

**Project Profile**  
for  
**Temporary Sewage Pumping Station ancillary to  
Tung Chung Area 56 Public Housing Development**



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## 1. Basic Information

### 1.1 Project Title

- 1.1.1 The title of the project is “Temporary Sewage Pumping Station ancillary to Tung Chung Area 56 Public Housing Development” herein after referred to as “the Project”.

### 1.2 Purpose and Nature of Project

- 1.2.1 A Temporary Sewage Pumping Station (TSPS) is proposed as an ancillary facility to the proposed Tung Chung Area 56 Public Housing Development, to collect the sewage solely from the Tung Chung Area 56 Public Housing Development only and discharge it to the existing public sewer at Ying Hei Road.
- 1.2.2 The proposed TSPS is an un-manned facility and is not considered as a sensitive use susceptible to the influence of to external potential environmentally polluting uses.
- 1.2.3 According to the Planning Department’s Tung Chung Town Centre Area Layout Plan No. L/I-TCTC/1E, a permanent sewage pumping station (SPS) will be provided in the Tung Chung Area 104 located to the northeast of the Tung Chung Area 56. Upon the intake of the population of Tung Chung Area 56 Public Housing Development, the TSPS is expected to provide a few years of service to the public housing development. Upon the commissioning of the permanent sewage pumping station in Tung Chung Area 104, sewage generated in Tung Chung Area 56 public housing development will be conveyed to SPS in Tung Chung Area 104 and the operation of the TSPS in Area 56 will be terminated. The infrastructure work including permanent foul water pipes and manhole to the permanent SPS in Tung Chung Area 104 is scheduled to be provided during the construction period of the Tung Chung Area 56 public housing development for ease of future transition operations. Thus the TSPS in Area 56 is of temporary nature.

### 1.3 Name of the Project Proponent

- 1.3.1 The Hong Kong Housing Authority is the project proponent of this project.

### 1.4 Site Location and Scale of Project and History of Site

- 1.4.1 The proposed TSPS is located on a reclaimed land at the western side of Tung Chung Area 56, which is currently vacant at Lantau, approximately 222 m northeast of Caribbean Coast Phase 1 Development. The site area is approximately 170 m<sup>2</sup>. **Figure 1** shows the general location of the TSPS.
- 1.4.2 The average dry weather flow (ADWF) of the proposed TSPS is 2,311.6 m<sup>3</sup> per day. General arrangement layout plans of the TSPS and the details of the building height, building footprint and access of the TSPS are provided in **Appendix A**.

### 1.5 Number and Type of Designated Project Covered by the Project Profile

- 1.5.1 The installed capacity (ADWF) of the proposed TSPS is greater than 2,000 m<sup>3</sup> per day and the planned Public Housing Development at Tung Chung Area 56 will be located within 150 m from the boundary of the TSPS. Thus, the proposed TSPS is a designated project under F.3 (b) (i) of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO),
- 1.5.2 The predicted impacts from the implementation of the Proposed Project are not expected to be adverse and sufficient information is provided in this Project Profile on mitigation measures to meet the requirements under the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).



1.5.3 This Project Profile is prepared to seek permission from the Director of Environmental Protection under Section 5(11) of the EIAO to apply directly for an Environmental Permit for the construction and operation of the TSPS.

## **1.6 Name and Number of Contact Person**

1.6.1 The name and contact details of the Project Proponent are provided below:

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## **2. Outline of Planning and Implementation programme**

### **2.1 Project Implementation**

- 2.1.1 The Project will be implemented under the Building Contract of The Tung Chung Area 56 Public Housing development. The Project will be managed by the Hong Kong Housing Authority (HKHA) and the construction will be carried out by a qualified contractor. Drainage Services Department (DSD) is responsible for the design of the Temporary Sewage Pumping Station and the operation and maintenance will be undertaken jointly by HKHA and DSD.

### **2.2 Project Timetable**

- 2.2.1 Planning and design of the TSPS has been in process since July 2012. Construction of the TSPS is scheduled from 9/2013 to 3/2016 during the construction period of the Building Contract of the public housing development at Tung Chung Area 56.

### **2.3 Interactions with Other Projects**

- 2.3.1 The TSPS will be constructed under the Building Contract supervised by Housing Department, and would be carried out at the same time as the public housing development at Tung Chung Area 56 under the same contract. Overlapping with other projects are not anticipated.



### 3. Possible Impact on the Environment

#### 3.1 Outline of Process Involved

3.1.1 The general layout of the TSPS is shown in **Appendix A**. Sewage collected from the public housing development at Tung Chung Area 56 will be conveyed to the TSPS via gravity sewers. The incoming sewage will first flow into the inlet chamber and then pass through the screening chamber and enter the wet well. In the screening chamber, two sets of mechanically raked screens will be installed to remove large objects in the sewage. The sewage screened by mechanically raked bar screens in the screening chamber enters the wet well where it will be pumped by submersible pumps out of the TSPS to the existing public sewer at Ying Hei Road. The sewage will then be conveyed via the Tung Chung Sewage Pumping Station to Siu Ho Wan Sewage Treatment Works for proper treatment before disposal. The TSPS will be fully enclosed by a single storey concrete structure.

#### 3.2 Possible Environmental impacts during Construction Stage of the Temporary Sewage Pumping Station

##### *Air Quality*

3.2.1 Air Sensitive Receivers (ASRs) in the vicinity of the construction site may be impacted. Possible air quality impacts arising from the construction of the TSPS would be fugitive dust emissions from site clearance, excavation, wind erosion of open sites and stockpiling areas, and construction of superstructure. Emissions from diesel powered equipment will also be generated. In view of the small scale of the TSPS and the small site area (approximately 170 m<sup>2</sup>), and dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation will be applied, no adverse dust emissions are expected at ASRs.

3.2.2 The existing air sensitive receivers are listed in **Table 3.1**.

**Table 3.1 Existing Air Sensitive Receivers in the vicinity of Temporary Sewage Pumping Station**

I.D.	Air Sensitive Receiver	Land Use	Approximate Horizontal Distance from the Nearest Site Boundary (m)
ANSR1	Monterey Cove Tower 1	Residential	222
ANSR2	Ho Yu Primary School	Educational	350
ASR7	Tung Chung North Park	Recreational	440
ANSR8	Albany Cove Tower 6	Residential	442

3.2.3 The amount of C&D materials to be excavated is about 1,160 m<sup>3</sup> and the excavation period will last for about 1 month (assuming 26 working days per month). The average hauling volume of the truck is 6 m<sup>3</sup> per trip. Therefore, about 8 trips per day would be required for handling the excavated materials. All the trucks will be properly covered. The Project site will be regularly sprayed with water four times per construction day and dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation will be applied.



- 3.2.4 The construction works of the TSPS would be carried out at the same time as the public housing development and under the same contract. The future contractor will be required to schedule carefully their dusty construction activities for the TSPS such as site formation and excavation such that it would not overlap the major dusty construction activities for the public housing development. Cumulative construction dust impacts due to the construction of the TSPS will be controlled and are expected to be insignificant.

#### **Noise**

- 3.2.5 Noise Sensitive Receivers (NSRs) in the vicinity of the construction site may be affected by the construction noise impacts arising from construction activities for the TSPS involving the use of Powered Mechanical Equipment (PME). A detailed construction noise impact assessment is provided in **Appendix B**.
- 3.2.6 Within the 300m boundary from the TSPS one on-going EIA project has been identified, which is the Tung Chung New Town Development Extension. An EIA Study Brief (No. ESB-251/2012) has been issued. Based on the respective Project Profile information, the Project Study has commenced in January 2012 and expected completion in about 30 months. This will be followed detailed design and tendering period which is assumed to be about 24 months. The earliest start of the construction would be in mid 2016. Therefore, it is not expected to have any cumulative impacts. The Hong Kong Link Road of the Hong Kong-Zhuhai-Macao Bridge (HKZMB) are currently under construction and scheduled to be completed by end 2016. Nonetheless, they are located over 300 m away from the TSPS site. Cumulative impacts are not expected.
- 3.2.7 The construction of TSPS may overlap some construction activities for the public housing development. The TSPS will be under the same construction contract of the Tung Chung Area 56 Public Housing development. Noise mitigation measures will be implemented to control the potential impacts arising. The contractor will be required to carefully schedule the noisy activities for the TSPS such that the noise contribution from the construction works of the TSPS would not result in significant cumulative construction noise impacts. With proper scheduling of works, cumulative construction noise impacts due to the construction of the TSPS will be controlled and adverse cumulative impacts are not expected.

#### **Water Quality**

- 3.2.8 Water quality environmental impacts could potentially arise from uncontrolled surface runoff generated by the use of dust suppression sprays and the erosion of open stockpiles and exposed earthworks during storm events. Wastewater and sewage generated from workforce will also be generated and need to be properly controlled. Due to the limited scale of the Project, as well as the requirements to future contractor to fully comply with the *Water Pollution Control Ordinance* and to implement the best practice site drainage measures as described in the ProPECC Note PN 1/94 "Construction Site Drainage", adverse water quality impacts due to construction runoff are not anticipated.





### ***Waste Management***

- 3.2.9 Construction and demolition (C&D) material and waste such as excavated spoil (soil and rock), broken concrete, metal scraps and packaging materials will be generated from the construction of the TSPS. The estimated volume of excavated C&D materials is about 1160 m<sup>3</sup>. The inert portion will be transported to public filling facility whereas the non-inert C&D waste will be disposed of at landfill. No marine deposit will be generated from the works. With the implementation of good construction site management practice, environmental impact due to waste generated from the Project would be minimal. Small amount of chemical wastes from maintenance of equipment will also be generated. Provided that the chemical waste is handled and disposed of in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste, adverse environmental impacts would not be anticipated. In view of the limited construction activities for the TSPS, it is expected that insignificant amount of general refuse will be generated from the construction workforce. Any general refuse generated will be collected regularly and disposed of at the West New Territories (WENT) Landfill via the North Lantau Refuse Transfer Station.
- 3.2.10 The TSPS site is located on the reclaimed area in Tung Chung. The reclamation was completed in 2003. Based on the review of the past aerial photos of the site since 2003 there was no specific use on this site and has remained unused over the years. Land contamination impact due to the Project is not anticipated.

### ***Landscape and Visual***

- 3.2.11 The TSPS site is a reclaimed land which is current vacant. The site location is currently inaccessible such that no significant visual impact on the surrounding communities such as road users on Ying Hei Road was identified. No trees were identified within the site. During the preparation of the Project Profile, the site has already been hoarded by construction site hoardings of the site of the Public Housing Development in Tung Chung Area 56. It is inaccessible to the public. The approximate location of the TSPS site and existing views from the surroundings are illustrated in **Appendix C**. Adverse landscape and visual impact due to the construction of the TSPS would not be anticipated.

### ***Cultural Heritage***

- 3.2.12 There are no declared monuments or historical buildings identified within 500 m from the TSPS site boundary. No cultural heritage impacts are anticipated.

### ***Ecology***

- 3.2.13 The proposed TSPS are located on a reclaimed land. The site is not surrounded by areas of ecological value (e.g. woodland and natural stream). Adverse ecological impacts are not expected to occur.



### 3.3 Possible Environmental Impacts during Operation of the Temporary Sewage Pumping Station

#### *Air Quality*

- 3.3.1 Air quality impact arising from the operation of the Project would be odour emissions from the TSPS. The inlet chamber, coarse screen and wet well would be the main sources of odour emissions. Potential odour impact would be expected at the nearby ASRs of the Project without mitigation measures. However, all odour sources will be housed inside the TSPS structure and deodourising system will be installed to remove the odour. No adverse odour impacts are expected.
- 3.3.2 There are no other odour emission sources identified within 500 m area from the boundary of the TSPS. Therefore no cumulative odour impacts are expected.

#### *Noise*

- 3.3.3 The main noise impact from the operation phase will be fixed plant noise from pumps, mechanical screens, and exhaust fans. However, the pumps, mechanical screens, and exhaust fans will all be housed inside a concrete structure with major openings. No adverse fixed plant noise impacts due to the operation of the TSPS are expected.
- 3.3.4 Detailed operational noise impact assessment is provided in **Appendix B**.

