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1 November 2018

**By Fax:**

Dear

**Environmental Impact Assessment (EIA) Ordinance, Cap 499**  
**Project Title: Widening and Reconstruction of Tai Po Road (Sha Tin Section)**  
**Submission of under Condition 2.3 of Environmental Permit No. EP-463/2013/B**

We refer to your memo under reference enclosing an updated EM&A Manual (the "Manual") in response to the requirements under Condition 2.3 of the Environmental Permit (EP) No. EP-463/2013/B.

The submitted Manual details the EM&A requirements recommended in the EIA Review Report, and has been certified by the ET leader and verified by the IEC. The Manual is therefore considered acceptable to be deposited under Condition 2.3 of EP No. EP-463/2013/B.

Yours Sincerely,

(Wang YUEN)

Senior Environmental Protection Officer  
for Director of Environmental Protection

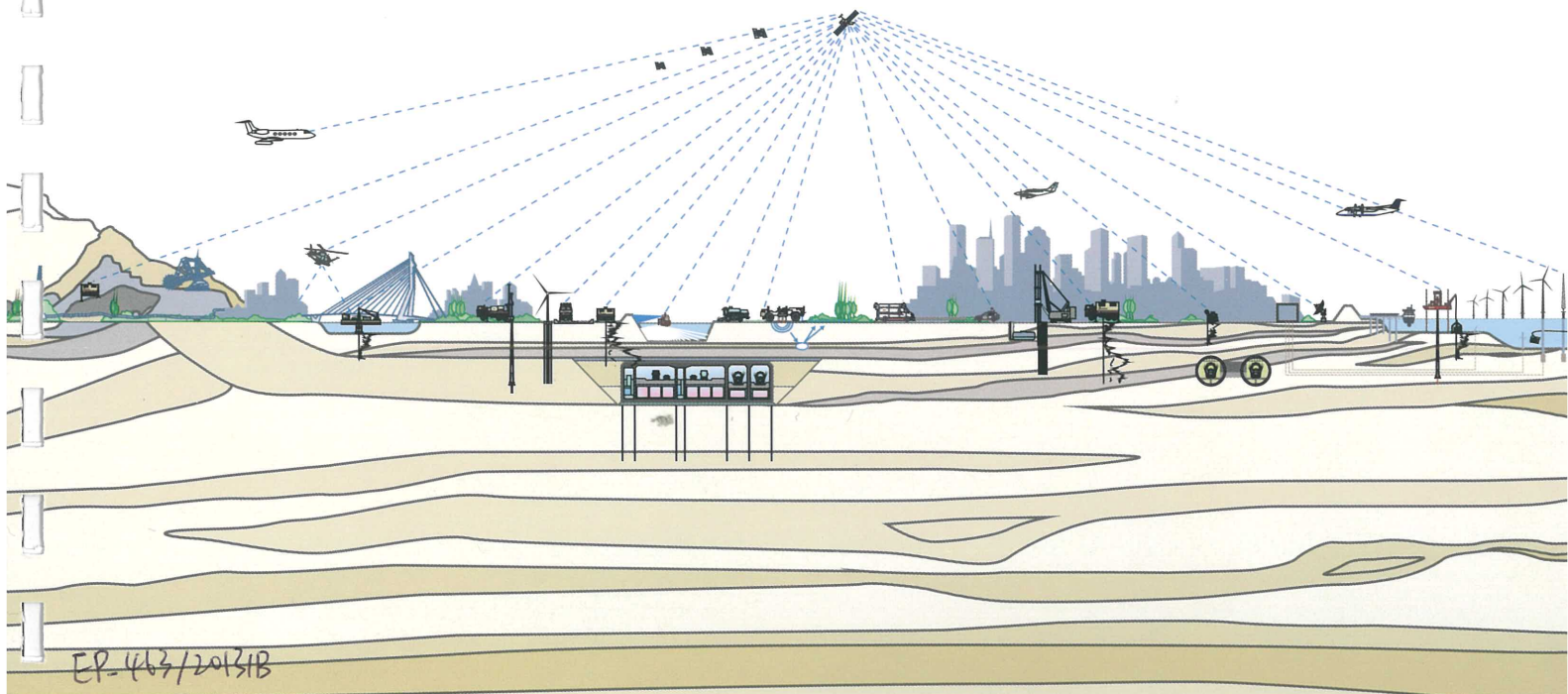
**UPDATED ENVIRONMENTAL MONITORING AND AUDIT MANUA**

**Client** : Civil Engineering and Development D

**Contract No.** : NDO 03/2018

**Contract Name** : Road Widening and Retrofitting Noise  
on Tai Po Road (Sha Tin Section)

**Reference No.** : 0064/18/ED/0122D



EP-463/2018/B

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### UPDATED ENVIRONMENTAL MONITORING AND AUDIT MANUAL

**Client** : Civil Engineering and Development Department  
**Contract No.** : NDO 03/2018  
**Contract Name** : Road Widening and Retrofitting Noise Barriers  
on Tai Po Road (Sha Tin Section)  
**Reference No.** : 0064/18/ED/0122D  
**Prepared Date** : 26<sup>th</sup> September 2018

**Prepared by** : Sang Wu, Rex Chow

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Tony Wong  
Environmental Team Leader  
Fugro Technical Services Limited

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## **1. Introduction**

### **1.1 Purpose of the Manual**

1.1.1 This updated Environmental Monitoring and Audit (EM&A) Manual (hereafter referred as "the Manual") is prepared by Fugro Technical Services Limited (FTS) as appointed by the Civil Engineering and Development Department (CEDD).

1.1.2 Pursuant to the latest Environmental Permit (EP), EP-463/2013/B Condition 2.3, this Manual is to update to include the EM&A requirements in accordance with the information and recommendations described in the Environmental Impact Assessment (EIA) Review Report and by taking into account any specific site conditions, such as on the protection and monitoring regime of old and valuable trees, that may be changed before the construction of the road widening and retrofitting noise barriers on Tai Po Road (Sha Tin Section) (TPR-ST) (hereafter referred as "the Project").

1.1.3 This Manual provides the following updated information as specified in the previous EIA Review Report and latest EP:

- (i) Identification and recommendations for monitoring requirements for all phases of development, including:
  - identification of sensitive receivers;
  - monitoring locations;
  - monitoring parameters and frequencies;
  - monitoring equipment to be used;
  - programmes for baseline monitoring and impact monitoring; and
  - data management of monitoring results.
- (ii) The organisation management structure and procedures for auditing of the Project and implementation of mitigation measures that are recommended for the Project;
- (iii) The environmental quality performance limits for compliance auditing for each of the recommended monitoring parameters to ensure compliance with relevant environmental quality objectives, statutory or planning standards;
- (iv) Organisation and management structure and procedures for reviewing the design submissions, monitoring results and auditing the compliance of the monitoring data with the environmental quality performance limits, contractual and regulatory requirements and environmental policies and standards;
- (v) Event and Action plans for impact and compliance procedures;
- (vi) Complaints handling, liaison and consultation procedures; and
- (vii) Interim notification of exceedances, reporting procedures, report formats and reporting frequency including periodical quarterly summary reports and annual reviews to cover all construction, post-Project and operational phases of the development as required.

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1.1.4 This Manual is considered to be a working document and should be reviewed periodically and revised once substantial changes have been made.

### 1.2 Background Information

1.2.1 To address the increasing traffic demand as a result of the continuous development of Sha Tin and Ma On Shan area, Sha Tin and Ma On Shan District Traffic Study (STMOSDTS) was completed in 1995 and the EIA report (AEIAR-020/1999) - Widening and Reconstruction of Tai Po Road (Sha Tin Section) was approved by Environmental Protection Department (EPD) in November 1999. The EM&A Manual (AEIAR-20/1999) was subsequently approved by EPD in 2000.

1.2.2 The existing Tai Po Road (Sha Tin Section) (TPR-ST) was one of the existing road sections to be retrofitted with Direct Noise Mitigation Measures (DNMM) under the retrofitting policy endorsed in November 2000. Thus the DNMM works along the section of Tai Po Road from Scenery Court near Sha Tin Centre Street to Wo Che Estate near Fo Tan Road was proposed. Under the Agreement No. CE 22/2008 (HY) Retrofitting of Noise Barriers on Tai Po Road (Sha Tin Section), an Environmental Review Report (ERR) was prepared to review and optimise the extent and design of the proposed DNMM in order to provide optimum noise protection to the noise sensitive receivers along the section of Tai Po Road from Scenery Court near Sha Tin Centre Street to Wo Che Estate near Fo Tan Road.

1.2.3 The Widening and Reconstruction of TPR-ST was put on hold until 2012 because of the uncertainty of Trunk Road T4 programme. In July 2012, Technical Feasibility Statement for the Widening and Reconstruction of TPR-ST was completed by Civil Engineering and Development Department, New Territories East (CEDD/ NTE) and was approved by Development Bureau (DEVB). In September 2012, the widening and reconstruction of TPR-ST (which subsequently defined as "Package 1" under Agreement No. CE 33/2015 (HY) Widening of Tai Po Road – Design and Construction) (hereafter referred as "Package 1"), was included in Public Works Programme (PWP) as item PWP Item No. 7861TH - Widening of Tai Po Road (Sha Tin Section).

1.2.4 In September 2013, an EIA Review Report was submitted to review and update the preliminary design of the Project, so as to take into account the various changes such as project details, site conditions and requirements of the Project. Due to the updated road design criteria under the current Transport Planning & Design Manual (TPDM), there were some necessary minor changes on the road works that adopted in the previously approved EIA Report. An Environmental Permit (EP No: EP-463/2013), was granted on 9 October 2013.

1.2.5 To address the comments / concerns raised by the stakeholders and with the aim to completely resolve the envisaged traffic problems of TPR-ST after widening, an alternative Variation of Environmental Permit (VEP) road scheme was developed with minor modification to the existing diamond-shaped interchange at the junctions of Shatin Rural Committee Road (STRC Rd) and TPR-ST. In February 2015, a supporting document of application of VEP No. EP-463/2013 (hereafter referred as "SD 2015") was prepared for the acceptance of environmental implications and provisioning of necessary mitigation measures. The variation of Environmental Permit (EP No: EP-463/2013/A) was issued by EPD on 16 March 2015.



- 1.2.6 The review of retrofitting of noise barriers on TPR-ST was commenced in early 2016 and optimisation of the extent and design review of the DNMM have been completed in mid 2016 in order to provide optimum noise protection to the noise sensitive receivers (NSR) along the section of TPR-ST from Scenery Court near Sha Tin Centre Street to Wo Che Estate near Fo Tan Road. An additional vertical noise barrier of 155m long 5m high along the central medium of TPR-ST between Citylink Plaza and Wai Wah Centre is proposed to optimize noise protection to the existing dwellings at Tin Liu from potential traffic noise impacts. This additional vertical noise barrier is observed to fall within the scope of the Widening and Reconstruction of TPR-ST, but it was not considered in the EP-463/2013/A. In December 2016, a supporting document of application of VEP No. EP-463/2013/A (hereafter referred as "SD 2016") is prepared to assess the likely environmental implications associated with the proposed changes, to confirm the validity of environmental performance of the Project under EP-463/2013/A and the acceptance of environmental implications due to the provision of additional vertical noise barrier. The latest variation of Environmental Permit (EP No: EP-463/2013/B) was issued by EPD on 20 December 2016.
- 1.2.7 Under the Agreement No. CE 33/2015 (HY), in order to review the environmental impacts associated with the provision of DNMM for Sections which were not included in the extents of noise barrier works along TPR-ST under Package 1, an Environmental Review Report (ERR) for Package 2 was prepared. Since the works of provision of DNMM for Sections under Package 2 were not classified as a designated project (DP) under the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and were beyond the site boundaries that stipulated in the latest EP, EP-463/2013/B, thus the retrofitting noise barriers on Tai Po Road under Package 2 (hereafter referred as "Package 2") was not governed by EP-463/2013/B. With reference to the findings of the ERR for Package 2, it was concluded that, with the implementation of mitigation measures, there would be no insurmountable environmental impacts associated with the proposed DNMM. Therefore, the EM&A requirements with recommendations and proposed environmental mitigation measures in this Manual should also apply to Package 2.
- 1.2.8 Contract No. NE/2017/05 – Road Widening and Retrofitting Noise Barriers on Tai Po Road (Sha Tin Section) (TPR-ST) (hereafter referred as "the Contract"), is the Works Contract involved the construction of road widening and retrofitting noise barriers on TPR-ST. The general layout plan of the Contract is shown in **Figure 1.1a** and **Figure 1.1b**.
- 1.2.9 The Works of road widening on TPR-ST is classified as a designated project (DP) under the Part I of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499). The scale and scope of DP is classified as below:
- Widening and reconstruction of an approximate 1.2km long of the existing Tai Po Road (Sha Tin Section) from dual 2-lane to dual 3-lane carriageway; and improvement of the existing Sha Tin Rural Committee Road and its junctions.
- 1.2.10 The portions of Works under EP-463/2013/B are shown in **Figure 1.2**.
- 1.2.11 The Scope of works under the Contract comprises as below:
- (i) Road widening works of TPR-ST:

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- (a) widening of TPR-ST of about 1.1 kilometres between Sha Tin Rural Committee Road (STRCR) and Fo Tan Road from dual two-lane to dual three-lane;
  - (b) modification to the existing diamond interchange at TPR-ST / STRCR (STRCR Interchange);
  - (c) provision of two pedestrian lifts, re-provision of staircase and cycle track ramp at the modified STRCR Interchange;
  - (d) modification of existing cycle track subway no. NS30 near Sha Tin Plaza;
  - (e) modification of the existing footbridge no. NF40 across TPR-ST near Wo Che Street;
  - (f) modification of the existing footbridge no. NF66 near Fung Wo Lane;
  - (g) installation of noise mitigation measures between Citylink Plaza and Mei Wo House of Wo Che Estate;
  - (h) associated drainage works, waterworks, street lighting works and traffic control and surveillance system (TCSS).
- (ii) Retrofitting of noise barriers along TPR-ST:
- (a) western section between Citylink Plaza and Scenery Court;
  - (b) eastern section between Mei Wo House of Wo Che Estate and Fo Tan Road;  
and
  - (c) associated drainage works, waterworks and street lighting works.
- (iii) Associated street furniture, road marking, traffic signs, directional signs, services and utilities, and
- (iv) Associated landscaping works.

### 1.3 Project Organisation

- 1.3.1 For the purpose of this EM&A Manual, the Civil Engineering and Development Department (CEDD) of the Hong Kong Special Administrative Region Government is referred to as the Employer and the Engineer defined as the Employer designated Engineer who will be responsible for the supervision of the construction of the Project on behalf of the Employer. The Engineer will nominate a Supervising Officer's (SO) Representative and Resident Site Staff (RSS). An organisation chart showing the responsibility for the Environmental Monitoring and Auditing is shown on **Appendix B**.
- 1.3.2 As part of the Resident Site Staff, an Environmental Team (ET) Leader is to be employed along with support staff for carrying out the environmental monitoring including field measurements, sampling, laboratory testing, analysis of monitoring work results, reporting and auditing. The Environmental Team Leader shall be competent and shall



- have at least 7 years relevant environmental monitoring and audit experience on projects of a similar scale and nature.
- 1.3.3 The Environmental Team Leader will provide an assessment of all environmental work and the Contractor's implementation of environmental mitigation measures required as part of the EIA.
- 1.3.4 The Contractor will be delegated responsibility for implementation of environmental mitigation measures required as part of the EIA. All the environmental mitigation measures should be under the supervision of the Environmental Team Leader.
- 1.3.5 The Independent Environmental Checker (IEC) shall be an independent person or company with a minimum of 7 years EIA experience and proven track record in EM&A similar to the scope proposed in this Manual.

#### **1.4 Terminology**

- 1.4.1 To clarify the terminology for noise and air quality impact monitoring and audit, the following definitions are used throughout this Manual.
- 1.4.2 Monitoring refers to the systematic collection of data through a series of repetitive measurements. The stages of monitoring are defined in this document as follows:
- (i) Baseline Monitoring refers to the measurement of noise and air quality impact parameters during a representative pre-project period for the purpose of determining the nature and ranges of natural variation and to establish, where appropriate, the nature of change.
  - (ii) Impact Monitoring involves the measurement of noise and air quality impact parameters during Project construction and implementation so as to detect changes in these parameters which can be attributed to the Project.
  - (iii) Compliance Monitoring unlike Baseline and Impact Monitoring is not necessarily aimed at noise and air quality impact parameters, but takes the form of periodic sampling and/or continuous measurement of noise and dust levels to ensure that regulatory requirements are observed and standards are met. There are no requirements for compliance monitoring for this project.
- 1.4.3 Audit is a term that refers the verification of a practice and certification of data. The types of audit are defined below:
- (i) Compliance audit is defined as follows:  
  
The process of verification that all or selected parameters measured by a noise or air quality impact monitoring programme or levels of an operation are in compliance with regulatory requirements and internal policies and standards; and The determination of the degree and scope of any necessary remediation in the event of exceedance of compliance.
  - (ii) Post Project Audit is carried out after the implementation and commissioning of a Project and was found not to be applicable to this project.

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1.4.4 For the purpose of noise and air quality impact monitoring and audit, the Action and Limit Levels are defined as follows:

- (i) The Action Level is the level defined in which there is an indication of a deteriorating ambient level for which a typical response could be an increase in the monitoring frequency.
- (ii) The Limit Level is the level beyond the appropriate remedial pollution control ordinances, noise and air quality impact objectives or Hong Kong Planning Standards and Guidelines established by EPD for a particular project, such that the works should not proceed without appropriate remedial action, including a critical review of plant and work methods.





## 2. Noise

### 2.1 Noise Parameters

#### Construction Phase

- 2.1.1 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ).  $L_{eq}$  (30 mins) shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods,  $L_{eq}$  (5 mins) shall be employed for comparison with the Noise Control Ordinance (NCO) criteria.
- 2.1.2 As supplementary information for data auditing, statistical results such as  $L_{10}$  and  $L_{90}$  shall also be obtained for reference and shall be recorded by the Environmental Team (ET) under the supervision by the ET Leader. A sample data record sheet is shown in **Appendix C** for reference.

