEP-501/2016) was submitted to and approved by the EIAO Authority in 2016, in respect of the increased GTWTF handling capacity from originally 400 m³ per day to 500 m³ per day), and an EP was subsequently obtained (EP No. FEP-02/247/2006/A).
- 1.1.6. In 2019, a VEP application (Application No. VEP-571/2019) was also submitted and approved by EIAO Authority, in respect of the increased GTWTF handling capacity from 500 m³ per day to 600 m³ per day, and an EP was subsequently obtained (EP No. FEP-02/247/2006/B).
- 1.1.7. GTW received at GTWTF is treated by various processes and facilities, comprising screening, sand grit trap, sedimentation, dissolved air flotation (DAF) and centrifuge units. The primary objective is to recover the oil and fat fraction present in the grease trap waste. Two fat products are produced during the process, namely Concentrated Fat (also referred as Pre-treated GTW) and Recycled Fat (also referred as GTW Recycled Product). They are suitable for various usages such as a potential material or additive for energy resources, biodiesel or other industrial and/or manufacturing process.
- 1.1.8. The original design capacity of the GTWTF commissioned in 2008 was 400 m³ per day. As mentioned above, the throughput capacity was subsequently increased to 500 m³ per day. Following the process improvements and the associated VEP application in 2016, the throughput capacity was further increased to 600 m³ per day in 2019.

- 1.1.9. With reference to the operational historical records, the volume of grease trap waste received by the GTWTF shows both a weekly and yearly patterns. Typically, the volume received during Monday – Saturday is higher than that received on Sundays. The volume received is also higher in weeks or months coinciding with festivals. The operation of the GTWTF's component equipment is therefore required to cope with the fluctuating pattern of grease trap waste volume.
- 1.1.10. The trend of the volume of GTW received by the GTWTF is increasing in recent years. In order to meet the expected increasing demand over the next few years, further improvement is required and a new GTWTF with increased compacity will be constructed and housed inside a new Transfer Building B at WKTS.
- 1.1.11. Proposed modification works required to enhance the handling capacity of the GTWTF up to 900 m³ per day comprising the construction of a new Transfer Building B, process re-engineering, installation of new equipment. The location plan of the GTWTF at Transfer Building B of WKTS is shown in **Figure 1.1** of ERR. Preliminary floor layout plans of GTWTF are provided in **Appendix A** of the ERR.
- 1.1.12. The operational hours for receiving grease trap waste will be maintained as 7:30 am – 8:00 pm throughout the year. The operational hours will be extended to 24 hours for emergency situations.
- 1.1.13. The existing GTWTF equipment installed at WKTS Tipping Hall / Transfer Building A will be demolished after the commencement of Operation of the GTWTF in Transfer Building B.

1.2. Objectives of the SIA

- 1.2.1. The objectives of this Sewerage Impact Assessment (SIA) are to assess whether the capacity of the existing sewerage networking is sufficient to cope with the increased sewage flow from the site and evaluate whether the envisages GTWTF throughput capacity upgrades at WKTS will result in any environmental changes from the Project Profile PP-271/2005 and the current Environmental Permit (EP No. FEP 02/247/2006/B).

1.3. Report Structure

- 1.3.1. The remaining chapters of this report are shown below:

Chapter 2 – Site Context

Chapter 3 – Evaluation of Sewerage Impact

Chapter 4 – Result and Discussion

Chapter 5 – Conclusion

2. Site Context

2.1. Site Location and Its Environs

- 2.1.1. WKTS is located at West Kowloon Reclamation area, between the West Kowloon Expressway and Stonecutters Island, and it is bounded by Hing Wah Street West to the north-southern and north-eastern. West Kowloon No. 2 Sewage pumping Station and Stonecutters Island Sewage Treatment Works are located at its western and southern, respectively. The site area is approximately 18,742 m².
- 2.1.2. According to the approved Stonecutters Island OZP (OZP No.: S/SC/10) gazette on 23/09/2011, the site is currently zoned as “Other Specified Uses” (“OU”) Zone. **Figure 2.1** shows the Site location and its environs.

2.2. Proposed Variation

- 2.2.1. In order to increase the handling capacity of GTW and to improve the GTWTF treatment performance, a new GTWTF is proposed to feature all new operational equipment, and the existing GTWTF equipment shall be decommissioned and dismantled after the commissioning of the new GTWTF.
- 2.2.2. The proposed provision of the new GTWTF include:
- Installation of GTW treatment equipment in Transfer Building B to increase the average handling capacity from 600 to 900 m³ per day;
 - Enhancement of treatment performance and efficiency of GTWTF in Transfer Building B;
 - Improvement of operating conditions inside the Tipping Hall of the main transfer building(existing Transfer Building A); and
 - Separating Refuse Collection Vehicle (RCV) and GTW tanker traffic at WKTS to reduce queuing time (individual weighbridge will be provided at each unloading bay for GTW tankers).
- 2.2.3. The preliminary floor layout plans of GTWTF are provided in **Appendix A** of the ERR. The tentative implementation programme for the GTWTF is provided below in **Table 2-1**

Table 2-1 Project Implementation Programme

Task	Tentative timeframe
Design Stage	Q2 2023 to Q4 2024
Construction Stage	Q1 2025 to Q4 2026
Testing and Commission	Q1 2027 to Q2 2027
Operation Commencement:	Q2 2027

2.3. Existing Sewerage Condition

- 2.3.1. The drainage plans (plan no.: 11-NW-12B-3, 11-NW-12D-1) were obtained from the Drainage Services Department (DSD) in Nov 2024 to gather the background information on sewerage infrastructure in the vicinity of the Site. The relevant drainage data are extracted from the drainage plans detailed in **Appendix 2-1** and presented in **Figure 2.2** for ease of reference. Concerned sewage network was identified for estimation of the potential sewage impact to the downstream sewers associated with the proposed development.
- 2.3.2. A series of public sewers with diameter ranged from 225 – 450 mm were found along Ngong Shung Road and connecting to West Kowloon No. 2 Sewage Pumping Station; and from 825 – 1200mm running across the Hing Wah Street West and Tsing Sha Highway. Sewage generated from the site will be discharged to an existing 450mm diameter sewer at foul water manhole A1 (FMH4018438) and conveyed west along Ngong Shung Road to the West Kowloon No.2 Sewage Pumping Station presented in **Figure 2.2** and ultimately to Stonecutters Island Sewage Treatment Works (SISTW).

3. Evaluation of Sewerage Impact

3.1. Assessment Methodology

- 3.1.1. The sewage discharge location from WKTS under the 2FOC will continue to be connected to the existing 450mm diameter sewer at Manhole A1 (manhole no.: FMH4018438) Ngong Shung Road. The adequacy in capacities of the existing sewer along Ngong Shung Road and Hing Wah Street West has been checked based on the existing upstream and downstream flow estimates and estimation of future sewage generated from WKTS.
- 3.1.2. According to drainage layout plans from DSD and Buildings Department, the sewage generated from downstream development (Administration Building - Stonecutters Island Sewage Treatment Works) is discharged into Manhole B1.
- 3.1.3. In addition, segment C1 – C2 and D1 – D2 are assumed as full-bore flow to represent the flow of the downstream catchments (i.e. Stonecutters Island Sewage Treatment Works, etc.) of segment C1 – C2, and flow from upstream catchments (i.e. Kowloon Motor Bus Depot, Ocean Shipyard, Chu Kong Group Shipyard Building, Wang Tak Building, etc.) of segment D1 – D2.
- 3.1.4. The unit flow factors as recommended in the Environmental Protection Department's (EPD's) "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning" (hereafter as "GESF") published by EPD in 2005 has been adopted in the assessment.

3.2. Estimation of Sewage Flow from Site

- 3.2.1. The calculation of the daily flow for 2FOC of WKTS is provided in **Appendix 3.1** for reference. For the sewage flow estimation of future operation of WKTS, the peak wastewater generation estimation is anticipated to be 1,484 m³/day and the design flow rate would be 1,580 m³/day. This SIA will be conducted based on the design flow rate of 1,580 m³/day as worst-case scenario.

3.3. Sewerage Capacity

- 3.3.1. According to the "Sewerage Manual – Key Planning Issues and Gravity Collection System" published by DSD in 2013, the capacities of respective sewers have been calculated based on Colebrook-White equation for circular pipes:

$$V = -2(2gDS)^{0.5} \log \left(\frac{k}{3.7D} + \frac{2.5\nu}{D(2gDS)^{0.5}} \right)$$

Where

V = mean velocity (m/s)

g = gravitational acceleration (m/s²)

D = pipe diameter (m)

ks = hydraulic pipeline roughness (m)

ν = kinematic viscosity of fluid (m²/s)

s = frictional slope (energy gradient due to frictional loss)

- 3.3.2. The sewerage impact on various segments of the sewer was evaluated by comparing the estimated peak flow against the capacity of the respective sewer segments.
- 3.3.3. The detailed calculations of sewer's capacity are provided in **Appendix 3.2** for reference.

4. Result and Discussion

4.1. Sewage Generation and Sewers Capacity

- 4.1.1. Based on the worst-case scenario, the peak estimated flow of the WKTS will be increased to 1,580 m³/day. The proposed final discharge point from WKTS will be connected to the existing 450 mm diameter sewer at manhole A1 (refer to **Figure 2.2**).
- 4.1.2. The capacities of each sewer segment for the concerned upstream and downstream sewers (segment A1 to A5, B1 – A2, C1 to A3 and D1 – A5) between each manhole have been evaluated. The percentage of used capacity for the concerned sewers (i.e. A1 to A5, B1 – A2, C1 to A3 and D1 – A5) range from 15.7% to 78.6%. Estimation of the flow generated and used capacities are detailed in **Appendix 3-1** and **Appendix 3-2**, respectively.

Table 4-1 Used capacity of Existing Sewers

Sewer	Flow Capacity, m ³ /s ^[1]	Estimated Peak Flow, m ³ /s	Used Capacity, %
B1-A2	0.107	0.107	(100%) ^[1]
C1-C2	0.028	0.028	(100%) ^[1]
C2-C3	0.180	0.028	15.7%
C3-C4	0.180	0.028	15.7%
C4-A3	0.180	0.028	15.7%
D1-D2	0.912	0.912	(100%) ^[1]
D2-A5	1.648	0.912	55.4%
A1-A2	0.330	0.119	36.0%
A2-A3	0.248	0.181	72.9%
A3-A4	0.271	0.200	73.9%
A4-A5	0.254	0.200	78.6%

Note:

[1]: (100%): Sewer assumed with full-bore flow.

- 4.1.3. Based on the assessment results presented in **Table 4-1**, all concerned sewers along Ngong Shung Road and Hing Wah Street West are capable to cater for peak flow. As such, there will be no adverse sewerage impact from the proposed development.

4.2. Capacity of Pumping Station

- 4.2.1. The sewage generated from the surrounding developments and proposed development will be discharged to the Pumping Station. An enquiry to Drainage Services Department (DSD) was made to request the daily flow in 2023 and the peak design pumping rate for the West Kowloon No.2 Sewage Pumping Station (WK2SPS) and is presented in **Appendix 4-1**. According to the information provided by DSD, the current average daily flow was estimated as 5,099 m³/day, while the design peak flow was 540 l/s.
- 4.2.2. Based on the assessment results, the sewage flow from the proposed development will not exceed the capacity of Pumping Station under the worst-case scenario.
- 4.2.3. **Table 4-2** Table 4-2 summarised the percentages of used capacity of the Pumping Station, and detail calculation and sewage flow data of pumping station are presented in **Appendix 4-2**.

Table 4-2 Used capacity of WK2SPS

Peak Design Pumping Rate, l/s	Current Average Daily Flow, m ³ /day	Daily Flow from Proposed Development, m ³ /day	Overall Daily Flow, m ³ /day	Peak Discharge, l/s ^[1]	Used Capacity, %
540	5099	1580	6679	271	50

Note:

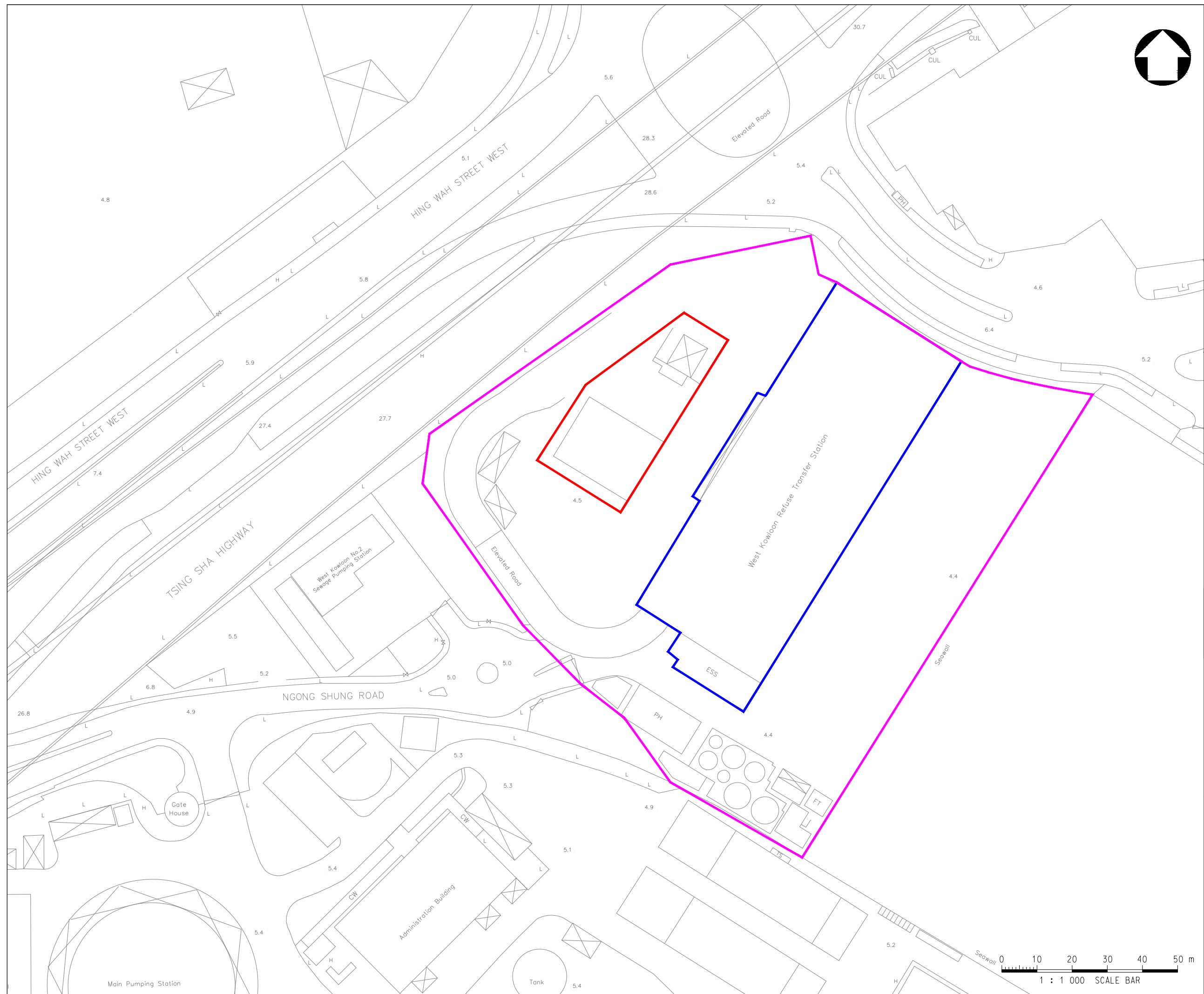
[1]: With peaking factor of 3.5 considered.

5. Conclusion

- 5.1.1. A Sewerage Impact Assessment (SIA) has been conducted to evaluate the possible impacts on the local sewerage network due to the operation of the WKTS.
- 5.1.2. The assessment findings demonstrated and confirmed that there should be sufficient sewage capacity for the public sewers along Ngong Shung Road and Hing Wah Street West even though there is a change of sewage generation due to the proposed development, no mitigation measures are considered necessary for the existing sewers.
- 5.1.3. Based on the above, it is concluded that the sewerage impact arising from the proposed development should be acceptable.

Figures

The background of the page is an abstract composition of overlapping, curved, organic shapes in various shades of green and yellow. The colors range from a deep forest green to a bright, almost neon yellow. The shapes are layered, creating a sense of depth and movement, with some areas appearing more saturated than others due to the overlapping effect.