#### *Water Quality*

- 3.3.5 Under normal operating conditions, the Project will not cause any adverse impacts on the water quality of the surrounding environment. Under emergency situations, such as pump failure or extended power loss, sewage may need to be discharged to nearby storm water drainage system. However with the implementation of appropriate preventative measures (Section 5.3) this emergency discharge scenario will be extremely unlikely.

#### *Waste Management*

- 3.3.6 The waste generated during the operation phase would consist of small amounts of screening. The screenings would be packed and handle carefully inside the TSPS structure to avoid odour and hygienic nuisance. The screenings will be disposed of to landfill regularly. No adverse impact is expected to result during the operation of the Project.

#### *Landscape and Visual*

- 3.3.7 The proposed TSPS will be built on reclaimed land and no trees will be affected. The one-storey TSPS building has a low building height profile. The building abuts two other blocks and very limited area of the front and rear façade (and roof) will be visible. Greenery design has been incorporated to soften the building structure Visual quality of this small scale TSPS. The conceptual design of the TSPS building structures is attached in **Appendix A**. Vertical greening provided at its rear fence wall and greenery is also provided onto the roof slab including the front-screen shrub planters on the same podium level. In addition, a large panel of roof greening and vertical greening are extended to the other blocks which sit adjoining to the TSPS building. Since the subject sewage building is a long and narrow block which abuts two other blocks, the area of its remaining facades (i.e. front and rear) becomes very limited and most of which are occupied with large access doors and louvres. In this connection, the periphery planting arrangement as has been optimized to achieve the best screen effects. Visual impacts will be alleviated to acceptable level.



- 3.3.8 Careful aesthetic design of the TSPS, along with a number of various mitigation measures are proposed to reduce the potential visual impacts of the TSPS structure. In view of the small scale of the TSPS and with proper mitigation measures, no significant adverse landscape and visual impact are anticipated during the operation phase of the Project.
- 3.3.9 The planned schools in Tung Chung Area 89 currently have no programme for their implementation. Therefore, there will no visual impacts during the duration of the construction of the TSPS. The schools will be built after the TSPS is fully established, there will be no change in visual impacts when the schools come in operation. The TSPS will be integrated with the built-up context of its adjacent buildings that greenery design will be incorporated. The potential visual impact on the planned schools in Area 89 can be alleviated to acceptable level.

***Cultural Heritage***

- 3.3.10 No cultural heritage impacts are anticipated to occur during the operation of the TSPS.

***Ecology***

- 3.3.11 Adverse ecological impact is not expected to occur during the operational of the TSPS.



## 4. Major Elements of the Surrounding Environment

### 4.1 Existing and Planned Sensitive Receivers and Sensitive Parts of the Natural Environment

- 4.1.1 The proposed TSPS is located at a reclaimed land at Tung Chung Area 56 which is currently zoned as Residential zone as in the Tung Chung Town Centre Area Outline Zoning Plan No.S/I-TCTC/18. The locations of existing and planned noise and air quality sensitive receivers (NSRs and ASRs, respectively) are shown in **Figure 2**.
- 4.1.2 The area adjacent to the west of the site is intended to be used for schools. This is still at very early planning stage however the schools are considered as planned sensitive receiver for the purpose of this PP. Tung Chung Area 55b located further to the west of the site is another planned sensitive receiver. As the planned schools are located closer to the site, the planned schools were selected for the worst case assessment. The future public housing development at Tung Chung Area 56 located to the east of the site are planned sensitive receivers. Block 1 and 2 of which will be the nearest residential dwellings and are included for the PP.
- 4.1.3 The closest existing residential dwelling is Monterey Cove Tower 1 of The Caribbean Coast Phase 1. Ho Yu Primary School is the nearest existing school to the site.
- 4.1.4 The representative noise and air sensitive receivers are listed in **Table 4.1**.

**Table 4.1 Air and Noise Sensitive Receivers in the vicinity of Temporary Sewage Pumping Station**

I.D.	Sensitive Receiver	Land Use	Construction Noise Criteria dB(A)	Approximate Horizontal Distance from the Nearest Site Boundary (m)
ANSR1	Monterey Cove Tower 1	Residential	75	222
ANSR2	Ho Yu Primary School	Educational	70 (daytime) 65 (examination)	350
ANSR3	Block 2 Tung Chung Area 56 Public Housing Development	Residential (planned)	75	22
ANSR4	Proposed School in Tung Chung Area 89	Educational (Planned)	70 (daytime) 65 (examination)	29
ANSR5	Block 1 Tung Chung Area 56 Public Housing Development	Residential (Planned)	75	55
ANSR6	Tung Chung Area 55b Residential Zone	Residential (Planned)	75	100
ASR7	Tung Chung North Park	Recreational	75	440
ANSR8	Albany Cove Tower 6	Residential	75	442

Notes:

ANSR = Air and Noise Sensitive Receiver

ASR = Air Sensitive Receiver



## 5. Environmental Protection Measures to be Incorporated in the Construction and Operation and any Further Environmental Implication

### 5.1 General

5.1.1 Environmental pollution control clauses and all environmental pollution mitigation measures as recommended in this Project Profile will be included within the contractor's contract to ensure that proper mitigation techniques are used. A qualified Environmental Officer (EO) shall be employed to audit the implementation of all environmental mitigation measures recommended and to confirm full compliance through monthly audit report to the EPD during and upon completion of the construction works. The EO shall be present full time on site. The minimum qualification of the EO shall be a corporate member of a professional institution (e.g. Hong Kong Institute of Engineers (HKIE) in Environmental Discipline or equivalent, Hong Kong Institute of Surveyors, etc.) either having at least 3 years of experience in environmental management, environmental monitoring and auditing of construction activities, or in possession of a diploma or above in environmental studies or environmental engineering, awarded by a local or overseas tertiary educational institution.

5.1.2 The contractor will be required to prepare and implement an Environmental Management Plan (EMP) in accordance with ETWB TC(W) No. 19/2005 – "Environmental Management on Construction Sites". The EMP should detail the adopted mitigation and measures that the contractor must oblige.

### 5.2 Mitigation Measures during Construction Phase

#### *Air Quality*

5.2.1 Dust control and suppression measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* of the *Air Pollution Control Ordinance* (APCO) will be strictly adhered to control the dust emissions.

5.2.2 The implementation of mitigation measures such as water spraying of exposed surfaces at least four times a day, wheel washing and covering stockpiles with tarpaulin sheet, and provision of covers for all trucks will help reduce the level of construction related dust and reduce any air quality impacts.

5.2.3 With proper implementation of the mitigating measures, dust emissions from the construction of the TSPS will be controlled to within acceptable levels.

#### *Noise*

5.2.4 The contractor will be required to use quiet Powered Mechanical Equipment (PME) during construction.

5.2.5 Details of the calculations and the Sound Power Levels (SWL) of the PME are provided in **Appendix B**. The construction noise from the Project will be within the EIAO-TM daytime noise standard of 75 dB(A) (or 70 dB(A) for school (and 65 dB(A) during exam)).



5.2.6 In addition to quiet PME, the contractor will be required to adopt the following good site practices during the construction phase.

- Use well maintained site equipment and PME;
- Employ the use of silencers and mufflers where applicable;
- Situate mobile equipment (i.e. generators as far away as reasonably possible);
- Site machinery used intermittently should be turned off or throttled to a minimum when not in use;
- Site machinery that emits noise in a particular direction should be positioned to emit noise away from NSRs; and
- Position material stockpiles, site offices and site hoardings as noise barriers where reasonably possible.

#### ***Water Quality***

5.2.7 The construction of the Project includes excavation and general building works. The contractor will be required to provide a sedimentation tank to mitigate the risk of contaminated run-off in case of accident. The contractor will follow the guidelines stipulated in EPD's ProPECC Note PN1/94 – "Construction Site Drainage".

5.2.8 With the implementation of these measures, water quality will be kept within acceptable levels.

#### ***Waste Management***

5.2.9 The contractor will be required to sort all C&D materials and waste into different categories for suitable disposal. Disposal of C&D materials will be managed through the trip-ticket system as stipulated in DEVB TC(W) No. 6/2010 . The inert portion will be transported to public filling facility whereas the non-inert C&D waste will be disposed of at landfill. The Environmental Officer shall audit the proper handling and disposal of the C&D materials generated.

5.2.10 All chemical wastes from equipment maintenance will be handled, stored and disposed of properly and in accordance with the requirements for *Waste Disposal (Chemical Waste) Regulation*. General refuse will be stored and disposed of separately from general construction waste and chemical waste. The storage bins for general refuse will be provided with lids, which should be kept closed to avoid odour nuisance and wind blown litter.

5.2.11 With a suitable waste management plan and proper implementation of the recommended waste management measures, no adverse waste impact during the construction phase is expected.

#### ***Landscape and Visual***

5.2.12 No adverse landscape and visual impacts are expected during the construction phase. Site hoardings compatible with the surrounding environment will be provided to screen the construction site from the surroundings.



### ***Cultural Heritage***

5.2.13 As no cultural heritage impact is expected during the construction phase, no mitigation measures are necessary.

### ***Ecology***

5.2.14 As no ecological impact is expected during the construction phase, no mitigation measures are necessary.

## **5.3 Mitigation Measures during Operational Phase**

5.3.1 The proposed TSPS is an un-manned facility and is not considered as a sensitive use susceptible to the influence of to external potential environmentally polluting uses (e.g. an existing LPG/petrol filling station located at Ying Hei Road). External factors are not anticipated to have adverse impacts on the TSPS during the operation.

### ***Air Quality***

5.3.2 To minimize air quality impact in the TSPS, the inlet chamber, wet well and the screening will be enclosed with covers inside the TSPS structure to reduce odour. The TSPS will include granular activated carbon filter used as the main deodorizer. The deodorizer will be maintained to at least 99.5% odour removal rate. The odour level measured at the nearest ASR of the TSPS is expected to be not exceed 5 odour units based on an averaging time of 5 seconds, complying with the acceptable level stipulated in Annex 4 of the EIAO-TM. The capacity of the proposed deodorizer would be based on ventilation rates of 3 to 6 air change per hour (ACH) for covered chambers and wet wells and 12 to 15 ACH for areas where man access. The exhaust of the deodorizer would be located in a direction away from the sensitive receivers, i.e. away from the public rental housing development at Tung Chung Area 56 and the planned schools in Tung Chung Area 89.

### ***Noise***

5.3.3 All the pump sets will be located at wet well. Mechanically raked screens will be located in a 200 mm reinforced concrete structure with a soundproof door.

5.3.4 The deodorizer unit will be fully enclosed inside the concrete building of the TSPS. Acoustic enclosure would be provided for the fans of the deodorizer unit, if necessary. Exits of the ventilation exhaust fans will be fitted with proper type of louver to mitigate the noise level in compliance with the statutory requirement for the region.

### ***Water Quality***

5.3.5 No impacts are expected during normal operation of the TSPS. To minimise the chance of abnormal situation and emergency sewage bypass, the TSPS contains contingency measures. Firstly, the wet well has a 2-hour retention limit of average dry weather flow influent, allowing for the temporary holding of excess sewage and/or water during ultimate flow conditions. The TSPS also has 4 pumps, with normally only three pumps operational and one pump as standbys. Regular maintenance works will be carried out to prevent equipment failure and to maintain normal operation.



- 5.3.6 In addition, the twin rising mains also provide a large pumping capacity. Dual power supplies and dual start controls also mitigate the risk of sewage bypass due to lack of power. A Supervisory Control and Data Acquisition (SCADA) system will also be installed in order to allow for remote monitoring of the TSPS, because it is due to be unmanned. The SCADA system allows for immediate action to be taken in the event of an emergency.
- 5.3.7 The dual-feed power supply is by CLP. According to the information from CLP, the CLP supply reliability reaches 99.999%. The dual-feed power supply further enhances the supply security and reliability. On top of this, the wet well is designed to have a 2-hour storage time of ADWF before emergency bypass will occur. In consideration of this intense backup, the chance of an emergency bypass situation is considered to be extremely remote.

#### ***Waste Management***

- 5.3.8 Screenings collected in the screening hall of the TSPS will be properly packed in plastic bags within the TSPS. The screenings will then be transported to landfill site for disposal. No adverse environmental impact is anticipated.