#### Operational Phase

- 2.1.3 The traffic noise level shall be measured within the first year of the road opening. Measurements shall be made in terms of the A-weighted  $L_{10}$  over 3 half hour period during the peak traffic hour at each measurement point at two elevations at high rise monitoring locations and one elevation at the low rise monitoring location. A traffic census including traffic flow and the percentage of heavy vehicles, which is defined as vehicle with an unladen weight exceeding 1525kg, shall also be conducted during the measurement period and the average speed of vehicle estimated.

### 2.2 Monitoring Equipment

- 2.2.1 As given in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring.
- 2.2.2 Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0dB.
- 2.2.3 Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding  $5\text{ms}^{-1}$  or wind with gusts exceeding  $10\text{ms}^{-1}$ ; the wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in  $\text{ms}^{-1}$ .
- 2.2.4 The Contractor will be responsible for the provision of the monitoring equipment. The Contractor shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.



**2.3 Monitoring Locations**

2.3.1 The specific locations of the monitoring stations are to be determined by the ET Leader with verification by IEC and approved by EPD prior to monitoring. If the status or locations of noise sensitive receivers change after issuing this Manual, the ET Leader shall propose the updated monitoring locations and seek agreement from EPD of the proposal to amend the monitoring locations.

2.3.2 When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:

- (i) Monitoring at sensitive receivers close to the major site activities which are likely to have noise impacts;
- (ii) Monitoring at the noise sensitive receivers as defined in the Technical Memorandum; and
- (iii) Assurance of minimal disturbance to any occupants during monitoring.

Construction Noise

2.3.3 Monitoring should be carried out at the most-affected existing NSRs. According to the EIA Review Report, 25 construction noise monitoring locations are proposed. Some minor adjustments are made at Wai Wah Centre (i.e. NMS5 and NMS6), Lek Yuen Estate (i.e. NMS10) and Sheung Wo Che (i.e. NMS25). The monitoring locations NMS5, NMS6, NMS10 and NMS25 are proposed to be relocated by alternative monitoring locations NMS5A, NMS6A, NMS10A and NMS25A respectively or construction noise monitoring. The rationales for the relocation are summarized in **Table 2.1**.

Table 2.1 Alternative Construction Noise Monitoring Locations

Original Monitoring Station ID	Original Monitoring Location in EIA Review Report	Alternative Monitoring Location	Reasons
NMS5 and NMS6	Wai Wah Centre	Wai Wah Centre (Site Boundary) (Station ID: NMS5A and NMS6A)	<ol style="list-style-type: none"> <li>1. The occupants' representatives formally rejected the original locations (i.e. NMS5 and NMS6) as they concerned the disturbance by the monitoring setup.</li> <li>2. The alternative locations are moving closer towards the site boundary which are expected to represent worse scenarios to receive construction noise impact from the sites.</li> <li>3. The alternative locations are deviated from the original monitoring locations with approximate 20m of horizontal distance. Thus it is considered the proposed alternative location are still valid to</li> </ol>

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Original Monitoring Station ID	Original Monitoring Location in EIA Review Report	Alternative Monitoring Location	Reasons
			represent the NSRs and in a more conservative approach.
NMS10	Lek Yuen Estate	Shatin Tsung Tsin School (Station ID: NMS10A)	<ol style="list-style-type: none"> <li>1. The alternative location is moving closer towards the site boundary which is expected to represent worse scenario to receive construction noise impact from the sites.</li> <li>2. The alternative location is deviated from the original monitoring location with approximate 75m of horizontal distance. Thus it is considered the proposed alternative location is still valid to represent the NSR, and in a more conservative approach as more stringent noise standard will be applied to the NSR (i.e. 70 dB(A) for schools and 65 dB(A) during school examination at 0700-1900 normal weekdays),</li> </ol>
NMS25	Sheung Wo Che	Sheung Wo Che (Station ID: NMS25A)	<ol style="list-style-type: none"> <li>1. The occupants' representatives formally suggested the relocation of the original location (i.e NMS25) as they concerned the equipment setup may disturb the passage of local residents.</li> <li>2. The alternative location is moving closer towards the site boundary which is expected to represent worse scenario to receive construction noise impact from the sites.</li> <li>3. The alternative location is deviated from the original monitoring location with approximate 30m of horizontal distance. Thus it is considered the proposed alternative location is still valid to represent the NSR, and in a more conservative approach.</li> </ol>

Note: Replies from occupants' representatives of Wai Wah Centre and Sheung Wo Che are attached in Appendix F.

2.3.4 The updated construction noise monitoring locations are shown in **Table 2.2** and **Figure 2.1**.

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Table 2.2 Proposed Construction Noise Monitoring Locations

Monitoring Location No.	Description	Landuses
NMS1	Scenery Court	Residential
NMS2	Villa Le Parc	Residential
NMS3	Hilton Plaza	Residential
NMS4	Tin Liu	Residential Village
NMS5A	Wai Wah Centre (Site Boundary)	Residential
NMS6A	Wai Wah Centre (Site Boundary)	Residential
NMS7	Tin Liu	Residential Village
NMS8	Shatin Plaza	Residential
NMS9	Lek Yuen Estate	Residential
NMS10A	Shatin Tsung Tsin School	School
NMS11	Sheung Wo Che	Residential Village
NMS12	SKH Holy Spirit Primary School	School
NMS13	Lek Yuen Estate	Residential
NMS14	Sheung Wo Che	Residential Village
NMS15	Ha Wo Che	Residential Village
NMS16	Ha Wo Che	Residential Village
NMS17*	Shatin Pui Ying College	School
NMS18	Ha Wo Che	Residential Village
NMS19	Wo Che Estate	Residential
NMS20	Wo Che Estate	Residential
NMS23	Pai Tau	Residential Village
NMS24	Shatin Plaza	Residential
NMS25A	Sheung Wo Che	Residential Village
NMS26	Wo Che Estate	Residential
NMS27 <sup>^</sup>	Jockey Club Ti-I College	School

**Remark:**

The exact monitoring locations may be subject to change due to the permission of the land owners. Permission shall be obtained prior to the commencement of monitoring.

\* Due to proximity of the Shatin Pui Ying College and Kiangsu-Chekiang College (Shatin) (<10 meters), NMS17 is also considered to represent the Kiangsu-Chekiang College (Shatin) in a more conservative approach as the monitoring station is closer towards the site boundary.

<sup>^</sup> Since the Jockey Club Ti-I College was not consider in the noise assessment in Previous EIA Review Report and the latest EP, and is now within the 300m Noise Assessment Boundary of the work area under Package 2, thus construction noise monitoring is considered in NMS27.

### Operation Noise

2.3.5 According to the EIA Review Report, the proposed monitoring locations are listed in **Table 2.3.**

Table 2.3 Proposed Operation Noise Monitoring Locations

Monitoring Location No.	Description	Landuses
ON1	Shatin Plaza	Residential
ON2A*	Shatin Tsung Tsin School	School
ON3	Ha Wo Che	Residential Village

**Remark:**

The exact monitoring locations may be subject to change due to the permission of the land owners. Permission shall be obtained prior to the commencement of monitoring.

\* ON2A should be the same point as NMS10A. The justification for the alternative location is given in Table 2.1.

- 2.3.6 The monitoring station shall normally be at a point 1m from the exterior of the sensitive receivers building facade and be at a position 1.2m above the ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen and a correction to the measurements shall be made.
- 2.3.7 After carrying out noise measurements, noise levels shall be corrected in accordance with Section 2.10, 2.11 and 2.13 of the "Technical Memorandum on Noise From Construction Works Other Than Percussive Piling".
- 2.3.8 The baseline monitoring and the impact monitoring shall be carried out at the same positions. The Contractor shall establish the construction equipment list and construction schedule which shall be checked and approved by the Engineer. The timing of the noise impact monitoring work shall be developed by the ET Leader and approved by EPD and shall be based on the Contractor's construction schedule. If the status or locations of monitoring locations change after issuing this Manual, the ET Leader shall propose the updated monitoring locations and seek agreement from EPD of the proposal to amend the monitoring locations.

**2.4 Baseline Monitoring**

- 2.4.1 Baseline noise measurements shall be carried out at each monitoring station prior over a 24 hour period to the commencement of the construction work. The baseline monitoring shall be carried out daily for a period of at least two weeks. The monitoring programme and schedule shall be agreed by IEC and EPD prior to the commencement of monitoring.
- 2.4.2 In no circumstance should construction works be carried out within the range of the monitoring stations during the two weeks of baseline monitoring. Any non Project related construction activities in the vicinity of the stations during the baseline monitoring shall be noted and the source and location recorded.
- 2.4.3 No baseline operational noise monitoring is required.

**2.5 Impact Monitoring**Construction Phase

- 2.5.1 Noise monitoring shall be carried out at each of the designated monitoring stations once every 6 days or on a per week basis after construction has commenced during the course of construction works. The following defines the regular monitoring frequency at each station on a per week basis when noise generating activities are underway:
- 1 no. of Leq (30min) noise measurements between 0700-1900 hours on any normal weekdays
  - 3 nos. of consecutive Leq (5min) noise measurements between 0700-1900 hours on general holidays or Sundays (if work is undertaken)

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- 3 nos. of consecutive Leq (5min) noise measurements between 1900-2300 hours (if evening activities are undertaken)
- 3 nos. of consecutive Leq (5min) noise measurements between 2300-0700 hours next day (if there are nighttime activities).

2.5.2 In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Event and Action Plan in Section 2.6 shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be unrelated to the construction activities.

### Operational Phase

2.5.3 Noise monitoring shall be carried out at all the designated traffic noise monitoring stations. The following is an initial guide on the traffic noise monitoring requirements during the operational phase:

- (i) 3 locations within the first year of the road opening, they are Shatin Plaza, Shatin Tsung Tsin School at Lek Yuen Estate and House in Ha Wo Che. For Shatin Plaza, there are two elevations (6/F and top floor); for Shatin Tsung Tsin School, there are two elevations (4/F and top floor); for House in Ha Wo Che, there is only one elevation (3/F);
- (ii) the measurement period shall be three half hour periods during the peak traffic hours (for example, 0800-0930 and 1730 – 1800);
- (iii) a concurrent census of traffic flow and percentage heavy vehicle shall be conducted for the widened road and the existing road network in the vicinity of each measuring point; and
- (iv) the average vehicle speed estimated.



**2.6 Even and Action Plan for Noise**

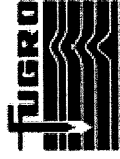
Construction Noise

2.6.1 The Action and Limit levels for construction noise are defined in **Table 2.4**. Should non-compliance of the criteria occur, action in accordance **Table 2.5** shall be carried out for exceedance of the action or limit level.

Table 2.4 Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received	75* dB(A)
0700-2300 hrs on holidays; and 1900-2300 hrs on all other days		60/65/70** dB(A)
2300-0700 hrs of next day		45/50/55** dB(A)
Remark: * reduce to 70 dB(A) for schools and 65 dB(A) during school examination ** to be selected based on Area Sensitivity Rating.		





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Table 2.5 Event and Action Plan for Construction Noise

EVENT	ACTION			Contractor
	ET Leader	IEC	SO	
Action Level	<ol style="list-style-type: none"> <li>1. Notify the IEC and the Contractor.</li> <li>2. Carry out investigation.</li> <li>3. Report the results of investigation to the IEC.</li> <li>4. Discuss with the Contractor and formulate remedial measures.</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ET.</li> <li>2. Review the proposed remedial measures by the Contractor and advise the SO accordingly.</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>4. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC.</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify the IEC, the SO and the Contractor.</li> <li>2. Identify the source.</li> <li>3. Repeat measurement to confirm findings.</li> <li>4. Increase monitoring frequency.</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented.</li> <li>6. Inform the IEC, the SO and the EPD the causes &amp; actions taken for the exceedance.</li> <li>7. Assess effectiveness if the Contractor's remedial actions and keep the IEC and the SO informed of the results.</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst the SO, the ET Leader and the Contractor on the potential remedial actions.</li> <li>2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly.</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>4. Ensure remedial measures are properly implemented.</li> <li>5. If exceedance continues, consider what activities of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification.</li> <li>3. Implement the agreed proposals</li> <li>4. Resubmit proposals if problem still not under control</li> <li>5. Stop the relevant activity of works as determined by the SO until the exceedance is abated.</li> </ol>



## 2.7 Noise Mitigation Measure

### Construction Phase

2.7.1 According to the EIA Review Report, the updated construction noise control and mitigation measures to reduce noise levels from Project construction has been recommended. The Contractor shall be responsible for the design and implementation of the measures below. The recommended construction noise mitigation measures are summarised below:

- the construction activities should be carried out in the daytime period (0700-1900) wherever practical. If construction is required during evening or night time hours, a Construction Noise Permit (CNP) will be required to be obtained by the Contractor;
- silencers should be installed at the exhaust pipes of the dump trucks, air compressors, mobile cranes, excavators, lorries;
- mufflers should be installed on pneumatic breakers;
- acoustic enclosures should be installed for pumps and generators;
- construction of temporary noise barriers along the construction site boundary to screen the equipment;
- the contractor should avoid work in the area of schools during examinations;
- selection and optimization of construction programmes, avoidance of parallel operation of noisy Powered Mechanical Equipment (PME);
- use of "quiet" PME and working methods;
- use of good site practice/techniques can provide considerable reductions in noise emissions. Examples of these site practices include
  - use of well-maintained and regularly-serviced plant during the works;
  - plant operating on intermittent basis should be turned off or throttled down when not in active use;
  - plant that is known to emit noise strongly in one direction should be orientated to face away from the NSRs;
  - silencers, mufflers and enclosures for plant should be used where possible and maintained adequately throughout the works
  - where possible fixed plants should be sited away from NSRs; and
  - stockpiles of excavated materials and other structures such as site buildings should be used effectively to screen noise from the works.

2.7.2 Mitigation in the form of noise enclosures around noisy activities will require consideration during any evening and night time working, if such work is required. The design of the temporary noise enclosures will be the responsibility of the Contractor who will be required to submit his design to the Engineer for approval before carrying out the work. The design will also have to be submitted to EPD, as the Authority under the NCO, with the Contractor's application for a Construction Noise Permit.



- 2.7.3 If the above measures are not sufficient to restore the construction noise quality to an acceptable level, upon advice from the ET Leader, the Contractor shall liaise and gain approval from the Engineer on other mitigation measures proposed to reduce noise levels to an acceptable level and carry out these measures.
- 2.7.4 The measures may include but not be limited to amendments to the construction schedule to restrict noisy equipment to certain time periods and restricting the type of equipment that can be used during construction at any one time.

Operational Phase

- 2.7.5 The EIA Review Report has recommended operational noise mitigation measures which are summarised but not limit to the following **Table 2.6**. The locations of noise mitigation measures at operational phase are illustrated graphically in **Figure 2.2a, Figure 2.2b, Figure 2.2c and Figure 2.2d**.

Table 2.6 Summary of Proposed Noise Mitigation Measures at Operational Phase

Item	Noise Mitigation Measures			Road Name	Direction
	ID	Description	Approx. Length (m)		
1	C1	Low noise road surfacing along both widening and reconstruction sections	1400	TPR-ST (reconstruction and New Road sections)	West Boundary
2	C2a/b	A series of: "Top-bent" barrier, 11m high (at tip) approximately 7m wide	70	TPR-ST West of Citylink Plaza (reconstruction section)	West Boundary
3	C3a/b	8.5m high (at tip) approximately 7m wide	60	TPR-ST West of Citylink Plaza (reconstruction section)	West Boundary
4	C4a/b	6m high (at tip) approximately 10m wide open on the side away from the NSR in front of Wai Wah Centre on the reconstruction section	150	TPR-ST West of Citylink Plaza (New Road section)	West Boundary
5	N1	"Top-bent" barrier, 11m high (at tip) approx. 5.2m wide (horizontal extent from carriageway) open on the side away from the NSR near Shatin Plaza	230	TPR-ST East of Citylink Plaza (New Road section)	West Boundary
6	N2	5m high barrier on the central median along the widening section near Pai Tau, Sheung Wo Che, Sha Tin Plaza and Lek	270	TPR-ST East of Citylink Plaza (New Road)	East Boundary

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Item	Noise Mitigation Measures			Road Name	Direction
	ID	Description	Approx. Length (m)		
		Yuen Estate		section)	
7	N3	"Top-bent" barrier, 11m high (at tip) and approximately 5m wide (open on the side away from the NSR) near Lek Yuen Estate. Due to current tree growing condition, a 25m section of semi-enclosure shall be replaced by a 5m high barrier.	320	TPR-ST East of Citylink Plaza (New Road section)	West Boundary
8	N4	6m high with approx. 3m (open on the side away from NSR) near Lek Yuen Estate	130	TPR-ST Ramp up to STRC Road (New Road section)	West Boundary
9	N5	1.2m barrier section on (0.8m standard) parapets (total height 2m) along slip road to the diamond interchange near Sheung Wo Che (absorptive)	190	Slip Road of STRC Road (New Road section)	East Boundary
10	N6	6m high barrier along widened section between Sheung Wo Che and Ha Wo Che in front of Siu Wo Court (absorptive barrier)	630	TPR- ST East of Citylink Plaza (New Road section)	East Boundary
11	N7	A series of: 11m high (at tip) 10m wide (horizontal extent from carriageway)	90	TPR- ST East of Citylink Plaza (New Road section)	West Boundary
12	N8	6m (at tip) high 10m wide (horizontal extent from carriageway)	200	TPR- ST East of Citylink Plaza (New Road section)	West Boundary
13	N9	6m high (at tip) 7m wide (horizontal extent from carriageway). At the widened and reconstructed section near Lek Yuen Estate and Wo Che Estate	210	TPR- ST East of Citylink Plaza (New Road section)	West Boundary
14	N10	A series of: 11m high (at tip) 3m wide (horizontal extent from carriageway)	40	TPR- ST East of Citylink Plaza (New Road section)	West Boundary
15	N11	8.5m (at tip) high 4m wide	40	TPR- ST	West

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Item	Noise Mitigation Measures			Road Name	Direction
	ID	Description	Approx. Length (m)		
		(horizontal extent from carriageway)		East of Citylink Plaza (New Road section)	Boundary
16	C5	6m high (at tip) 5m wide (horizontal extent from carriageway) at the reconstructed section towards eastern-end of Wo Che Estate	90	TPR- ST East of Citylink Plaza (New Road section)	West Boundary
17	C6a/b	5m high barrier along slip road connecting Fo Tan Road and TPR along the reconstructed section	210	TPR- ST East of Citylink Plaza (New Road section)	West Boundary
18	S1	4m high vertical noise barrier on the North bound of Shatin Rural Committee Road	40	STRC Road (New Road section)	North Boundary
19	S2	4m high vertical noise barrier on the South bound of Shatin Rural Committee Road	40	STRC Road (New Road section)	South Boundary



### **3. Air Quality**

#### **3.1 Air Quality Parameters**

3.1.1 Monitoring of the Total Suspended Particulates (TSP) levels shall be carried out to ensure that construction works are not generating dust which exceeds the acceptable level. Timely action should be taken to rectify the situation if an exceedance is detected.