LEGEND:

- West Kowloon Transfer Station
— Existing Transfer Building A
— Proposed Transfer Building B

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	
		■ ■ ■			■ ■ ■



Client



China Harbour Engineering Company Limited

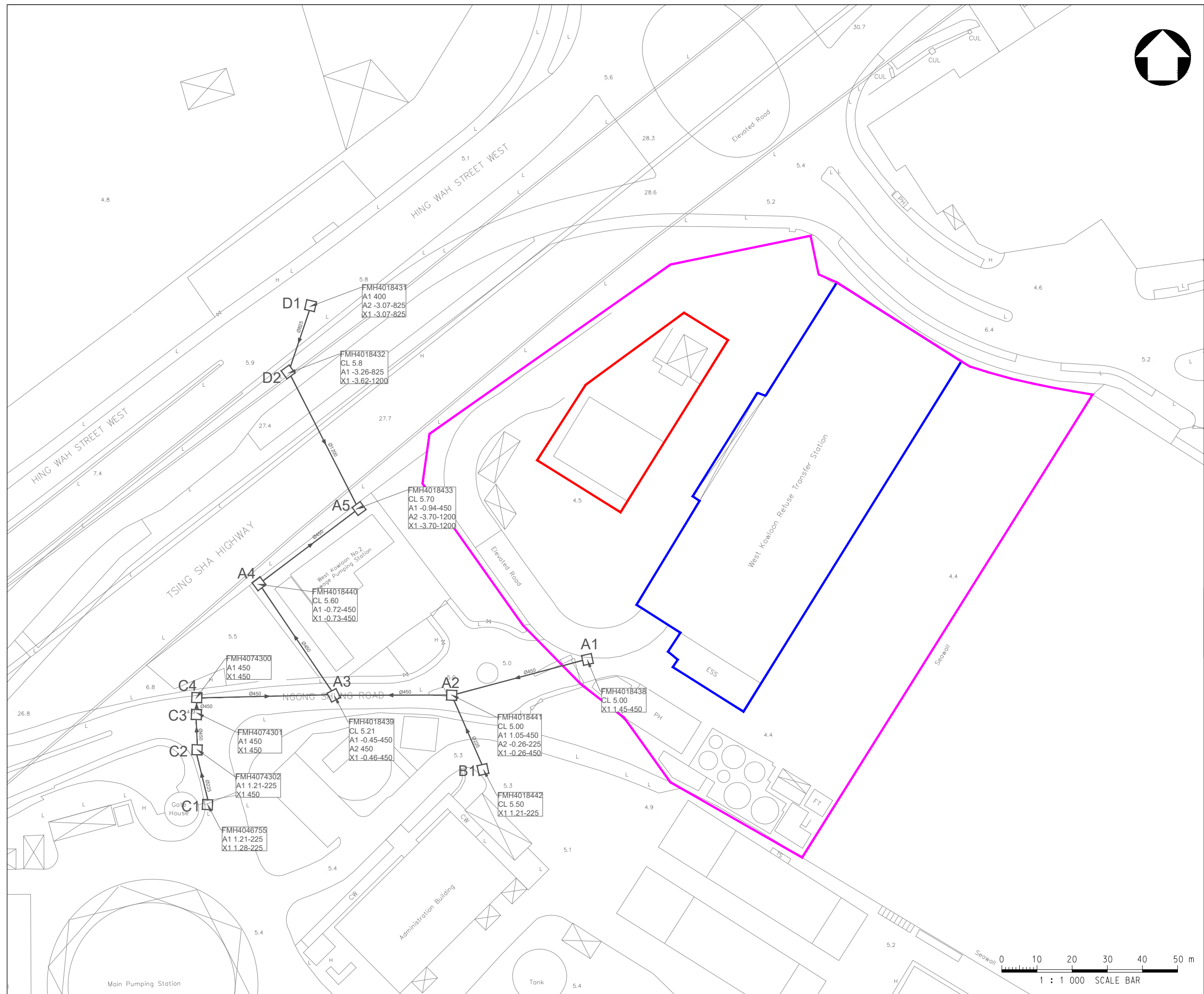
Project Title

Application for Variation to the
Environmental Permit for the Grease Trap
Waste Treatment Facility at West Kowloon
Transfer Station and Technical Design of
Enhancement Works

Drawing Title

GTWTF Location Plan

Scale As Shown	Designed	Drawn	Checked	Authorised
Original Size A3	Date	Date	Date	Date
Drawing Number				Revision
Figure 2.1				0



LEGEND:

- West Kowloon Transfer Station
 Existing Transfer Building A
 Proposed Transfer Building B
 Existing Manhole and Sewer

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	



Client	
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China Harbour Engineering Company Limited

Project Title

Application for Variation to the
Environmental Permit for the Grease Trap
Waste Treatment Facility at West Kowloon
Transfer Station and Technical Design of
Enhancement Works

Drawing Title

Overview of Existing Sewerage Network

Scale As Shown	Designed	Drawn	Checked	Authorised
Original Size A3	Date	Date	Date	Date
Drawing Number				Revision

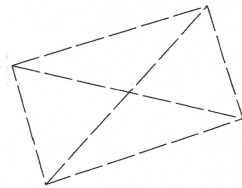
Appendix 2-1

Drainage Record

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經地政總署署長准許複印

29 NOV 2021

EXISTING SEWER
EXISTING S.W.D.
SEWER ALIGNMENT AND LEVELS SHOWN
ARE SUBJECT TO SITE VERIFICATION
PART OF DRG NO. 11-NW-12B-3
SCALE 1:500



HING WAH STREET WEST

高架道路

Elevated Road

FMH4018431
CL 5.80
A1 2.93-825
X1 375
X2 2.95-825

FMH4018430
CL 5.80
A1 2.93-825
X1 375
X2 2.95-825

SMH4065300
CL 5.60
A1 1.77-825
X1 1.77-900

SMH4020774
CL 5.60
A1 1.76-900
A2 375
X1 1.76-900

SMH4065302
CL 6.20
A1 1.65-900
X1 1.53-900

SMH4020775
CL 5.45
A1 1.88-900
X1 1.80-900

SMH4020776
CL 5.30
A1 1.69-900
X1 1.69-900

SMH4020777
CL 5.10
A1 1.60-900
A2 -0.05-2550
X1 -0.05-2550

SMH4020767
CL 5.10
A1 -0.12-2550
X1 -0.15-2550

SMH4020766
CL 5.15
A1 0.00-2550
A2 375
X1 0.00-2550

SMH4020764
CL 5.45
A1 5.25
A2 2.21-2550
X1 0.09-2550

SMH4020765
CL 5.20
A1 0.04-2550
X1 0.04-2550

FMH4018429
CL 5.45
A1 2.80-825
X1 2.80-825

SMH4020763
CL 5.50
A1 2.25
A2 2.00-2550
A3 675
X1 0.13-2550

FMH4018428
CL 5.45
A1 2.09-375
A2 2.50-825
X1 2.67-825

SMH4084228
CL 5.94
A1 0.21-2550
A2 0.21-450
X1 0.21-2550

5.1 +

5.3 +

+28.3

28.6 +

5.4 +

+5.2

+30.7

5.6 +

5.7 +

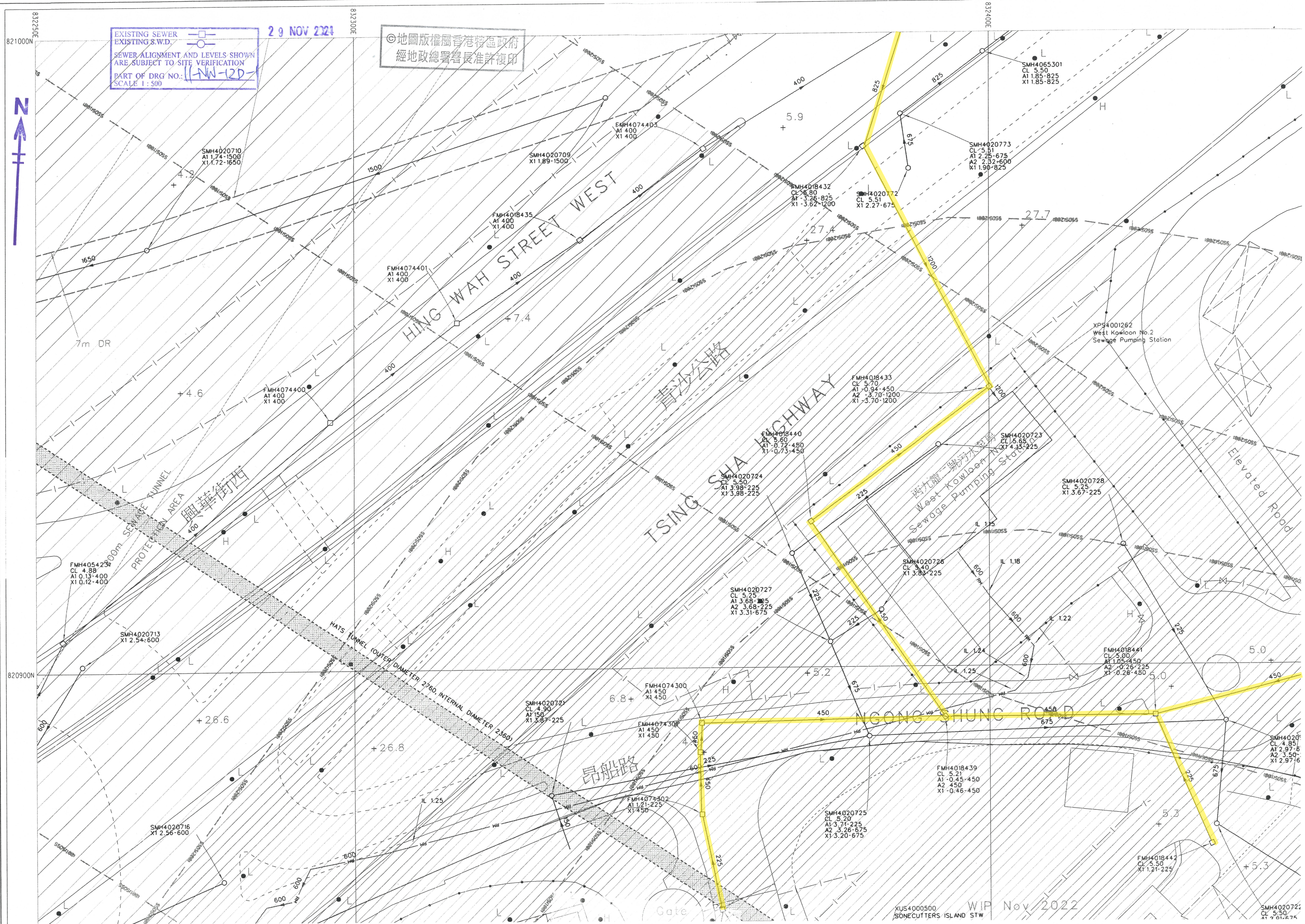
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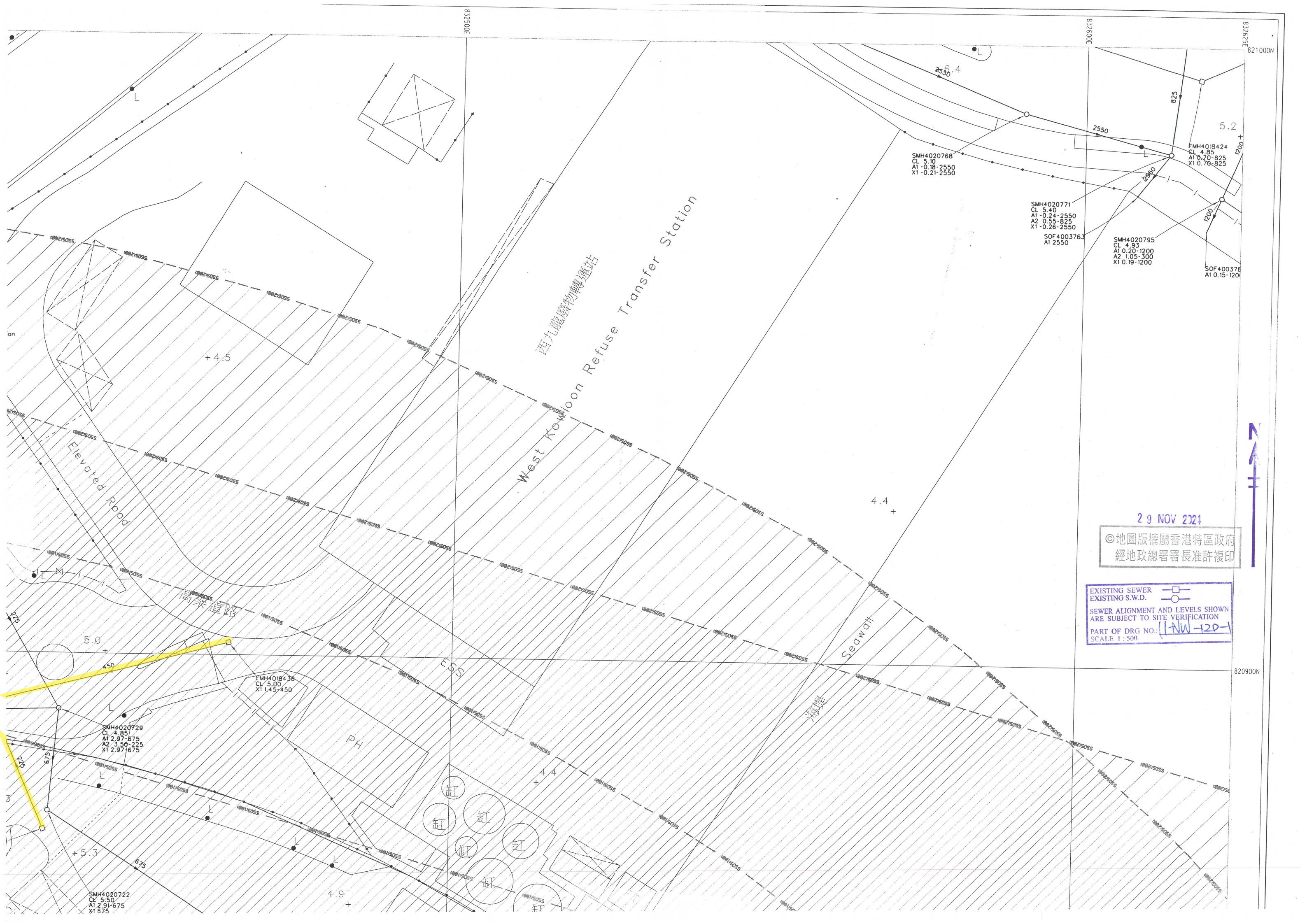
832400E

832500E

EXISTING SEWER 
EXISTING S.W.D. 
SEWER ALIGNMENT AND LEVELS SHOWN
ARE SUBJECT TO SITE VERIFICATION
PART OF DRG NO.: 11-NW-12D-1
SCALE 1" = 50'

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經地政總署署長准許複印





西九龍廢物轉運站
West Kowloon Refuse Transfer Station

29 NOV 2021

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經地政總署署長准許複印

EXISTING SEWER
EXISTING S.W.D.
SEWER ALIGNMENT AND LEVELS SHOWN
ARE SUBJECT TO SITE VERIFICATION
PART OF DRG NO. (1) NW-120-1
SCALE 1:500

SMH4020768
CL 5.10
A1 0.18-2550
X1 0.21-2550

SMH4020771
CL 5.40
A1 0.24-2550
A2 0.55-825
X1 0.26-2550
SOF 4003763
A1 2550

SMH4020795
CL 4.93
A1 0.20-1200
A2 1.05-300
X1 0.19-1200

FMH4018424
CL 4.85
A1 0.70-825
X1 0.78-825

SOF 400376
A1 0.15-1200

FMH4018438
CL 5.00
X1 1.45-450

SMH4020729
CL 4.85
A1 2.97-675
A2 3.50-225
X1 2.97-675

SMH4020722
CL 5.50
A1 2.91-675
X1 675

Legend for Drainage Record Plan

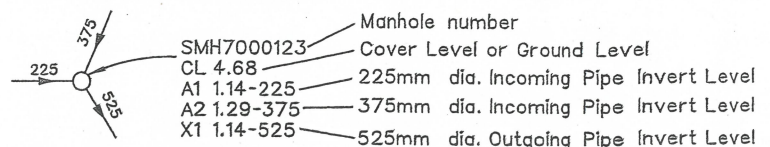
	Storm Water Manhole		Existing Pipe (Storm/Sewer/Combined)
	Storm Water Terminal Manhole		Existing Pipe (Storm/Sewer/Combined) (Planning / Identifying to be Abandoned)
	Storm Water Special Manhole		Rising Main (Storm/Sewer)
	Sewer Manhole		Existing Rising Main (Storm/Sewer) (Planning / Identifying to be Abandoned)
	Sewer Terminal Manhole		Vaccum Sewer
	Sewer Special Manhole		Existing Vaccum Sewer (Planning / Identifying to be Abandoned)
	Combined Manhole		Abandoned Pipe
	Catchpit		Abandoned Pipe (Filled with Materials)
	Desilting Opening		Proposed Pipe (Storm/Sewer)
	Inspection Opening		Works In Progress Pipe (Storm/Sewer)
	Dry Weather Flow Interceptor		Not Yet Commissioned Pipe (Storm/Sewer)
	Sand Trap		Existing U Channel / Stepped Channel (Storm)
	Inlet		Proposed U Channel / Stepped Channel (Storm)
	Outlet		Works In Progress U Channel / Stepped Channel (Storm)
	Gully Sump / Gully		Existing Submarine Outfall with Diffuser
	Tapping Point (Storm/Sewer)		Proposed Submarine Outfall with Diffuser
	Overflow (Sewer/Combined)		Works In Progress Submarine Outfall with Diffuser
	Interface Valve Chamber		Slope Sign Board
	Oil / Petrol Interceptor		Slope Number
	Valve		Slope Boundary
	Spot Level (Storm/Sewer)		Harbour Area Treatment Scheme Sewage Tunnel Protection Area (100m width)
	Water Gauge		(Please note that all proposed works within the HATS Sewage Tunnel Protection Area have to be complied with the requirements in the Environment, Transport and Works Bureau Technical Circular (Works) No.28/2003 or the Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-62 issued by the Buildings Department)
	Fencing/Railing/Concrete Parapet		Harbour Area Treatment Scheme Sewage Tunnel Outer Protection Area (200m width)
	Tunnel / Box Culvert (Storm/Sewer)		(Please note that all proposed works within the HATS Sewage Tunnel Protection Area have to be complied with the requirements in the Environment, Transport and Works Bureau Technical Circular (Works) No.28/2003 or the Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-62 issued by the Buildings Department)
	Drainage Reserve		
	Tunnel Protection Zone		
	Existing Y-Junction (Storm/Sewer/Combined)		

Notes :

- All levels are given in metres above principal datum.
- All dimensions shown are in millimetres unless otherwise stated.
- The information shown on the record drawings are subject to verification on site and no guarantee can be given that this is a complete record.
- Abbreviations for Channels of width smaller or equal to 1200mm:
 900C = 900mm width Surface Channel
 900SC = 900mm width Stepped Channel
 900UC = 900mm width U Channel
 900DWFC = 900mm width Dry Weather Flow Channel

- The Incoming Pipes are marked A1, A2, A3, ... counting clockwise from the first Outgoing Pipe X1. Outgoing Pipes are marked X1, X2, X3 ... counting clockwise from North.

eg.