#### ***Landscape and Visual***

- 5.3.9 The roof will be patched with greenery to further mitigate any visual impact caused by the TSPS. Since the TSPS building is a long and narrow block which abuts two other blocks, the area of its remaining facades (i.e. front and rear) becomes very limited and most of which are occupied with large access doors and louvres. In this connection, vertical greening will be provided at the TSPS rear fence wall and greenery will be provided onto the roof slab including the front-screen shrub planters on the same podium level. In addition, a large panel of roof greening and vertical greening are extended to the two blocks which abut the TSPS building.
- 5.3.10 The design and colour scheme of the exterior of the building to be created to blend the TSPS into the surroundings in order to reduce any visual impact. The conceptual drawings are provided in **Appendix A**.

#### ***Ecology***

- 5.3.11 As no ecological impact is expected during the operational phase of the TSPS, no mitigation measures will be taken.

#### ***Cultural Heritage***

- 5.3.12 As no cultural heritage impact is expected during the operational phase of the TSPS, no mitigation measures will be taken.





## 6. Summary of Potential Environmental Impacts and Mitigation Measures

### 6.1 Construction and Operation Stage Impacts and Mitigation Measures

6.1.1 The potential environmental impacts and proposed mitigation measures to be incorporated into the construction and design of the proposed pumping stations are summarized in **Table 6.1** and **Table 6.2**, respectively.

**Table 6.1** Summary of Potential Environmental Impacts and Mitigation Measures during Construction Stage

Potential Environmental Impact	Mitigation Measures	Implementation Agent	Relevant Section in Project Profile
Construction Dust	<ul style="list-style-type: none"><li>- Dust control and suppression measures stipulated in the <i>Air Pollution Control (Construction Dust) Regulation</i></li><li>- Water spraying on exposed surface at least four times a day</li><li>- Wheel washing</li><li>- covering stockpiles with tarpaulin sheet</li><li>- provision of covers for all trucks</li></ul>	Contractor	5.2.1 5.2.2
Noise	<ul style="list-style-type: none"><li>- Use quiet Powered Mechanical Equipment (PME)</li><li>- Good site practice</li></ul>	Contractor	5.2.4 5.2.6
Construction site runoff	<ul style="list-style-type: none"><li>- provide a sedimentation tank</li><li>- follow the guidelines stipulated in EPD's ProPECC Note PN1/94 – "Construction Site Drainage"</li></ul>	Contractor	5.2.7
Waste arising	<ul style="list-style-type: none"><li>- sort all C&amp;D materials and waste into different categories for suitable disposal</li><li>- chemical wastes from equipment maintenance will be handled, stored and disposed of properly and in accordance with the requirements for <i>Waste Disposal (Chemical Waste) Regulation</i></li><li>- General refuse will be stored and disposed of separately from general construction waste and chemical waste</li><li>- storage bins for general refuse will be provided with lids</li></ul>	Contractor	5.2.9 5.2.10 5.2.11
Landscape and visual impacts	<ul style="list-style-type: none"><li>- provide site hoardings compatible with the surrounding environment</li></ul>	Contractor	5.2.12



**Table 6.2 Summary of Potential Environmental Impacts and Mitigation Measures during Operation Stage**

Potential Environmental Impact	Mitigation Measures	Implementation Agent	Relevant Section in Project Profile
Odour	<ul style="list-style-type: none"> <li>- wet well and the screening will be enclosed with covers inside TSPS structure</li> <li>- TSPS to include granular activated carbon filter used as deodorizer</li> <li>- deodorizer will have at least 99.5% odour removal rate</li> </ul>	HKHA / DSD	5.3.2
Noise	<ul style="list-style-type: none"> <li>- pump sets will be located in wet well. Mechanically raked screens will be located in a 200 mm reinforced concrete structure with a soundproof door</li> <li>- Acoustic enclosure would be provided for the fans of the deodorizer unit, if necessary. Exits of the ventilation exhaust fans will be fitted with proper type of louver to mitigate the noise level in compliance with the statutory requirement for the region.</li> </ul>	HKHA / DSD	5.3.3 5.3.4
Emergency bypass	<ul style="list-style-type: none"> <li>- No impacts are expected during normal operation</li> <li>- wet well has a 2-hour retention limit of average dry weather flow influent, allowing for the temporary holding of excess sewage and/or water during ultimate flow conditions</li> <li>- one standby pump</li> <li>- twin rising mains</li> <li>- Dual power supplies and dual start controls</li> <li>- Install Supervisory Control and Data Acquisition (SCADA) system</li> <li>- Regular maintenance of equipment</li> </ul>	HKHA / DSD	5.3.5 5.3.6
Waste arising	<ul style="list-style-type: none"> <li>- Screenings collected in the screening hall of the TSPS will be properly packed in plastic bags within the TSPS</li> </ul>	HKHA / DSD	5.3.9
Landscape and visual impacts	<ul style="list-style-type: none"> <li>- Roof patched with greenery</li> <li>- design and colour scheme of the exterior of the building to be created to blend the TSPS into the surroundings</li> </ul>	HKHA / DSD	5.3.10 5.3.11



## 7. Previously Approved Project Profiles

### 7.1 Project Profile of Similar Nature Referenced

7.1.1 There are a number of Project Profiles of similar nature of this designated project – sewage pumping station, used for direct application of Environmental Permit under the EIAO. Some examples are listed in **Table 7.1**.

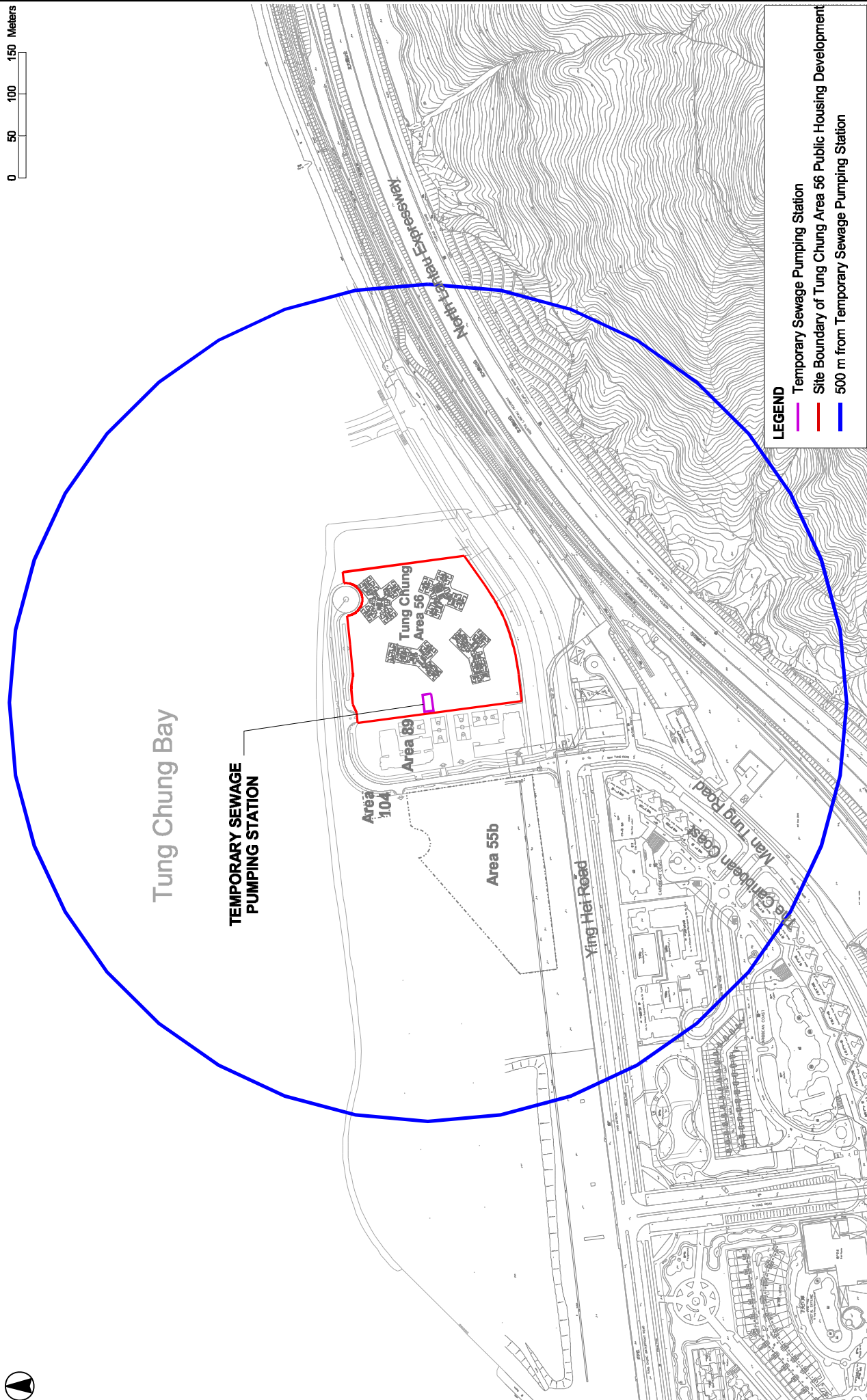
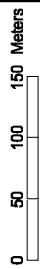
**Table 7.1 Previous Direct Application of EP for Sewage Pumping Stations**

Application No.	Project Profile Title	Pumping Capacity (ADWF)	Nearest Sensitive Receiver
DIR-180/2009	Control of Water Pollution at Jordan Valley Box Culvert - Sewage Pumping Station (JVBCSPS)	Pump rate of 0.5 m <sup>3</sup> /s	81 m
DIR-175/2008	Western Interceptor Sewer Sewage Pumping Station	54,630 m <sup>3</sup> /day	61 m
DIR-173/2008	Yuen Long Kau Hui No. 2 Sewage Pumping Station	5,900 m <sup>3</sup> /day	30 m
DIR-171/2008	Upgrading of Chinese University Sewage Pumping Station	9,500 m <sup>3</sup> /day	130 m
DIR-168/2008	Sewage Interception Scheme in Kowloon City Sewage Pumping Stations	SPS No.1: 60,480 m <sup>3</sup> /day SPS No.2: 64,800 m <sup>3</sup> /day	SPS No.1 - 21 m SPS No.2 - 10 m
DIR-161/2007	Tai Po Tai Wo Road Sewage Pumping Station	12,100 m <sup>3</sup> /day	29m



## Figures

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**LEGEND**

- Temporary Sewage Pumping Station
- Site Boundary of Tung Chung Area 56 Public Housing Development
- 500 m from Temporary Sewage Pumping Station