3.1.2 1-hour and 24-hour TSP levels shall be measured to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval by IEC and SO Representative, TSP levels may be measured by direct reading methods.

3.1.3 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, any other special phenomena and work progress of the concerned site shall be recorded. A sample data sheet is shown in **Appendix C**.

#### **3.2 Monitoring Equipment**

3.2.1 A high volume sampler in compliance with the following specifications shall be used for carrying out the 1-hr and 24-hr TSP monitoring:

- (i) 0.6-1.7 m<sup>3</sup>/min (20-60 SCFM) adjustable flow range;
- (ii) equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- (iii) installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- (iv) capable of providing a minimum exposed area of 406 cm<sup>2</sup> (63 in<sup>2</sup>);
- (v) flow control accuracy: +/- 2.5% deviation over 24-hr sampling period;
- (vi) equipped with a shelter to protect the filter and sampler;
- (vii) incorporating an electronic mass flow rate controller or equivalent device;
- (viii) equipped with a flow recorder for continuous monitoring;
- (ix) provided with a peaked roof inlet;
- (x) equipped with a manometer;
- (xi) able to hold and seal the filter paper to the sampler housing in a horizontal position;
- (xii) easily changed filter; and

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(xiii) capable of operating continuously for 24-hr period.

3.2.2 The ET shall be responsible for provision of the monitoring equipment and shall ensure that sufficient number of high volume samplers with an appropriate calibration kit are available for carrying out the baseline monitoring, impact monitoring and ad hoc monitoring. The high volume samplers shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc. shall be clearly labelled.

3.2.3 Calibration of dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The calibration data shall be properly documented for future reference. All the data shall be converted into standard temperature and pressure condition.

3.2.4 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and recorded in the data sheet as described in Section 3.1.

3.2.5 If the ET propose to use a direct reading dust meter to measure TSP levels, sufficient information shall be provided to the IEC and SO Representative to prove that the instrument is capable of achieving a comparable result with the high volume sampler. The instrument should also be calibrated regularly, and the 1-hr sampling shall be checked periodically by the high volume sampling to check the validity and accuracy of the results measured by the direct reading method.

3.2.6 Wind data monitoring equipment shall also be provided by the Contractor and set up at appropriate locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be agreed with by the SO Representative.

3.2.7 For installation and operation of wind data monitoring equipment, the following points shall be observed:

- (i) the wind sensors should be installed on masts at an elevated level 10 m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- (ii) the wind data should be captured by a data logger to be down-loaded for processing at least once a month;
- (ii) the wind data monitoring equipment should be re-calibrated at least once every six months; and
- (iv) wind direction should be divided into 16 sectors of 22.5 degrees each.

### 3.3 Laboratory Measurement/Analysis

3.3.1 A clean laboratory with constant temperature and humidity control and equipped with necessary measuring and conditioning instruments shall be used for sample analysis and equipment calibration and maintenance. The laboratory shall be HOKLAS accredited for the measurement to be made.





- 3.3.2 If a site laboratory is set up for carrying out the laboratory analysis, the laboratory equipment shall be approved by the SO Representative. The Contractor shall provide the SO Representative with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for reference.
- 3.3.3 Filter paper with designated size shall be labelled before sampling. It shall be a clean filter paper with no pin holes, and shall be conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.
- 3.3.4 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.
- 3.3.5 All the collected samples shall be kept in a good condition for 6 months before disposal.

**3.4 Monitoring Locations**

3.4.1 The air quality sensitive receivers (ASRs) was determined and recommended by the EIA Review Report. According to the EIA Review Report, 19 construction dust monitoring locations are proposed. Some minor adjustments are made at Wai Wah Centre (i.e. AMS3 and AMS4) and Sheung Wo Che (i.e. AMS7 and AMS11). The monitoring locations AMS3, AMS4, AMS7 and AMS11 are proposed to be relocated by alternative monitoring locations AMS3A, AMS4A, AMS7A and AMS11A respectively or construction dust monitoring. The rationales for the relocation are summarized in **Table 3.1**.

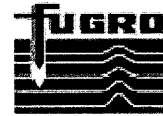
**Table 3.1 Alternative Construction Dust Monitoring Locations**

Original Monitoring Station ID	Original Monitoring Location in EIA Review Report	Alternative Monitoring Location	Reasons
AMS3 and AMS4	Wai Wah Centre	Wai Wah Centre (Site Boundary) (Station ID: AMS3A and AMS4A)	<ol style="list-style-type: none"> <li>1. The occupants' representatives formally rejected the original locations (i.e. AMS3 and AMS4) as they concerned the disturbance by the monitoring setup.</li> <li>2. The alternative locations are closer towards the site boundary which are expected to represent worser scenarios to receive construction dust impact from the sites.</li> <li>3. The alternative locations are deviated from the original monitoring locations with approximate 20m of horizontal distance. Thus it is considered the proposed alternative locations are still valid to represent the ASRs and in a more conservative approach.</li> </ol>

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Original Monitoring Station ID	Original Monitoring Location in EIA Review Report	Alternative Monitoring Location	Reasons
AMS7 and AMS11	Sheung Wo Che	Sheung Wo Che (Station ID: AMS7A and AMS11A)	<ol style="list-style-type: none"> <li>The occupants' representatives formally suggested the relocation of the original location (i.e AMS7 and AMS11) as they concerned the equipment setup may disturb the passage of local residents.</li> <li>The alternative locations are moving closer towards the site boundary which are expected to represent worse scenario to receive construction dust impact from the sites.</li> <li>The alternative locations are deviated from the original monitoring location with approximate 10m (for AMS7) and 75m (for AMS11) of horizontal distance. Thus it is considered the proposed alternatives location are still valid to represent the ASRs and in a more conservative approach.</li> </ol>

Note: Replies from occupants' representatives of Wai Wah Centre and Sheung Wo Che are attached in Appendix F.

3.4.2 The updated dust monitoring locations are shown in **Table 3.2** and **Figure 3.1**. The specific locations of the monitoring stations are to be determined by the ET Leader with verification by IEC and approved by EPD prior to monitoring. The status and locations of dust sensitive receivers may change after the issue of this manual. If this happens, the ET Leader shall propose updated monitoring locations and seek agreement from EPD on the proposal.

**Table 3.2 Construction Dust Monitoring Locations**

Monitoring Location No.	Description	Landuses
AMS1	Scenery Court	Residential
AMS2	Villa Le Parc	Residential
AMS3A	Wai Wah Centre (Site Boundary)	Residential
AMS4A	Wai Wah Centre (Site Boundary)	Residential
AMS5	Tin Liu	Residential Village
AMS6	Shatin Plaza	Residential
AMS7A	Sheung Wo Che	Residential Village
AMS8	Lek Yuen Estate	Residential
AMS9*	Shatin Tsung Tsin School	School
AMS10	Shatin Police Station	Office
AMS11A	Sheung Wo Che	Residential Village

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Monitoring Location No.	Description	Landuses
AMS12	Fung Wo Estate	Residential
AMS13	Fung Wo Estate	Residential
AMS14	Ha Wo Che	Residential Village
AMS15	Ha Wo Che	Residential Village
AMS16 <sup>^</sup>	Shatin Pui Ying College	School
AMS17	Wo Che Estate	Residential
AMS18	Tin Cheung Terrace	Residential Village
AMS19	Jockey Club Ti-I College	School

**Remark:**

The exact monitoring locations may be subject to change due to the permission of the land owners. Permission shall be obtained prior to the commencement of monitoring.

\* Due to proximity of the Shatin Tsung Tsin School and SKH Holy Spirit Primary School (<75 meters), AMS9 is also considered to represent the SKH Holy Spirit Primary School in a more conservative approach as the monitoring station is closer towards the site boundary.

<sup>^</sup> Due to proximity of the Shatin Pui Ying College and Kiangsu-Chekiang College (Shatin) (<10 meters), AMS16 is also considered to represent the Kiangsu-Chekiang College (Shatin) in a more conservative approach as the monitoring station is closer towards the site boundary.

3.4.3 When alternative monitoring locations are proposed, the following preferred locations and factors shall be considered:

- (i) the site boundary or locations close to the major dust emission source;
- (ii) close to the sensitive receptors; and
- (iii) prevailing meteorological conditions.

3.4.4 The ET Leader shall agree with the IEC and EPD the position of the high volume samplers. When positioning the samplers, the following points shall be noted:

- (i) a horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;
- (ii) the distance between the sampler and an obstacle, such as buildings, shall be at least twice the height that the obstacle protrudes above the sampler;
- (iii) a minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;
- (iv) a minimum of 2 metre separation from any supporting structure, measured horizontally is required;
- (v) no furnace or incinerator flue is nearby;
- (vi) airflow around the sampler is unrestricted;
- (vii) the sampler is more than 20 metres from the dripline;
- (viii) any wire fence and gate to protect the sampler, shall not cause any obstruction during monitoring;



- (ix) permission must be obtained to set up the samplers and to obtain access to the monitoring stations;
- (x) a secured supply of electricity is needed to operate the samplers; and
- (xi) no two samplers should be placed less than 2 metres apart.

3.4.5 Prior to Project construction, the construction schedule shall be established and the dust monitoring schedule shall be developed by ET Leader.

### **3.5 Baseline Monitoring**

3.5.1 Baseline monitoring shall be carried out at representative locations as shown on **Figure 3.1** for at least 14 consecutive days prior to the start of the construction works to obtain daily 24-hr TSP samples. 1-hr sampling shall also be carried out at least 3 times per day during the same period. The monitoring programme and schedule shall be agreed by IEC and EPD prior to the commencement of monitoring.

3.5.2 During the baseline monitoring, there should not be any construction or dust generation activities in the vicinity of the monitoring stations.

3.5.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, monitoring may be carried out at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be verified by IEC and agreed with EPD.

3.5.4 In the event that insufficient baseline monitoring data or questionable results are obtained, the Environmental Team Leader shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference.

3.5.5 Ambient conditions may vary seasonally and shall be reviewed at three monthly intervals. If the ET Leader considers that the ambient conditions have been changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring should be at times when the Contractor's activities are not generating dust, at least in the proximity of the monitoring stations. Should a change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, shall be revised. The revised baseline levels and air quality criteria shall be verified by IEC and agreed with EPD.

### **3.6 Impact Monitoring**

3.6.1 Impact monitoring shall be carried out during the course of the works. For regular impact monitoring, the sampling frequency of at least once in every six days shall be strictly observed at four of the designated monitoring stations for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six days should be undertaken at four locations when the highest dust impact occurs. The stations to be monitored should be selected based on the prevailing wind direction and their proximity to the active construction works.



3.6.2 The specific time to start and stop the 24-hr TSP monitoring shall be clearly defined for each location and be strictly followed by the operator.

3.6.3 In case of non-compliance with the air quality criteria, more frequent monitoring, as specified in the Action Plan, shall be conducted within 24 hours after the non compliance is detected. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

**3.7 Even and Action Plan for Air Quality**

3.7.1 The baseline monitoring results will form the basis for determining the air quality criteria for the impact monitoring. The Environmental Team Leader shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP, **Table 3.3** shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance with the air quality criteria occur, the ET Leader, the SO and the Contractor shall undertake their specified actions in accordance with the Action Plan shown in **Table 3.4**.

Table 3.3 Action and Limit Levels for Air Quality

Parameters	Actions	Limit
24 Hour TSP Level in g/m <sup>3</sup>	For baseline level < 108 g/m <sup>3</sup> , Action level = average of baseline level plus 30% and Limit level For baseline level > 108 g/m <sup>3</sup> and baseline level < 154 g/m <sup>3</sup> , Action level = 200 g/m <sup>3</sup> For baseline level > 154 g/m <sup>3</sup> , Action level = 130% of baseline level	260
1 Hour TSP Level in g/m <sup>3</sup>	For baseline level < 154 g/m <sup>3</sup> Action level = average of baseline level plus 30% and Limit level For baseline level > 154 g/m <sup>3</sup> and baseline level < 269 g/m <sup>3</sup> , Action level = 350 g/m <sup>3</sup> For baseline level > 269 g/m <sup>3</sup> , Action level = 130% of baseline level	500



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Table 3.4 Event and Action Plan for Air Quality

EVENT	ACTION			Contractor
	ET Leader	IEC	SO	
<p>Action Level</p> <p>1. Exceedance for one sample</p>	<ol style="list-style-type: none"> <li>1. Identify the source.</li> <li>2. Inform the IEC and the SO.</li> <li>3. Repeat measurement to confirm findings.</li> <li>4. Increase monitoring frequency to daily.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET Leader.</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice.</li> <li>2. Amend working methods if appropriate.</li> </ol>
<p>2. Exceedance for two or more consecutive samples</p>	<ol style="list-style-type: none"> <li>1. Identify the source.</li> <li>2. Inform the IEC and the SO.</li> <li>3. Repeat measurement to confirm findings.</li> <li>4. Increase monitoring frequency to daily.</li> <li>5. Discuss with the IEC and the Contractor on remedial actions required.</li> <li>6. If exceedance continues, arrange meeting with the IEC and the SO.</li> <li>7. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET Leader.</li> <li>2. Check the Contractor's working method.</li> <li>3. Discuss with the ET Leader and the Contractor on possible remedial measures.</li> <li>4. Advise the SO on the effectiveness of the proposed remedial measures.</li> <li>5. Supervisor implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial actions to IEC within 3 working days of notification.</li> <li>2. Implement the agreed proposals.</li> <li>3. Amend proposal if appropriate.</li> </ol>
<p>Limit Level</p> <p>1. Exceedance for one sample</p>	<ol style="list-style-type: none"> <li>1. Identify the source.</li> <li>2. Inform the SO and the EPD.</li> <li>3. Repeat measurement to confirm findings.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET Leader.</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>2. Submit proposals for remedial actions to IEC</li> </ol>

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EVENT	ACTION			Contractor
	ET Leader	IEC	SO	
	<p>4. Increase monitoring frequency to daily.</p> <p>5. Assess effectiveness of Contractor's remedial actions and keep the IEC, the EPD and the SO informed of the results.</p>	<p>3. Discuss with the ET Leader and the Contractor on possible remedial measures.</p> <p>4. Advise the SO on the effectiveness of the proposed remedial measures.</p> <p>5. Supervisor implementation of remedial measures.</p>	<p>3. Ensure remedial measures are properly implemented.</p>	<p>within 3 working days of notification.</p> <p>3. Implement the agreed proposals.</p> <p>4. Amend proposal if appropriate.</p>
<p>2. Exceedance for two or more consecutive samples</p>	<p>1. Notify the IEC, the SO and the EPD and the Contractor.</p> <p>2. Identify the source.</p> <p>3. Repeat measurement to confirm findings.</p> <p>4. Increase monitoring frequency to daily.</p> <p>5. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented.</p> <p>6. Arrange meeting with the IEC and the SO to discuss the remedial actions to be taken.</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep the IEC, the EPD and the SO informed of the results.</p> <p>8. If exceedance stops, cease additional monitoring.</p>	<p>1. Discuss amongst the SO, ET Leader and the Contractor on the potential remedial actions.</p> <p>2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly.</p> <p>3. Supervisor implementation of remedial measures.</p>	<p>1. Confirm receipt of notification of failure in writing.</p> <p>2. Notify the Contractor.</p> <p>3. In consultation with the Contractor on the remedial measures to be implemented.</p> <p>4. Ensure remedial measures are properly implemented.</p> <p>5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.</p>	<p>1. Take immediate action to avoid further exceedance.</p> <p>2. Submit proposals for remedial actions to IEC within 3 working days of notification.</p> <p>3. Implement the agreed proposals.</p> <p>4. Resubmit proposals if problem still not under control.</p> <p>5. Stop the relevant activity of works as determined by the SO until the exceedance is abated.</p>





### 3.8 Dust Mitigation Measures

3.8.1 According to the EIA Review Report and the latest EP, the updated dust control and mitigation measures have been recommended. The Contractor shall be responsible for the design and implementation of the measures below.