- Piling foundations on culverts may be present but not shown for brevity. Please refer to the relevant as-built drawings on details of the pile foundation.
- Drainage facilities maintained by other parties, if shown, are indicative only. It is no guarantee that these information are exact.

Please note that drainage information is now accessible through the GeoInfo Map services of the Lands Department (<https://www.map.gov.hk/gm/?lg=en>). A Quick Reference Guide on the operation of the system is available in DSD homepage at https://www.dsd.gov.hk/EN/Service_Enquiries/Drainage_Record_Plans/index.html.

We would draw your particular attention that *[some of]* the subject site(s) fall(s) within the Harbour Area Treatment Scheme (HATS) Sewage Tunnel Protection Area. Please note that all proposed works within the HATS Sewage Tunnel Protection Area have to be complied with the requirements in the Environment, Transport and Works Bureau Technical Circular (Works) No. 28/2003 or the Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-62 issued by the Buildings Department.

Appendix 3-1

Estimation of Sewage Discharge from the Site

Parameters	2023 operation data from CHEC (m ³ / day)	Remarks	Proposed Value in Current VEP application (m ³ / day)		Remarks
			Average Influent flow	Peak Influent Flow	
Leachate	301	Transfer Building A: Based on average MSW handling capacity of 2,334.62 tpd (EPD record of 2,450 tpd MSW and 450 tpd GTW as of 2023)	311.4		GTWTF is relocated to Transfer Building B.
Vehicle Wash Water					
Surface Water					
GTW Treatment Process Wastewater	364	Transfer Building A: Based on incoming GTW tonnage minus pre-treated GTW tonnage (EPD record of 450 tpd of GTW as of 2023)	1070.7	1172.7	Transfer Building B: Estimated based on mass balance of GTWTF process capacity at peak/avg influent quality scenario, plus wastewater generated from vehicle washing and other drains within TBB
Total Sewage Discharge	665	Total Sewage Discharge	1382	1484	

Appendix 3-2

Calculation of Flow Capacity of Existing Sewers

Calculation of Flow Capacity of Proposed Development

Sewer No.				Internal Diameter (m) [a]	Cross-section Area (m²)	Length (m)	Inlet mPD US, IL (m) [a]	Outlet mPD DS, IL (m) [a]	Hydraulic pipeline roughness (m) [b]	Hydraulic Gradient	Mean Velocity (m/s) [c]	Max Capacity of Sewer (m³/s)	Total Average Dry Weather Flow	Catchment Inflow Factor	Revised Total Average Dry Weather Flow [g]	Contributing Population	Peaking Factor	Peak Discharge from Project Site m³/day	Peak Discharge through Manhole m³/s	Percentage of capacity	Remark
ID	From	ID	To	D	A	L			s	V	m³/day		[f]	m³/day	[d]	[e]			[h]		
Catchment B																					
B1	FMH4018442	A2	FMH4018441	0.225	0.040	21.2	1.21	-0.26	0.003	0.06924	2.70	0.107	1426	1.3	1854	6865	5.0	9268	0.107	100.0%	Catchment B (served by B1-A2, assumed full bore flow)
Catchment C																					
C1	FMH4046755	C2	FMH4074302	0.225	0.040	14.4	1.28	1.21	0.003	0.00487	0.71	0.028	314	1.3	408	1511	6.0	2449	0.028	100.0%	Catchment C (served by C1-C2, assumed full bore flow)
C2	FMH4074302	C3	FMH4074301	0.450	0.159	9.0	1.21	1.17	0.003	0.00487	1.13	0.180	314	1.3	408	1511	6.0	2449	0.028	15.7%	Catchment C (served by C1-C2) Based on DSD's drainage records, no I.L. are provided at C2 & C3. Therefore, I.L. of the sewer is assumed as the same as the incoming pipe at C2. The I.L. of incoming pipe at C3 of the sewer is calculated by assumed the slopes are the same as the former segment C1 - C2.
C3	FMH4074301	C4	FMH4074300	0.450	0.159	3.8	1.16	1.14	0.003	0.00487	1.13	0.180	314	1.3	408	1511	6.0	2449	0.028	15.7%	Catchment C (served by C1-C2) Based on DSD's drainage records, no I.L. are provided at C3 & C4. Therefore, I.L. of the sewer is assumed as the same as the incoming pipe at C3. The I.L. of incoming pipe at C4 of the sewer is calculated by assumed the slopes are the same as the former segment C2 - C3.
C4	FMH4074300	A3	FMH4018439	0.450	0.159	37.0	1.14	0.95	0.003	0.00487	1.13	0.180	314	1.3	408	1511	6.0	2449	0.028	15.7%	Catchment C (served by C1-C2) Based on DSD's drainage records, no I.L. are provided at C4 & C5. Therefore, I.L. of the sewer is assumed as the same as the incoming pipe at C4. The I.L. of incoming pipe at C5 of the sewer is calculated by assumed the slopes are the same as the former segment C3 - C4.
Catchment D																					
D1	FMH4018431	D2	FMH4018432	0.825	0.535	38.0	-3.07	-3.26	0.003	0.00499	1.71	0.912	15924	1.3	20702	76673	3.8	78819	0.912	100.0%	Catchment D (served by D1-D2, assumed full bore flow)
D2	FMH4018432	A5	FMH4018433	1.200	1.131	35.5	-3.62	-3.70	0.003	0.00225	1.46	1.648	15924	1.3	20702	76673	3.8	78819	0.912	55.4%	Catchment D (served by D1-D2)
From Site to WKSPS																					
A1	FMH4018438	A2	FMH4018441	0.450	0.159	38.3	1.45	1.05	0.0006	0.01044	2.07	0.330	1580	1.3	2054	7607	5.0	10270	0.119	36.0%	Flow from Site
A2	FMH4018441	A3	FMH4018439	0.450	0.159	32.0	-0.26	-0.45	0.0006	0.00594	1.56	0.248	3006	1.3	3908	14472	4.0	15630	0.181	72.9%	Flow from Site + Catchment B
A3	FMH4018439	A4	FMH4018440	0.450	0.159	36.9	-0.46	-0.72	0.0006	0.00705	1.70	0.271	3320	1.3	4316	15984	4.0	17262	0.200	73.9%	Flow from Site + Catchments B + Catchment C
A4	FMH4018440	A5	FMH4018433	0.450	0.159	33.7	-0.73	-0.94	0.0006	0.00624	1.60	0.254	3320	1.3	4316	15984	4.0	17262	0.200	78.6%	Flow from Site + Catchments B + Catchment C

Note:

[a] Reference from Drainage Plan and Geoinfo Map.
[b] ks values of 3.0mm and 0.6mm for clayware under "poor" condition for pipe velocities approximately 0.75m/s and 1.2m/s will be adopted in this assessment.
[c] The velocity is calculated using the Colebrook-White Formula:

$$f' = -2 \left(2gDS \right)^{0.5} \log \left(\frac{k}{3.7D} + \frac{2.5v}{D \left(2gDS \right)^{0.5}} \right)$$

where
k = Colebrook-White roughness coefficient, in meter
V = mean velocity (m/s)
D = circular cross-section pipe, inside diameter (m)
S = slope, in meters per meter
v = kinematic viscosity of water, in meter per second (0.000001306 m/s)
g = gravitational acceleration (m/s²) (9.807m/s²)

[d] The Contributing Population is defined as:
Contributing Population = $\frac{\text{Average flow (m³/day)}}{0.27 \text{ (m³/person/day)}}$

[e] Reference from Table T-5 of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning
[f] Reference from Table T-4 of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning
[g] Revised Total Average Dry Weather Flow = Total Average Dry Weather Flow x Catchment Inflow Factor
[h] Pipe segment that exceeded 100% used capacity are bolded and underlined

Appendix 4-1

Response from DSD on the Design Capacity and Daily Flow Record

**Drainage Services Department****Sewage Treatment Division 2**

Stonecutters Island Sewage Treatment Works,
Ngong Shung Road, Ngong Shuen Chau, Kowloon, Hong Kong

渠務署
污水處理部 2
香港九龍昂船洲
昂船洲昂船洲污水處理廠

來函檔號 Your Ref: 5221890/18.30/OC0039
本署檔號 Our Ref: (010DCD) in ST2 9/SPS/41
電話 Tel: (852) 2195 3486
傳真 Fax: (852) 2991 4233

By Fax (2890 6343)

5221890/18.20/IC0026

16 December 2024

AtkinsRealis

13/F, Wharf T&T Centtr, Harbour City,
Tsim Sha Tsui, Hong Kong
(Attn: Joseph NG, Project Manager)

Dear Sir/Madam,

EPD Contract No. EP/SP/170/20
West Kowloon Transfer Station Second Follow-On Contract

Request for Information – Record of Daily Sewage Flow Record
at West Kowloon No. 2 Sewage Pumping Station

I refer to your letter ref. 5221890/18.30/OC0039 dated 25 November 2024.

Please find our reply below for your information.

(1) The design capacity of the West Kowloon No. 2 Sewage Pumping Station (WK2SPS) is 11,664 m³/d.

(2) Please find the daily sewage flow record at WK2SPS in Year 2023 in the enclosure.

Should you have any enquiries, please feel free to contact the undersigned at 2195 3486 or ptlam@dsd.gov.hk.

Yours faithfully,

(P. T. LAM)

For Chief Engineer/Sewage Treatment 2
Drainage Services Department

Encl

Date	WK2SPS Daily Influent (m3)
01-Jan-23	4288
02-Jan-23	4347
03-Jan-23	4229
04-Jan-23	4681
05-Jan-23	4526
06-Jan-23	4484
07-Jan-23	4344
08-Jan-23	4351
09-Jan-23	4511
10-Jan-23	2583
11-Jan-23	6025
12-Jan-23	4478
13-Jan-23	4471
14-Jan-23	4477
15-Jan-23	4236
16-Jan-23	4494
17-Jan-23	4330
18-Jan-23	4345
19-Jan-23	4584
20-Jan-23	4338
21-Jan-23	4670
22-Jan-23	3650
23-Jan-23	3377
24-Jan-23	3497
25-Jan-23	3740
26-Jan-23	4080
27-Jan-23	4199
28-Jan-23	3905
29-Jan-23	4085
30-Jan-23	4175
31-Jan-23	4278

Date	WK2SPS Daily Influent (m3)
01-Feb-23	4319
02-Feb-23	4377
03-Feb-23	4407
04-Feb-23	4338
05-Feb-23	4371
06-Feb-23	4534
07-Feb-23	4600
08-Feb-23	4768
09-Feb-23	4773
10-Feb-23	4753
11-Feb-23	4625
12-Feb-23	4665
13-Feb-23	4543
14-Feb-23	4587
15-Feb-23	4749
16-Feb-23	4711
17-Feb-23	4619
18-Feb-23	4589
19-Feb-23	4709
20-Feb-23	4734
21-Feb-23	4987
22-Feb-23	5280
23-Feb-23	4992
24-Feb-23	4963
25-Feb-23	4688
26-Feb-23	4902
27-Feb-23	4677
28-Feb-23	4780

Date	WK2SPS Daily Influent (m3)
01-Mar-23	4845
02-Mar-23	4857
03-Mar-23	4812
04-Mar-23	4568
05-Mar-23	4586
06-Mar-23	4564
07-Mar-23	4497
08-Mar-23	4625
09-Mar-23	4643
10-Mar-23	4635
11-Mar-23	4484
12-Mar-23	4404
13-Mar-23	4330
14-Mar-23	4657
15-Mar-23	4721
16-Mar-23	4605
17-Mar-23	4893
18-Mar-23	4648
19-Mar-23	4461
20-Mar-23	4701
21-Mar-23	4685
22-Mar-23	4845
23-Mar-23	4637
24-Mar-23	4793
25-Mar-23	5066
26-Mar-23	4831
27-Mar-23	4606
28-Mar-23	4856
29-Mar-23	4750
30-Mar-23	4679
31-Mar-23	4626

Date	WK2SPS Daily Influent (m3)
01-Apr-23	4479
02-Apr-23	4516
03-Apr-23	4506
04-Apr-23	4631
05-Apr-23	5458
06-Apr-23	6356
07-Apr-23	4904
08-Apr-23	4636
09-Apr-23	4726
10-Apr-23	4685
11-Apr-23	4824
12-Apr-23	5399
13-Apr-23	5107
14-Apr-23	5007
15-Apr-23	4974
16-Apr-23	4928
17-Apr-23	4915
18-Apr-23	3105
19-Apr-23	7391
20-Apr-23	5340
21-Apr-23	5218
22-Apr-23	5520
23-Apr-23	4786
24-Apr-23	4955
25-Apr-23	5398
26-Apr-23	5091
27-Apr-23	5035
28-Apr-23	5037
29-Apr-23	5062
30-Apr-23	4638

Date	WK2SPS Daily Influent (m3)
01-May-23	4604
02-May-23	5293
03-May-23	5295
04-May-23	5238
05-May-23	5151
06-May-23	5173
07-May-23	5225
08-May-23	5404
09-May-23	5452
10-May-23	5299
11-May-23	5480
12-May-23	5246
13-May-23	5369
14-May-23	5418
15-May-23	5256
16-May-23	5436
17-May-23	6127
18-May-23	5316
19-May-23	5195
20-May-23	5085
21-May-23	4994
22-May-23	4982
23-May-23	5421
24-May-23	5475
25-May-23	5272
26-May-23	5255
27-May-23	4984
28-May-23	5928
29-May-23	6231
30-May-23	6170
31-May-23	6448

Date	WK2SPS Daily Influent (m3)
01-Jun-23	6516
02-Jun-23	6448
03-Jun-23	5891
04-Jun-23	5220
05-Jun-23	5351
06-Jun-23	5906
07-Jun-23	6034
08-Jun-23	6021
09-Jun-23	5557
10-Jun-23	5657
11-Jun-23	6109
12-Jun-23	6196
13-Jun-23	5207
14-Jun-23	5881
15-Jun-23	5842
16-Jun-23	6084
17-Jun-23	6493
18-Jun-23	5543
19-Jun-23	5784
20-Jun-23	6398
21-Jun-23	6346
22-Jun-23	6448
23-Jun-23	5041
24-Jun-23	5113
25-Jun-23	4451
26-Jun-23	4722
27-Jun-23	4823
28-Jun-23	4924
29-Jun-23	4847
30-Jun-23	4762

Date	WK2SPS Daily Influent (m3)
01-Jul-23	4513
02-Jul-23	5138
03-Jul-23	4990
04-Jul-23	5123
05-Jul-23	4863
06-Jul-23	4962
07-Jul-23	5021
08-Jul-23	4858
09-Jul-23	4541
10-Jul-23	4611
11-Jul-23	4811
12-Jul-23	4837
13-Jul-23	4825
14-Jul-23	4900
15-Jul-23	4930
16-Jul-23	4821
17-Jul-23	4936
18-Jul-23	5269
19-Jul-23	5292
20-Jul-23	5007
21-Jul-23	5244
22-Jul-23	4856
23-Jul-23	4730
24-Jul-23	4657
25-Jul-23	4728
26-Jul-23	4855
27-Jul-23	4409
28-Jul-23	4986
29-Jul-23	5965
30-Jul-23	4786
31-Jul-23	5646