Tung Chung Bay

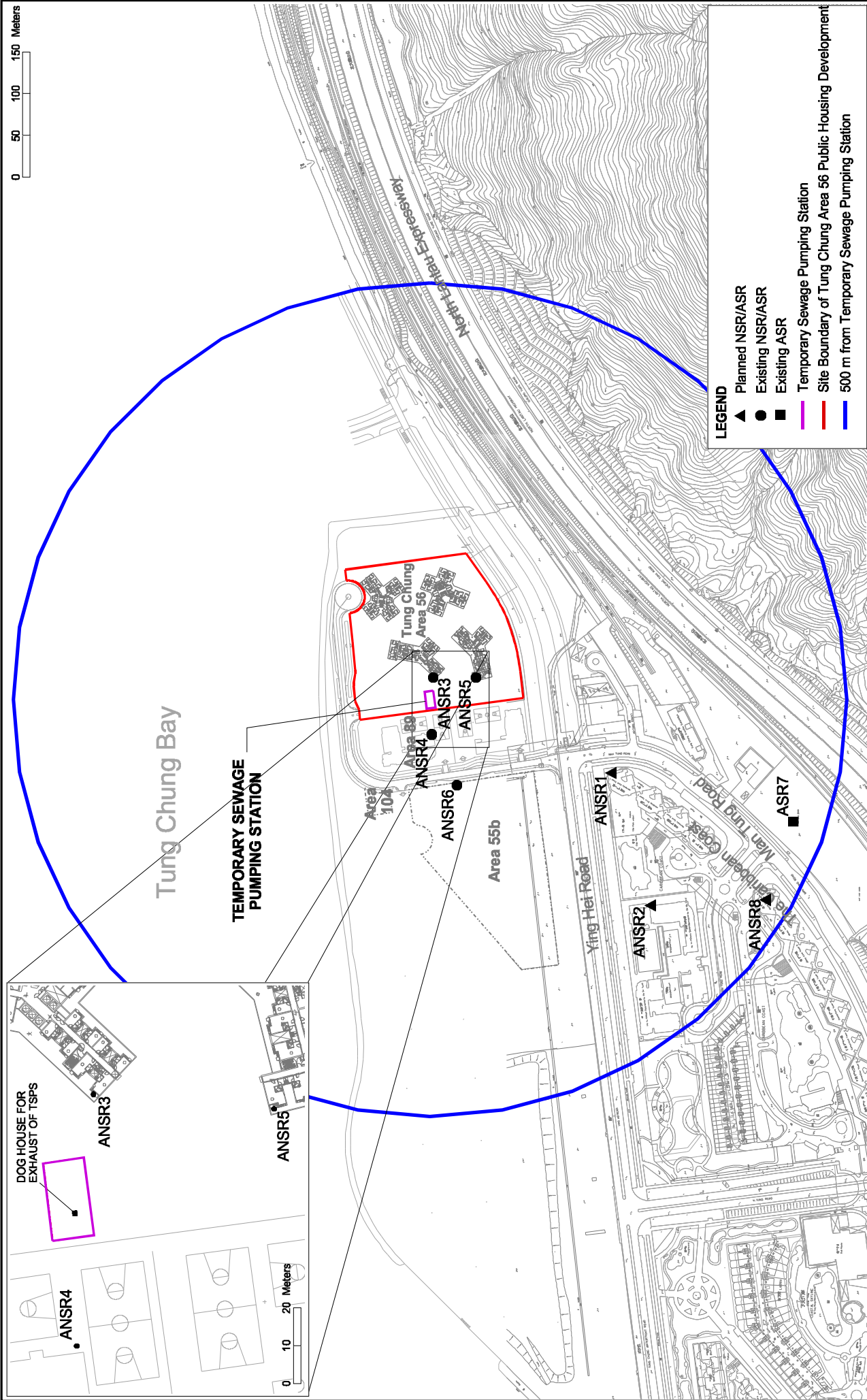
TEMPORARY SEWAGE PUMPING STATION

Area 104  
Tung Chung Area 56  
Area 89

Area 55b

Yung Hei Road

Man Tung Road



 香港房屋委員會 Hong Kong Housing Authority	<b>Temporary Sewage Pumping Station ancillary to Tung Chung Area 56 Public Housing Development</b>		<b>ATKINS</b>
	Title : Location of Sensitive Receivers	Date : February 2013	



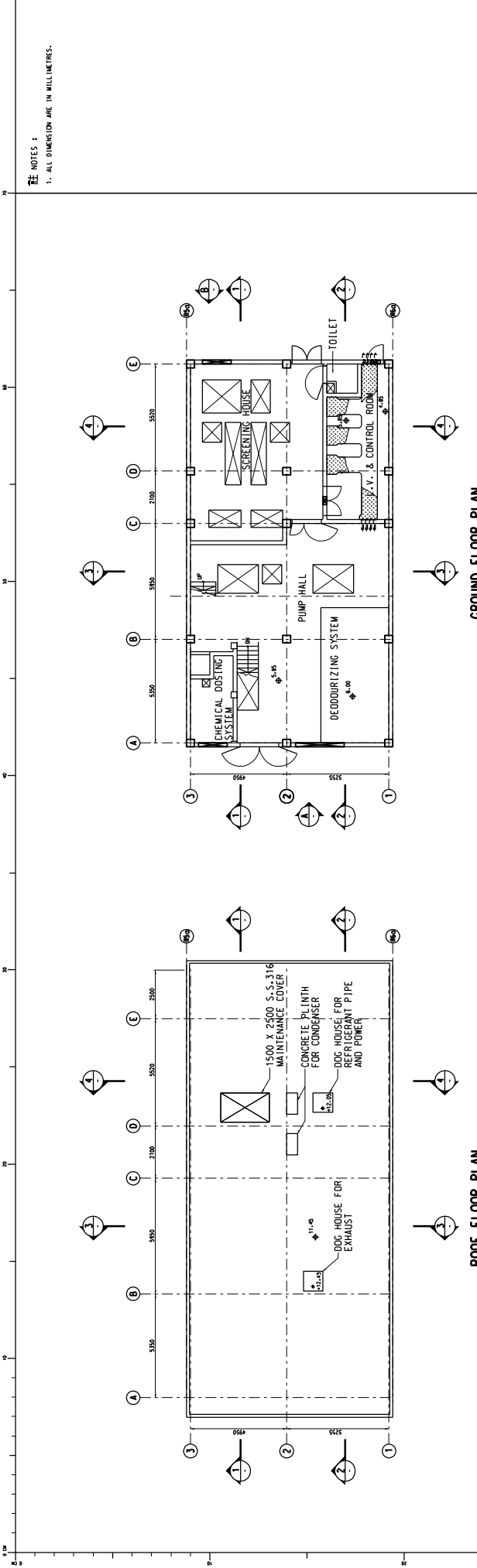
## **Appendix A**

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### Temporary Sewage Pumping Station General Arrangement Layout Plans and Conceptual Drawings

**註 NOTES :**

1. ALL DIMENSIONS ARE IN MILLIMETERS.



**GROUND FLOOR PLAN**  
SCALE 1:100

**ROOF FLOOR PLAN**  
SCALE 1:100

**PLAN AT LEVEL 0.50MPD**  
SCALE 1:100

**PLAN AT LEVEL 3.15 MPD**  
SCALE 1:100

日期 DATE	修改項目 DESCRIPTION	由 BY
<b>修訂 REVISION</b>		
1	定名 NAME	白振浩 S. P. NG
2	繪圖 DRAWING	C. P. LEE
3	校對 CHECKED	S. H. CHAN
4	審核 NOTED	F. Y. WONG
5	批准 APPROVED	

總工程師  
Chief Engineer 白振浩  
S. P. NG  
合同編號  
contract no.  
建築編號  
building no.  
工程編號  
project no.  
合約名稱  
contract

SUPPLY AND INSTALLATION OF ELECTRICAL AND MECHANICAL EQUIPMENT FOR TEMPORARY SEWAGE PUMPING STATION AT TUNG CHUNG AREA 36

圖則名稱  
drawing title  
**GENERAL ARRANGEMENT LAYOUT PLAN (SHEET 2 OF 2)**

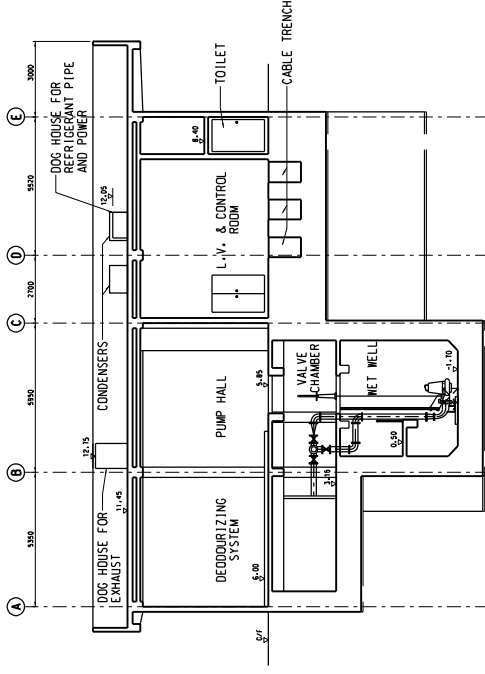
圖則編號  
drawing no.  
DEMT582/MO2A

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MECHANICAL AND ELECTRICAL PROJECTS DIVISION

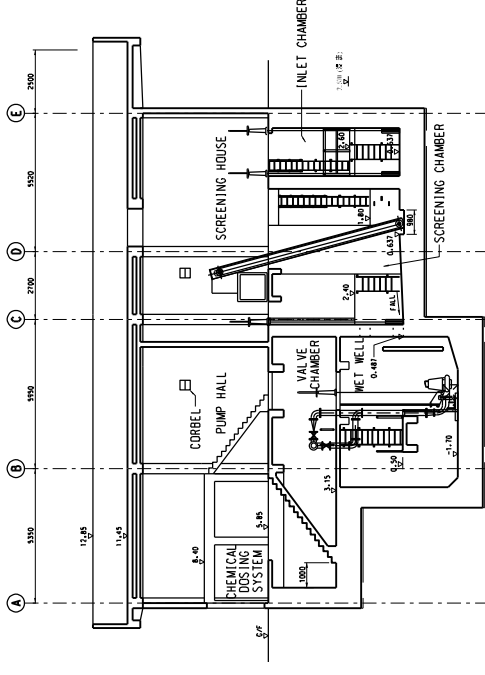




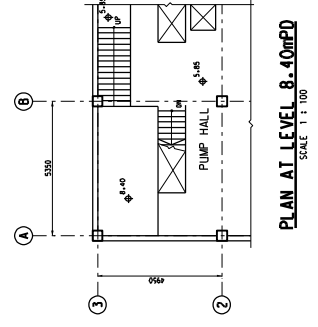
註 NOTES :  
1. ALL DIMENSIONS ARE IN MILLIMETRES.



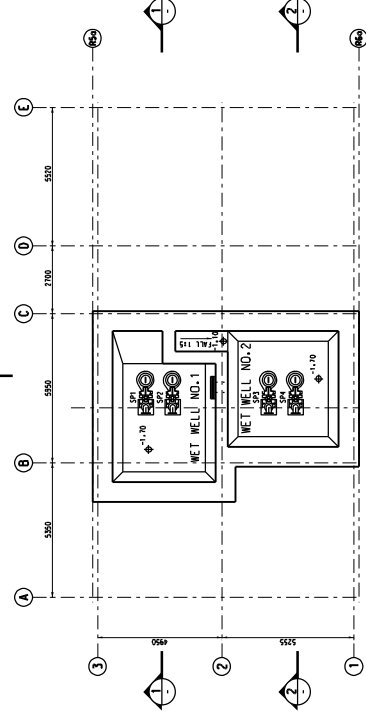
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SCALE 1 : 100



SECTION 1 - 1  
SCALE 1 : 100



PLAN AT LEVEL 8.40m  
SCALE 1 : 100



PLAN AT LEVEL -1.50m  
SCALE 1 : 100

圖名	修改項目	圖號
修訂	DESCRIPTION	REVISED
圖號	姓名	日期
圖號	姓名	日期
圖號	姓名	日期
圖號	姓名	日期
圖號	姓名	日期
圖號	姓名	日期

總工程師  
Contract no.  
圖號  
Drawing no.  
圖號  
Drawing no.  
圖號  
Drawing no.