- The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. Dust suppression measures such as the water spraying are necessary and should be installed to ensure that the air quality at the boundary of the site and at any sensitive receivers complies with the Hong Kong Air Quality Objectives.
- The Contractor shall notify any specific construction works as stated in the Air Pollution Control (Construction Dust) Regulation to the Authority before the commencement of such work.
- The Contractor shall apply for a license or permit under the requirements of the relevant legislation (e.g. Air Pollution Control Ordinance and its subsidiary regulations) wherever applicable.
- Watering of unpaved areas, access roads, construction areas and dusty stockpiles shall be undertaken at least eight times daily during dry and windy weather. Watering of the haul road shall be undertaken four to eight times daily during dry or windy weather. Water sprays may be either fixed or mobile to follow individual areas to be wetted as and when required. Application of suitable wetting agents, such as dust suppression chemicals, shall be used in addition to water, especially during the dry season (October to December).
- Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate, and other similar materials, wet dust is likely to be created and to dampen all stored materials during dry and windy weather.
- Stockpiles of sand, aggregate or any other dusty materials greater than 20m<sup>3</sup> shall be enclosed on three sides, with walls extending above the pile and 1 metre beyond the front of the pile.
- Suitable chemical wetting agent such as dust suppression chemical shall be used on completed cuts and fills to reduce wind erosion.
- Areas within the construction site where there is a regular movement of vehicles shall have a paved surface and be kept clear of loose surface material.
- The Contractor shall restrict all motorized vehicles within the construction site, excluding those on public roads, to maximum speed of 20 km per hour and confine haulage and delivery vehicles to designated roadways inside the Site.
- Construction working areas will be restricted to a minimum practicable size.
- The Contractor shall ensure that no earth, rock or debris is deposited on public or private rights of way as result of his activities, including any deposits arising from the movement of plant or vehicles.
- The Contractor shall provide a wheel washing facility at the exits from work areas to the satisfaction of the Engineer and to the requirements of the Commissioner of Police. Water in wheel washing facilities and sediment shall be changed and removed respectively at least once a month.
- The Contractor shall submit details of the wheel washing facilities, which shall be usable prior to any earthworks excavation activity on the construction site. The Contractor shall also provide a hard-surfaced road between any washing facility and the public road.

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- In the event of any spoil or debris from construction works being deposited on adjacent land, or steams, or any slit being washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Engineer.
- If spoil cannot be immediately transported out of the Site, stockpiles should be stored in sheltered areas.
- Plant and vehicles shall be inspected annually to ensure that they are operating efficiently and that exhaust emissions are not causing a nuisance. All site vehicle exhausts should be directed vertically upwards or directed away from ground.
- Path for complaints and handling procedures should be set up and implement.

3.8.2 If the above measures are not sufficient to restore the air quality to acceptable levels upon the advice of the Environmental Team Leader, the Contractor shall liaise with the Environmental Team Leader on other mitigation measures, propose these measures to the Engineer for approval, and implement the measures.



#### **4. Water Quality Audit**

##### **4.1 Introduction**

4.1.1 The Project Area lies in the extreme south east section of a catchment drained by a number of streams. The catchment watershed is defined by a line linking Needle Hill to Grassy Hill, and grouped under Shing Mun River Water Course. The upper sections of the streams are in open ground and a few of the lower sections pass through lightly wooded and sparsely inhabited areas. Immediately upstream of the existing road the streams have been culverted to pass under the site before discharge in the Shing Mun River Channel through the north west bank of the Channel. The principal function of these culverts is purely on drainage to convey storm water to the Shing Mun River Channel.

4.1.2 Refer to the EIA Review Report, it was expected that the potential water quality impacts associated with the revised road layout and works boundary would be similar to that stated in the approved EIA Report. There was no further update in the status and the EM&A requirement in the latest EP.

4.1.3 During the construction phase, non-point surface runoff from the works site could get into the Shing Mun River through stormwater drainage systems and hence has to be controlled. Also, point discharge will also be likely for treated effluent generated during the foundation works.

4.1.4 Though the Project does not involve site formation and the earthwork will only be minimal, there is still the potential of stormwater runoff leading to increased loads of suspended solids and contaminants into the drains and eventually leads to the Shing Mun River Channel.

4.1.5 Potential sources of pollution generated in construction site include:

- Runoff and erosion of exposed surfaces, accidental spillage from plant maintenance and material handling;
- Release of grouting and cement with rain wash;
- Wash water from dust suppression sprays; and
- Fuel and lubricants from maintenance of construction plants and mechanical equipment.

4.1.6 With the implementation of adequate construction site drainage and provision of silt removal facilities, adverse water quality impacts to the receiving waters will not be anticipated.

4.1.7 No specific water quality monitoring has been recommended. Instead, regular on-site environmental audit should be sufficient to ensure that the recommended water pollution mitigation measures would be properly implemented, functioned and maintained during construction phase of the Project.

##### **4.2 Water Pollution Mitigation and Management**

4.2.1 According to the EIA Review Report and latest EP, mitigation measures as suggested in the approved EIA Report are considered adequate and valid. For record purposes, the mitigation measures are recapped as follows:



## Construction Phase

### ***Surface Water Run-off***

- (i) Construction works should be programmed so as to minimise excavation during the wet season (April to September). If this is not possible then measures should be taken to minimise the areas exposed by covering temporary exposed slopes with tarpaulins or similar material, the protection of temporary road surfaces with gravel or crushed stone and the early reinstatement of final surfaces with hydroseed grass/shrub mixture. This latter measure would have the added benefit of reducing the windblown dust during the dry season. Where temporary covering of slopes is required this should be carried out before the onset of the rainfall or storm.
- (ii) Existing and newly constructed open manholes should be covered and sealed to prevent run off and water borne debris entering the drainage network without having previously passed through a sediment trap.
- (iii) Stock piles of construction materials, sand and gravel or excavated material should be covered with tarpaulins prior to rainstorms. The washing of material from the stockpiles directly into the storm drains should be prevented by passing the run off through a sediment trap.
- (iv) The surface water from the site should be discharged into storm water drain after passing through sand and silt traps designed to accommodate the maximum discharge from the site. Within the site channels, bunds or sandbags should be used to direct run off into the traps. Storm water from outside the site should be prevented from washing over the site by the construction of interceptor channels at the site boundary. Both perimeter channels and the sedimentation traps should be constructed prior to the commencement of site formation and earthworks.
- (v) The efficiency of the interceptor channels, traps and sedimentation chambers should be maintained by regular cleaning of accumulated silt and sand. Particular attention should be paid to maintenance following heavy rainfall and immediately after the issue of heavy rainfall warning by the Hong Kong Observatory.
- (vi) The ingress of rainwater into trenches should be minimised by the construction of bunds to prevent water flowing into the trench and covering by tarpaulins to prevent direct entry. The lengths of excavated trenches should be minimised and backfilled at the earliest opportunity. Water pumped from the trenches should be discharged to the storm water drains following passage through a suitable silt trap.

### ***Groundwater***

Any ground water seeping into any trenches or foundation works should be passed through a silt trap prior to discharge to the storm water drains.

***Wastewater from Concrete Batching***

The water used for the washing down of mixing drums used for onsite batching of concrete and delivery lorries for off-site batched concrete should be recycled whenever possible. Wastewater generated from the washing which is discharged should be passed through a silt trap before discharge to the storm water system.

***Water from Wheel and Subframe Washing***

The waste water from the washing of the wheels and subframe of vehicles returning from the site onto public roads will contain suspended solids and debris. A washing bay should be provided at the exit from the site and should, where practicable, incorporate water recirculation. Water from the washing bay which is discharge d to the storm water system should first be passed through a silt trap which also includes an oil/grease removal weir.

***Wastewater from Site Facilities***

- (i) Run off from plant maintenance area will carry fuel and lubricating and hydraulic oils adsorbed on the suspended solids. Plant maintenance areas should be paved to prevent waste oils soaking into the ground. Where possible the area should be undercover to minimise the formation of runoff and any runoff from the paved area passed through an oil trap before being discharged to the storm drains. Fuel storage tanks should be surrounded by bunds with a capacity of at least 150% of the storage capacity. The bunded areas should be able to be drained of rain water through the petrol interceptor and accumulated rain removed at regular intervals.
- (ii) Waste oils from the site should be collected and stored for recycling or disposal in accordance with the Waste Disposal Ordinance and absorbent cloths and granules should be available for the cleanup of spillages.
- (iii) Sewage from toilets and kitchens should be discharged directly into a foul sewer. If it is not possible to locate the site offices within easy access of a foul sewer a septic tank and soakaway should be constructed before the offices are occupied. If only toilets are provided then chemical toilets will be more appropriate. Chemical toilets should be emptied on a daily basis and the contents taken to a foul sewer or the Sha Tin Sewage Treatment Works for disposal. Wastewater collected from canteen kitchens should be discharged to the foul sewers via grease traps which provide a minimum of 20 minutes retention during peak flow. All discharges into foul sewers and storm sewers would have to be complied with TM standards under WPCO.
- (iv) Run off from roofed surfaces of site facilities should be collected and diverted to a storm water drain. Passage through a silt trap is only required if the water is diverted via open channels which might accumulate solids during non rainy periods or which intercept surface run off from unpaved areas.

***Licensing of Site Discharges***



Discharges into foul sewers or storm water drains, other than domestic sewage and unpolluted water, and the discharge of septic tank effluent into the ground are controlled under the Water Pollution Control Ordinance (WPCO). The discharge from the construction site will therefore be controlled under the Ordinance. Discharges from the site will be required to meet the terms and conditions of a valid WPCO license. The application for a WPCO license is made through the EPD or District Office. The application for the license should contain details of the points of discharge of the wastewater and storm water, and the volumes to be discharged and should be made before the commencement of any discharge. A minimum of twenty days is required for the processing of a license for a discharge into any waters of Hong Kong and a minimum of fifty days for public notification as required by the WPCO.

### Operation Phase

#### ***Normal Runoff***

Contaminants present in the runoff during normal operation normal will, by their chemical nature, be strongly adsorbed onto the particulate phase. Standard HyD road gullies with silt traps would be installed in the road drainage systems along the alignment to intercept and enable removal of residual grit, particulate matter and pollutants in road runoff. These facilities serve as a control to minimise the pollutants from discharging to the Tolo Harbour. Regular cleaning of rubbish and sediment from the drainage systems following the normal highway maintenance practices is required to maintain the normal operation of the systems at all times, such that accumulation of solids with the resultant reduction in retention time and thus efficiency can be avoided.

Carriageway would discharge to inland drainage systems similar to the existing highways and urban areas. HyD undertakes routine road inspection, maintenance and cleaning for public roads, expressways, trunk roads, and other roads. With the routine cleaning practices adopted by HyD in place, the potential water quality impacts due to road runoff are expected to be low. In addition, road runoff would be discharged into the Tolo Harbour waters via Shing Mun Main Channel. The pollutants would be rapidly diluted by tidal flows near the outlets of the channel/river minimising the water quality impacts. Special mitigation measures to deal with road runoff would not be required.

With the provision of the above measures, it can warrant containing the increase in suspended solids and materials (refuse etc.) washed out during heavy rainstorms which run-offs are drained into the Tolo Harbour through stormwater drainage system and the watercourses.

#### ***Accidental Spillage***

In the event of an accident giving rise to the spillage of fuel or vehicle load from a vehicle permitted to use the roadway, the primary objective should be to contain the spillage for removal from the road and its subsequent safe disposal. If this is not possible and the spillage enters the surface water drainage system, it should be held back by interceptor tanks with both under and overspill weirs to retain floating and

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settling material. These should be readily accessible for emptying in the event of an accident.

The issue for TPR is similar to all highways and roads in Hong Kong. Government through the emergency services and relevant works departments have appropriate procedures for dealing with accidental spillage. These are specific to the nature of the spillage and the impacts and hazards the spillage presents. As far as practical containment and collection of the spillage is preferred for appropriate disposal. The following issues require to be considered and appropriate action taken on a case by case basis:

- (i) measures to prevent the potential pollution to the local stream courses and the downstream water body in case of an accident;
- (ii) requirements to inspect the drainage systems to ensure that the channels or drain pipes are in normal function;
- (iii) procedures and guidelines to deal with different categories of spillage;
- (iv) actions to inspect and monitor the water quality of the nearby receiving water body after an accident;
- (v) provision of pollution control equipment; and
- (vi) Actions to restore the affected water body.



## 5. Landscape and Visual Audit

### 5.1 Introduction

5.1.1 According to the EIA Review Report and the review in the latest EP, vegetation in Roadside Soft Landscape Areas (LR1) is identified as the key landscape resource which would be potentially affected by the proposed Project. Vegetation found within Roadside Soft Landscape Areas includes a mix of native and mature trees, shrub planting and green verge with grass. It is a roadside landscape resource commonly found in Hong Kong. Tree survey has been carried out within this EIA Review Boundary in accordance with ETWB TC(W) No. 3/2006. There are approximately 390 nos. of trees identified. 3 of them are registered OVTs. They are LCSD ST/5 (*Bischofia polycarpa* 重陽木), LCSD ST/6 (*Bischofia polycarpa* 重陽木) and LCSD ST/17 (*Ficus annulata* 環紋榕). Other dominant tree species include *Acacia confusa*, *Bauhinia blakeana*, *Bauhinia variegata*, *Bischofia javanica*, *Bischofia polycarpa*, *Bombax ceiba*, *Cinnamomum camphora*, *Ficus hispida*, *Grevillea robusta*, *Lagerstroemia speciosa*, *Leucaena leucocephala*, *Livistona chinensis*, *Macaranga tanarius*, *Melaleuca quinquenervia*, *Morus alba*, *Syzygium levinei* and *Thevetia peruviana*. They are generally of semi-mature to mature size with an average of medium amenity value and of local importance. The overall sensitivity of this resource is considered as medium.

5.1.2 The visual envelope of the Project shall be identified by site visit and desktop study of topographic maps and photographs to determine the visibility of the Project from various locations. The Project is located within the major transportation corridor in Sha Tin. The visual envelope shall be confined by the existing building line to the south east of Tai Po Road and the ridgelines to the north west of Tai Po Road.

5.1.3 Within the visual envelope, key visually sensitive receivers (VSRs) that would be potentially affected by the Project shall be identified. The sensitivity of VSRs shall be assessed in accordance with EIAO Guidance Note No. 8/2010. According to the EIA Review Report and the review in the latest EP, a list of VSRs that are considered as high sensitivity are list below:

- Villa Le Parc
- Tin Liu Village
- Pai Tau Village.
- Sheung Wo Che
- Ha Wo Che
- Siu Wo Court
- The Palazzo
- Hilton Plaza
- New Town Plaza Phase 3
- Wai Wah Centre
- Scenery Court
- Shatin Plaza
- Lek Yuen Estate
- Lucky Plaza / Shatin Centre
- Wo Che Estate
- Ten Thousand Buddhas Monastery





## **5.2 Sources of Landscape and Visual Impact**

5.2.1 According to the EIA Review Report and the review in the latest EP, the sources of impacts would create varying levels of landscape and visual impact during construction and operation phases of the Project. Potential impacts would result from the temporary and permanent works during construction phase and permanent highways structures including noise barriers and enclosures during operation phase.

### ***Construction Phase***

The sources of landscape impacts in the construction phase would include:

- Widening works for Tai Po Road and associated slope works;
- Construction of noise barriers/screening/semi-enclosures; and
  - Loss of greenery.

### ***Operation Phase***

- Provision of noise barriers and semi-enclosures; and
- Operation of widened Tai Po Road.

## **5.3 Mitigation Measures**

5.3.1 Refer to the EIA Review Report, the proposed mitigation measures in the approved EIA Report are summarized as below:

- protection of retained trees, replanting of transplanted trees and conservation of top soil;
- compensatory planting for loss of existing woodland;
- planting of engineered slopes, road verges, central dividers and around structures;
- screen barriers;
- hard landscape treatment of the carriageway and roadside furniture, including the development of chromatic themes in the architectural treatment of engineering structures, and the consideration of landscape lighting and special landscape features.

5.3.2 Based on the assessment findings in the Landscape and Visual Impact Assessment due to the EIA Review Report, additional measures are updated and proposed to mitigate any additional adverse impact identified. The additional measures include:

- Protection of OVT is proposed within the project boundary during construction in accordance with ETWB TCW No. 29/2004. A protection zone is set up to encompass the tree along its dripline projecting vertically from the tree canopy and extending 2 m below the ground level and 2 m above the top of the tree. For a tree growing on a retaining structure/wall, the tree protection zone should encompass the body of the tree itself and 2 m above the tree crown as well as the vertical and horizontal surfaces of the retaining structure/wall, covered by the tree roots together with the space up to 2 m behind those surfaces. Within the protection zone of the trees, construction works such as excavation, trenching, piling and landfilling, etc. should be avoided as far as possible.



- Control of Night-time Lighting Glare is proposed to minimize the night-time glare during construction.
- Erection of Decorative Screen Hoarding is proposed to provide visual screen to the construction works to mitigate any potential adverse impact on adjacent Pedestrians and Cyclists on Footpath/Bicycle Track during construction.
- Shrubs and Climbers planting are proposed along the Noise Enclosures and Barriers to mitigate any potential adverse impact on adjacent VSRs during operation.