Date	WK2SPS Daily Influent (m3)
01-Aug-23	4890
02-Aug-23	5291
03-Aug-23	5201
04-Aug-23	5454
05-Aug-23	5071
06-Aug-23	4580
07-Aug-23	4885
08-Aug-23	4627
09-Aug-23	4887
10-Aug-23	5196
11-Aug-23	5404
12-Aug-23	5181
13-Aug-23	5250
14-Aug-23	5239
15-Aug-23	5352
16-Aug-23	4722
17-Aug-23	5235
18-Aug-23	5074
19-Aug-23	4882
20-Aug-23	4755
21-Aug-23	4965
22-Aug-23	4952
23-Aug-23	5104
24-Aug-23	4926
25-Aug-23	5249
26-Aug-23	4938
27-Aug-23	4713
28-Aug-23	5051
29-Aug-23	5238
30-Aug-23	5069
31-Aug-23	5072

Date	WK2SPS Daily Influent (m3)
01-Sep-23	6921
02-Sep-23	5045
03-Sep-23	5606
04-Sep-23	5434
05-Sep-23	5512
06-Sep-23	5300
07-Sep-23	5698
08-Sep-23	10377
09-Sep-23	5762
10-Sep-23	6243
11-Sep-23	5749
12-Sep-23	5581
13-Sep-23	5300
14-Sep-23	5591
15-Sep-23	5479
16-Sep-23	5336
17-Sep-23	5044
18-Sep-23	5118
19-Sep-23	5088
20-Sep-23	5185
21-Sep-23	5051
22-Sep-23	5144
23-Sep-23	5505
24-Sep-23	5225
25-Sep-23	4794
26-Sep-23	5373
27-Sep-23	5278
28-Sep-23	5162
29-Sep-23	5403
30-Sep-23	5044

Date	WK2SPS Daily Influent (m3)
01-Oct-23	4687
02-Oct-23	4910
03-Oct-23	5204
04-Oct-23	5554
05-Oct-23	5375
06-Oct-23	5479
07-Oct-23	5386
08-Oct-23	4692
09-Oct-23	10629
10-Oct-23	6363
11-Oct-23	5827
12-Oct-23	5864
13-Oct-23	5533
14-Oct-23	5519
15-Oct-23	5518
16-Oct-23	5608
17-Oct-23	5537
18-Oct-23	5713
19-Oct-23	5733
20-Oct-23	5407
21-Oct-23	5590
22-Oct-23	5126
23-Oct-23	5042
24-Oct-23	5132
25-Oct-23	5499
26-Oct-23	5288
27-Oct-23	5189
28-Oct-23	5101
29-Oct-23	5172
30-Oct-23	4935
31-Oct-23	4819

Date	WK2SPS Daily Influent (m3)
01-Nov-23	5289
02-Nov-23	5180
03-Nov-23	5080
04-Nov-23	5034
05-Nov-23	4887
06-Nov-23	4766
07-Nov-23	4919
08-Nov-23	5007
09-Nov-23	4955
10-Nov-23	5051
11-Nov-23	4778
12-Nov-23	5006
13-Nov-23	4959
14-Nov-23	4800
15-Nov-23	5102
16-Nov-23	4765
17-Nov-23	5307
18-Nov-23	4970
19-Nov-23	4888
20-Nov-23	5109
21-Nov-23	4972
22-Nov-23	5136
23-Nov-23	4828
24-Nov-23	5033
25-Nov-23	5101
26-Nov-23	5319
27-Nov-23	5347
28-Nov-23	4802
29-Nov-23	5446
30-Nov-23	5072

Date	WK2SPS Daily Influent (m3)
01-Dec-23	5055
02-Dec-23	5151
03-Dec-23	5108
04-Dec-23	5084
05-Dec-23	5376
06-Dec-23	5443
07-Dec-23	5559
08-Dec-23	5398
09-Dec-23	5381
10-Dec-23	5341
11-Dec-23	5372
12-Dec-23	5437
13-Dec-23	6891
14-Dec-23	5970
15-Dec-23	6177
16-Dec-23	6675
17-Dec-23	6154
18-Dec-23	6768
19-Dec-23	7095
20-Dec-23	5573
21-Dec-23	5010
22-Dec-23	4821
23-Dec-23	5198
24-Dec-23	4677
25-Dec-23	4138
26-Dec-23	4399
27-Dec-23	4688
28-Dec-23	4781
29-Dec-23	4705
30-Dec-23	4709
31-Dec-23	4659

From: Pak Tat LAM <ptlam@dsd.gov.hk>
Sent: 17 December 2024 17:22
To: [REDACTED]
Cc: [REDACTED]
Subject: Re: [Internet]Request for Information – Peak Design Pumping Rate at West Kowloon No.2 Sewage Pumping Station (EPD Contract No. EP/SP/170/20 - West Kowloon Transfer Station Second Follow-On Contract)
Attachments: 5221890_IC0026.pdf
Follow Up Flag: Follow up
Flag Status: Flagged

Dear [REDACTED],

The maximum handling capacity of WK2SPS is 0.54 m3/s (i.e 540 L/s) for your information. Thanks.

Regards,
LAM Pak-tat
EME/ST2/2/1, DSD
Tel.: 2195 3486



From: [REDACTED]@atkinsrealis.com>
To: "ptlam@dsd.gov.hk" <ptlam@dsd.gov.hk>
Cc: [REDACTED]
Date: 17/12/2024 15:39
Subject: [Internet]Request for Information – Peak Design Pumping Rate at West Kowloon No.2 Sewage Pumping Station (EPD Contract No. EP/SP/170/20 - West Kowloon Transfer Station Second Follow-On Contract)
Serial No.: [REDACTED]

=====

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EPD Contract No. EP/SP/170/20
West Kowloon Transfer Station Second Follow-On Contract
Request for Information – Record of Daily Sewage Flow Record at West Kowloon No.2 Sewage Pumping Station

Dear Mr. Lam,

Thank you so much for your previous response to our enquiry regarding the design capacity and daily sewage flow records of West Kowloon No. 2 Sewage Pumping Station (see attached). Following our phone conversation today, we would also like to know the **peak design pumping rate** (in l/s) of the station. Your prompt reply would be much appreciated. Thank you!

Should you have any queries, please feel free to contact me at [REDACTED]. Thank you!

Should you have any queries, please feel free to contact me. Thank you! Kind Regards,

[REDACTED]
Assistant Environmental Consultant

 AtkinsRéalis

Appendix 4-2

Calculation of Flow Capacity of West Kowloon No.2 Sewage Pumping Station

WK2SPS Daily Influent (m3)												
Date/ Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	4288	4319	4845	4479	4604	6516	4513	4890	6921	4687	5289	5055
2	4347	4377	4857	4516	5293	6448	5138	5291	5045	4910	5180	5151
3	4229	4407	4812	4506	5295	5891	4990	5201	5606	5204	5080	5108
4	4681	4338	4568	4631	5238	5220	5123	5454	5434	5554	5034	5084
5	4526	4371	4586	5458	5151	5351	4863	5071	5512	5375	4887	5376
6	4484	4534	4564	6356	5173	5906	4962	4580	5300	5479	4766	5443
7	4344	4600	4497	4904	5225	6034	5021	4885	5698	5386	4919	5559
8	4351	4768	4625	4636	5404	6021	4858	4627	10377	4692	5007	5398
9	4511	4773	4643	4726	5452	5557	4541	4887	5762	10629	4955	5381
10	2583	4753	4635	4685	5299	5657	4611	5196	6243	6363	5051	5341
11	6025	4625	4484	4824	5480	6109	4811	5404	5749	5827	4778	5372
12	4478	4665	4404	5399	5246	6196	4837	5181	5581	5864	5006	5437
13	4471	4543	4330	5107	5369	5207	4825	5250	5300	5533	4959	6891
14	4477	4587	4657	5007	5418	5881	4900	5239	5591	5519	4800	5970
15	4236	4749	4721	4974	5256	5842	4930	5352	5479	5518	5102	6177
16	4494	4711	4605	4928	5436	6084	4821	4722	5336	5608	4765	6675
17	4330	4619	4893	4915	6127	6493	4936	5235	5044	5537	5307	6154
18	4345	4589	4648	3105	5316	5543	5269	5074	5118	5713	4970	6768
19	4584	4709	4461	7391	5195	5784	5292	4882	5088	5733	4888	7095
20	4338	4734	4701	5340	5085	6398	5007	4755	5185	5407	5109	5573
21	4670	4987	4685	5218	4994	6346	5244	4965	5051	5590	4972	5010
22	3650	5280	4845	5520	4982	6448	4856	4952	5144	5126	5136	4821
23	3377	4992	4637	4786	5421	5041	4730	5104	5505	5042	4828	5198
24	3497	4963	4793	4955	5475	5113	4657	4926	5225	5132	5033	4677
25	3740	4688	5066	5398	5272	4451	4728	5249	4794	5499	5101	4138
26	4080	4902	4831	5091	5255	4722	4855	4938	5373	5288	5319	4399
27	4199	4677	4606	5035	4984	4823	4409	4713	5278	5189	5347	4688
28	3905	4780	4856	5037	5928	4924	4986	5051	5162	5101	4802	4781
29	4085		4750	5062	6231	4847	5965	5238	5403	5172	5446	4705
30	4175		4679	4638	6170	4762	4786	5069	5044	4935	5072	4709
31	4278		4626		6448		5646	5072		4819		4659

Average 5099 m³

Capacity check for WK2SPS

Peak Design Pumping Rate ^[1]	a. Current Average Daily Flow ^[2]	b. Daily Flow from Proposed Building	Overall Daily Flow _{a+b}	Contributing Population ^[3]	Peaking Factor _[4]	Overall Peak Flow _{a+b}	% of Used Capacity Peak Discharge / Design Peak Pumping Rate
l/s	m ³ /day	m ³ /day	m ³ /day			l/s	
540	5099	1580	6679	24737	3.5	271	50%

Note:

[1] Information provided by DSD (Appendix 4-1).

[2] Current average daily flow estimated based on daily sewage flow (Year 2023) provided by DSD (Appendix 4-1).

[3] The Contributing Population is defined as:

Contributing Population =
$$\frac{\text{Calculated overall daily flow (m}^3\text{/day)}}{0.27 \text{ (m}^3\text{/person/day)}}$$

[4] Reference from Table T-5 of Guidelines for Estimating Sewage Flows for Sewerage Infrastructure Planning.

Population Range	Peaking Factor (including stormwater allowance) for facility with existing upstream sewerage	Peaking Factor (excluding stormwater allowance) for facility with new upstream sewerage
(a) For sewers		
<1,000	8	6
1,000 – 5,000	6	5
5,000 – 10,000	5	4
10,000 – 50,000	4	3
>50,000	$\text{Max}\left(\frac{7.3}{N^{0.15}}, 2.4\right)$	$\text{Max}\left(\frac{6}{N^{0.175}}, 1.6\right)$
(b) Sewage Treatment Works, Preliminary Treatment Works and Pumping Stations		
<10,000	4	3
10,000 – 25,000	3.5	2.5
25,000 – 50,000	3	2
>50,000	$\text{Max}\left(\frac{3.9}{N^{0.065}}, 2.4\right)$	$\text{Max}\left(\frac{2.6}{N^{0.065}}, 1.6\right)$

Notes of Table T-5:

(1) N is the contributing population in thousands.

Appendix F

Ground Investigation Records

1995 Ground Investigation Records

19149

Y1
TPI
DS
P1

VIBRO

GEOTECHNICAL INFORMATION
UNIT
31 AUG 1994
RECEIVED

GROUND INVESTIGATION REPORT

By

VIBRO (H. K.) LIMITED

CONTRACT NO.

GE/93/06

ORDER NO.

GE/93/06.65

SITE LOCATION

Agreement No. CE 18/92

West Kowloon Transfer Station

CLIENT

Geotechnical Engineering Office

DATE

2nd August 1994

CIVIL ENGINEERING DEPARTMENT	
GEOTECHNICAL	
INFORMATION UNIT	
Report No.	19149
AREA	11NW12B7.8
Ref.	11NW12D1.2

TSC
Michael T.S. CHAN
Geotechnical Engineer

29/F, NEW WORLD TOWER
16-18, QUEEN'S ROAD CENTRAL
HONG KONG

TEL. 522-6171 (3 Lines)
FAX No. 524-9724

**GROUND INVESTIGATION
WORKS ORDER : GE/93/06.65
Agreement No. CE 18/92
West Kowloon Transfer Station
Ground Investigation**

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CED Term Contract: Ground Investigation - Hong Kong & Kowloon

Contract No. GE/93/06

Contractor: Vibro (H.K.) Limited

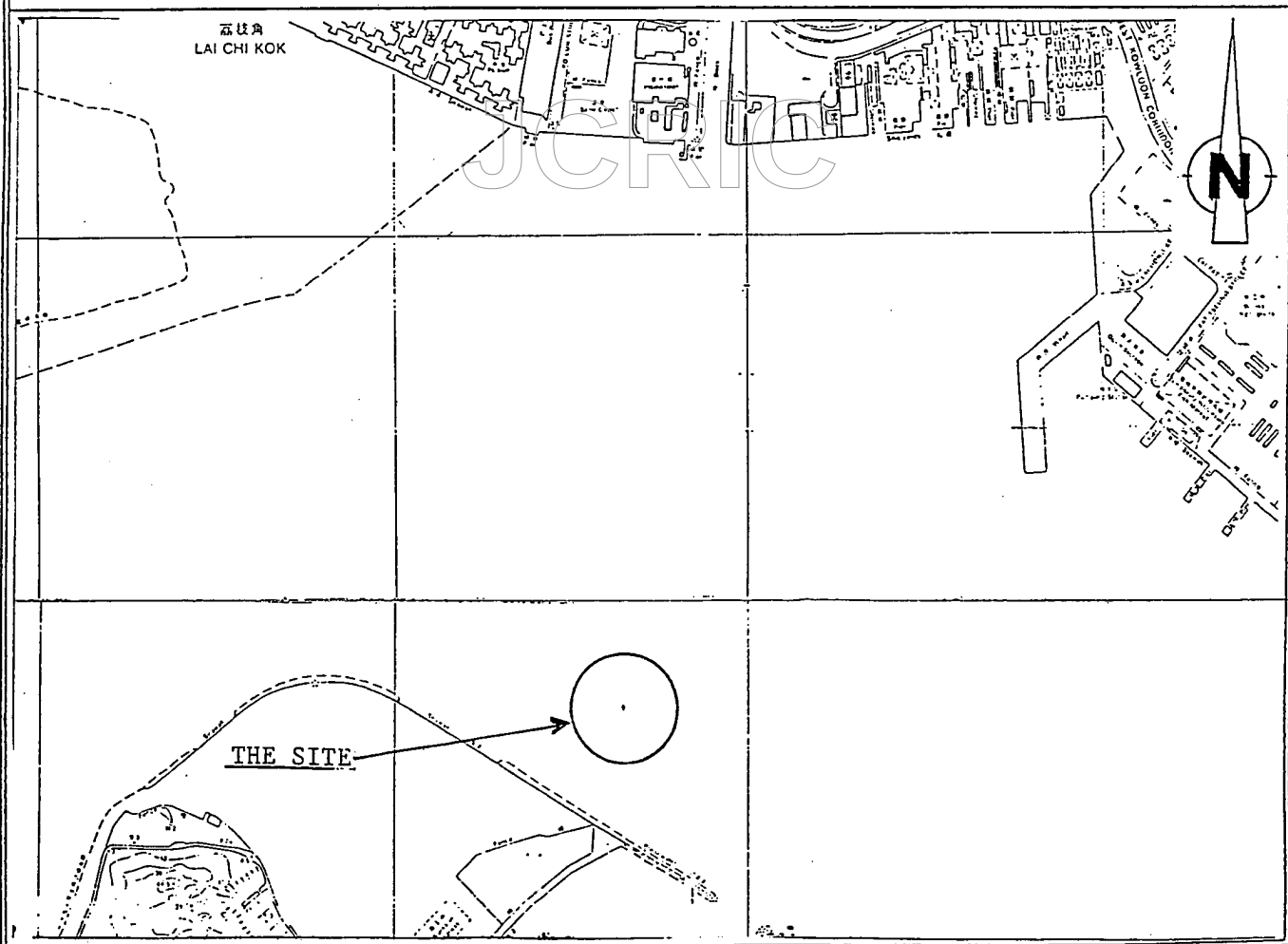
VIBRO

Contract Data Summary

Project Name GROUND INVESTIGATION -HK & KLN	Site Name WEST KOWLOON TRANSFER STATION	Date: Aug 93 to Jul 95 Official only
G.I. Contractor VIBRO(H.K.) LTD.	Client Geotechnical Engineering Office, Civil Engg. Depart.	G.E.O. Data Bank No.
Contract No. GE/93/06	W.O. No. GE /93/06.65	File Ref.