合約名稱  
SUPPLY AND INSTALLATION OF ELECTRICAL AND MECHANICAL EQUIPMENT FOR TEMPORARY SEWAGE PUMPING STATION AT TUNG CHUNG AREA 30

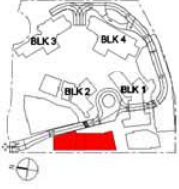
圖則名稱  
GENERAL ARRANGEMENT LAYOUT PLAN (SHEET 1 OF 2)

圖則編號  
DEM1582/MO3A

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電工部  
ELECTRICAL AND MECHANICAL PROJECTS DIVISION



REF PLAN



NOTES :

1. NOTES & LEGEND REFER TO DWG. # NO. 810205/AS/PS-01

REVISIONS

INITIAL AND REVISION	DATE
DWG. LOD. RAJTR	26-01-2015
TK	26/01/15
TK	26/01/15

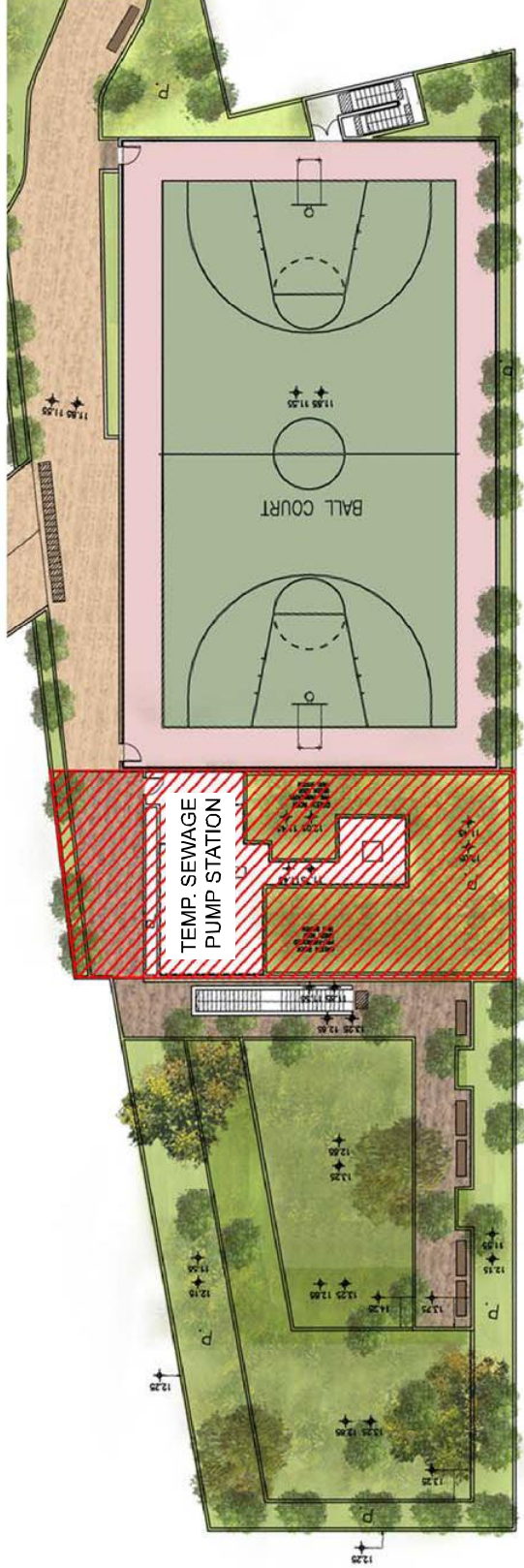
NAME AND POSITION	INITIAL	DATE
<b>C Y S Associates ( H K ) Ltd.</b>		
AUTHORISED FOR	KEN K. S. CHENG	
ISSUE BY NO.	(DWT)	
APPROVED	MARGRET T. K. CHAU (JC)	02/03/15
ENDORSED	THOMAS H. P. CHAN (HAG)	02/03/15
CHECKED	JOYCE W. C. WONG (JW)	02/03/15
DRAWN	C. K. FANG (CKF)	02/03/15

PROJECT : PUBLIC RENTAL HOUSING DEVELOPMENT AT TUNG CHUNG AREA 56  
 DRAWING NO. : ANNEY- REFUSE COLLECTION POINT, TEMP. SEWAGE PUMP STATION & SUPERMARKET G/F, ROOF PLANS  
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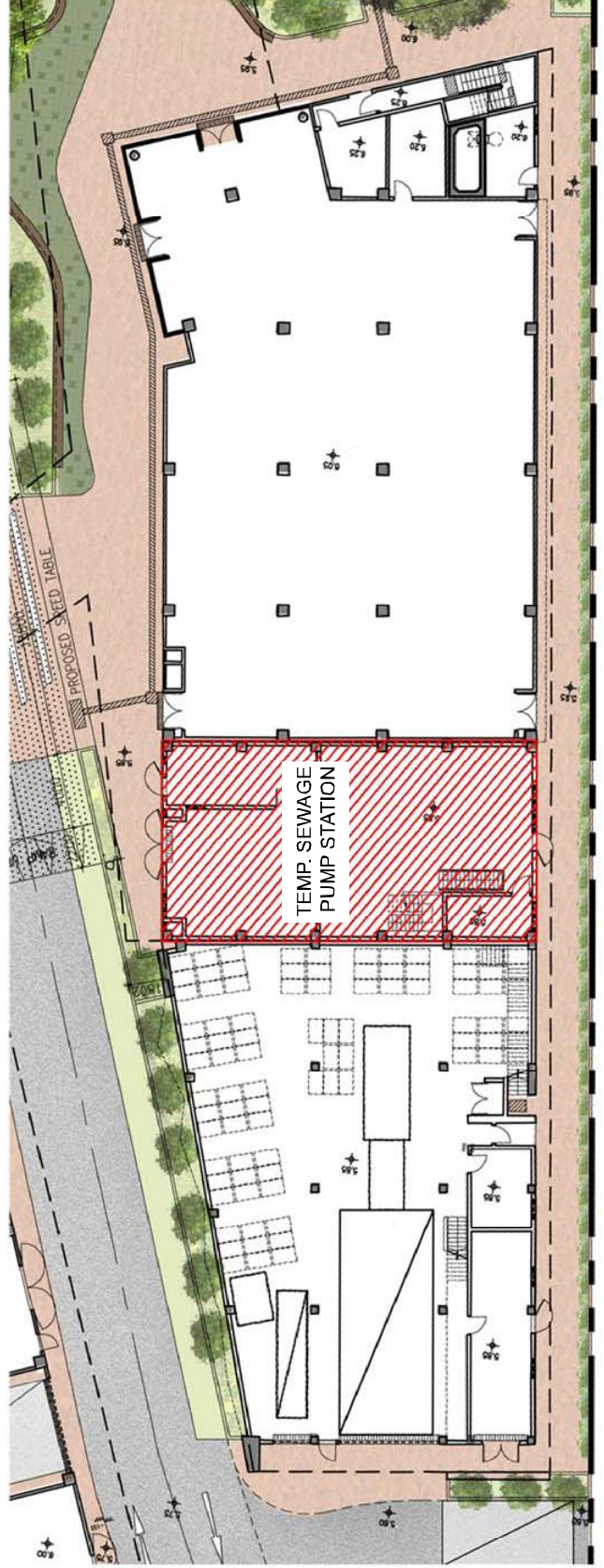
SOURCE 1  
 (C) NO. 1



HOUSING DEPARTMENT  
 11-48 WING LOK STREET, HONG KONG

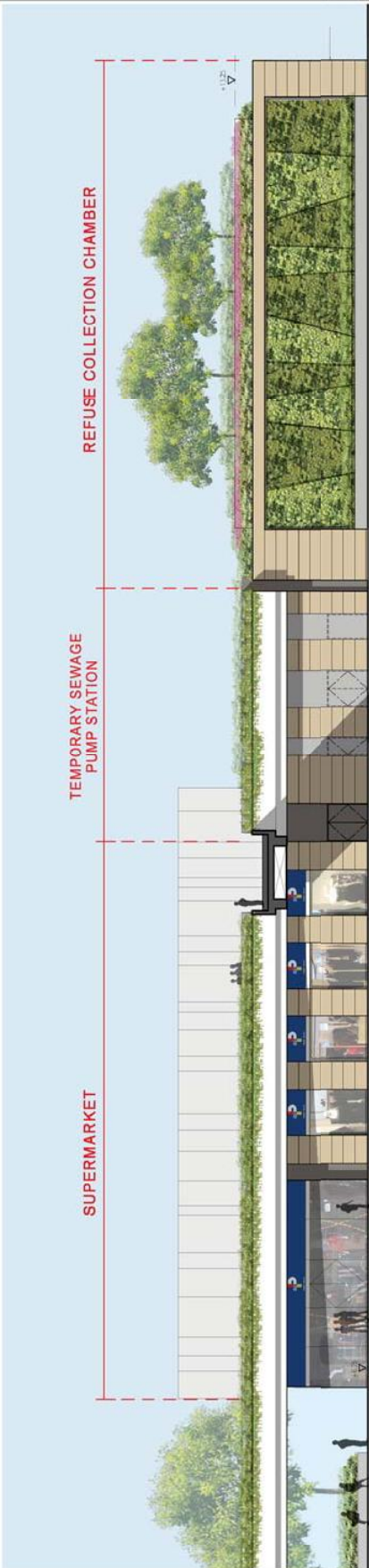
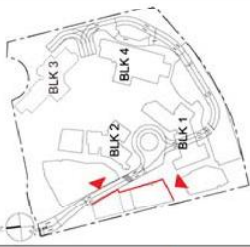


1/F PLAN



G/F PLAN  
 REFUSE COLLECTION POINT, TEMPORARY SEWAGE PUMP STATION & SUPERMARKET

KEY PLAN



SIDE ELEVATION



FRONT ELEVATION

REVISIONS

NO.	DESCRIPTION AND DATE	INITIAL AND SIGNATURE	DATE
01	ISSUE FOR PERMIT		
02			
03			

APPROVED FOR ISSUE BY IS :

NAME AND POSITION	INITIAL	DATE

C Y S Associates ( H K ) Ltd

AUTHORISED	DESIGNED	CHECKED	DRAWN
KENNETH L. N. CHAN (JC)	THOMAS K. P. TAM (TK)	WING YIP (WY)	C. K. TAM (TK)
(00)	(00)	(00)	(00)

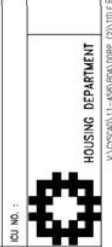
PROJECT : PUBLIC RENTAL HOUSING DEVELOPMENT AT TUNG CHUNG AREA 56

DRAWING TITLE : SHOPFRONT ELEVATION FACING SHOPPING STREET (SUPERMARKET,TPH&RSMR)

DRAWING NO. : IS107TSPS/A-SKA-02

SOURCE :

IDU NO. :





## **Appendix B**

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### Construction and Operational Noise Impact Assessment



## **APPENDIX B**

### **CONSTRUCTION AND OPERATIONAL NOISE IMPACT ASSESSMENT**

#### **1. Introduction**

1.1.1 This appendix provides the details of the assessment of the potential construction and operation noise impact from the proposed temporary Sewage Pumping Station (TSPS) to nearby noise sensitive receivers.

#### **2. Environmental Legislation, Plans, Standards and Criteria**

##### **2.1 Environmental Legislation, Plans, Standards and Criteria**

2.1.1 The noise impacts were assessed in accordance with the methodology and criteria laid out in the Technical Memoranda made under the Environmental Impact Assessment Ordinance (EIAO).

2.1.2 The Noise Control Ordinance (NCO) provides the statutory framework for noise control. The NCO invokes the following four Technical Memoranda, which define the technical means for noise assessment:

- Technical Memorandum on Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM);
- Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM);
- Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM); and
- Technical Memorandum on Noise from Percussive Piling (PP-TM)

2.1.3 The NCO and the accompanying Technical Memoranda provide a mechanism for assessing noise levels and the statutory power to control noise.

2.1.4 With regard to the assessment of the operational and construction noise impacts the NCO designates acceptable noise levels for Noise Sensitive Receivers (NSRs) on the basis of an Area Sensitivity Rating (ASR), based on the characteristics of the area in which the NSRs are located. The Categories are rural, village, low-density residential, or urban. Within these areas, the presence of “influencing factors” (such as the presence of major roads) can further effect the ASR and therefore the acceptable noise level (see **Table 1**).



**Table 1 Area Sensitivity Ratings**

Type of Area Containing NSR	Degree to which NSR is affected by Influencing Factor		
	Not Affected	Indirectly Affected	Directly Affected
Rural Area	A	B	B
Urban Area	B	C	C
Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
Area other than those above	B	B	C

## 2.2 Construction Phase

2.2.1 Under the GW-TM, the construction activity Noise from the site is not restricted during the 0700 – 1900 hours on weekdays, except Public Holidays. However, the EIAO-TM identifies a general daytime construction noise limit of  $Leq_{(30 \text{ minutes})}$  75 dB(A) for domestic premises and  $Leq_{(30 \text{ minutes})}$  70 dB(A) for educational institutes during normal teaching hours ( $Leq_{(30 \text{ minutes})}$  65 dB(A) during examination hours). This standard has been used as an assessment criterion in the construction noise assessment.

## 2.3 Operation Phase

2.3.1 The operational noise emitted from the Proposed TSPS is controlled under the IND-TM. According to the IND-TM, the Acceptable Noise Levels (ANLs) for different Area Sensitivity Ratings (ASRs) are given in **Table 2**. The ANL is based upon the type of area within which the NSR is and the effect of Influencing factors such as major roads and industrial activity.