The enhanced mitigation measures proposed during construction and operation phase which updated by the EIA Review Report and the review of the latest EP are described in **Table 5.1.**

Table 5.1 Landscape and Visual Mitigation Measure during Construction and Operation Phase

ID No.	Landscape and Visual Mitigation Measures	Implementation Agency	Maintenance/ Management Agency
<b>Construction Phase</b>			
CM1	<p><b>Protection of retained trees, transplanting of transplanted trees and conservation of topsoil</b></p> <p>Existing trees shall be preserved as much as possible. Detailed tree preservation and transplanting proposals shall be submitted to relevant government departments for approval in accordance with DEVB TC(W) No. 7/2015.</p> <p>Topsoil will be conserved as far as possible during the road improvement works and utilized during the replanting operations. The stock piling height of the topsoil will not be more than 2m.</p>	Contractor	CEDD
CM2	<p><b>Protection of OVTs</b></p> <p>OVTs identified in the Project Boundary shall be protected in accordance with ETWB TCW no. 29/2004.</p>	Contractor	CEDD
CM3	<p><b>Control of Night-time Lighting Glare</b></p> <p>Night-time lighting glare shall be properly managed and control during construction so as to minimize any adverse visual impact on adjacent VSRs.</p>	Contractor	CEDD
CM4	<p><b>Erection of Decorative Screen Hoarding</b></p> <p>Decorative screen hoarding with design</p>	Contractor	CEDD

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ID No.	Landscape and Visual Mitigation Measures	Implementation Agency	Maintenance/ Management Agency
	compatible with the surrounding landscape setting shall be erected along the southern boundary of Tai Po Road to mitigate any potential adverse impact on adjacent Pedestrian and Cyclists on Footpath/Bicycle Track.		
<b>Operation Phase</b>			
OM1	<p><b>Compensatory planting for loss of existing trees</b></p> <p>Compensatory planting shall be provided within and outside the project boundary where possible. Detailed compensatory planting proposal will be prepared in accordance with DEVB TC(W) No. 7/2015.</p>	Contractor	LCSD/HyD
OM2	<p><b>Planting of engineered slopes, road verges, central divider and around structures</b></p> <p>Planting shall be undertaken at the earliest practical time in the construction period. The planting proposal shall aim to strengthen the existing tree species and supplement the existing tree planting to provide an effective screen to ameliorate any potential landscape and visual impacts. The proposed species to be utilized for road improvement works shall be agreed with LCSD and future maintenance authorities. All the proposed species for compensatory planting shall be suitable for roadside streetscape planting.</p>	Contractor	LCSD/HyD
OM3	<p><b>Provision of visually pleasing aesthetic treatment on noise barriers and enclosures</b></p> <p>Provision of visually pleasing noise barriers and enclosures design shall be proposed. The design of these structures aims to minimize any potential visual impact and visually integrate the proposed structures into the adjacent landscape context. This should be achieved through the use of form, colour, tones, materials and planting materials.</p>	Contractor	HyD
OM4	<b>Hard Landscape Treatment of</b>	Contractor	HyD



ID No.	Landscape and Visual Mitigation Measures	Implementation Agency	Maintenance/ Management Agency
	<p><b><i>Carriageway, Structures and Roadside Furniture</i></b></p> <p>Aesthetically pleasing hard landscape treatment of the carriageway and roadside furniture, including development of chromatic themes in the architectural treatment of engineering structures, and the consideration of landscape lighting and special landscape features.</p>		
OM5	<p><b><i>Shrubs and Climbers Planting proposed along the facade of Noise Enclosures and Barriers</i></b></p> <p>Shrubs and climbers planting are proposed on the facade of Noise Enclosures and Barriers to mitigate any adverse impact on adjacent VSRs in area where space for tree planting is not feasible.</p>	Contractor	LCSD/HyD

**5.4 Construction and Operational Phase Audit**

- 5.4.1 All measures undertaken by both the Contractor and a specialist Landscape Sub-Contractor during the construction phase and first year of the operational phase shall be audited by environmental auditing team, on a regular basis to ensure compliance with the intended aims of the measures. Site inspections should be undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase. The broad scope of the audit is detailed and should be undertaken with reference to the Environmental Mitigation Implementation Schedule in **Appendix A**.
- 5.4.2 In the event of non compliance the responsibilities of the relevant parties is detailed in the Event and Action plan provided in **Table 5.2**.



**Table 5.2 Event and Action Plan for Landscape & Visual Impact**

Event	Action		
	ET	SO	Contractor
Non-conformity on one occasion	<ol style="list-style-type: none"> <li>1. Identify Source;</li> <li>2. Inform the Contractor and the SO;</li> <li>3. Discuss remedial actions with the SO and the Contractor; and</li> <li>4. Monitor remedial actions until rectification has been completed</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor; and</li> <li>2. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working methods;</li> <li>2. Rectify damage and undertake any necessary replacement.</li> </ol>
Repeated Non-conformity	<ol style="list-style-type: none"> <li>1. Identify Source;</li> <li>2. Inform the Contractor and the SO;</li> <li>3. Increase monitoring frequency;</li> <li>4. Discuss remedial actions with the SO and the Contractor;</li> <li>5. Monitor remedial actions until rectification has been completed; and</li> <li>6. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor; and</li> <li>2. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Amend working methods;</li> <li>2. Rectify damage and undertake any necessary replacement.</li> </ol>



## **6. Waste Management**

### **6.1 Applicable Environmental Standard and Guidelines**

6.1.1 The criteria and guidelines for assessing waste management implications are outlined in Annex 7 and Annex 15 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), respectively.

6.1.2 Same as that in the EIA Review Report, the following legislation also covers the handling, treatment and disposal of waste in Hong Kong:

- Waste Disposal Ordinance (Cap. 354);
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C);
- Land (Miscellaneous Provisions) Ordinance (Cap. 28);
- Public Health and Municipal Services Ordinance (Cap. 132) - Public Cleansing and Prevention of Nuisances Regulation;
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N); and
- Dumping at Sea Ordinance (Cap. 466).

6.1.3 There are some new guidelines issued and updated by the EIA Review Report, which detail how the Contractor should comply with are as follow:

- A Guide to the Chemical Waste Control Scheme, Environmental Protection Department, Hong Kong (ver. 2008);
- Section 4.1.3, Chapter 4 of Project Administration Handbook for Civil Engineering Works Management of Construction/Demolition Materials including Rocks (ver. 2010);
- ETWB TC(W) No. 34/2002 - the Environment, Transport and Works Bureau Technical Circular (Works) No. 34/2002 - Management of Dredged/Excavated Sediment;
- ETWB TC(W) No. 19/2005, Environmental Management on Construction Sites; and
- DEVB TC (W) No. 6/2010, Trip-ticket System for Disposal of Construction and Demolition Materials.

6.1.4 Construction/Demolition (C&D) materials that are wholly inert, namely public fill, should not be disposed of at landfill, but be taken to Public Fill Reception Facilities (PFRFs), which usually form part of reclamation schemes. The Land (Miscellaneous Provisions) Ordinance requires the dumping licenses to be obtained by individuals or companies who deliver public fill to PFRFs. The CEDD issues the licenses under delegated powers from the Director of Lands.

6.1.5 Further measures are introduced under Section 4.1.3, Chapter 4 of Project Administration Handbook for Civil Engineering Works that management of C&D materials, including rocks are strengthened and their generation at sources are minimized. The enhancement measures include: (i) drafting of a Construction and Demolition Material Management Plan (C&DMMP) at an early design stage to minimize C&D materials generation and encourage proper management of such materials; (ii) vetting of the C&DMMP prior to upgrading of the project to Category A in the Public Works Programme; and (iii) providing the contractor with information from the C&DMMP in order to facilitate the preparation of the Waste Management Plan (WMP) and to minimize C&D materials



generation during construction. Projects generating C&D materials or importing fill material less than 50,000m<sup>3</sup> are exempted from the C&DMMP.

- 6.1.6 The ETWB TC(W) No. 34/2002 sets out the procedure for seeking approval to and the management framework for marine disposal of dredged/ excavated sediment. This technical circular outlines the requirements to be followed in assessing and classifying the sediment and explains the marine disposal arrangement for the classified material. The sediment quality criteria for the classification of sediment were referred as the Lower Chemical Exceedance Level (LCEL) and Upper Chemical Exceedance Level (UCEL). The LCEL and UCEL are presented in Appendix A of ETWB TC (W) No. 34/2002. Subject to the results of the chemical screening, biological screening may be required to determine the disposal requirement of the sediment.
- 6.1.7 The final determination of the appropriate disposal options, routing and the allocation of a permit to dispose of material at a designated site shall be determined in accordance with ETWB TC(W) No. 34/2002. Three types of disposal options for dredged/ excavated sediments were stipulated in the ETWB TC(W) No. 34/2002: Type 1 – Open Sea Disposal or Open Sea Disposal in Dedicated Sites, Type 2 – Confined Marine Disposal and Type 3 – Special Treatment / Disposal. For Type 3 disposal, the Project Proponent shall be responsible for identifying and agreeing with the EPD the most appropriate treatment and/or disposal arrangement. The determination of the appropriate disposal options shall be based on the sediment classification and if necessary, the biological screening results.
- 6.1.8 In accordance with the DEVB TC(W) No.6/2010 'Trip Ticket System for Disposal of Construction and Demolition Materials', all contracts that are expected to generate inert C&D materials (e.g. soil, broken rock, broken concrete and building debris, etc) requiring disposal from site, the project office shall write to the Public Fill Committee (PFC) through Secretary of the PFC to request a designated disposal ground for incorporation into the tender documents. For contracts where the estimated amount of non -inert C&D materials requiring disposal at landfill facilities equal or exceed 50m<sup>3</sup>, the project office shall seek confirmation from the EPD in terms of the availability of landfill facilities for disposal of such materials. The EPD will designate landfill facilities, if available, for the contract. Where the estimated amount of on-inert C&D materials to be generated from the contract is less than 50m<sup>3</sup>, the project office is not required to apply to EPD for designated landfill facilities. However, the project office should still specify in the tender documents of the appropriate landfill facilities (e.g. SENT Landfill at Tseung Kwan O, NENT Landfill at Ta Kwu Ling and WENT Landfill at Nim Wan) for disposal.

## **6.2 Mitigation Measure**

- 6.2.1 The general waste management mitigation measures were updated in the EIA Review Report. The Contractor is responsible for the management of materials and wastes during construction. This includes control of wastes on site, removal of the waste materials from the site and the implementation of any mitigation measures to minimise waste or redress any problems that arise from waste associated with the works.
- 6.2.2 This section sets out the measures to be adopted to avoid or minimise potential adverse impacts associated with waste arising from the works under the headings of each waste type. The Contractor should incorporate these recommendations into



a comprehensive on-site Waste Management Plan, (WMP). If, for any reason, the recommendations cannot be implemented, full justification should be given in the WMP.

- 6.2.3 In accordance with ETWB TC(W) No. 19/2005 - Environmental Management on Construction Sites", the Contractor shall prepare and implement a WMP as part of the EMP. The EMP shall describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Engineer for approval.

The Contractor should implement the waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor.

#### *Waste Management Hierarchy*

- 6.2.4 The waste management hierarchy has been applied in the assessment and development of mitigation measures for waste which aims at evaluating the desirability of waste management methods and includes the followings in descending preference:

- (a) Avoidance and reduction of waste generation;
- (b) Reuse of materials as far as practicable;
- (c) Recovery and recycling of residual materials where possible; and
- (d) Treatment and disposal according to relevant laws, guidelines and good practices.

- 6.2.5 Based on the waste management hierarchy, waste reduction measures are recommended as follow to reduce impacts and costs arisen from the Project. Recommendations of good site practices and waste reduction measures would be stated in order to achieve avoidance and minimization of waste generation in the hierarchy. Environmental Management Plan (EMP) and trip-ticket system are recommended for monitoring management of waste. Specific measures targeting the mitigation of impacts in works areas and the transportation of spoil off-site would be provided to minimize the potential impacts to the surrounding environment.

#### *Training*

- 6.2.6 To facilitate adoption of the best-practice philosophy, training shall be provided to all personnel working on site. The training shall promote the concept of general site cleanliness and clearly explain the appropriate waste management procedures defined in the EMP. Overall, the training should encourage all workers to reduce, reuse and recycle wastes.

#### *Records of Waste and Management*

- 6.2.7 The contractor's environmental performance is monitored and controlled through the weekly environmental walks. The items after the environmental walks shall include:

- (a) A review of the EMP in particular the suitability of the environmental measures on nuisance abatement and waste management adopted by the contractor;





- (b) the environmental performance of the contractor and his sub-contractors;
- (c) the effectiveness of the environmental measures on nuisance abatement and waste management implemented on the site, and any complaints received; and
- (d) the promptness of rectification or improvement actions of the contractor on the defects and deficiencies identified during inspections of the site.

6.2.8 Waste shall only be disposed of at licensed sites and the WMP should include procedures to ensure that illegal disposal of wastes does not occur. Only waste haulers authorized to collect the specific category of waste concerned should be employed and a trip ticket system shall be implemented for offsite disposal of inert C&D materials and non-inert C&D materials at public fill reception facilities and landfills, respectively. Appropriate measures should be employed to minimize windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers.

*Site Planning*

6.2.9 Work site(s) shall be arranged and managed to facilitate the proper management of wastes and materials. The WMP shall include plans indicating specific areas designated for the storage of particular types of waste, reusable and recyclable materials as well as areas and management proposals for any stockpiling areas. Waste storage areas should be well maintained and cleaned regularly. Specific provisions for different types of material are outlined below. In general, these areas should be designed to avoid cross contamination of materials as well as pollution of the surrounding environment.

*Construction and Demolition (C&D) Material*

6.2.10 In order to minimize the impact resulting from collection and transportation of C&D material for off -site disposal, it is recommended that the excavated fill material should be reused on site as backfill material as far as possible. Also, careful design, planning and good site management should be maintained in order to minimise over ordering and generation of surplus materials such as concrete, mortars and cement grouts. The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.

6.2.11 C&D materials should be segregated on site into different waste and material types. This will increase the feasibility of certain components of the waste stream being recycled by specialised contractors. The Contractor should clearly demonstrate in the EMP how he intends to maximise the reuse of C&D material on-site. Where reuse of materials on site is not feasible, the Contractor should explore opportunities for recycling materials off-site, and inert C&D materials shall be reused on site as much as possible.

6.2.12 Potential opportunities for recycling and reuse of C&D materials from the Project include:

- (a) paving bricks arising from existing pavement could be recycled on site;
- (b) existing marginal roadside barriers comprise pre-cast units, which may be possible to be reused in the following widening works; and
- (c) existing bridge parapets comprise aluminum post and railings, which have a recyclable value and could be sold for reconditioning or reused for scrap metal.



6.2.13 Any stockpile should be sited away from existing watercourses and suitably covered to prevent wind erosion and impacts on air and water quality.

*Chemical Waste*

6.2.14 Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows. Containers used for the storage of chemical wastes should:

- (a) be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- (b) have a capacity of less than 450L unless the specifications have been approved by the EPD; and
- (c) display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C).

6.2.15 The storage area for chemical wastes should:

- (a) be clearly labelled and used solely for the storage of chemical waste;
- (b) be enclosed on at least 3 sides;
- (c) have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;
- (d) have adequate ventilation;
- (e) be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and
- (f) be arranged so that incompatible materials are adequately separated.

6.2.16 The Contractor shall register with EPD as a Chemical Waste Producer. Waste oils and other chemical wastes as defined in the Waste Disposal (Chemical Waste) (General) Regulation will require disposal by appropriate means and could require pre-notification to EPD prior to disposal. Appropriate means include disposal:

- (a) via a licensed waste collector; and
- (b) to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers; or
- (c) to a reuser of the waste, under approval from EPD.

*General Refuse*

6.2.17 General refuse generated on-site should be stored in enclosed bins or compaction units separate from construction and chemical wastes. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily or every second day basis to minimize odour, pest and litter impacts. The burning of refuse on construction sites is prohibited by law.

6.2.18 General refuse is generated largely by food service activities on site, so reusable rather than disposable dishware should be used if feasible. Aluminum cans are often



recovered from the waste stream by individual collectors if they are segregated or easily accessible. Therefore separate, labelled bins for their deposit should be provided if feasible.

6.2.19 Office waste can be reduced through recycling of paper if volume is large enough to warrant collection. Participation in a local collection scheme should be considered if one is available.

**6.3 EM&A Requirements**

6.3.1 EM&A is recommended during the construction phase only and limited to supervision and audit of the Contractor.

6.3.2 The Contractor is responsible for waste control within the construction site, removal of the waste material produced from the Site and to implement any mitigation measures to minimise waste or redress problems arising from the waste from the site. The waste material may include any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Site onto any adjoining land, storm sewer, sanitary sewer, or any waste matter or refuse to be deposited anywhere within the Site or onto any adjoining land.

6.3.3 The Contractor shall also pay attention to the environmental standard and guidelines as discussed above and carry out appropriate waste management work. The relevant license/permit, such as the effluent discharge license, the chemical waste producer registration, etc. shall be obtained. The Contractor shall refer to the relevant booklets issued by EPD when applying for the license/permit.

6.3.4 During the site inspections and the document review procedures as mentioned in this Manual, the Environmental Team Leader shall pay special attention to the issues relating to waste management, and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of Hong Kong.



## **7. Site Environmental Audit**

### **7.1 Site Inspections**

7.1.1 Site inspections shall be undertaken routinely to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

7.1.2 The ET Leader shall be responsible for formulating the environmental site inspection, the deficiency and remedial action reporting system, and for carrying out the site inspection works. The ET Leader shall submit a proposal for site inspection and deficiency and remedial action reporting procedures to the Contractor for agreement, and to the SO for approval. The ET's proposal for rectification would be made known to the IEC

7.1.3 Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the environmental situation and the pollution control and mitigation measures within the site, it should also review the environmental situation outside the works area which is likely to be affected directly or indirectly by the site activities. The ET shall make reference to the following information in conducting the inspection:

- The EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
- Ongoing results of the EM&A program;
- Ongoing results of the EM&A program;
- Individual works methodology proposals (which shall include proposal on associated pollution control measures);
  - Contract specifications on environmental protection and pollution prevention control;
  - Relevant environmental protection and pollution control laws; and
  - Previous site inspection results undertaken by the ET and others.

7.1.4 The Contractor shall keep the ET Leader updated with all relevant information on the construction contract necessary for him/her to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works shall be submitted to the IEC and the Contractor within 24 hours for reference and for taking immediate remedial action. The Contractor shall follow the procedures and time-frame stipulated in the environmental site inspection, and the deficiency and remedial action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections.