Field Work Summary

Drillholes Total No. FIVE	Method: Rotary Drilling	Date: 2-5-94 to 2-8-94
Pits / XXXXXXXXXXXX No. FOUR	; In-situ dry density determination Test No. TWELVE	
Probes : No. EIGHT		
Piezometers : No. FIVE		
Insitu Tests : No.	Type Standard Penetration Test	
Geophysics : Traverses	Type Nil	
Location Plan	SCALE 1 : 2500	Derived from : 5000 sheet 11-NW-A&C



GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING DEPARTMENT, HONG KONG



**GROUND INVESTIGATION REPORT
CIVIL ENGINEERING DEPARTMENT
GEOTECHNICAL ENGINEERING OFFICE**

**TERM CONTRACT NO. : GE/93/06
GROUND INVESTIGATION - HONG KONG and KOWLOON
WORKS ORDER NO : GE/93/06.65
SITE : Agreement No. CE 18/92
West Kowloon Transfer Station
Ground Investigation**

1. GENERAL INTRODUCTION

This ground investigation report has been prepared by Vibro (H.K.) Ltd in order to complete the above referenced works order issued by the Geotechnical Engineering Office, Materials Division, who administer the captioned contract. The contract period is of 24 months duration, and commenced on 30th July 1993.

The work carried out under this term contract consists of ground investigation by any or all of the following methods, namely the excavation of trial pits, stripping of slope protection, sinking of GCO probes, rotary drilling, field testing, installation of instrumentation and coring. The Contract Area is any location on Hong Kong Island and the part of Kowloon to the South of Lion Rock, East of Tsuen Wan and West of Lei Yue Mun.

The works are carried out in accordance with British Standard 1377, British Standard 5930, Geoguide 2 (GCO, 1987) and Geoguide 3 (GCO, 1988).

2. THE SITE

The site is located at the proposed West Kowloon Transfer Station just northeast from the Stonecutters Island between approximate coordinates E 832400 and E 832600 and N 820800 and N 821100. A plan showing the locations of the exploratory holes is shown in Appendix H.

3. GEOLOGY

The geology of the area is shown on sheet 11 published by the Hong Kong Geological Survey. This indicates that the site is located within the new West Kowloon Reclamation Area; this reclamation was completed in 1993. The site is generally underlain by FILL material comprising hydraulically placed sand.

4. EXTENT OF GROUND INVESTIGATION

The fieldworks were carried out between 3rd May and 8th June 1994, and comprised the following:

- a. the sinking of five drillholes. Termination depths were determined on site.
- b. the carrying out insitu tests, including Standard Penetration Tests, In-situ dry density tests and GCO probing tests.
- c. the recovery of soil samples using Mazier, Piston, U76 and liner samplers.
- d. the installation of piezometers in five drillholes for groundwater monitoring.
- f. the excavation of four trial pits.

4.1 DRILLING

The drillholes were advanced using rotary drilling techniques. In superficial soils, such as colluvium, and soils derived from in-situ weathering of rock, a Mazier triple tube core barrel with a tungsten carbide bit was used. A double tube T2-101 core barrel, with a diamond cutting bit, was employed to advance the borehole through rock. The cuttings arising from the drilling process were removed from the borehole by means of water flush.

4.2 TRIAL PITTING

All trial pits were excavated by hand, assisted by mechanical tools where necessary, to the required depth. The pits were backfilled with compacted suitable material and the surface reinstated to match the original surface.

4.3 SAMPLING

Undisturbed samples were taken from drillholes using a Mazier triple tube core barrel fitted with a detachable rigid PVC inner tube, approximately 74mm inner diameter and 1000mm long, with a wall thickness of 2mm.

A 35mm inner diameter liner was inserted in the split spoon sampler in order to obtain 'undisturbed' samples from Standard Penetration Tests. On completion of the test, the liner was removed from the split spoon sampler and the end waxed before transportation to the store.

Undisturbed Piston samples were taken by advancing a metre long 75mm internal diameter thin walled stainless steel tube, whose lower end is shaped to form a cutting edge, under continuous static thrust. These samplers are only suitable for use in fine soils (i.e. clays and silts) up to firm in consistency, and free from large particles.

Undisturbed U76 samples were taken by driving a 78mm diameter seamless steel tube for a distance of not less than 350mm using a drop weight. The sample tube is fitted with a screw-on cutting shoe and a drive head. The number of blows taken to drive the sample tube, and the total penetration are recorded.

Rock core samples were recovered from drillholes using a double tube bearing swivel type core barrel.

4.4 IN-SITU TESTS

Standard Penetration Tests (SPT) were carried out in accordance with BS 1377 (1975) Test 19. The sampler was seated by being driven 150mm into the soil with blows from a 65 kg hammer falling 760mm. The number of blows required to achieve each 75mm of penetration were recorded. Subsequently the sampler was driven for further 300mm, and the number of blows for each 75mm of penetration recorded. The total number of blows for the 300mm penetration below the seating drive is termed the penetration resistance (N value).

In-situ dry density tests were carried out in accordance with B.S.1377: 1975 Test 15(A) at selected depths by the sand replacement method. The sand used for the tests was calibrated in the soil laboratory before the commencement of the work.

GCO probes were carried out on site at the locations specified. They ranged in depth from 0.42m to 4.90m.

4.6 INSTALLATION

Piezometers were installed in all drillholes at depths instructed on site. After installation, response tests were carried out to ensure proper functioning of the piezometers.

5. GEOLOGICAL FEATURES

The downward succession of strata encountered in the drillholes comprised the following:

FILL

FILL/MARINE DEPOSIT/ALLUVIUM

GRANITE - Grade V including corestones if present.

GRANITE - Grade III or better with occasional Grade V/IV.

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TABLE 1 -

SUMMARY OF COORDINATES, LEVELS AND DEPTHS FOR DRILLHOLES, TRIAL PITS AND GCO PROBES

Hole No.	Coordinates		Ground Level (mPD)	Depth (m)
	Easting	Northing		
D 1	832 442.88	820 960.80	+4.23	45.05
D 2	832 499.90	820 964.54	+4.20	37.77
D 3	832 500.00	820 894.72	+4.80	45.22
D 4	832 543.11	820 945.40	+4.48	32.60
D 5	832 549.50	820 987.28	+4.41	42.69
TP 1	832 481.49	821 007.36	+4.25	2.50
TP 2	832 473.46	820 930.98	+4.25	2.50
TP 3	832 495.90	820 934.45	+4.18	2.50
TP 4	832 570.50	820 969.27	+4.43	2.50
P 1	832 517.25	821 017.15	+4.53	4.90
P 2	832 489.16	820 921.75	+4.21	4.80
P 3	832 577.35	820 972.58	+4.58	0.42
P 3A	832 574.57	820 974.35	+4.38	4.80
P 4	832 573.86	820 944.36	+4.67	2.02
P 4A	832 574.28	820 944.09	+4.69	2.03
P 5	832 528.98	820 912.31	+4.36	4.90
P 6	832 521.71	820 860.79	+4.60	4.80

11NW12D1

"

"

11NW12D2

"

11NW12D3

11NW12D1

"

11NW12D2

11NW12D1

11NW12D1

11NW12D2

"

"

"

"

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TABLE 2 -

SUMMARY OF DEPTH AND THICKNESS OF STRATA ENCOUNTERED IN THE DRILLHOLES

Drill Hole No.	Thickness (m)				Depth of Drill Hole (m)	Ground Level (mPD)	Grade III or better rock Level (mPD)
	Fill	Fill/ M.D./ Alluvium	C.D.G.	M.D.G.			
D 1	17.50	2.50	25.05	-	45.05	+4.23	-
D 2	17.00	2.00	13.67	5.10	37.77	+4.20	-28.47
D 3	20.00	4.00	17.75	3.47	45.22	+4.80	-36.95
D 4	12.00	4.00	11.52	5.08	32.60	+4.48	-23.04
D 5	16.50	2.50	18.55	5.14	42.69	+4.41	-33.14

Remarks

M.D. - Marine Deposit

C.D.G. - Completely Decomposed Granite including corestones if present.

M.D.G. - Moderately Decomposed Granite and better with occasional Grade V/IV.

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APPENDICES

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APPENDIX A - DRILLHOLE RECORDS

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		DRILLHOLE RECORD		HOLE NO. D1									
		CONTRACT GE/93/06		SHEET 1 of 5									
PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.													
METHOD ROTARY			CO-ORDINATES E 832442.88 N 820960.80		W.O. No GE/93/06.65								
MACHINE & No. DR18					DATE from 24/5/94 to 30/5/94								
FLUSHING MEDIUM Water			ORIENTATION Vertical		GROUND LEVEL 4.23 mPD								
Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
24/5/94	SX							0.00					Loose becoming medium dense at 3.50m greyish brown silty fine to coarse SAND with many shell fragments. (FILL)
1								1 1.50					
2							2,2 2,2,3,3 N=10	2 1.95					
3	PX							3 3.50					
4							2,2 2,3,3,3 N=11	4 3.95					
5								5 5.50					
6							2,2 3,2,3,3 N=11	6 5.95					
7								7 7.50					
8							2,2 3,3,3,3 N=12	8 7.95					
9								9 9.50					
10		2.50m at 18:00					2,2 3,2,3,4	10					
● SMALL DISTURBED SAMPLE ⬆ LARGE DISTURBED SAMPLE ▬ SPT LINER SAMPLE ▨ U76 UNDISTURBED SAMPLE ▩ U100 UNDISTURBED SAMPLE ▧ MAZIER SAMPLE ▦ PISTON SAMPLE △ WATER SAMPLE ■ PIEZOMETER TIP □ STANDPIPE ⬇ STANDARD PENETRATION TEST ⬇ PERMEABILITY TEST ⬇ IN-SITU VANE SHEAR TEST								LOGGED <u>WCH</u> DATE <u>21/6/94</u> CHECKED <u>MC</u> DATE <u>23/6/94</u>		REMARKS JCRIC			

										DRILLHOLE RECORD					HOLE NO. D1	
										CONTRACT GE/93/06					SHEET 2 of 5	
PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.																
METHOD ROTARY										CO-ORDINATES E 832442.88 N 820960.80					W.O. No GE/93/06.65	
MACHINE & No. DR18															DATE from 24/5/94 to 30/5/94	
FLUSHING MEDIUM Water										ORIENTATION Vertical					GROUND LEVEL 4.23 mPD	
Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description			
25/5/94	PX	2.80m at 08:00					N=12	9.95					See sheet 1 of 5			
11																
12	HX		0					11.50								
13								12.50								
14			0					13.50								
15								14.50								
16						2,2 3,3,4,6 N=16		15.50								
17								15.95								
18								17.50	-13.27	-17.50						
19						3,3 3,4,5,5 N=17		17.95								
20		2.50m at 18:00	100					18.00				Medium dense dark greenish grey fine sandy SILT with many shell fragments and occasional subangular medium gravel. (FILL/MARINE DEPOSIT ?)				
								19.00								
21								-15.77	-20.00							

• SMALL DISTURBED SAMPLE △ WATER SAMPLE
■ LARGE DISTURBED SAMPLE ▣ PIEZOMETER TIP
▨ SPT LINER SAMPLE □ STANDPIPE
▩ U78 UNDISTURBED SAMPLE ⊥ STANDARD PENETRATION TEST
▤ U100 UNDISTURBED SAMPLE ⊥ PERMEABILITY TEST
▥ MAZIER SAMPLE ⊥ IN-SITU VANE SHEAR TEST
▦ PISTON SAMPLE

LOGGED WCH
 DATE 21/6/94
 CHECKED MC
 DATE 23/6/94

REMARKS

										DRILLHOLE RECORD					HOLE NO. D1	
										CONTRACT GE/93/06					SHEET 3 of 5	
PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.																
METHOD ROTARY										CO-ORDINATES E 832442.88 N 820960.80					W.O. No GE/93/06.65	
MACHINE & No. DR18															DATE from 24/5/94 to 30/5/94	
FLUSHING MEDIUM Water										ORIENTATION Vertical					GROUND LEVEL 4.23 mPD	
Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description			
26/5/94	HX	3.40m at 08:00	100					22 20.00 23 20.45 24 21.00 25 21.45 26 22.00 27 23.00 28 23.45 29 24.00 30 24.45 31 25.00 32 25.45 33 26.00 34 26.45 35 27.00 36 27.45 37 28.00 38 29.00 39 29.45 40 29.45 41 30.00				V	Extremely weak, reddish brown mottled white, completely decomposed medium grained GRANITE. (Slightly clayey silty medium to coarse SAND)			
21						2,2 3,3,5,7 N=18										
22			0													
23						2,3 3,4,6,9 N=22										
24			100			B-33										
25						3,4 6,7,9,11 N=33										
26			100			B-34										
27						3,3 4,4,5,9 N=22										
28			100													
29		2.90m at 18:00														
27/5/94		3.50m at 08:00					3,3 5,6,10,13 N=34					V	Extremely weak, grey mottled brown and dark green, completely decomposed, medium grained GRANITE. (Silty medium to coarse SAND)			
30																

SMALL DISTURBED SAMPLE
 LARGE DISTURBED SAMPLE
 SPT LINER SAMPLE
 U76 UNDISTURBED SAMPLE
 U100 UNDISTURBED SAMPLE
 MAZIER SAMPLE
 PISTON SAMPLE

WATER SAMPLE
 PIEZOMETER TIP
 STANDPIPE
 STANDARD PENETRATION TEST
 PERMEABILITY TEST
 IN-SITU VANE SHEAR TEST

LOGGED WCH

DATE 21/6/94

CHECKED MC

DATE 23/6/94

REMARKS

Piezometer installed at 25.00m.

JCRIC										DRILLHOLE RECORD					HOLE NO. D1	
										CONTRACT GE/93/06					SHEET 4 of 5	
PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.																
METHOD ROTARY								CO-ORDINATES E 832442.88 N 820960.80				W.O. No GE/93/06.65				
MACHINE & No. DR18												DATE from 24/5/94 to 30/5/94				
FLUSHING MEDIUM Water								ORIENTATION Vertical				GROUND LEVEL 4.23 mPD				
Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description			
27/5/94	HX		100					30.00				V	See sheet 3 of 5			
31							3, 4 6, 9, 12, 15 N=42	42, 43 31.00 44 31.45	-26.77	31.00		V	Extremely weak, brownish yellowish mottled dark brown, completely decomposed, fine grained GRANITE. (Sandy SILT)			
32			100					45 32.00	-27.77	32.00		V	Extremely weak, reddish brown becoming greyish brown, completely decomposed, medium grained GRANITE. (Silty medium to coarse SAND)			
33							5, 10 12, 14, 15, 17 N=58	46, 47 33.00 48 33.45								
34			100					49 34.00								
35							5, 7 9, 12, 15, 19 N=55	50, 51 35.00 52 35.45								
36			100					53 36.00								
37							5, 6 8, 12, 14, 17 N=51	54, 55 37.00 56 37.45								
38			0					57 38.00	-33.77	38.00		V/IV	Very weak to weak, grey mottled white, completely to highly decomposed, medium grained GRANITE. (Silty medium to coarse SAND)			
39		3.10m at 18:00						58, 59 39.00 60 39.45								
28/5/94		3.50m at 08:00					11, 18 25, 38, 51, 72 N=186									
40								-35.77	-40.00							

• SMALL DISTURBED SAMPLE Δ WATER SAMPLE
 + LARGE DISTURBED SAMPLE ■ PIEZOMETER TIP
 ▨ SPT LINER SAMPLE ▨ STANDPIPE
 ▨ U78 UNDISTURBED SAMPLE ▨ STANDARD PENETRATION TEST
 ▨ U100 UNDISTURBED SAMPLE ▨ PERMEABILITY TEST
 ▨ MAZIER SAMPLE ▨ IN-SITU VANE SHEAR TEST
 ▨ PISTON SAMPLE

LOGGED WCH
 DATE 21/6/94
 CHECKED MC
 DATE 23/6/94

REMARKS

										DRILLHOLE RECORD										HOLE NO. D1									
										CONTRACT GE/93/06										SHEET 5 of 5									
PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.																													
METHOD ROTARY															CO-ORDINATES E 832442.88 N 820960.80										W.O. No GE/93/06.65				
MACHINE & No. DR18																									DATE from 24/5/94 to 30/5/94				
FLUSHING MEDIUM Water															ORIENTATION Vertical										GROUND LEVEL 4.23 mPD				
Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description																
28/5/94	HX		100	100	82	NA			-36.02	40.25		V/IV	See sheet 4 of 5																
41								T2-101				II	Strong, grey spotted black and mottled pink, slightly decomposed medium grained, GRANITE with widely spaced, iron stained, joints dipping 10-20° and 30-40°. (CORESTONE)																
42							3,3 7,9,27,31 N=74	61 41.50 82 41.80				V	Extremely weak, yellowish brown, completely decomposed, medium grained, GRANITE. (Silty medium to coarse SAND)																
43			98	98	87	NA		TNW				II	Strong, grey spotted black and mottled pink, slightly decomposed medium grained GRANITE with widely spaced, iron stained joint dipping 30-40°. (CORESTONE)																
44		3.20m at 18:00				NR			-39.48	43.71		V/IV	Weak to moderately weak in place, yellowish brown spotted black, completely to highly decomposed, medium grained GRANITE. (Silty medium to coarse SAND)																
30/5/94		3.60m at 08:00	100	0	0	NA		TNW				V/IV	Wash bored from 43.71 to 44.06m - assumed to be completely to highly decomposed medium grained GRANITE.																
45							5,12 21,32,37,52 N=142	83 44.06 84 44.16 84 44.60					End of investigation hole at 45.05																
46																													
47																													
48																													
49																													
50																													
● SMALL DISTURBED SAMPLE ■ LARGE DISTURBED SAMPLE ▨ SPT LINER SAMPLE ▨ U78 UNDISTURBED SAMPLE ▨ U100 UNDISTURBED SAMPLE ▨ MAZIER SAMPLE ▨ PISTON SAMPLE △ WATER SAMPLE ■ PIEZOMETER TIP □ STANDPIPE ⬇ STANDARD PENETRATION TEST ⬇ PERMEABILITY TEST ⬇ IN-SITU VANE SHEAR TEST															LOGGED <u>WCH</u> DATE <u>21/6/94</u> CHECKED <u>MC</u> DATE <u>23/6/94</u>					REMARKS NR = No Recovery. NA = Not Applicable.									

PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.

METHOD ROTARY

CO-ORDINATES

W.O. No **GE/93/06.65**

MACHINE & No. DR4

E 832499.90

DATE from **24/5/94** to **28/5/94**

N 820964.54

FLUSHING MEDIUM **Water**

ORIENTATION **Vertical**

GROUND LEVEL	4.20	mPD
--------------	------	-----

Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
24/5/94	SX							0.00					Medium dense to very dense greyish brown to dark brown silty fine SAND. (FILL)
1													
2							6,6 7,14,18,19 N=58	1 2	1.50 1.95				
3													
4							2,3 2,4,5,7 N=18	3 4	3.50 3.95				
5													
6							4,4 5,5,7,11 N=28	5 6	5.50 5.95				
7													
8		2.10m at 18:00					3,4 6,6,8,12 N=32	7 8	7.50 7.95				
25/5/94		2.55m at 08:00											
9													
10							2,2 4,7,7,9	9 10	9.50				

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

LOGGED WCH

DATE 21/6/94

CHECKED MC

DATE **23/6/94**

REMARKS

										DRILLHOLE RECORD					HOLE NO. D2	
										CONTRACT GE/93/06					SHEET 2 of 4	
PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.																
METHOD ROTARY										CO-ORDINATES E 832499.90 N 820964.54					W.O. No GE/93/06.65	
MACHINE & No. DR4															DATE from 24/5/94 to 28/5/94	
FLUSHING MEDIUM Water										ORIENTATION Vertical					GROUND LEVEL 4.20 mPD	
Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description			
25/5/94							N-27	9.95					See sheet 1 of 4			
11	PX		100				11	11.00	-6.80	11.00			Dark greenish grey silty fine SAND. (FILL)			
12							12	12.00								
13			60				13	13.00								
14							14	14.00								
15			80				15	15.00								
16							16	16.00								
17			65				17	17.00	-12.80	17.00			Dark greenish grey silty fine SAND with some shell fragments. (FILL/MARINE DEPOSIT ?)			
18							18	18.00								
19			100				19	19.00	-14.80	19.00						
20		1.95m at 18:00					20	20.00	-15.80	20.00		V	Extremely weak, reddish brown mottled white and black, completely decomposed medium GRANITE. (Slightly clayey silty medium to coarse SAND)			

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

LOGGED WCH
DATE 21/6/94
CHECKED MC
DATE 23/6/94

REMARKS
 Piezometer installed at 11.00m.

JCRIC										DRILLHOLE RECORD				HOLE NO. D2	
										CONTRACT GE/93/06				SHEET 4 of 4	
PROJECT Agreement No. CE 18/92 West Kowloon Transfer Station.															
METHOD ROTARY								CO-ORDINATES				W.O. No GE/93/06.65			
MACHINE & No. DR4								E 832499.90 N 820964.54				DATE from 24/5/94 to 28/5/94			
FLUSHING MEDIUM Water								ORIENTATION Vertical				GROUND LEVEL 4.20 mPD			
Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description		
27/5/94	HX														
31			100	85	85	NA	+35 100blows /45mm +20,35 100blows /51mm	T2-101 30.00 30.15 30.50 -26.70 30.90 31.00 31.22	-26.30	30.50	+	V/IV	Very weak, grey mottled brown, completely to highly decomposed, medium grained GRANITE. (Silty medium to coarse SAND)		
											+	III/II	Moderately strong to strong, grey mottled pink and black, moderately to slightly decomposed, medium grained GRANITE. (CORESTONE)		
32													Very weak, reddish brown mottled white and black, completely to highly decomposed, medium grained GRANITE. (Silty medium to coarse grained SAND)		
33			100	95	78	5.1		T2-101 32.67	-28.47	32.67	+	II	Strong, grey mottled pink and black, slightly decomposed, medium grained GRANITE.		
34		2.00m at 18:00	100	100	90	0		33.58			+		Joints are widely spaced, closely spaced in places, rough undulating, iron stained, dipping 10-20°.		
28/5/94		2.65m at 08:00	100	100	100			34.54			+		Slightly to moderately decomposed from 32.67 to 32.72m, 33.73 to 33.83m and 35.65 to 35.70m.		
35			96	96	94	6.7		35.32			+				
36			100	100	100	0		36.10			+				
37		2.00m at 18:00	100	100	100			36.78			+				
38								-33.57	37.77		+		End of investigation hole at 37.77m.		
39															
40															

* SMALL DISTURBED SAMPLE
 LARGE DISTURBED SAMPLE
 SPT LINER SAMPLE
 U76 UNDISTURBED SAMPLE
 U100 UNDISTURBED SAMPLE
 MAZIER SAMPLE
 PISTON SAMPLE

△ WATER SAMPLE
 ▴ PIEZOMETER TIP
 ▽ STANDPIPE
 ▾ STANDARD PENETRATION TEST
 ▽ PERMEABILITY TEST
 ▽ IN-SITU VANE SHEAR TEST

LOGGED WCH

DATE 21/6/94

CHECKED MC

DATE 23/6/94

REMARKS

NA = Not Applicable.

JCRIC

JCRIC

APPENDIX H - GROUND INVESTIGATION PLAN

JCRIC

JCRIC

JCRIC

JCRIC

Legend

- Project Site Boundary
- Proposed Extent of Excavation

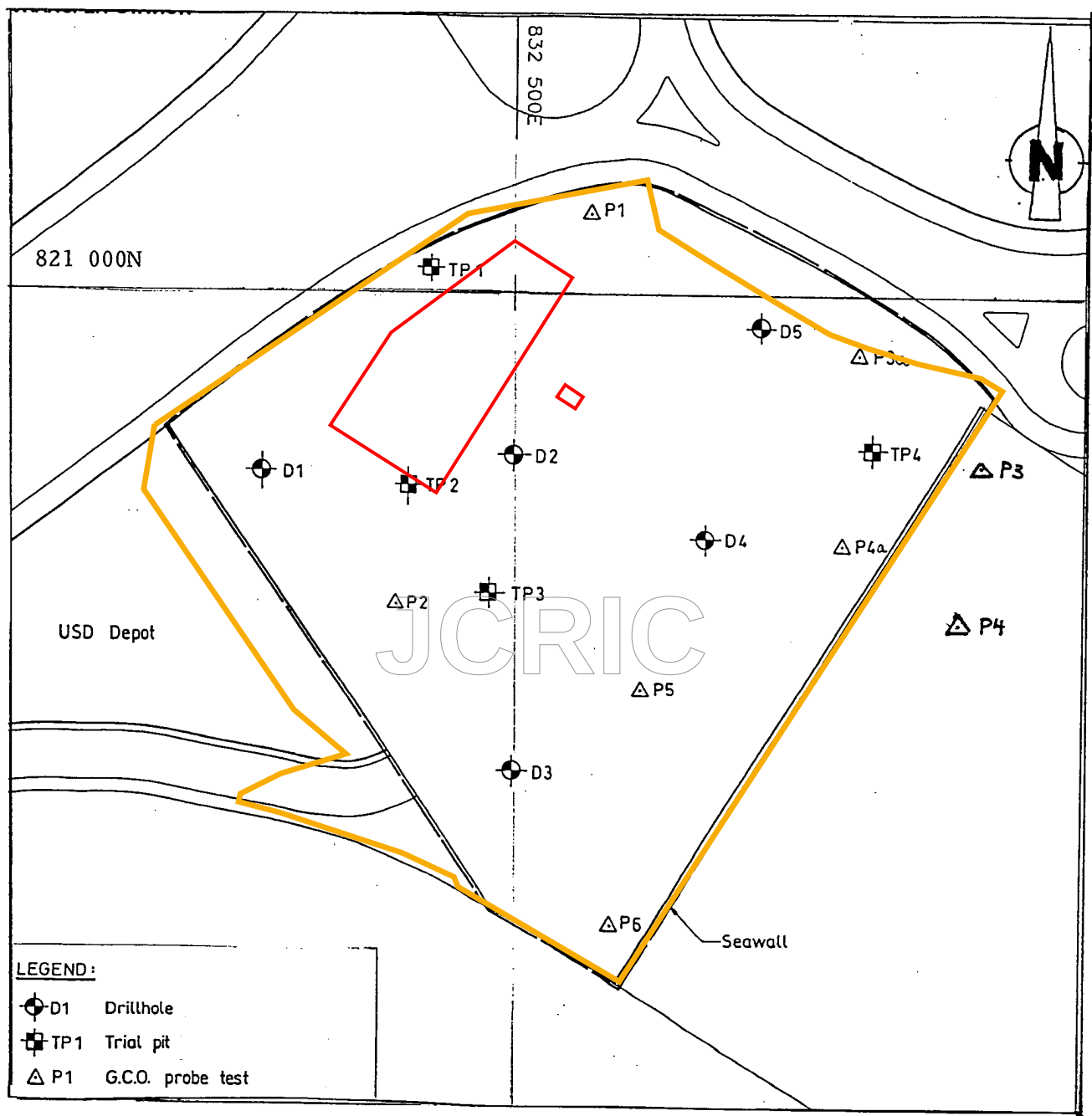


Fig . 1

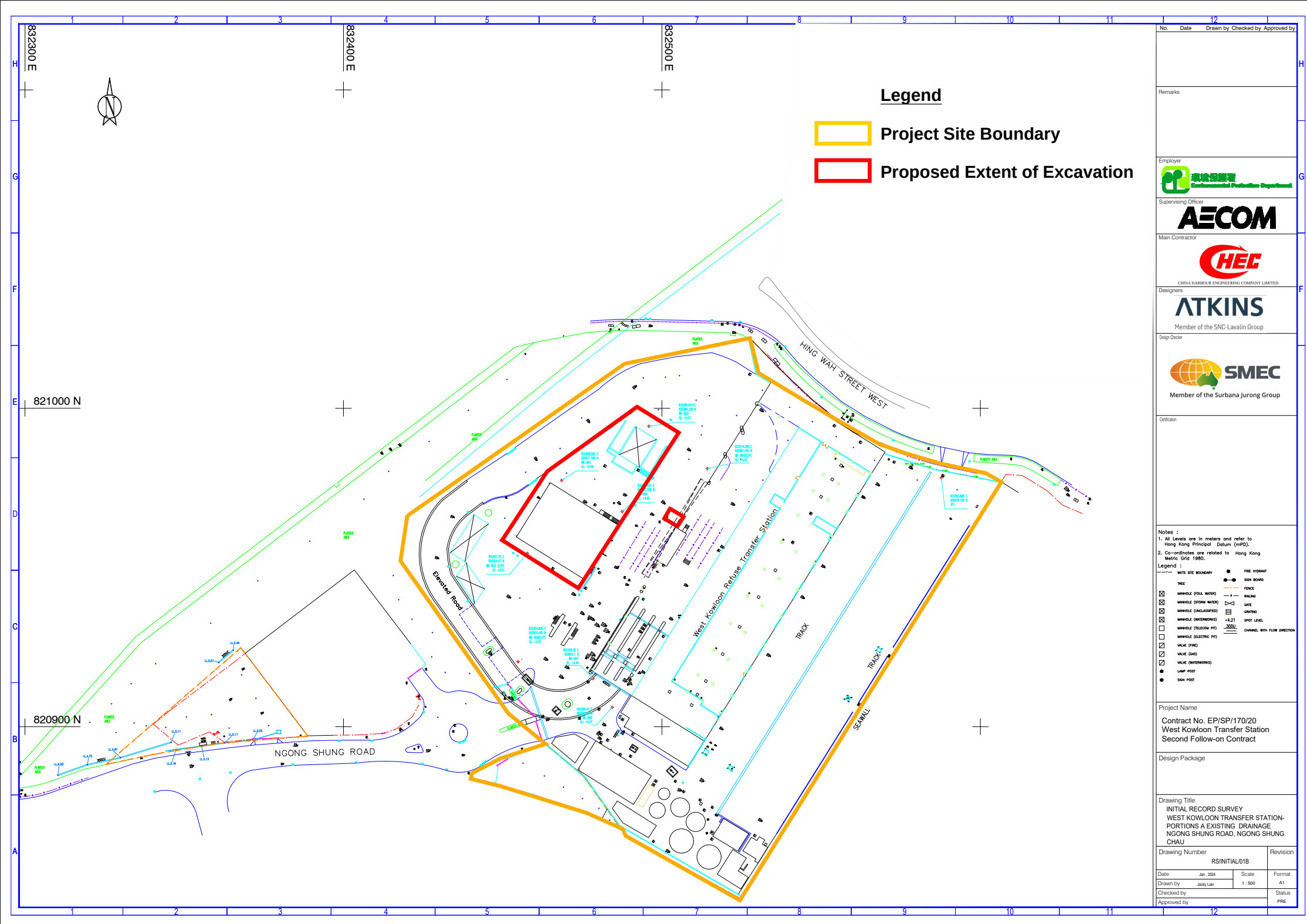
GROUND INVESTIGATION PLAN (PLAN NO.90364/SI/SK-001)

Scale 1:1000

JCRIC

JCRIC

2023 Ground Investigation Record



Legend

- Project Site Boundary
- Proposed Extent of Excavation

No. Date Drawn by Checked by Approved by

Remarks

Employer



Supervising Officer



Main Contractor



Designers



Design Checker



Certification

- Notes :
- All Levels are in meters and refer to Hong Kong Principal Datum (mPD).
 - Co-ordinates are related to Hong Kong Metric Grid 1980.

- Legend :
- WATER SITE BOUNDARY
 - MANHOLE (STORM WATER)
 - MANHOLE (STORM WATER)
 - MANHOLE (UNCLASSIFIED)
 - MANHOLE (WATERWORKS)
 - MANHOLE (TELECOM PITS)
 - MANHOLE (ELECTRIC PITS)
 - VALVE (PVC)
 - VALVE (DAS)
 - VALVE (WATERWORKS)
 - LAMP POST
 - SUN POST
 - FIRE HYDRANT
 - SUN BOARD
 - FENCE
 - RAILINGS
 - GATE
 - CHITING
 - SPOT LEVEL
 - CHANNEL WITH FLOW DIRECTION

Project Name
Contract No. EP/SP/170/20
West Kowloon Transfer Station
Second Follow-on Contract

Design Package

Drawing Title
INITIAL RECORD SURVEY
WEST KOWLOON TRANSFER STATION-
PORTIONS A EXISTING DRAINAGE
NGONG SHUNG ROAD, NGONG SHUNG
CHAU

Drawing Number		Revision	
RS/INITIAL/01B			
Date	Jan. 2004	Scale	1 : 500
Drawn by	Janey Lee	Format	A1
Checked by		Status	PRE
Approved by			



基翔工程發展股份有限公司
GOLD RAM ENGINEERING & DEVELOPMENT LTD

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香港商業中心709-711室
Rm. 709-711, Hong Kong Plaza,
186-191 Connaught Rd. W., H.K.
Tel : 2559 8802 (6 Lines)
Fax : 2559 8644

Transmittal Form

To:	<u>China Harbour Engineering Co., Ltd.</u>	Date:	<u>27-Nov-23</u>
		Our ref.:	<u>GRED/GID/BG0803/23/104/CY</u>
		Project:	<u>Contract No. EP/SP/170/20 (CHEC339)</u>
Attn:	<u>Mr. Kosdum Liu</u>		<u>West Kowloon Transfer Station Second</u>
Email:	<u>kosdum.liu@chectss.com</u>		<u>Follow-On Contract</u>

Dear Sirs,

Please find enclosed the following:

No. of Copies	Description	Date
1	Preliminary Drillhole Record	
	BH1	
1	Groundwater Monitoring Record	
	BH3(SP)	

- | | |
|---|--|
| ☐ For your review | ☐ For your approval |
| ☐ For your onward submission | ☐ For your use |
| ☐ For your reference | ☒ For your comment |

Remarks : _____

Yours faithfully,
Gold Ram Engineering and Development Ltd


Colin Yeung
Geotechnical Engineer

encl.