**Table 2 Acceptable Noise Levels (ANLs)**

Time Period	ASR A	ASR B	ASR C
Day (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)			
Night (2300 to 0700 hours)	50	55	60

2.3.2 When assessed in accordance with the IND-TM, the level of the intruding noise at the façade of the nearest sensitive receiver should be at least 5 dB(A) below the appropriate ANL shown in Table 3 of the IND-TM or, in the case of the background



being more than 5dB(A) lower than the ANL, the predicted noise level should not exceed the background noise level.

- 2.3.3 For assessing operational noise impacts of the TSPS, the Area Sensitivity Rating (ASR) at the identified NSRs is defined in accordance with the IND-TMs. The North Lantau Expressway is an Influencing Factor (IF) because it has an annual average daily traffic (AADT) flow in excess of 30,000. The 2011 statistics from the Transport Department show that the road had an AADT flow of 42,540. In addition, the Hong Kong International Airport is an IF. An Area Sensitivity Rating of “B” is therefore assigned for the NSRs indirectly influenced by the IF and “C” for NSR directly influenced by the IF according to the IND-TM.
- 2.3.4 At the time of preparation of this Project Profile, Tung Chung Area 56 is fenced off with hoardings thus is inaccessible for carrying prevailing noise measurements within Tung Chung Area 56. The prevailing noise level in the vicinity of Project has therefore made reference to the Baseline Monitoring Report (submitted under condition 4.3 of the Environmental Permit No. EP/354/2009/A ([http://www.hzmbenpo.com/ep\\_docs/HKBCF\\_HY201002/503/Baseline\\_Report\\_Version\\_C.pdf](http://www.hzmbenpo.com/ep_docs/HKBCF_HY201002/503/Baseline_Report_Version_C.pdf))). Noise measurement results at a Noise Sensitive Receiver NMS3 – Ho Yu College (roof top façade measurement) are considered to be representative of the prevailing noise level in the vicinity of Project in view of its location and the surrounding conditions. The baseline noise monitoring results (measured during October - November 2011) are summarized in **Table 3**.

**Table 3 Noise Assessment Criteria adopted in the Assessment**

Location	Time Period	Prevailing Noise Levels, dB(A) [1]	ASR	ANL-5 dB(A)	Criteria dB(A) [2]
NMS3 Ho Yu College (Rooftop, façade measurement)	Daytime 0700-1900 hrs on normal weekdays	$L_{eq(30\text{ min})} = 66.3$	B	60	60
	Evening-time 1900-2300 hrs on all days & Daytime 0700-1900 hrs on holidays	$L_{eq(5\text{ min})} = 61.4$			
	Night-time 2300-0700 hrs of the next day	$L_{eq(5\text{ min})} = 57.1$	B	50	50

Notes to Table 3

[1] measured mean noise levels

[2] the lower value of the (ANL-5) and the measured prevailing noise level



- 2.3.5 As the prevailing background noise level is higher than the (ANL-5) dB(A) value, the ANL-5 value is used as required under the EIAO-TM.
- 2.3.6 In any event, the ASR assumed in this assessment is for indicative assessment only. It should be noted that fixed noise sources are controlled under section 13 of the NCO. Nothing in this assessment shall bind the Noise Control Authority in assessing noise from these sources upon the receipt of complaints. The Authority shall assess the noise impacts based on the contemporary conditions.

### 3. Noise Sensitive Receivers

- 3.1.1 Potential Noise sensitive receivers have been identified in accordance with the criteria set out in the EIAO-TM. The Noise Sensitive Receivers selected for the assessment are set out in **Table 4**. Locations of the NSRs are shown in **Figure 2**.

**Table 4 Representative Noise Sensitive Receivers**

NSR ID	Description	Number of Floors	Approximate Horizontal Distance from the TSPS Boundary (m)	Land Use Nature
ANSR1	Monterey Cove Tower 1	49	222	Residential
ANSR2	Ho Yu Primary School	8	350	Educational
ANSR3*	Block 2 Tung Chung Area 56 Public Housing Development	N/A	22 (31#)	Residential
ANSR4*	Proposed School in Tung Chung Area 89	N/A	29 (36#)	Educational
ANSR5*	Block 1 Tung Chung Area 56 Public Housing Development	N/A	55 (59#)	Residential

Notes:

\* Represents planned noise sensitive receivers.

# Horizontal separation measured from the NSR to Dog House for Exhaust of TSPS.

### 4. Construction Noise Impact Assessment

#### 4.1 Identification of Noise Source





- 4.1.1 The main source of noise impacts arising from the construction phase of the TSPS would be the use of Power Mechanical Equipment (PME) for carrying out the construction works and is provided in **Table 5**.
- 4.1.2 The inventory of project specific powered mechanical equipment for each works type was developed in collaboration with the Project Proponent and DSD and is considered to be appropriate and practical for completing works within the proposed works programme.

**Table 5 Powered Mechanical Equipment Inventory**

Construction Activity	Power Mechanical Equipment
Surface Breaking	Excavator Mounted Hydraulic Breaker
	Dump Truck
	Air Compressor
	Generator
Excavation	Excavator
	Dump Truck
	Generator
	Air Compressor
Construction of Superstructure	Crane (diesel)
	Saw, Circular, Wood
	Chipper, hand held
	Poker, Vibratory
	Concrete Lorry Mixer
	Air Compressor
	Concrete Pump
	Generator, Silenced
	Bar Bender/Cutter
E&M Installations	Crane (diesel)
	Lorry
	Air Compressor
	Generator

## 4.2 Assessment Methodology

- 4.2.1 The assessment followed the procedures given in the GW-TM. For the assessment of noise from PME, the distance attenuation was estimated using the standard formula:



Distance Attenuation in dB(A) =  $20 \log D + 8$  [where D is the distance in meters]

4.2.2 Sound Power Levels of the equipment were taken from Table 3 of the GW-TM and BS5228: Part 1: 2009. Groups of equipment likely to be employed for each construction task are shown in **Appendix B1**. The equipment lists are considered realistic and practicable. All works would be carried out in the non-restricted hours (0700-1900 hours).

4.2.3 Noise impact was assessed based on the following three assumptions:

- All PME required for construction would be located inside the TSPS site boundary. The horizontal distance was measured from the TSPS site boundary to the nearest NSR in the vicinity;
- A +3dB(A) façade correction was added to the predicted noise levels to account for the façade effect at each NSR; and
- Noise impacts at the nearest sensitive façades of the residential buildings to the source positions were assessed.

### 4.3 Prediction and Evaluation of Environmental Impacts

4.3.1 The predicted construction noise levels at each existing noise sensitive receiver are summarized in **Table 6**. Noise exceedances were predicted at the representative educational ANSR 2 during surface breaking. Noise mitigation measures would be required and the calculation is shown in **Appendix B1**.

**Table 6 Predicted Noise Levels at Existing NSRs (Unmitigated)**

Construction Activity	Predicted Noise Levels, dB(A)	
	ANSR 1	ANSR 2
Surface Breaking	71	<b><u>68</u></b>
Excavation	67	63
Construction of Superstructure	67	63
E&M Installations	64	60
Criteria	75	70/65 (Exam)

Notes: Underlined bold numbers refers to not meeting the noise criteria.

### 4.4 Mitigation of Potential Adverse Environmental Impacts

4.4.1 The predicted noise levels show that unmitigated construction activities would exceed the examination noise criteria at the ANSR2. Noise mitigation measures are therefore required to alleviate the noise impacts. Noise emissions from construction



sites could be minimized by using quiet plants, scheduling of construction outside school examination periods.

4.4.2 In addition to the use of silenced PME, the good site practices listed below should be adopted to further reduce any impact on the NSRs during the construction of the TSPS and should be included in the contract.

- Only well-maintained plant should be operated on site and should be serviced regularly during the construction phase;
- Silencers or mufflers on construction equipment should be utilized, if found necessary, to further reduce noise, and should be properly maintained during the construction phase;
- Mobile plant should be located as far away from the NSRs as reasonable possible
- Machines and plant (i.e. trucks) which are used intermittently should be turned off or throttled down to a minimum during periods of non-use;
- Equipment that produces noise strongly in one direction should be orientated to direct noise away from the NSRs
- Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activity

4.4.3 The mitigated construction noise levels are shown in **Table 7**. Detailed calculations of the construction noise levels at the representative noise sensitive receivers under the mitigated scenario are presented in **Appendix B1**.

4.4.4 With the adoption of quiet plant PME, the noise exceedances of the representative noise sensitive receivers will comply with the required noise criteria.

**Table 7 Predicted Noise Levels at Existing NSRs (Mitigated)**

Construction Activity	Predicted Noise Levels, dB(A)	
	ANSR 1	ANSR 2
Surface Breaking	67	63
Excavation	67	63
Construction of Superstructure	67	63
E&M Installations	64	60
Criteria	75	70 / 65 (Exam)

## 4.5 Conclusion



4.5.1 With the adoption of quiet PME, the predicted mitigated construction noise levels at the representative NSRS comply with the daytime and evening noise criteria. Thus, no adverse construction noise impact would be expected.

## 5. Operational Noise Impact Assessment

### 5.1 Identification of Noise Source

5.1.1 Fixed plant noise impact would arise during the operation phase of the Temporary Sewage Pumping Station (TSPS). The major noise sources from the TSPS would be the operation of sewage pumps, deodorizer fans, mechanically raked bar screens and exhaust fans, based on the DSD's Design Memorandum.

### 5.2 Assessment Methodology

5.2.1 The assessment followed the procedures given in the IND-TM. For the assessment of noise from equipment, the distance attenuation was estimated using the standard formula as mentioned above in Section 4.2.1.

5.2.2 The estimated SWL of equipment was referenced from the specifications of similar items of equipment provided by the contractor/plant supplier and other similar projects. The deodorizer unit, pump sets and screening facilities will be located within the structure of the TSPS within a 200 mm thick reinforced concrete structure with a soundproof door. This is expected to have a noise attenuation of 20 dB(A).

5.2.3 Noise impact was assessed on the basis of the following assumptions

- The distance separation was measured from the TSPS site boundary to the nearest NSR in the vicinity;
- A +3 dB(A) façade correction was added to the predicted noise levels to account for the façade effect at each NSR;
- A 6 dB(A) tonality correction was added to the predicted noise level at each NSR; and
- Noise impacts at the nearest NSR façades were assessed.

### 5.3 Prediction and Evaluation of Environmental Impacts

5.3.1 The predicted operational noise levels at identified NSRs are summarized in **Table 8**. Noise mitigation measures would be required and the detailed calculation is shown in **Appendix B2**.



**Table 8 Predicted Noise Levels at Representative NSRs (Unmitigated)**

NSR ID	Predicted Noise Levels, dB(A)	Noise Criteria Day and Evening / Night	Exceedance	
			Day & Evening	Night
ANSR1	37	60 / 50	No	No
ANSR2	33	60 / no night-time teaching	No	N/A
ANSR3*	54	60 / 50	No	Yes
ANSR4*	53	60 / no night-time teaching	No	N/A
ANSR5*	48	60 / 50	No	No

Note: \* represents planned noise sensitive receiver

5.3.2 Nighttime noise exceedances were predicted at the representative planned residential ANSR3. Noise mitigation measures would be required during the operational phase.

#### 5.4 Mitigation of Potential Adverse Environmental Impacts

5.4.1 In order to reduce the operational noise levels to within the ANL daytime and night-time criteria, the following mitigation measures will be implemented:

- A 5 dB(A) noise attenuation is assumed for the louvers fitted for the ventilation fans

5.4.2 The predicted mitigated operational noise levels at identified NSRs are summarized in **Table 9**. With the noise mitigation measures implemented, the predicted mitigated operational noise levels would comply with the daytime and nighttime noise criteria. The detailed calculation is presented in **Appendix B2**.

**Table 9 Predicted Noise Levels at Representative NSRs (Mitigated)**

NSR ID	Predicted Noise Levels, dB(A)	Noise Criteria Day and Evening / Night
ANSR1	33	60 / 50
ANSR2	29	60 / no night-time teaching
ANSR3*	50	60 / 50
ANSR4*	49	60 / no night-time teaching
ANSR5*	44	60 / 50

Note: \* represents planned noise sensitive receiver



## **5.5 Conclusion**

5.5.1 The noise impacts associated with the operation of the TSPS were assessed. The assessment result indicated that the operation noise levels predicted at representative NSRS will exceed with the noise criteria. However, with the adoption of acoustic louvers, and equipments are enclosed in a concrete structure, the operational noise levels at the representative noise sensitive receivers due to the operation of the TSPS would comply with the relevant noise criteria.