### **7.2 Compliance with Legal and Contractual Requirements**

7.2.1 There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong with which the construction activities shall comply.



- 7.2.2 In order that the works are in compliance with the contractual requirements, all the works method statements submitted by the Contractor to the Engineer for approval shall be checked by the Environmental Team Leader to see whether sufficient environmental protection and pollution control measures have been included. The implementation schedule of mitigation measures is summarised in **Appendix A**.
- 7.2.3 The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated and that any foreseeable potential for violating the laws can be prevented.
- 7.2.4 The Contractor shall regularly copy relevant documents to the Engineer so that the checking work can be carried out. The document shall include at minimum the updated Work Progress Reports, the updated Works Programme, the application letters for different licenses/permits under the environmental protection laws and all valid licenses/permits.
- 7.2.5 After reviewing the document, the ET Leader shall advise the SO, IEC and Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. The ET Leader shall advise the SO, IEC and Contractor on the current status on license/permit application and any environmental protection and pollution control preparation works that may not cope with the works programme or may result in potential violation of environmental protection and pollution control requirements.
- 7.2.6 Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The SO and ET Leader shall follow up to ensure that appropriate action has been taken by the Contractor in order that the environmental protection and pollution control requirements are fulfilled.

### **7.3 Environmental Complaints**

- 7.3.1 Complaints shall be referred to the ET Leader for carrying out complaint investigation procedures.
- 7.3.2 The ET Leader shall undertake the following procedures upon receipt of the complaints:
- (i) log complaint and date of receipt into the complaint database;
  - (ii) investigate the complaint and discuss with the Contractor to determine its validity and to assess whether the source of the problem is due to works activities;
  - (iii) if a complaint is considered valid by the Engineer or EPD and due to the works, the ET Leader shall identify mitigation measures;
  - (iv) if mitigation measures are required, the ET Leader shall advise the Contractor accordingly;
  - (v) review the Contractor's response on the identified mitigation measures and the updated situation;

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- (vi) if the complaint is transferred from EPD, submit interim report to EPD on status of the complaint investigation and follow-up action within the time frame assigned by EPD;
  - (vii) undertake additional monitoring and audit to verify the situation if necessary and ensure that any valid reason for complaint does not recur;
  - (viii) report the investigation results and the subsequent actions on the source of the complaint for responding to complainant (If the source of complaint is EPD, the results should be reported within the time frame assigned by EPD); and
  - (ix) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.
- 7.3.3 During the complaint investigation work, the Contractor shall cooperate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation measures. The ET Leader shall check that the measures have been carried out by the Contractor. A flow chart of the complaint response procedures is shown in **Appendix E**.

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### 8. Reporting

#### 8.1 General

8.1.1 The EM&A reporting shall be carried out in paper based plus electronic submission upon agreeing the format with the Engineer and EPD. All the monitoring data (baseline and impact) shall also be submitted in electronic format. The formats for air quality and noise monitoring data to be submitted on diskette are shown in **Appendix C**.

8.1.2 Types of reports that the ET Leader shall prepare and submit include baseline monitoring report, monthly EM&A report, quarterly EM&A summary report and final EM&A review report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly summary and final review EM&A reports shall be made available to the Director of Environmental Protection (DEP).

#### 8.2 Electronic Reporting of EM&A Information

8.2.1 To facilitate public inspection of the baseline monitoring report and various EM&A reports via the EIAO internet website and at the EIAO Register Office, electronic copies of these reports shall be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by EPD and shall be submitted at the same time as the hardcopies. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of these reports shall be included at the beginning of the document. Hyperlinks to all figures, drawings and tables in these reports shall be provided in the main text from where the respective references are made. All graphics in these reports shall be in interlaced GIF format unless otherwise agreed by EPD. The content of the electronic copies of these reports must be the same as the hard copies. The summary of the monitoring data taken shall be included in the various EM&A reports to allow for public inspection via the EIAO internet website.

#### 8.3 Baseline Monitoring Report

8.3.1 The ET Leader shall prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of baseline monitoring. Three hard copies and two electronic copy of the Baseline Environmental Monitoring Report shall be submitted to the DEP. The submissions shall be certified by the ET Leader and verified by the IEC as complied with the requirements as set out in the updated EM&A Manual before submission to the DEP. The ET Leader shall liaise with the relevant parties on the exact number of copies required. Additional copies of the submission shall be provided upon request by the DEP.

8.3.2 The baseline monitoring report shall include at least the following:

- (i) up to half a page executive summary;
- (ii) background information;
- (iii) drawings showing locations of the baseline monitoring stations;



- (iv) monitoring results (in both hard and diskette copies) together with the following information:
  - monitoring methodology;
  - name of laboratory and equipment used and calibration details;
  - parameters monitored;
  - monitoring locations (and depth);
  - monitoring date, time, frequency and duration, and
  - QA/QC results and detection limits.
- (v) details on influencing factors, including:
  - major activities, if any, being carried out on the site during the period;
  - weather conditions during the period;
  - other factors which might affect the results;
- (vi) determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data;
- (vii) revisions for inclusion in the EM&A Manual; and
- (viii) comments and conclusions.

#### **8.4 Monthly EM&A Reports**

- 8.4.1 The results and findings of all EM&A work required in this Manual shall be recorded in the Monthly EM&A Reports prepared by the Environmental Team Leader. The Monthly EM&A Reports shall be prepared and submitted within 2 weeks after the end of each reporting month throughout the entire construction period. The EM&A Reports shall include a summary of all non-compliance. The submissions shall be certified by the ET Leader and verified by the IEC as complying with the requirements as set out in the updated EM&A Manual before submission to the Director. Additional copies of the submission shall be provided to the Director upon request by the DEP.
- 8.4.2 Three hard copies and two electronic copy of each Monthly EM&A Report shall be submitted to the DEP. Before submission of the first EM&A Report, the Environmental Team Leader shall liaise with the parties on the exact number of copies and format of the reports in both hard copy and electronic medium.
- 8.4.3 The Environmental Team Leader shall review the monitoring programme every 6 months or on as needed basis in order to cater for any changes in the surrounding environment and nature of works in progress and shall document all observation in the monthly report.

#### **8.5 First Monthly EM&A Report**

- 8.5.1 The first monthly EM&A report shall include at least the following:
  - (i) 1-2 pages executive summary;
  - (ii) basic Project information including a synopsis of the Project organisation (including key personnel, contact names and telephone numbers), a drawing of the Project area showing the environmentally sensitive receivers and the locations



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of monitoring and control stations, programme, management structure and the work undertaken during the month;

- (iii) a brief summary of EM&A requirements including:
  - all monitoring parameters;
  - environmental quality performance limits (Action and Limit levels);
  - Event-Action Plans;
  - environmental mitigation measures, as recommended in the Project EIA study final report;
  - environmental requirements in contract documents;
- (iv) advice on the implementation status of environmental protection and pollution control/mitigation measures as recommended in the Project EIA study report and summarised in the updated implementation schedule;
- (v) drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (vi) monitoring results (in both hard and diskette copies) together with the following information:
  - monitoring methodology;
  - name of laboratory and equipment used and calibration details;
  - parameters monitored;
  - monitoring locations;
  - monitoring date, time, frequency, and duration; and
  - QA/QC results and detection limits.
- (vii) graphical plots of trends of monitored parameters at the representative monitoring stations annotated against the following:
  - major activities being carried out on site during the period;
  - weather conditions during the period; and
  - any other factors which might affect the monitoring results;
- (viii) advice on the solid and liquid waste management status;
- (ix) a summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (ix) a review of the reasons for and the implications of noncompliance including a review of pollution sources and working procedures;
- (xi) a description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance;
- (xii) a summary record of all complaints received (written or verbal) for each media, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken and summary of complaints; and
- (xiii) an account of the future key issues as assessed from the works programme and work method statements.



## **8.6 Subsequent Monthly EM&A Reports**

8.6.1 The subsequent monthly EM&A reports shall include the following:

- (i) title page
- (ii) executive summary (1-2 pages):
  - breaches of all Action and Limit levels;
  - complaint log;
  - reporting changes; and
  - future key issues
- (iii) contents page
- (iv) environmental status:
  - drawing showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
  - summary of non-compliance with the environmental quality performance limits; and
  - summary of complaints
- (v) environmental issues and actions
  - review issues carried forward and any follow-up procedures related to earlier non-compliance (complaints and deficiencies);
  - description of the actions taken in the event of noncompliance and deficiency reporting;
  - recommendations (should be specific and target the appropriate party for action); and
  - implementation status of the mitigatory measures and the corresponding effectiveness of the measures
- (vi) future key issues
- (vii) appendix
  - action and limit levels;
  - graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following: major activities being carried out on site during the period; weather conditions during the period; and any other factors which might affect the monitoring results;
  - monitoring schedule for the present and next reporting period;
  - cumulative complaints statistics; and
  - details of complaints, outstanding issues and deficiencies.

## **8.7 Quarterly EM&A Summary Reports**

8.7.1 The ET Leader shall submit Quarterly EM&A Summary Reports which should be around 5 pages (including about 3 of text and tables and 2 of figures) and shall contain at minimum the following information:

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5 Lok Yi Street, Tai Lam,  
Tuen Mun, N.T.,  
Hong Kong.

Tel : +852 2450 8233  
Fax : +852 2450 6138  
E-mail : matlab@fugro.com  
Website : www.fugro.com



- (i) up to half a page executive summary;
- (ii) basic Project information including a synopsis of the Project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
- (iii) a brief summary of EM&A requirements including:
  - monitoring parameters;
  - environmental quality performance limits (Action and Limit levels); and
  - environmental mitigation measures, as recommended in the Project EIA study final report;
- (iv) advice on the implementation status of environmental protection and pollution control/mitigation measures as recommended in the Project EIA study report and summarised in the updated implementation schedule;
- (v) drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (vi) graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
  - the major activities being carried out on site during the period;
  - weather conditions during the period; and
  - any other factors which might affect the monitoring results;
- (vii) advice on the solid and liquid waste management status;
- (viii) a summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (ix) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- (x) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- (xi) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xii) comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
- (xiii) proponents' contacts and any hotline telephone number for the public to make enquiries.

### 8.8 Annual/Final EM&A Review Reports

8.8.1 The annual/final EM&A report should contain at least the following information:

- (i) Executive Summary (1-2 pages);

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E-mail : matlab@fugro.com  
Website : www.fugro.com

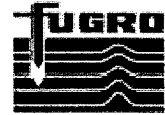


- (ii) drawings showing the project area any environmental sensitive receivers and the locations of the monitoring and control stations;
- (ii) basic project information including a synopsis of the project organization, contacts for key management staff and a synopsis of work undertaken during the course of the project or past twelve months;
- (iv) a brief summary of EM&A requirements including:
  - environmental mitigation measures as recommended in the project EIA study final report;
  - environmental impact hypotheses tested;
  - environmental quality performance limits (Action and Limit Levels);
  - all monitoring parameters;
  - Event-Action Plans;
- (v) a summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report and summarised in the updated implementation schedule;
- (vi) graphical plots and the statistical analysis of the trends of monitored parameters over the course of the projects including the post-project monitoring (or the past twelve months for annual reports) for all monitoring stations annotated against:
  - the major activities being carried out on site during the period;
  - weather conditions during the period, and
  - any other factors which might affect the monitoring results;
- (vii) a summary of noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (viii) a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- (ix) a description of the actions taken in the event of non-compliance;
- (x) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xi) a summary record of notifications of summonses and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches investigation, follow-up actions taken and results;
- (xii) a review of the validity of EIA predictions and identification of shortcomings in the EIA recommendations; and
- (xiii) a review of the effectiveness and efficiency of the mitigation measures;
- (xiv) a review of the success of the EM&A programme to identify any deterioration and to initiate prompt effective mitigatory action when necessary cost effectively.

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### 8.9 Data Keeping

The site documents such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the Monthly EM&A Reports for submission. However, the documents shall be kept by the Environmental Team Leader and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the documents. The monitoring data shall also be recorded in magnetic media, and the software copy shall be available upon request. All the documents and data shall be kept for at least one year after completion of the construction contract.

### 8.10 Interim Notification of Environmental Quality Limit Exceedance

With reference to Event/Action Plans, when the environmental quality limits are exceeded, the ET Leader shall immediately notify the Contractor, the IEC, the Engineer and EPD, as appropriate. The notification shall be followed up with advice to each party on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in **Appendix D**.

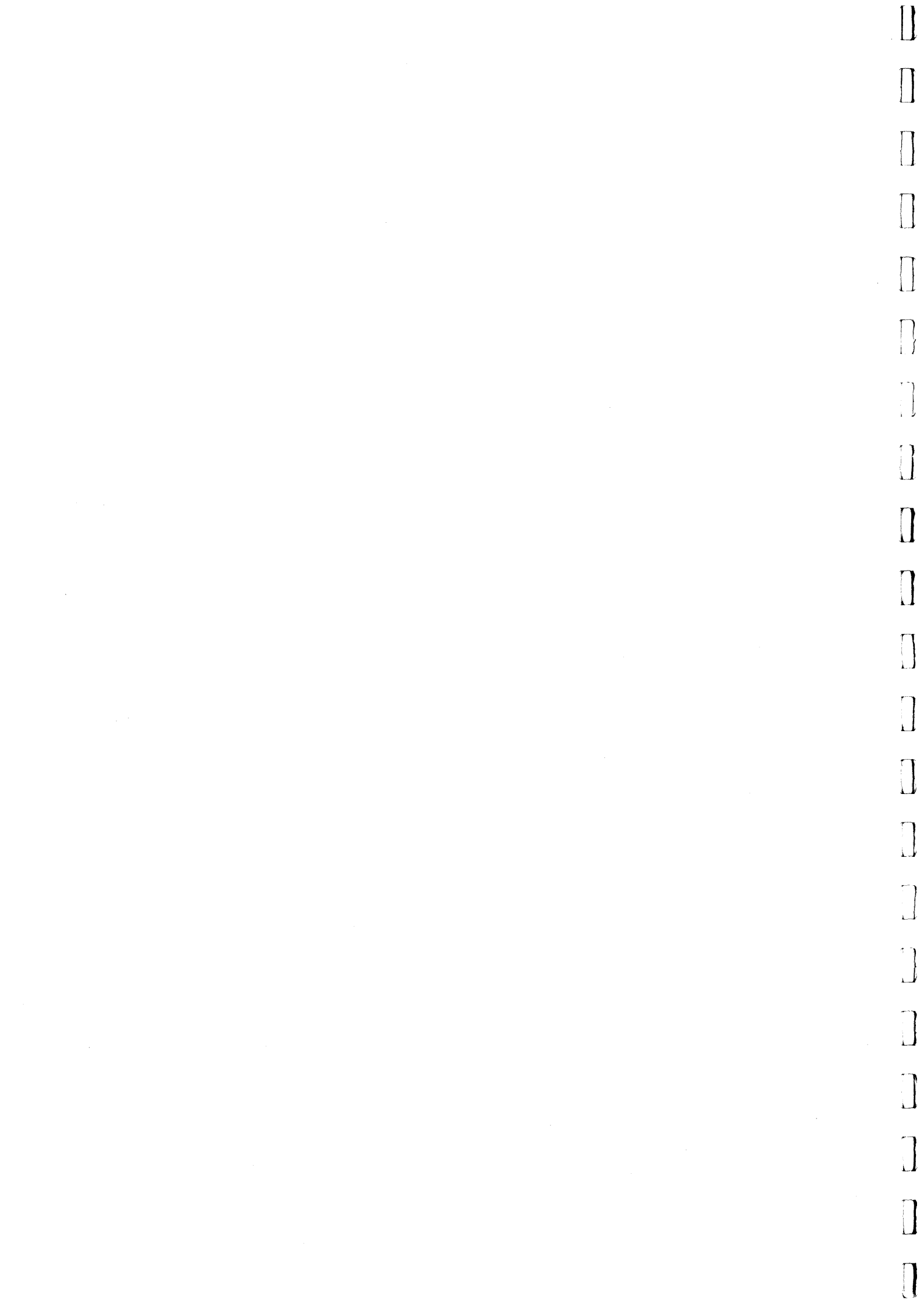
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Fax : +852 2450 6138  
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Website : www.fugro.com



**Figure 1.1  
General Layout Plan**



**AECOM**

PROJECT  
ROAD WIDENING AND  
RETROFITTING  
NOISE BARRIERS  
ON TAI PO ROAD  
(SHA TIN SECTION)