	Drillhole Record		Drillhole No. <u>BH1</u>
	Contract No. <u>EP/SP/170/20 (CHEC339)</u>	Sheet <u>1</u> of <u>6</u>	
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date <u>17/11/23</u> to <u>20/11/23</u>
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depths (m)	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
17/11/2023										A 0.40		0.50			Light greyish brown, silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments. (FILL)
										B 0.90					Greyish brown, fine to coarse SAND. (FILL)
										C 1.40					
										D 1.55		1.65			Light grey, angular COBBLE sized rock and concrete fragments. (FILL)
										T6-116					
				100						1 2.00		2.00			Brown, fine to coarse SAND. (FILL)
				100					B=38	2 2.45					
										3 3.00		3.00			Medium dense, brown, slightly silty fine to coarse SAND with some angular fine to medium gravel sized rock fragments with occasional shell fragments. (FILL)
									1,2, 2, 2, 3, 4 N=11	4 3.40					
										5 4.00					
				100					B=43	6 4.45					
										7 5.00					
									2,2, 3, 3, 5, 6 N=17	8 5.40					
										9 6.00		6.00			Medium dense, brown, fine to coarse SAND. (FILL)
				100					B=43	10 6.45					
										11 7.00					
									2,4, 5, 5, 5, 7 N=22	12 7.40					
										13 8.00		8.00			Greyish brown, slightly silty fine to coarse SAND with occasional angular to subangular fine to coarse gravel sized rock fragments. (FILL)
				100					B=45	14 8.45					
										15 9.00		9.00			Medium dense, brown, fine to coarse SAND. (FILL)
									1,4, 4, 6, 6, 8 N=24	16 9.40					

- Small Disturbed Sample - Large Disturbed Sample - SPT Liner Sample - U76 Undisturbed Sample - U100 Undisturbed Sample - Mazier Sample - Piston Sample - Water Sample	- Water Level - Standard Penetration Test - Permeability Test - Piezometer Tip - Standpipe Tip - Pressuremeter Test - Impression Packer Test - Vane Shear Test	LOGGED <u>Wallace Law</u> DATE <u>23/11/2023</u> CHECKED <u>Colin Yeung</u> DATE <u>24/11/2023</u>	REMARKS 1. An inspection pit was excavated by hand to a depth of 1.65m.
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 Gold Ram Engineering and Development Limited	Drillhole Record		Drillhole No. <u>BH1</u>
	Contract No. <u>EP/SP/170/20 (CHEC339)</u>		Sheet <u>2</u> of <u>6</u>
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date <u>17/11/23</u> to <u>20/11/23</u>
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depths (m)	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100					B=45	17 10.00 18 10.45					See previous page.
11								11.00	1,1 1,3,1,1 N=6	19 11.00 20 11.40		11.00			Loose to medium dense, grey spotted white, slightly silty fine to coarse SAND. (MARINE DEPOSIT)
12				100					B=40	21 12.00 22 12.45					
13								13.00	1,2 1,2,3,5 N=11	23 13.00 24 13.40					
14				100					B=36	25 14.00 26 14.45					
15								15.00	2,3 3,3,4,5 N=15	27 15.00 28 15.40					
16				100					B=32	29 16.00 30 16.45					
17								17.00	2,2 3,3,2,3 N=11	31 17.00 32 17.40					
18				100					B=40	33 18.00 34 18.45					
19								19.00	1,3 4,3,4,4 N=15	35 19.00 36 19.40					
20															

- Small Disturbed Sample
- Large Disturbed Sample
- ▨ SPT Liner Sample
- ▨ U76 Undisturbed Sample
- ▨ U100 Undisturbed Sample
- ▨ Mazier Sample
- Piston Sample
- △ Water Sample
- ⬇ Water Level
- Standard Penetration Test
- Permeability Test
- ⬇ Piezometer Tip
- ⬇ Standpipe Tip
- ⬇ Pressuremeter Test
- ⬇ Impression Packer Test
- ⬇ Vane Shear Test

LOGGED Wallace Law
 DATE 23/11/2023
 CHECKED Colin Yeung
 DATE 24/11/2023

REMARKS

 Gold Ram Engineering and Development Limited	Drillhole Record		Drillhole No. BH1
	Contract No. EP/SP/170/20 (CHEC339)		Sheet 3 of 6
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date 17/11/23 to 20/11/23
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depths (m)	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
20/11/2023				100					B=45	37 20.00 38 20.45					See previous page.
21/11/2023								21.00	2, 4, 5 N=19	39 21.00 40 21.40					
22/11/2023				100					B=44	41 22.00 42 22.45					
23/11/2023								23.00	1, 3, 4, 6, 6 N=20	43 23.00 44 23.40					
24/11/2023				100						45 24.00		24.00		V	Extremely weak, reddish brown mottled pink and grey, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with occasional fine gravel.)
25/11/2023								25.10	1, 3, 3, 5, 5, 5 N=18	46 25.00 47 25.10 48 25.50					
26/11/2023				100						49 26.00					
27/11/2023								27.10	1, 2, 3, 4, 4, 6 N=17	50 27.00 51 27.10 52 27.50					
28/11/2023				100						53 28.00					
29/11/2023								29.10	1, 2, 1, 3, 2, 3 N=9	54 29.00 55 29.10 56 29.50					
30/11/2023															

- Small Disturbed Sample - Large Disturbed Sample - SPT Liner Sample - U76 Undisturbed Sample - U100 Undisturbed Sample - Mazier Sample - Piston Sample - Water Sample	- Water Level - Standard Penetration Test - Permeability Test - Piezometer Tip - Standpipe Tip - Pressuremeter Test - Impression Packer Test - Vane Shear Test	LOGGED <u>Wallace Law</u> DATE <u>23/11/2023</u> CHECKED <u>Colin Yeung</u> DATE <u>24/11/2023</u>	REMARKS
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	Drillhole Record		Drillhole No. BH1
	Contract No. EP/SP/170/20 (CHEC339)		Sheet 4 of 6
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date 17/11/23 to 20/11/23
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depth (m)	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
31				100				31.10	3.5, 5, 5, 4, 4 N=18	57 30.00 58 31.00 59 31.10 60 31.50				V	See previous page.
32				100				33.10	2.5, 6, 6, 8, 7 N=27	61 32.00 62 33.00 63 33.10 64 33.50					
33				95				35.10	2.3, 3, 3, 5, 8 N=19	65 34.00 66 35.00 67 35.10 68 35.50		35.10		V	Extremely weak, pink mottled light grey and dark brown, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with occasional fine gravel.)
34				100				37.10	2.4, 4, 5, 6, 9 N=24	69 36.00 70 37.00 71 37.10 72 37.50					
35				100				39.10	3.3, 6, 6, 8, 10 N=30	73 38.00 74 39.00 75 39.10 76 39.50				V	Extremely weak to very weak, orangish brown mottled grey and dark grey, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with much fine gravel.)

- Small Disturbed Sample - Large Disturbed Sample - SPT Liner Sample - U76 Undisturbed Sample - U100 Undisturbed Sample - Mazier Sample - Piston Sample - Water Sample	- Water Level - Standard Penetration Test - Permeability Test - Piezometer Tip - Standpipe Tip - Pressuremeter Test - Impression Packer Test - Vane Shear Test	LOGGED <u>Wallace Law</u> DATE <u>23/11/2023</u> CHECKED <u>Colin Yeung</u> DATE <u>24/11/2023</u>	REMARKS
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 Gold Ram Engineering and Development Limited	Drillhole Record		Drillhole No. BH1
	Contract No. EP/SP/170/20 (CHEC339)		Sheet 5 of 6
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date 17/11/23 to 20/11/23
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depths (m)	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100												V	See previous page.
41								41.10	2.5, 5, 6, 7, 10 N=28	78		41.00					
										79		41.10					
										80		41.50					
42				95						81		42.00		42.00		V	Very weak, greyish brown mottled dark brown, completely decomposed medium grained GRANITE. (Fine to medium GRAVEL with some silty sandy matrix.)
43								43.10	3.7, 11, 13, 13, 20 N=57	82		43.00					
										83		43.10					
										84		43.50					
44				0								44.00					
45										85		45.00					
				0								45.10					
18/11/2023	45.83							45.83		86		45.73		45.83		III	Moderately strong, pinkish brown mottled light grey spotted white and black, moderately decomposed medium grained GRANITE. Joints are very closely to medium spaced, rough planar and undulating, limonite stained, dipping at 0°-10°, 10°-20°, 30°-40°, 40°-50° and 60°-70°.
20/11/2023	115mm			95	61	32	6.2	46.58			T2-101						
							>20	46.98									
47							19.2	47.24									
				100	100	87	3.4	48.11			T2-101						
48							>20	48.25									
49				100	100	94	3.2	49.50			T2-101					II	Strong, light grey mottled pink spotted black, slightly decomposed medium grained GRANITE. Joints are closely to medium occasionally very closely spaced, rough planar and undulating, limonite stained, dipping at 30°-40°, 40°-50°, 50°-60° and 60°-70°.
50							2.0										

• Small Disturbed Sample
 — Large Disturbed Sample
 ▨ SPT Liner Sample
 ▩ U76 Undisturbed Sample
 ▩ U100 Undisturbed Sample
 ▨ Mazier Sample
 □ Piston Sample
 △ Water Sample

水 Water Level
 — Standard Penetration Test
 — Permeability Test
 井 Piezometer Tip
 立 Standpipe Tip
 测 Pressuremeter Test
 印 Impression Packer Test
 剪 Vane Shear Test

LOGGED Wallace Law
 DATE 23/11/2023
 CHECKED Colin Yeung
 DATE 24/11/2023

REMARKS

 Gold Ram Engineering and Development Limited	Drillhole Record		Drillhole No. <u>BH1</u>
	Contract No. <u>EP/SP/170/20 (CHEC339)</u>		Sheet <u>6</u> of <u>6</u>
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date <u>17/11/23</u> to <u>20/11/23</u>
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depths (m)	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
51				100	70	59	2.0	50.48		T2-101	49.98	50.44	+	II	50.44-51.58m: Moderately strong, brown, moderately decomposed.
							15.0	50.68					+	III	
							>20	50.80					+		
							10.3						+		
52				100	92	86		51.58		T2-101	51.13	51.58	+	II	Drillhole completed at 53.07m
							3.4						+		
													+		
													+		
53				100	100	100				T2-101	52.03	53.07	+		Drillhole completed at 53.07m
20/11/2023													+		
													+		
													+		
54															
55															
56															
57															
58															
59															
60															

● Small Disturbed Sample — Large Disturbed Sample ▨ SPT Liner Sample ▨ U76 Undisturbed Sample ▨ U100 Undisturbed Sample ▨ Mazier Sample □ Piston Sample △ Water Sample	⊥ Water Level ⊥ Standard Penetration Test ⊥ Permeability Test ⊥ Piezometer Tip ⊥ Standpipe Tip ⊥ Pressuremeter Test ⊥ Impression Packer Test ⊥ Vane Shear Test	LOGGED <u>Wallace Law</u> DATE <u>23/11/2023</u> CHECKED <u>Colin Yeung</u> DATE <u>24/11/2023</u>	REMARKS
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基翔工程發展股份有限公司
GOLD RAM ENGINEERING & DEVELOPMENT LTD

香港干諾道西186-191號
香港商業中心709-711室
Rm. 709-711, Hong Kong Plaza,
186-191 Connaught Rd. W., H.K.
Tel : 2559 8802 (6 Lines)
Fax : 2559 8644

Transmittal Form

To:	<u>China Harbour Engineering Co., Ltd.</u>	Date:	<u>11-Dec-23</u>
		Our ref.:	<u>GRED/GID/BG0803/23/105/CY</u>
		Project:	<u>Contract No. EP/SP/170/20 (CHEC339)</u>
Attn:	<u>Mr. Kosdum Liu</u>		<u>West Kowloon Transfer Station Second</u>
Email:	<u>kosdum.liu@chechtss.com</u>		<u>Follow-On Contract</u>

Dear Sirs,

Please find enclosed the following:

No. of Copies	Description	Date
1	Preliminary Drillhole Record	
	BH2	

- | | |
|---|--|
| ☐ For your review | ☐ For your approval |
| ☐ For your onward submission | ☐ For your use |
| ☐ For your reference | ☒ For your comment |

Remarks : _____

Yours faithfully,
Gold Ram Engineering and Development Ltd


Colin Yeung
Geotechnical Engineer

encl.

 Gold Ram Engineering and Development Limited	Drillhole Record		Drillhole No. BH2
	Contract No. EP/SP/170/20 (CHEC339)		Sheet 1 of 5
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date 22/11/23 to 24/11/23
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.L. / Test Depths (m)	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
22/11/2023																	Greenish grey, slightly silty fine to coarse SAND with some angular to subangular fine to coarse gravel sized rock fragments. (FILL)
1																	
2				94													Grey, CONCRETE.
3				100					B=30	1		2.00					Medium dense, greenish grey, slightly silty fine to coarse SAND with occasional subangular fine to coarse gravel sized rock and shell fragments. (FILL)
4										2		2.45					
5										3		3.00					
6										4		3.40					
7										5		4.00					
8				100					B=40	6		4.45					
9										7		5.00					
10										8		5.40					
11										9		6.00					
12										10		6.45					
13										11		7.00					
14										12		7.40					
15										13		8.00					
16				100					B=49	14		8.45					
17										15		9.00					
18										16		9.40					

- Small Disturbed Sample - Large Disturbed Sample - SPT Liner Sample - U76 Undisturbed Sample - U100 Undisturbed Sample - Mazier Sample - Piston Sample - Water Sample	- Water Level - Standard Penetration Test - Permeability Test - Piezometer Tip - Standpipe Tip - Pressuremeter Test - Impression Packer Test - Vane Shear Test	LOGGED <u>Wallace Law</u> DATE <u>28/11/2023</u> CHECKED <u>Colin Yeung</u> DATE <u>29/11/2023</u>	REMARKS 1. An inspection pit was excavated by hand to a depth of 1.50m.
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 Gold Ram Engineering and Development Limited	Drillhole Record		Drillhole No. <u>BH2</u>
	Contract No. <u>EP/SP/170/20 (CHEC339)</u>		Sheet <u>2</u> of <u>5</u>
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. <u>72512</u>			Date <u>22/11/23</u> to <u>24/11/23</u>
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I./Test Depths (m)	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
23/11/2023 23/11/2023				100					B=50 3, 6, 8, 8, 7, 7 N=30	17 10.00 18 10.45 19 11.00 20 11.40					See previous page.
				100					B=44 2, 3, 3, 5, 5, 4 N=17	21 12.00 22 12.45 23 13.00 24 13.40					
				100					B=43 1, 3, 4, 4, 3, 4 N=15	25 14.00 26 14.45 27 15.00 28 15.40					
				100					B=45 2, 2, 2, 3, 4, 4 N=13	29 16.00 30 16.45 31 17.00 32 17.40					
				100					B=39 1, 1, 3, 3, 4, 5 N=15	33 18.00 34 18.45 35 19.00 36 19.40					

- Small Disturbed Sample - Large Disturbed Sample - SPT Liner Sample - U76 Undisturbed Sample - U100 Undisturbed Sample - Mazier Sample - Piston Sample - Water Sample	- Water Level - Standard Penetration Test - Permeability Test - Piezometer Tip - Standpipe Tip - Pressuremeter Test - Impression Packer Test - Vane Shear Test	LOGGED <u>Wallace Law</u> DATE <u>28/11/2023</u> CHECKED <u>Colin Yeung</u> DATE <u>29/11/2023</u>	REMARKS
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	Drillhole Record		Drillhole No. BH2
	Contract No. EP/SP/170/20 (CHEC339)	Sheet 3 of 5	
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date 22/11/23 to 24/11/23
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.L. / Test Depths (m)	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
21				100					B=47	37		20.00					See previous page.
										38		20.45					
21								21.00	2,2, 2, 3, 3, 4 N=12	39		21.00					
										40		21.40					
22				95						41		22.00		22.00		V	Extremely weak, reddish brown mottled white, completely decomposed medium grained GRANITE. (Soft, slightly sandy silty CLAY.)
23								23.10	1,1, 1, 1, 2, 1 N=5	42		23.00					
										43		23.10					
										44		23.50					
24				100						45		24.00		24.00		V	Extremely weak, purplish red mottled white, completely decomposed medium grained GRANITE. (Soft, sandy silty CLAY.)
25								25.10	1,2, 2, 3, 3, 5 N=13	46		25.00					
										47		25.10					
										48		25.50					
26				100						49		26.00		26.00		V	Extremely weak, purplish red spotted brown, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with occasional fine gravel.)
27								27.10	1,1, 3, 3, 3, 4 N=13	50		27.00		27.10		V	Extremely weak, brown mottled light grey, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with occasional fine gravel.)
										51		27.10					
										52		27.50					
28				100						53		28.00		28.00		V	Extremely weak, reddish brown spotted brown, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with occasional fine gravel.)
29								29.10	2,2, 4, 3, 4, 6 N=17	54		29.00					
										55		29.10					
										56		29.50					
30																	