Appendix B1  
Construction Noise Assessment (Unmitigated)

ANSR 1, Monterey Cove Tower 1

Construction Activity	PME	GW-TM Code	Quantity	SWL dB (A)	Total SWL dB (A)	Distance Separation (m)	Distance Attenuation dB (A)	Correction for Barrier dB (A)	Facade Correction dB(A)	Corrected Noise Level CNL dB (A)	Overall CNL dB(A)	Noise Criterion dB(A)
Surface Breaking	Excavator Mounted Hydraulic Breaker	CNP-028	1	122	122	222	-55		3	70	71	
	Dump Truck	CNP-067	1	117	117	222	-55		3	65		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
Excavation	Generator	CNP-101	1	108	108	222	-55		3	56	67	
	Excavator	CNP-112	1	112	112	222	-55		3	60		
	Dump Truck	CNP-067	1	117	108	222	-55		3	65		
	Generator	CNP-101	1	108	108	222	-55		3	56		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Crane (diesel)	CNP-048	1	112	112	222	-55		3	60		
	Saw, Circular, Wood	CNP-201	1	108	108	222	-55		3	56		
	Chipper, hand held	CNP-043	1	112	112	222	-55		3	60		
	Forker, Vibratory	CNP-170	1	113	113	222	-55		3	61		
	Concrete Lorry/Mixer	CNP-044	1	109	109	222	-55		3	57		
Construction of Superstructure	Air Compressor	CNP-003	1	104	104	222	-55		3	52	67	75 dB (A)/All domestic premises including temporary housing accommodation)
	Generator	CNP-101	1	108	108	222	-55		3	56		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Crane (diesel)	CNP-048	1	112	112	222	-55		3	60		
	Saw, Circular, Wood	CNP-201	1	108	108	222	-55		3	56		
	Chipper, hand held	CNP-043	1	112	112	222	-55		3	60		
	Forker, Vibratory	CNP-170	1	113	113	222	-55		3	61		
	Concrete Lorry/Mixer	CNP-044	1	109	109	222	-55		3	57		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Generator	CNP-101	1	108	108	222	-55		3	56		
E&M Installations	Air Compressor	CNP-003	1	104	104	222	-55		3	52	64	
	Generator	CNP-101	1	108	108	222	-55		3	56		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Generator	CNP-101	1	108	108	222	-55		3	56		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Generator	CNP-101	1	108	108	222	-55		3	56		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Generator	CNP-101	1	108	108	222	-55		3	56		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Generator	CNP-101	1	108	108	222	-55		3	56		

ANSR 2, Ho Yu Primary School

Construction Activity	PME	GW-TM Code	Quantity	SWL dB (A)	Total SWL dB (A)	Distance Separation (m)	Distance Attenuation dB (A)	Correction for Barrier dB (A)	Facade Correction dB(A)	Corrected Noise Level CNL dB (A)	Overall CNL dB(A)	Noise Criterion dB(A)
Surface Breaking	Excavator Mounted Hydraulic Breaker	CNP-028	1	122	122	350	-59		3	66	68	
	Dump Truck	CNP-067	1	117	117	350	-59		3	61		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
Excavation	Generator	CNP-101	1	108	108	350	-59		3	52	63	
	Excavator	CNP-112	1	112	112	350	-59		3	56		
	Dump Truck	CNP-067	1	117	117	350	-59		3	61		
	Generator	CNP-101	1	108	108	350	-59		3	52		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Crane (diesel)	CNP-048	1	112	112	350	-59		3	56		
	Saw, Circular, Wood	CNP-201	1	108	108	350	-59		3	52		
	Chipper, hand held	CNP-043	1	112	112	350	-59		3	56		
	Forker, Vibratory	CNP-170	1	113	113	350	-59		3	57		
	Concrete Lorry/Mixer	CNP-044	1	109	109	350	-59		3	53		
Construction of Superstructure	Air Compressor	CNP-003	1	104	104	350	-59		3	48	63	70 dB (A) (daytime noise standard), and 65 dB (A) (during examination)
	Generator	CNP-101	1	108	108	350	-59		3	52		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Crane (diesel)	CNP-048	1	112	112	350	-59		3	56		
	Saw, Circular, Wood	CNP-201	1	108	108	350	-59		3	52		
	Chipper, hand held	CNP-043	1	112	112	350	-59		3	56		
	Forker, Vibratory	CNP-170	1	113	113	350	-59		3	57		
	Concrete Lorry/Mixer	CNP-044	1	109	109	350	-59		3	53		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Generator	CNP-101	1	108	108	350	-59		3	52		
E&M Installations	Air Compressor	CNP-003	1	104	104	350	-59		3	48	60	
	Generator	CNP-101	1	108	108	350	-59		3	52		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Generator	CNP-101	1	108	108	350	-59		3	52		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Generator	CNP-101	1	108	108	350	-59		3	52		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Generator	CNP-101	1	108	108	350	-59		3	52		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Generator	CNP-101	1	108	108	350	-59		3	52		

Notes:

- PME = Powered Mechanical Equipment
- SWL = Sound Power Level
- TM = Technical Memorandum on Noise from Construction Work other than Percussive Piling

Appendix B1  
Construction Noise Assessment (Mitigated)

ANSR 1, Monterey Cove Tower 1

Construction Activity	PME	GW-TM Code	Quantity	SWL dB (A)	Total SWL dB (A)	Distance Separation (m)	Distance Attenuation dB (A)	Correction for Barrier dB (A)	Facade Correction dB(A)	Corrected Noise Level CNL dB (A)	Overall CNL dB(A)	Noise Criterion dB(A)
Surface Breaking	Breaker, hand-held, mass > 35kg	CNP-026	1	114	114	222	-55		3	62	67	
	Dump Truck	CNP-067	1	117	117	222	-55		3	65		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
Excavation	Generator	CNP-101	1	108	108	222	-55		3	56	67	
	Excavator	CNP-112	1	112	112	222	-55		3	60		
	Dump Truck	CNP-067	1	117	117	222	-55		3	65		
Construction of Superstructure	Generator	CNP-101	1	108	108	222	-55		3	56	67	75 dB (A)(All domestic premises including temporary housing accommodation)
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Crane (diesel)	CNP-048	1	112	112	222	-55		3	60		
	Saw, Circular, Wood	CNP-201	1	108	108	222	-55		3	56		
	Chipper, hand held	CNP-043	1	112	112	222	-55		3	60		
	Poker, Vibratory	CNP-170	1	113	113	222	-55		3	61		
	Concrete Lorry Mixer	CNP-044	1	109	109	222	-55		3	57		
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Concrete Pump	CNP-047	1	109	109	222	-55		3	57		
	Generator, Silenced	CNP-102	1	100	100	222	-55		3	48		
	Bar Bender/Cutter	CNP-021	1	90	90	222	-55		3	38		
	Crane (diesel)	CNP-048	1	112	112	222	-55		3	60		
E&M Installations	Lorry	CNP-141	1	112	112	222	-55		3	60	64	
	Air Compressor	CNP-003	1	104	104	222	-55		3	52		
	Generator	CNP-101	1	108	108	222	-55		3	51		

ANSR 2, Ho Yu Primary School

Construction Activity	PME	GW-TM Code	Quantity	SWL dB (A)	Total SWL dB (A)	Distance Separation (m)	Distance Attenuation dB (A)	Correction for Barrier dB (A)	Facade Correction dB(A)	Corrected Noise Level CNL dB (A)	Overall CNL dB(A)	Noise Criterion dB(A)
Surface Breaking	Breaker, hand-held, mass > 35kg	CNP-026	1	114	114	350	-59		3	56	63	
	Dump Truck	CNP-067	1	117	117	350	-59		3	61		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
Excavation	Generator	CNP-101	1	108	108	350	-59		3	52	63	
	Excavator	CNP-112	1	112	112	350	-59		3	56		
	Dump Truck	CNP-067	1	117	117	350	-59		3	61		
Construction of Superstructure	Generator	CNP-101	1	108	108	350	-59		3	52	63	70 dB (A) (daytime noise standard), and 65 dB (A) (during examination)
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Crane (diesel)	CNP-048	1	112	112	350	-59		3	56		
	Saw, Circular, Wood	CNP-201	1	108	108	350	-59		3	52		
	Chipper, hand held	CNP-043	1	112	112	350	-59		3	56		
	Poker, Vibratory	CNP-170	1	113	113	350	-59		3	57		
	Concrete Lorry Mixer	CNP-044	1	109	109	350	-59		3	53		
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Concrete Pump	CNP-047	1	109	109	350	-59		3	53		
	Generator, Silenced	CNP-102	1	100	100	350	-59		3	44		
	Bar Bender/Cutter	CNP-021	1	90	90	350	-59		3	34		
	Crane (diesel)	CNP-048	1	112	112	350	-59		3	56		
E&M Installations	Lorry	CNP-141	1	112	112	350	-59		3	56	60	
	Air Compressor	CNP-003	1	104	104	350	-59		3	48		
	Generator	CNP-101	1	108	108	350	-59		3	51		

Notes:

PME = Powered Mechanical Equipment

SWL = Sound Power Level

TM = Technical Memorandum on Noise from Construction Work other than Percussive Piling



Appendix B2  
Operational Noise Assessment (Unmitigated)

Monterey Cove Tower 1

NSR	Equipment	No. of Items Duty	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction (Ref. 3)	Distance (m)	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime		
ANSR 1	Submersible Pumps (Ref.1)	3	1	85	90	20	222	55	6	0	0	3	24	NO	NO	60	50
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	222	55	6	0	0	3	17				
	Mechanically raked bar screen (Ref.1)	2	0	89	92	20	222	55	6	0	0	3	26				
	Exhaust Fan (Ref. 1)	2	0	79	82	0	222	55	6	0	0	3	36				

Ho Yu Primary School

NSR	Equipment	No. of Items Duty	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction (Ref. 3)	Distance (m)	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime		
ANSR 2	Submersible Pumps (Ref.1)	3	1	85	90	20	350	59	6	0	0	3	20	NO	N/A, no nighttime class	60	N/A, no nighttime class
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	350	59	6	0	0	3	13				
	Mechanically raked bar screen (Ref.1)	2	0	89	92	20	350	59	6	0	0	3	22				
	Exhaust Fan (Ref. 1)	2	0	79	82	0	350	59	6	0	0	3	32				

Block 2 Tung Chung Area 56 Public Housing Development

NSR	Equipment	No. of Items Duty	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction (Ref. 3)	Distance (m) #	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime		
ANSR 3	Submersible Pumps (Ref.1)	3	1	85	90	20	31	38	6	0	0	3	41	NO	YES	60	50
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	31	38	6	0	0	3	34				
	Mechanically raked bar screen (Ref.1)	2	0	89	92	20	31	38	6	0	0	3	43				
	Exhaust Fan (Ref. 1)	2	0	79	82	0	31	38	6	0	0	3	53				

Proposed School in Tung Chung Area 89

NSR	Equipment	No. of Items Duty	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction (Ref. 3)	Distance (m) #	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime		
ANSR 4	Submersible Pumps (Ref.1)	3	1	85	90	20	36	39	6	0	0	3	40	NO	N/A, no nighttime class	60	N/A, no nighttime class
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	36	39	6	0	0	3	33				
	Mechanically raked bar screen (Ref.1)	2	0	89	92	20	36	39	6	0	0	3	42				
	Exhaust Fan (Ref. 1)	2	0	79	82	0	36	39	6	0	0	3	52				

Block 1 Tung Chung Area 56 Public Housing Development

NSR	Equipment	No. of Items Duty	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction (Ref. 3)	Distance (m) #	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime		
ANSR 5	Submersible Pumps (Ref.1)	3	1	85	90	20	59	43	6	0	0	3	35	NO	NO	60	50
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	59	43	6	0	0	3	29				
	Mechanically raked bar screen (Ref.1)	2	0	89	92	20	59	43	6	0	0	3	38				
	Exhaust Fan (Ref. 1)	2	0	79	82	0	59	43	6	0	0	3	48				