CLIENT  
CEDD  
Civil Engineering and  
Development Department

CONSULTANT  
AECOM Asia Company, Ltd.  
www.aecom.com

SUB-CONSULTANTS

CONTRACT NO.  
NEZ/017/05

SHEET TITLE  
KEY PLAN  
FIGURE 1.1a

SHEET NUMBER  
60461656C/1000A

ISSUE/REVISION

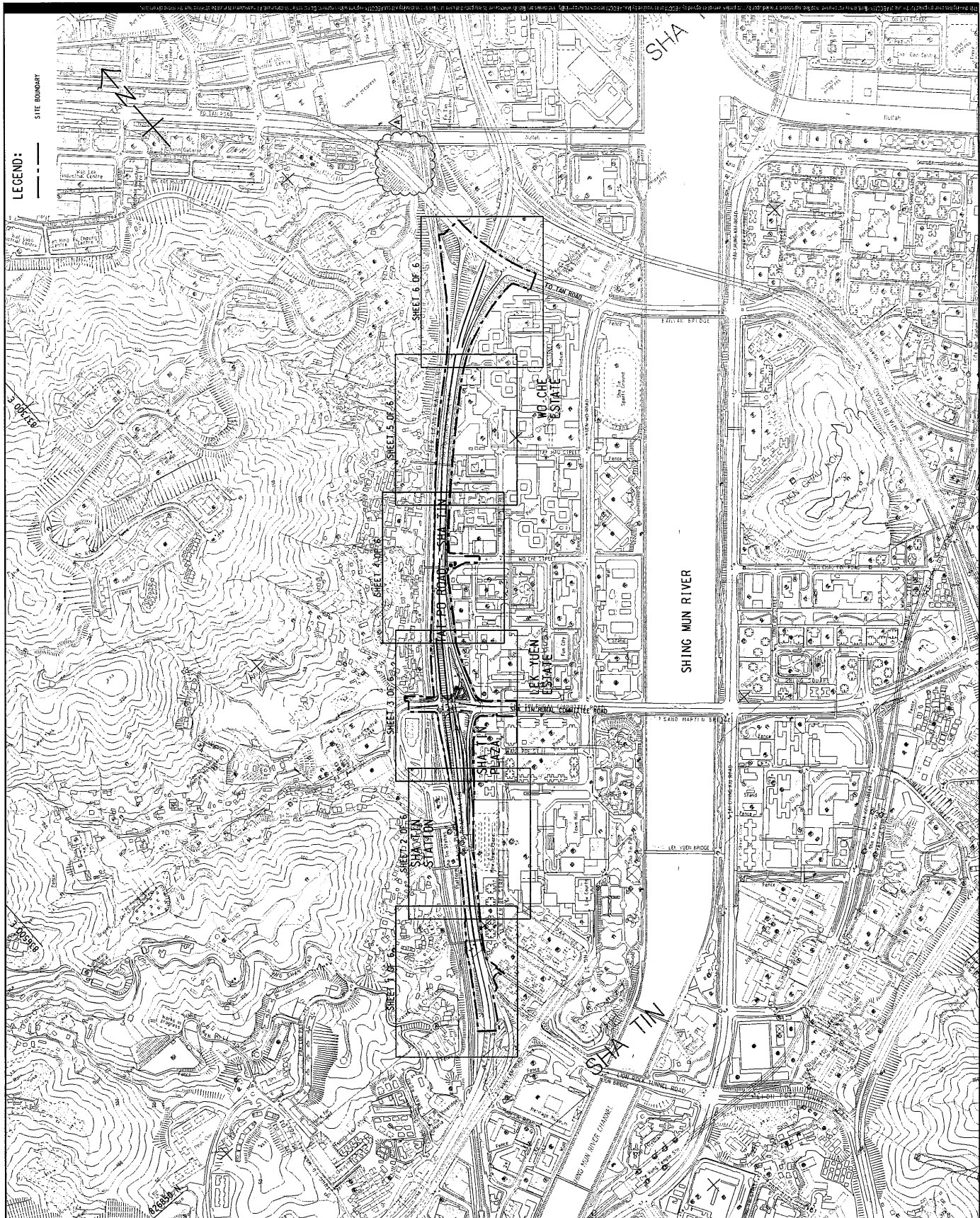
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-	JAN. 18	TENDER DRAWING	BCC		
		REVISED	BCC		

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REVISED

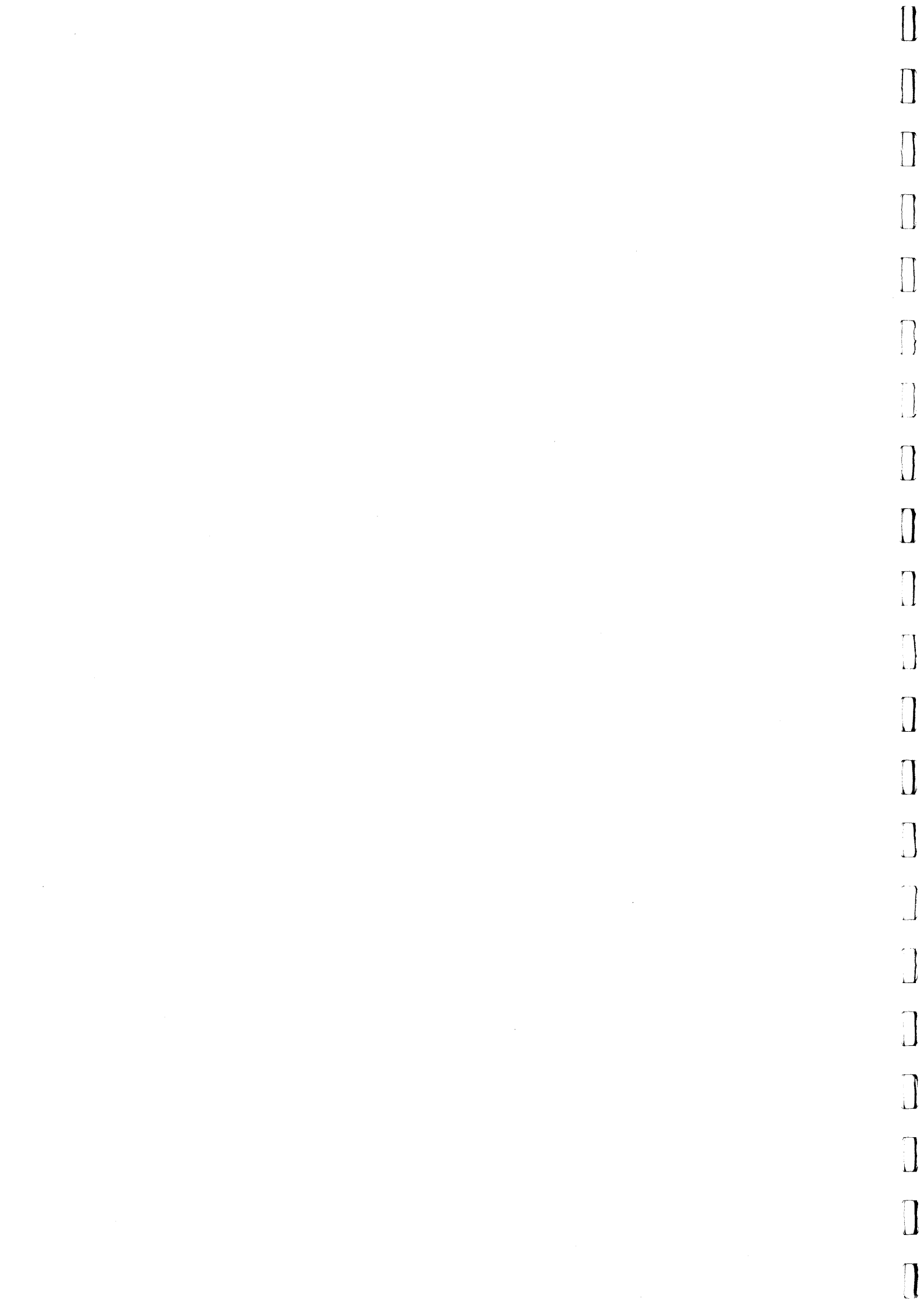
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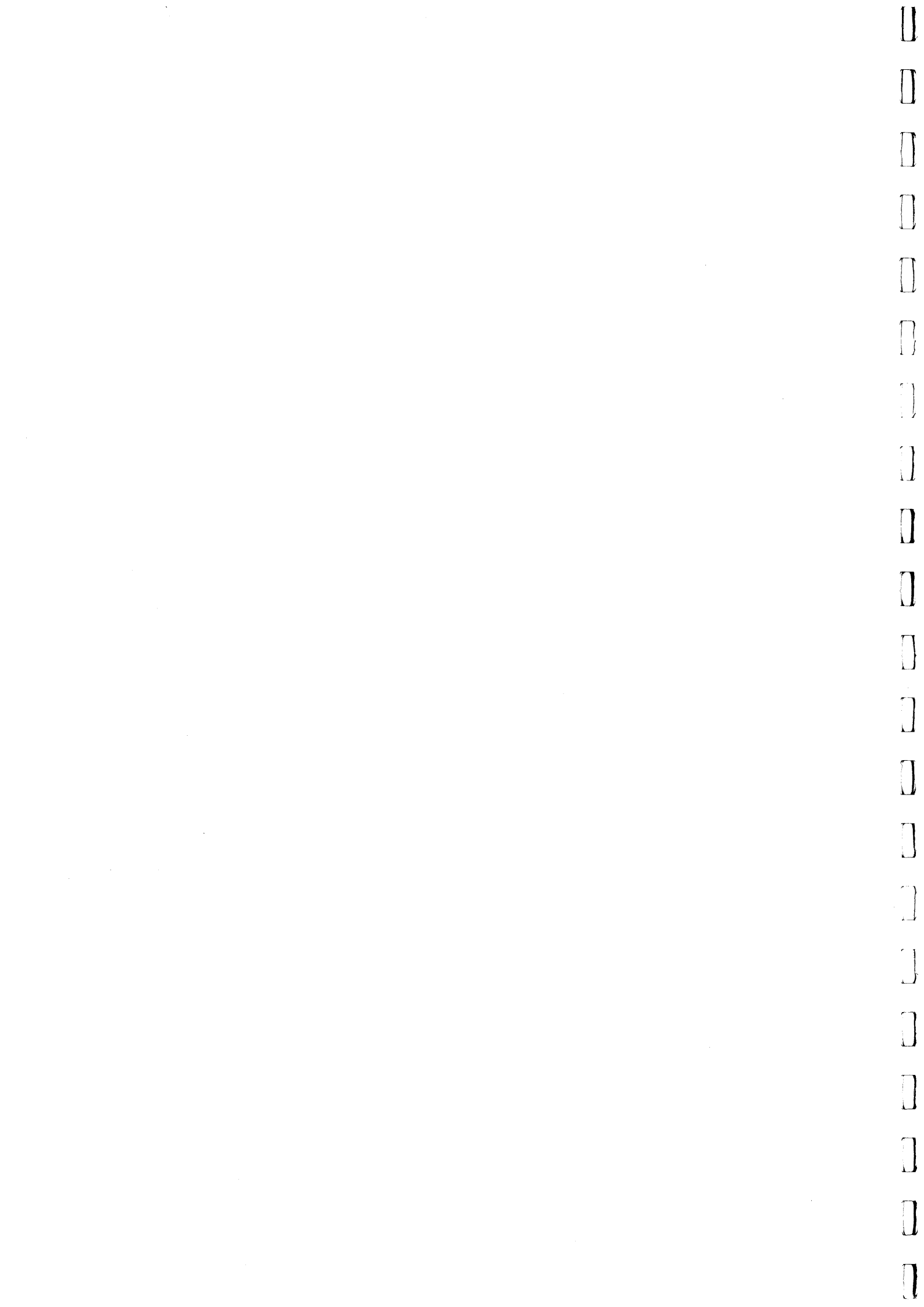
KEY PLAN  
FIGURE 1.1a







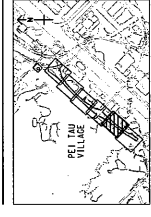




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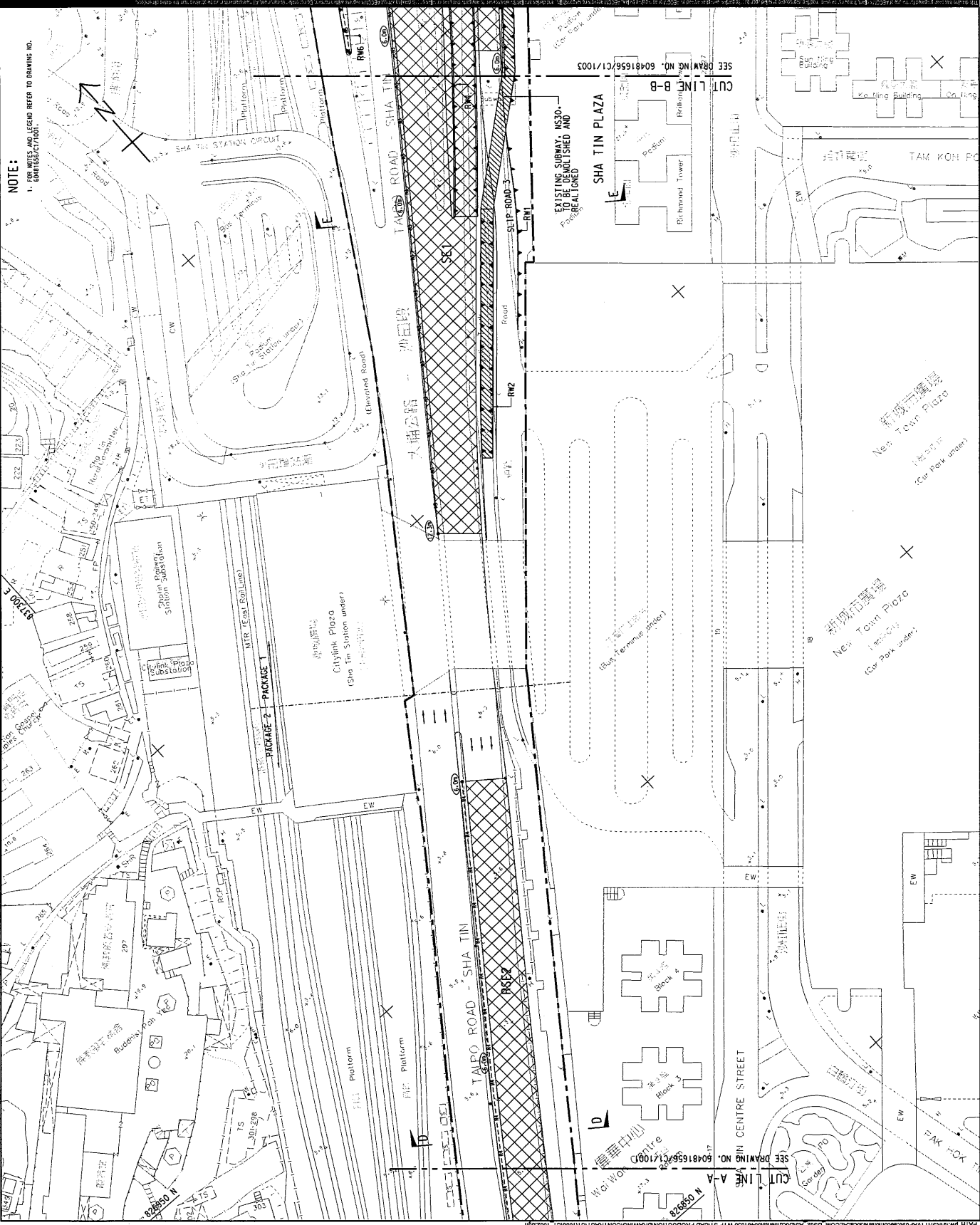
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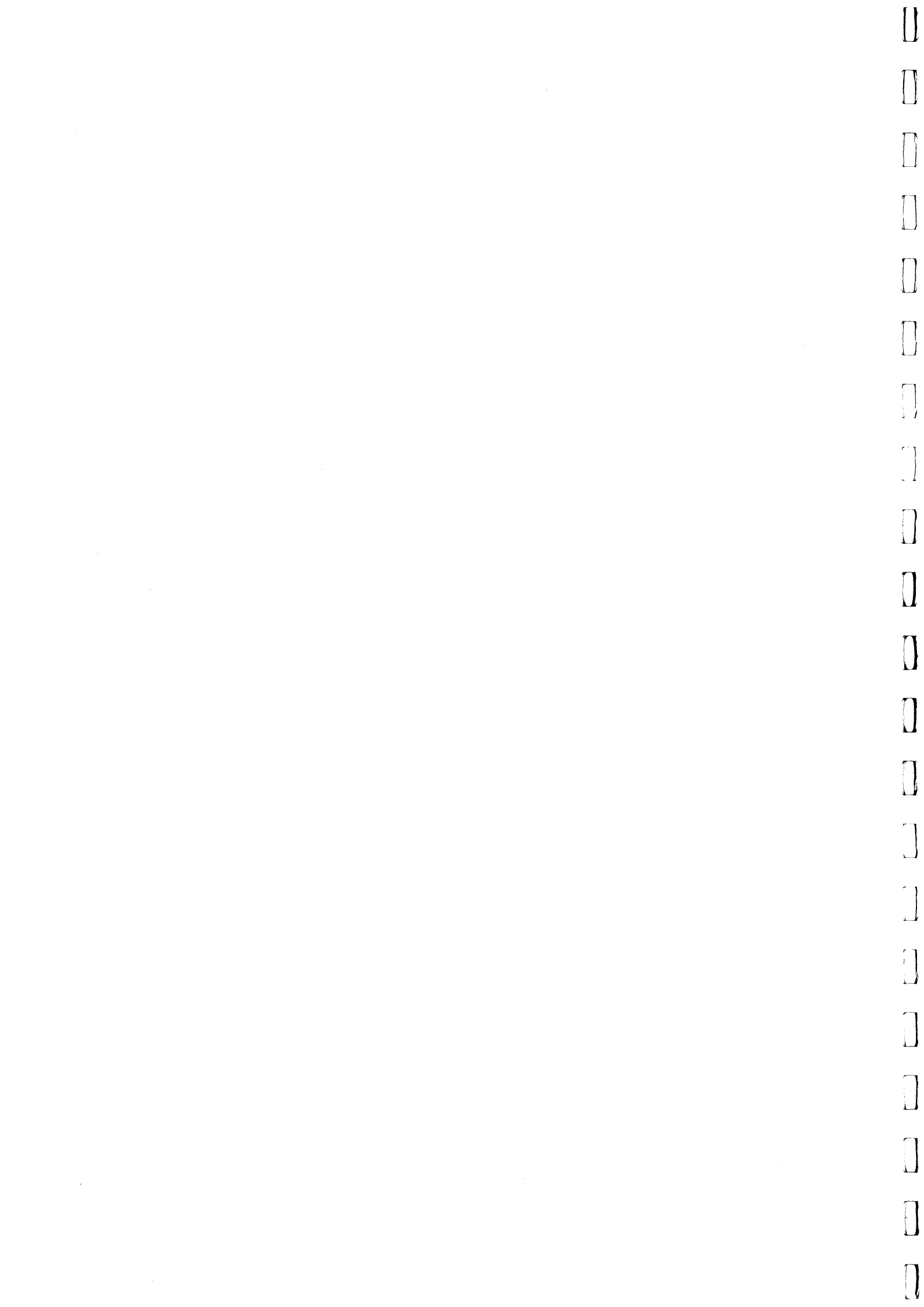


**CONTRACT NO.**  
 NEZ017/05

**SHEET TITLE**  
 GENERAL LAYOUT PLAN  
**FIGURE 1.1b**

**SHEET NUMBER**  
 60481656/C1/1002





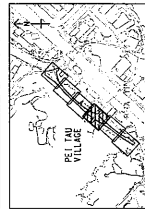
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-	JAN. 19	TENDER DRAWING	BCC	
			CHK	CHK