- Small Disturbed Sample
- Large Disturbed Sample
- ▨ SPT Liner Sample
- ▩ U76 Undisturbed Sample
- ▩ U100 Undisturbed Sample
- ▨ Mazier Sample
- Piston Sample
- △ Water Sample
- ⬇ Water Level
- ⬇ Standard Penetration Test
- ⬇ Permeability Test
- ⬇ Piezometer Tip
- ⬇ Standpipe Tip
- ⬇ Pressuremeter Test
- ⬇ Impression Packer Test
- ⬇ Vane Shear Test

LOGGED Wallace Law

DATE 28/11/2023

CHECKED Colin Yeung

DATE 29/11/2023

REMARKS

 Gold Ram Engineering and Development Limited	Drillhole Record		Drillhole No. <u>BH2</u>
	Contract No. <u>EP/SP/170/20 (CHEC339)</u>		Sheet <u>4</u> of <u>5</u>
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date <u>22/11/23</u> to <u>24/11/23</u>
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL <u>mPD</u>

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depths (m)	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100						57		30.00				V	See previous page.
31								31.10	1, 4, 4, 6, 6, 8 N=24	58		31.00					
										59		31.10					
										60		31.50					
32				100						61		32.00					
								33.10	2, 3, 3, 4, 6, 9 N=22	62		33.00					
33										63		33.10					
										64		33.50					
34				95						65		34.00		34.00		V	Extremely weak, reddish pink, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with occasional fine gravel.)
35								35.10	2, 3, 3, 6, 6, 10 N=25	66		35.00		35.10		V	Extremely weak, greyish brown spotted orangish brown, completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with some fine gravel.)
										67		35.10					
23/11/2023				0								36.00					
24/11/2023										69		37.00					
				95						70		37.10					
37								38.20	2, 6, 7, 7, 7, 10 N=31	71		38.10					
										72		38.20					
38										73		38.60					
39												39.10		39.10		IV	Weak, brown dappled dark grey, highly decomposed medium grained GRANITE. (Fine to coarse GRAVEL with cobble.)
40				0													

- Small Disturbed Sample - Large Disturbed Sample - SPT Liner Sample - U76 Undisturbed Sample - U100 Undisturbed Sample - Mazier Sample - Piston Sample - Water Sample	- Water Level - Standard Penetration Test - Permeability Test - Piezometer Tip - Standpipe Tip - Pressuremeter Test - Impression Packer Test - Vane Shear Test	LOGGED <u>Wallace Law</u> DATE <u>28/11/2023</u> CHECKED <u>Colin Yeung</u> DATE <u>29/11/2023</u>	REMARKS
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PRELIMINARY

	Drillhole Record		Drillhole No. BH2
	Contract No. EP/SP/170/20 (CHEC339)	Sheet 5 of 5	
PROJECT West Kowloon Transfer Station Second Follow-On Contract			
METHOD Rotary Drilling		CO-ORDINATES	Works Order No.
Machine & No. 72512			Date 22/11/23 to 24/11/23
FLUSHING MEDIUM Water		ORIENTATION VERTICAL	GROUND LEVEL mPD

Drilling Progress (dd/mm/yyyy)	Casing depth (m) / Size (mm)	Water level (m) / Time (hh:mm)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D. %	Fracture Index	F.I. / Test Depths (m)	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	40.20 115mm														
41				91	45	17	NI	40.20		74		40.20		IV	See previous page.
							5.9	40.32				40.32		IV	
							NI	40.49				40.49		III	
							>20	40.72		T2-101		40.72		IV	Moderately strong, pinkish brown, moderately decomposed medium grained GRANITE. Joints are closely to very closely spaced, rough planar and undulating, limonite stained, dipping at 0°-10° and 80°-90°.
							NI	40.95				40.95		III	
				100	71	71	>20	41.13		T2-101		41.13		IV	
								41.24				41.24		III	40.20-40.32m: Weak, highly decomposed.
								41.55		T2-101		41.55		III	40.49-40.72m: Weak, highly decomposed.
42				100	100	94	1.3	42.00		T2-101				III	40.95-41.24m: Moderately weak, highly decomposed.
							7.9	42.63							
43				100	100	89	4.9	43.66		T2-101					
							14.3	43.73				43.81		II	
44							3.6	44.01				44.04		III	43.81-44.04m: Strong, slightly decomposed.
							>20	44.25		T2-101					
				100	100	76	5.0	44.45							
45							13.0	44.68		T2-101					
							5.5	45.30				45.30		II	
46				100	100	91	14.3	45.59		T2-101					
							4.2	45.66							
47				100	93	66	12.5	46.38		T2-101					
							2.1	46.46							
							12.5	46.93							
24/11/2023							2.9	47.25		T2-101					
								47.60				47.60			Drillhole completed at 47.60m
48															
49															
50															

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample

- Water Level
- Standard Penetration Test
- Permeability Test
- Piezometer Tip
- Standpipe Tip
- Pressuremeter Test
- Impression Packer Test
- Vane Shear Test

LOGGED Wallace Law

DATE 28/11/2023

CHECKED Colin Yeung

DATE 29/11/2023

REMARKS

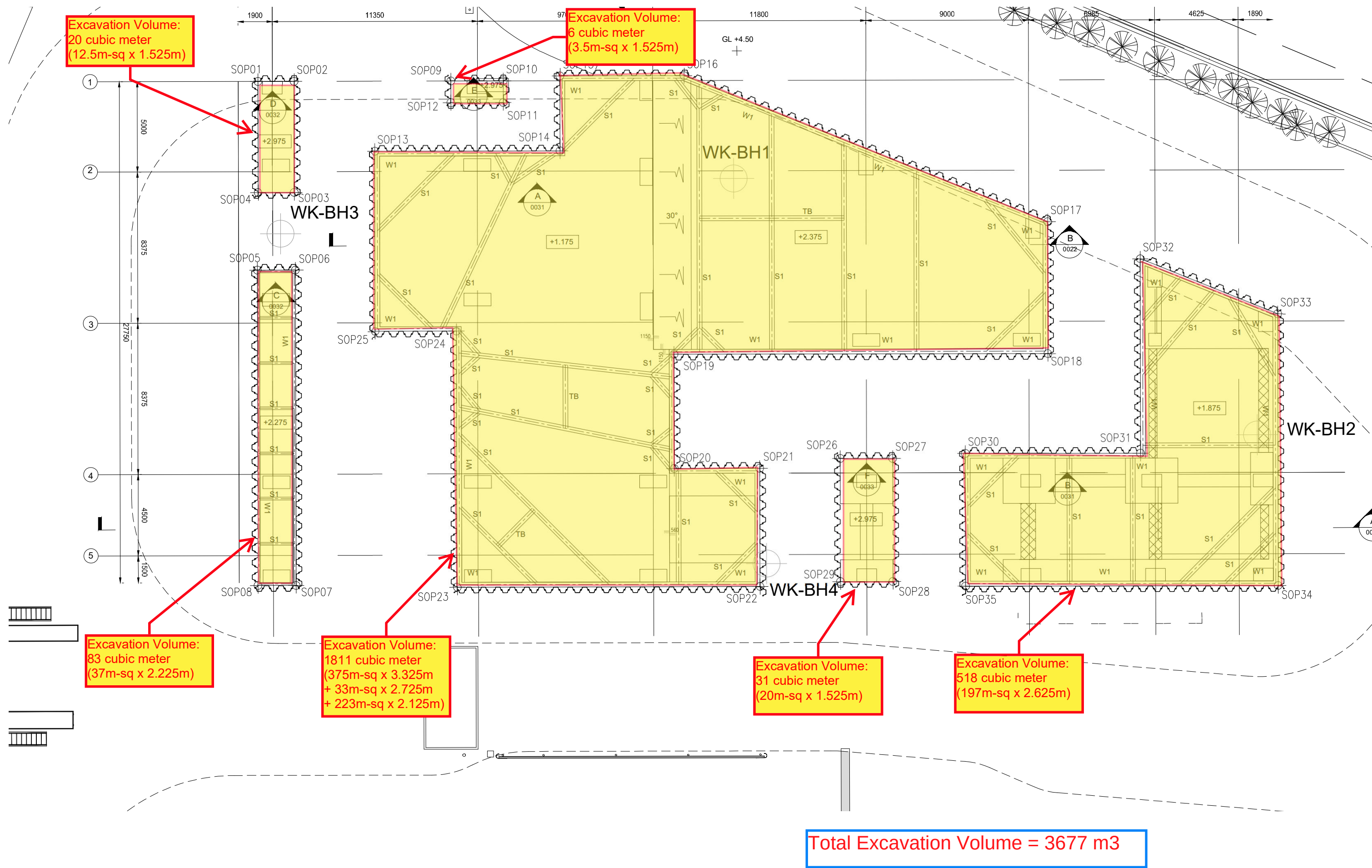
Appendix G

Proposed Excavation Requirements



1. Excavation and Pile Drilling for Transfer Building B

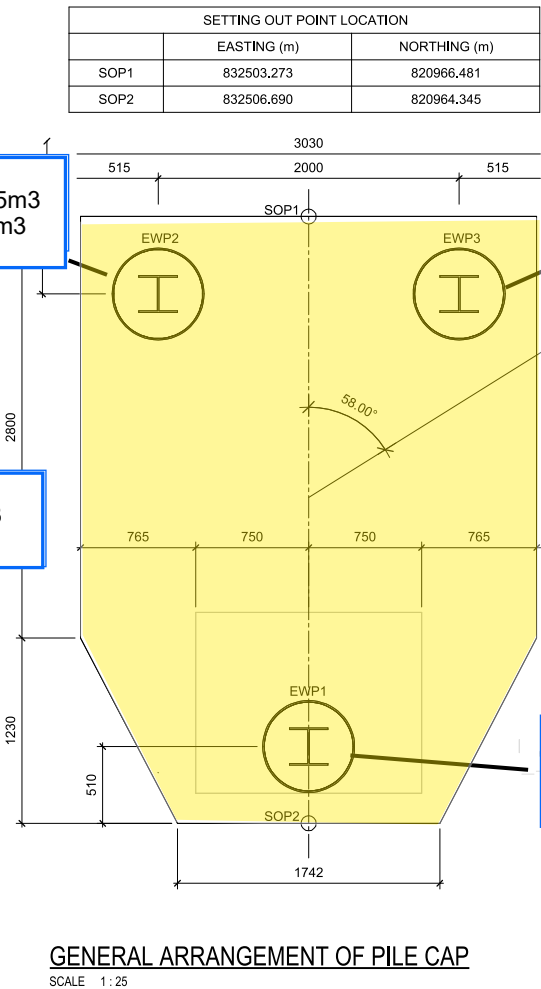
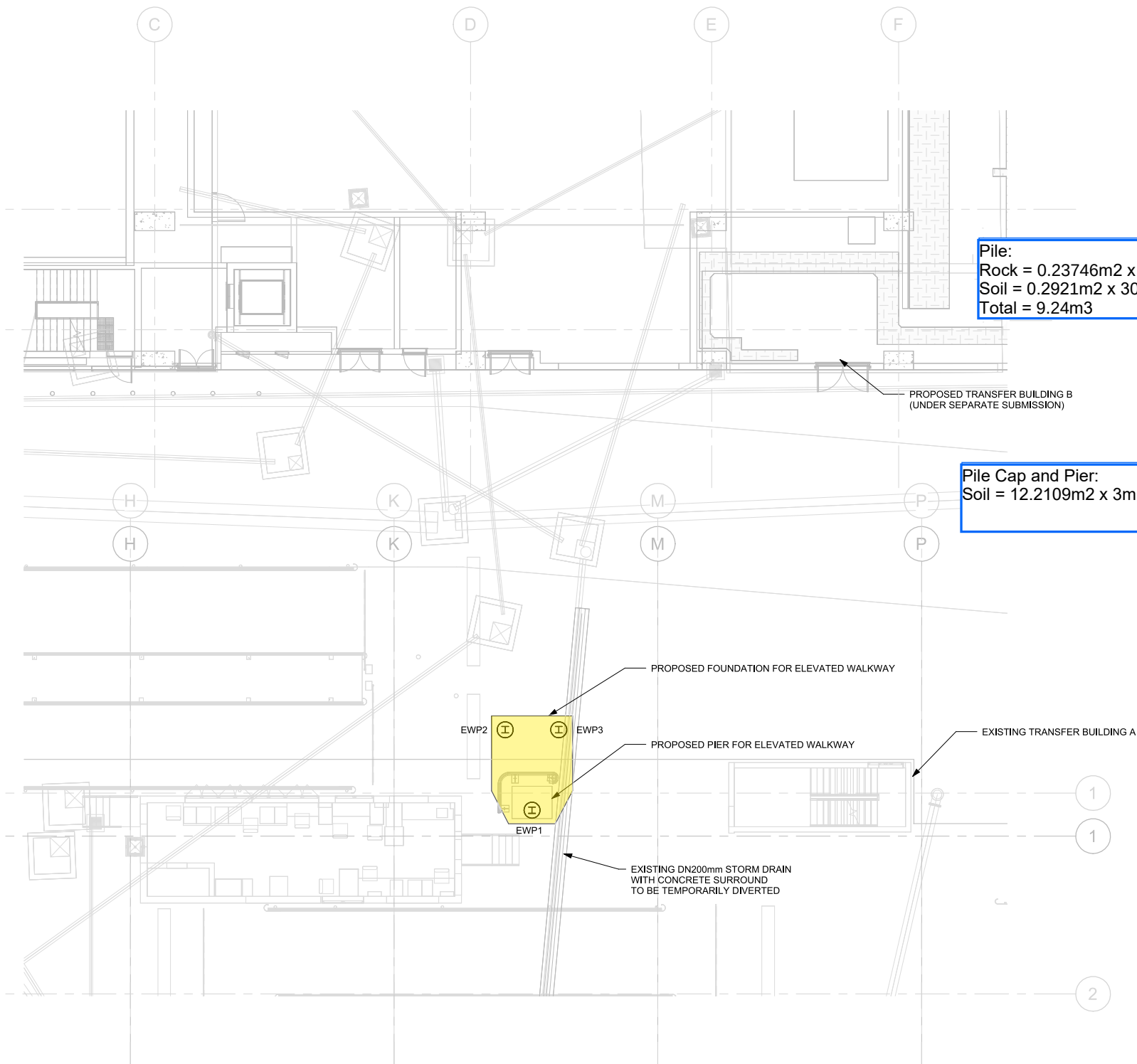
- a. Pile Drilling: $3.14 \times (0.305^2) \times 47 \times 88 = 1,208 \text{ m}^3$ (i.e. 88 piles, each with length of 47m and diameter of 0.61m. The area equals $\pi r^2 = 3.14 \times 0.305 \times 0.305$)
- b. Site Excavation: 2,469 m³ (see markups below)
- Total = a + b = 3,677 m³



2. Excavation and Pile Drilling for Elevated Walkway

- a. Pile Cap and Pier Excavation: 36.63 m3 (i.e. 12.2109 m2 area x 3m depth)
- b. Pile Drilling (3 no. in total): $(0.475+8.763) \times 3 = 9.238 \times 3 = 27.71 \text{ m3}$
(i.e. Rock section per pile: 0.55m drill diameter x 2m depth = $(0.55^2)/4 \times 3.14 \times 2 = 0.23746 \text{ m2} \times 2 = 0.475 \text{ m3}$
i.e. Soil section per pile: 0.61m drill diameter x 30m depth = $(0.61^2)/4 \times 3.14 \times 30 = 0.29210 \text{ m2} \times 30 = 8.763 \text{ m3}$)

Total = a + b = 64 m3



Pile:
Rock = 0.23746m2 x 2m = 0.475m3
Soil = 0.2921m2 x 30m = 8.763m3
Total = 9.24m3

Pile Cap and Pier:
Soil = 12.2109m2 x 3m = 36.63m3

Pile:
Rock = 0.23746m2 x 2m = 0.475m3
Soil = 0.2921m2 x 30m = 8.763m3
Total = 9.24m3

Pile:
Rock = 0.23746m2 x 2m = 0.475m3
Soil = 0.2921m2 x 30m = 8.763m3
Total = 9.24m3

Total Excavation Volume = 64.34m3

AtkinsRéalis

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