Remarks

- (Ref. 1) The estimated sound power level of submersible pumps, mechanically raked bar screen and exhaust fans were made reference from the Project Profile for Yuen Long Kau Hui No. 2 Sewage Pumping Station (EIAO Register No. DIR-173/2008). The Yuen Long Kau Hui No.2 Sewage Pumping Station average dry weather (ADWF) flow is 5,000m<sup>3</sup>/day which twice the ADWF of the Tung Chung Area 56 TSPS of 2,311m<sup>3</sup>/day. Therefore, for the purpose of this assessment the Yuen Long Kau Hui No. 2 SPS will be adopted as a worst case reference.
- (Ref. 2) A worst case assumption of +6 dB(A) tonality correction is applied.
- (Ref. 3) All plants are enclosed inside a concrete structure of the TSPS building. A -20 dB(A) noise reduction has been assumed. For ventilation exhaust fan that may have openings, no screening correction has been applied as a conservative approach.
- # Horizontal separation measured from the NSR to Dog House for Exhaust of TSPS

Appendix B2  
Operational Noise Assessment (Mitigated)

Monterey Cove Tower 1

NSR	Equipment	No. of Items	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction	Distance (m)	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		Predicted Operational Noise Level, dB(A)	(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime			
ANSR 1	Submersible Pumps (Ref. 1)	3	1	85	90	20	222	55	6	0	0	3	24	NO	NO	33	60	50
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	222	55	6	0	0	3	17					
	Mechanically raked bar screen (Ref. 1)	2	0	89	92	20	222	55	6	0	0	3	26					
	Exhaust Fan (Ref. 3)	2	0	79	82	5	222	55	6	0	0	3	31					

Ho Yu Primary School

NSR	Equipment	No. of Items	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction	Distance (m)	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		Predicted Operational Noise Level, dB(A)	(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime			
ANSR 2	Submersible Pumps (Ref. 1)	3	1	85	90	20	350	59	6	0	0	3	20	NO	N/A, no nighttime class	29	60	N/A, no nighttime class
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	350	59	6	0	0	3	13					
	Mechanically raked bar screen (Ref. 1)	2	0	89	92	20	350	59	6	0	0	3	22					
	Exhaust Fan (Ref. 3)	2	0	79	82	5	350	59	6	0	0	3	27					

Block 2 Tung Chung Area 56 Public Housing Development

NSR	Equipment	No. of Items	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction	Distance (m)	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		Predicted Operational Noise Level, dB(A)	(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime			
ANSR 3	Submersible Pumps (Ref. 1)	3	1	85	90	20	31	38	6	0	0	3	41	NO	NO	50	60	50
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	31	38	6	0	0	3	34					
	Mechanically raked bar screen (Ref. 1)	2	0	89	92	20	31	38	6	0	0	3	43					
	Exhaust Fan (Ref. 3)	2	0	79	82	5	31	38	6	0	0	3	48					

Proposed School in Tung Chung Area 89

NSR	Equipment	No. of Items	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction	Distance (m)	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		Predicted Operational Noise Level, dB(A)	(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime			
ANSR 4	Submersible Pumps (Ref. 1)	3	1	85	90	20	36	39	6	0	0	3	40	NO	N/A, no nighttime class	49	60	N/A, no nighttime class
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	36	39	6	0	0	3	33					
	Mechanically raked bar screen (Ref. 1)	2	0	89	92	20	36	39	6	0	0	3	42					
	Exhaust Fan (Ref. 3)	2	0	79	82	5	36	39	6	0	0	3	47					

Block 1 Tung Chung Area 56 Public Housing Development

NSR	Equipment	No. of Items	No. of Items Standby	Sound Power Level	Total Sound Power Level, dB(A) (duty items)	Screening/Barrier/Enclosure reduction	Distance (m)	Distance Attenuation, dB(A)	Tonality correction, dB(A) (Ref. 2)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction	Sound Pressure Level at NSR, dB(A)	Exceed Noise Criteria		Predicted Operational Noise Level, dB(A)	(ANL-5) Criteria Daytime	(ANL-5) Criteria Nighttime
														Daytime	Nighttime			
ANSR 5	Submersible Pumps (Ref. 1)	3	1	85	90	20	59	43	6	0	0	3	35	NO	NO	44	60	50
	Deodorizer Fan (Ref. 1)	1	1	83	83	20	59	43	6	0	0	3	29					
	Mechanically raked bar screen (Ref. 1)	2	0	89	92	20	59	43	6	0	0	3	38					
	Exhaust Fan (Ref. 3)	2	0	79	82	5	59	43	6	0	0	3	43					

Remarks

- (Ref. 1) Plants are enclosed inside a concrete structure of the TSFS building. A -20 dB(A) noise reduction has been assumed.
- (Ref. 2) A worst case assumption of +6 dB(A) tonality correction is applied.
- (Ref. 3) Acoustic louvers can be installed for the ventilation exhaust fan as noise mitigation measures. Assume a -5dB(A) noise reduction.

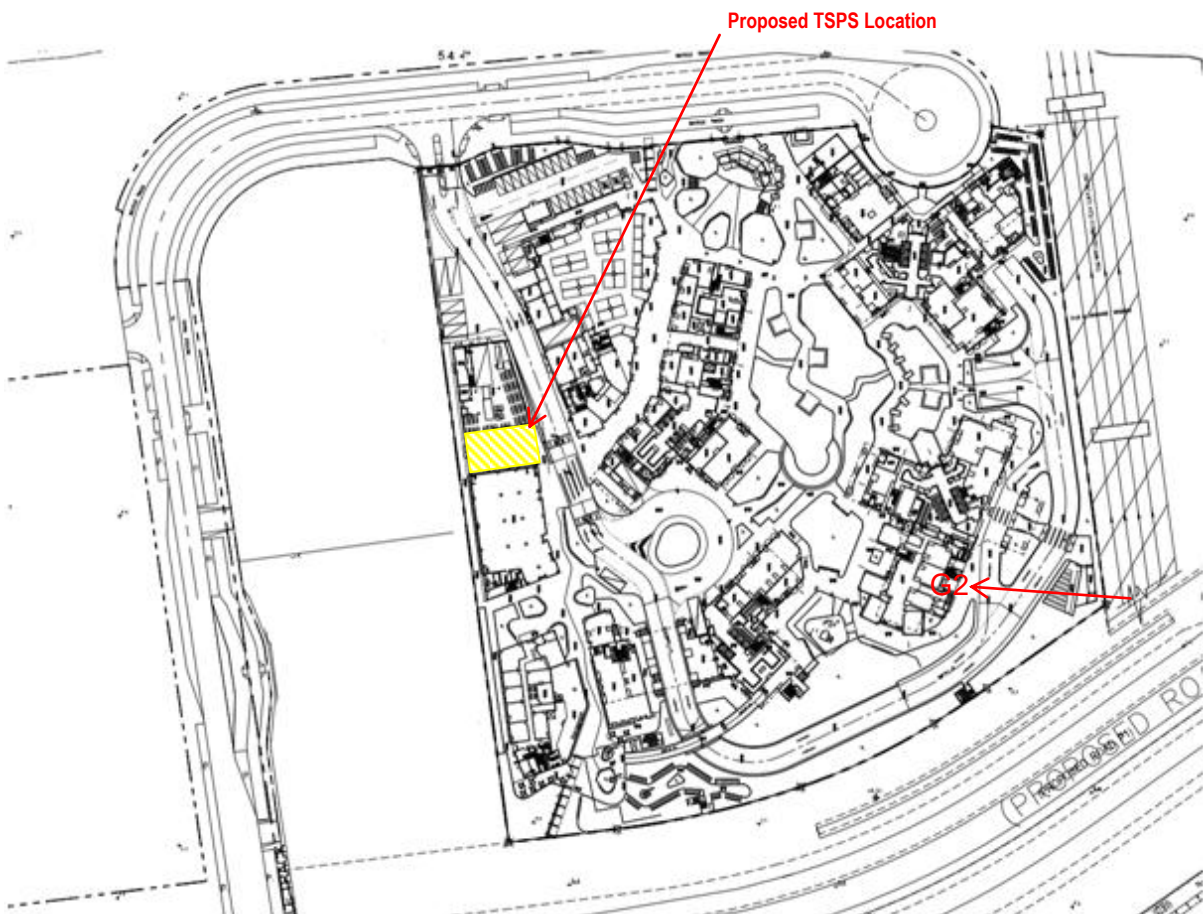
# Horizontal separation measured from the NSR to Dog House for Exhaust of TSFS

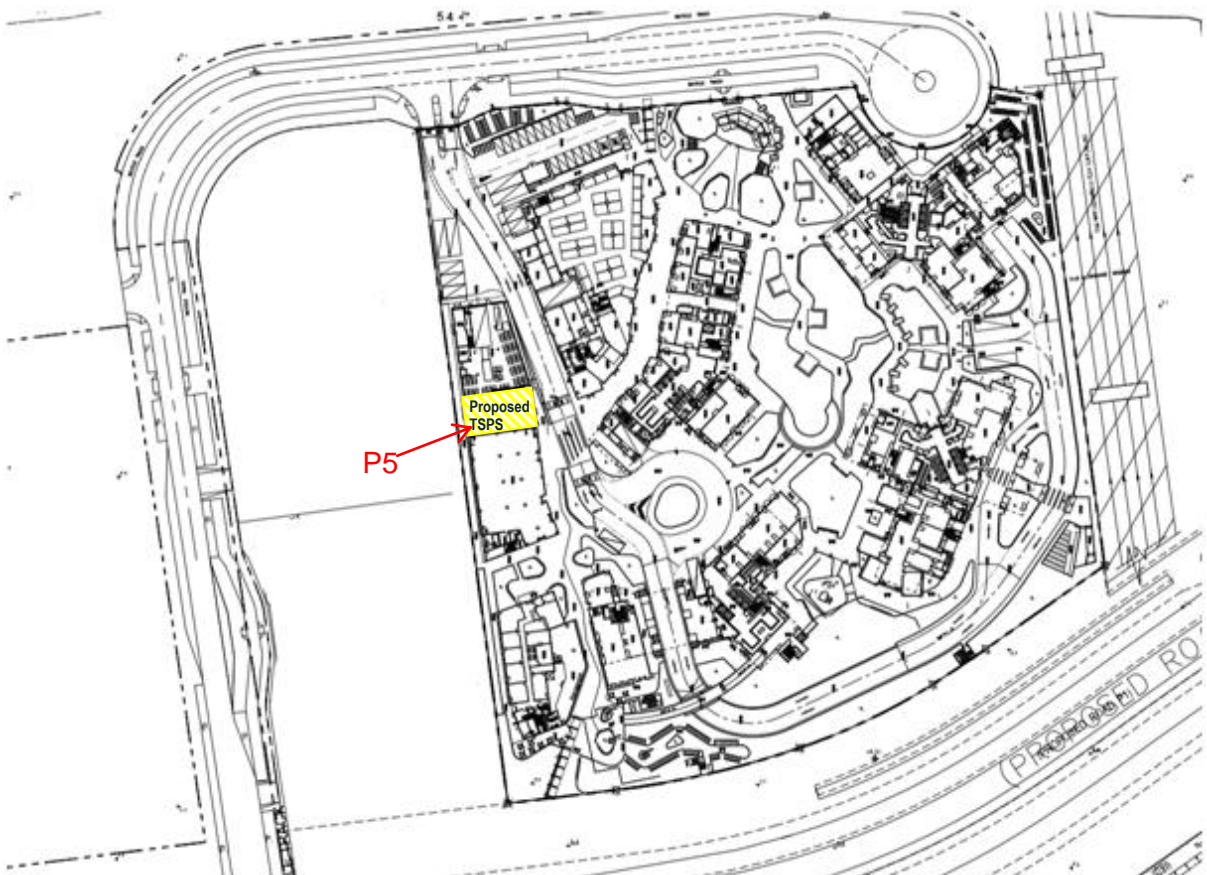


## **Appendix C**

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### Site Surroundings Photos





# Plan Design Enable

## Asia Pacific Presence

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