STATUS

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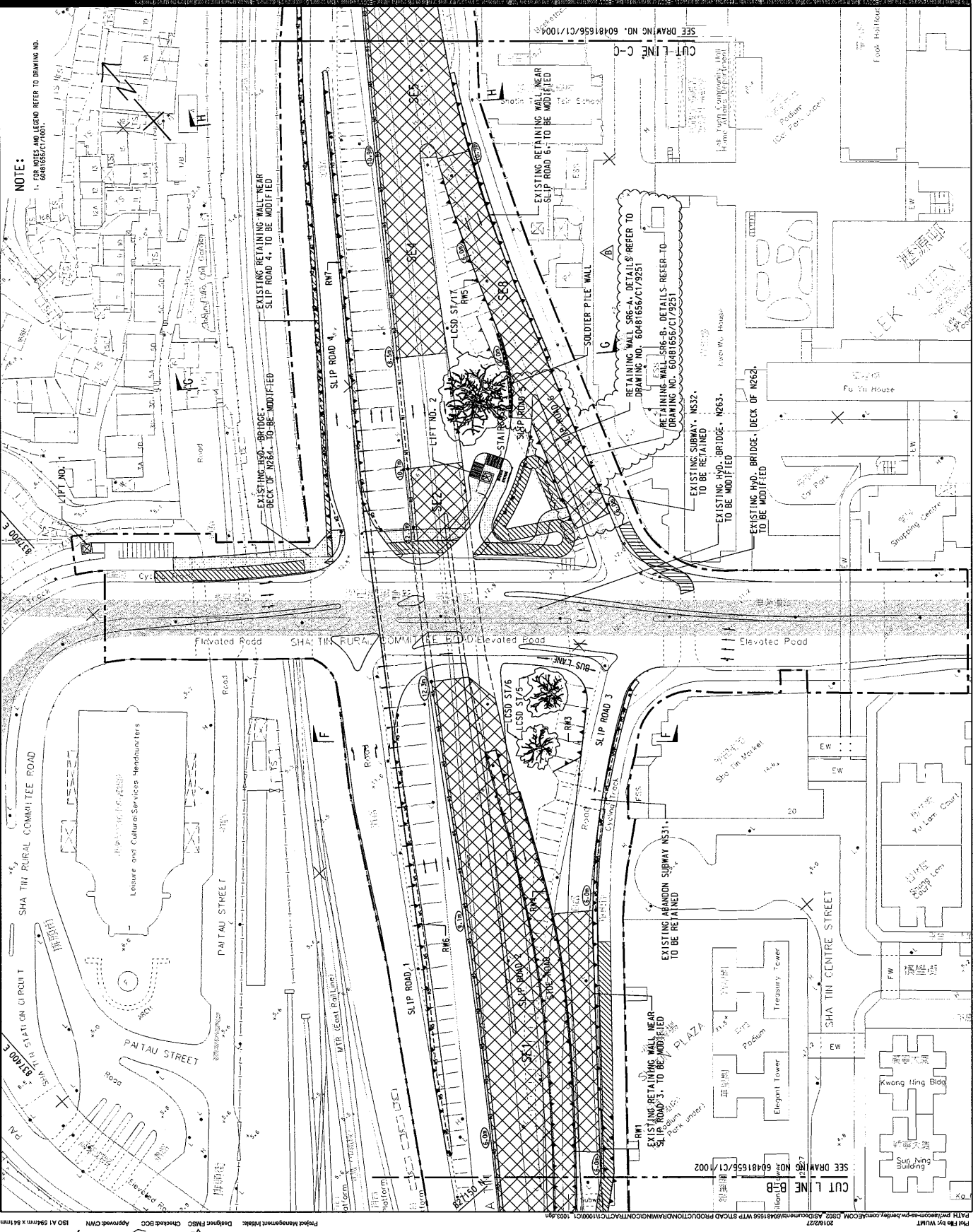
KEY PLAN A1:1:4000



CONTRACT NO.  
 NE/2017/05

SHEET TITLE  
**GENERAL LAYOUT PLAN**  
 FIGURE 1.1'b

SHEET NUMBER  
 SHEET 3 OF 6  
 60481656/C1/1003B



NOTE:  
 1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60481656/C1/1001.

EXISTING RETAINING WALL NEAR SLIP ROAD 4, TO BE MODIFIED

EXISTING RETAINING WALL NEAR SLIP ROAD 6, TO BE MODIFIED

RETAINING WALL SR6-A, DETAILS REFER TO DRAWING NO. 60481656/C1/9251

RETAINING WALL SR6-B, DETAILS REFER TO DRAWING NO. 60481656/C1/9251

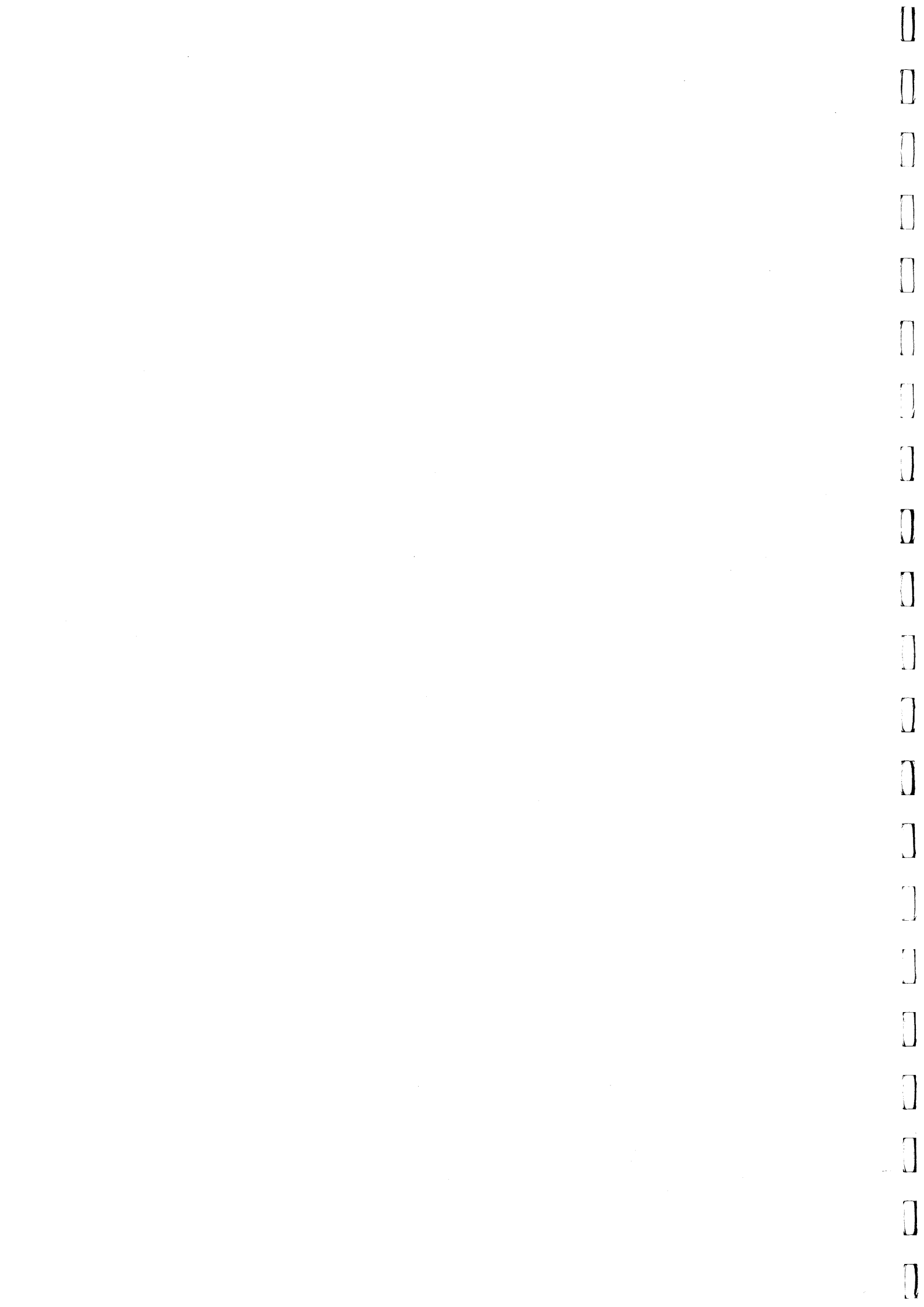
EXISTING SUBWAY, NS32, TO BE RETAINED

EXISTING HYD. BRIDGE, N263, TO BE MODIFIED

EXISTING HYD. BRIDGE, DECK OF N262, TO BE MODIFIED

EXISTING ABANDON SUBWAY NS31, TO BE RETAINED

EXISTING RETAINING WALL NEAR SLIP ROAD 3, TO BE MODIFIED



**REVISION**

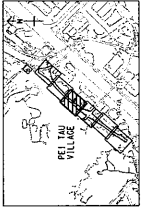
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KEY PLAN: AT 1:6000



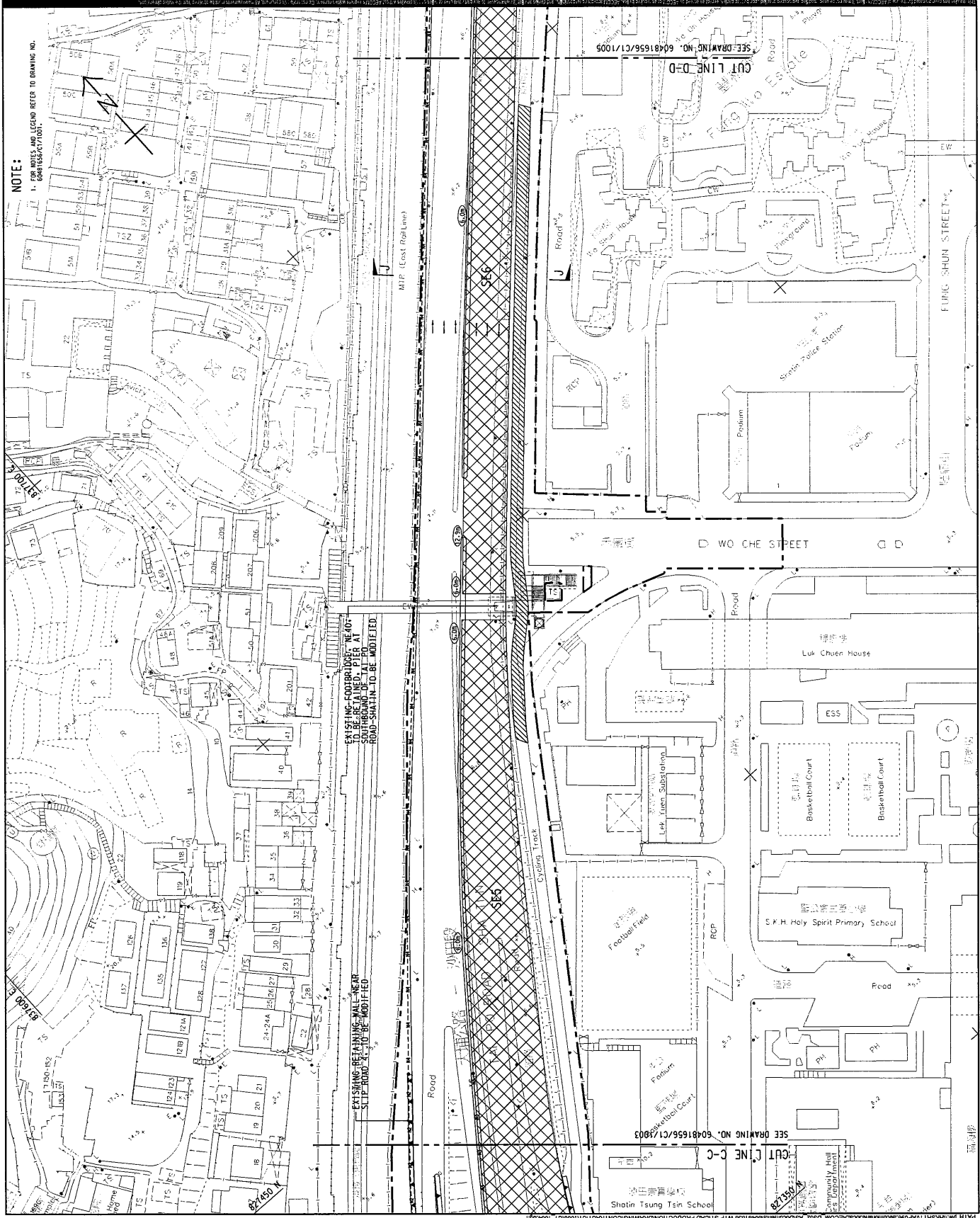
**CONTRACT NO.**  
NE/2017/05

**SHEET TITLE**  
GENERAL LAYOUT PLAN

**FIGURE NO.**  
FIGURE 1.1b

**SHEET NUMBER**  
60481656C1/1004

**SHEET 4 OF 6**



**NOTE:**  
 1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60481656C1/1001.

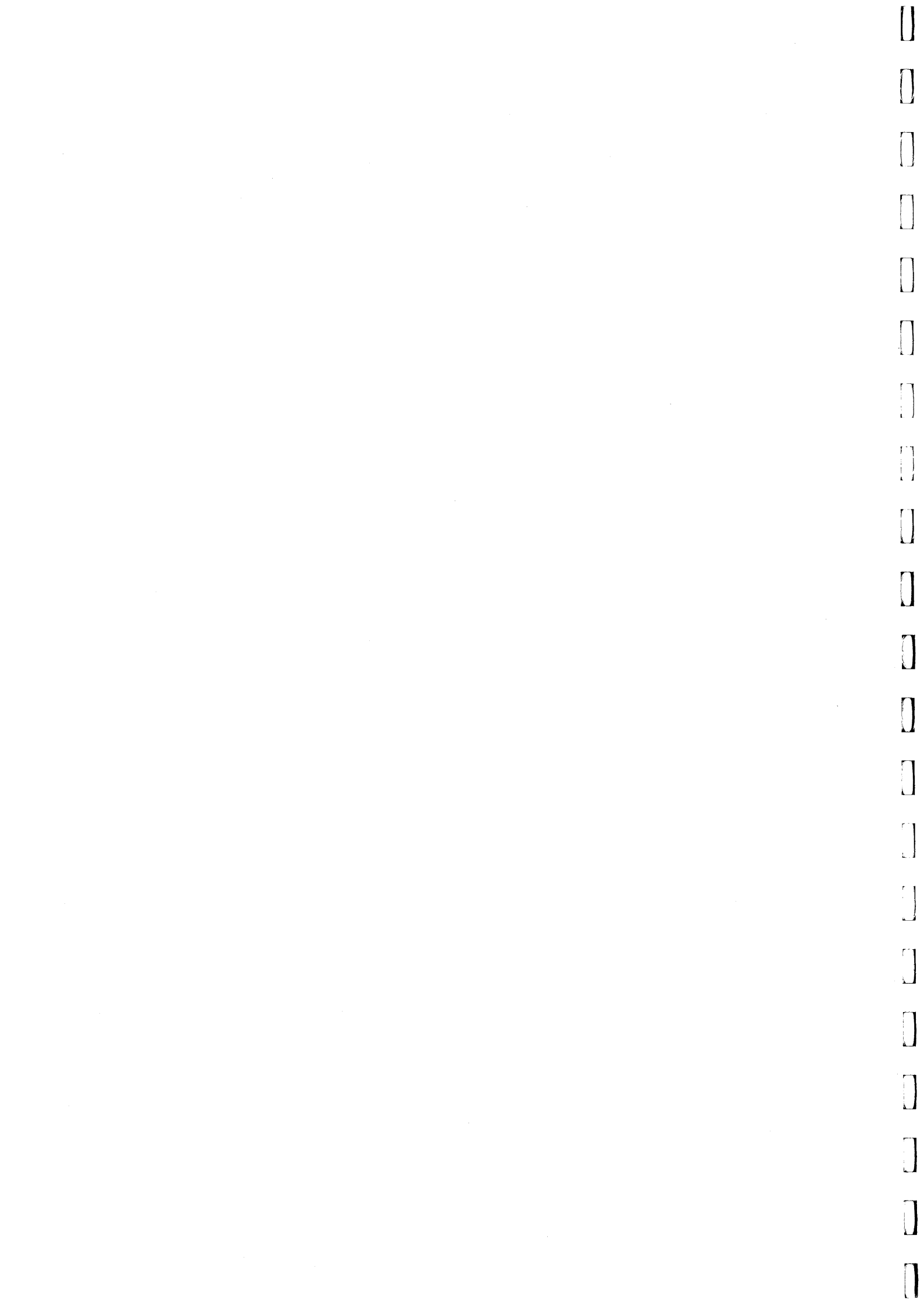
EXISTING FOOTBRIDGE - NE 404 - TO BE RETAINED. PIER AT SOUTHWEST CORNER OF AT PO ROAD - SHALL TO BE MODIFIED.

EXISTING RETAINING WALL NEAR SLIP ROAD 2 TO BE MODIFIED.

SEE DRAWING NO. 60481656C1/1005

SEE DRAWING NO. 60481656C1/1003





**AECOM**

PROJECT

**ROAD WIDENING AND  
RETROFITTING  
NOISE BARRIERS  
ON TAI PO ROAD  
(SHA TIN SECTION)**

CLIENT

CEED  
Development Department

CONSULTANT

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SUB-CONSULTANTS

REVISION

NO.	DATE	DESCRIPTION	BY	CHK
1	JAN. 18	TENDER DRAWING		
2				
3				
4				
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STATUS

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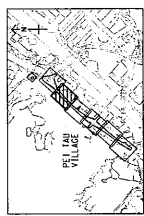
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SCALE

A1: 1:4000

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CONTRACT NO.

NEZ2017/05

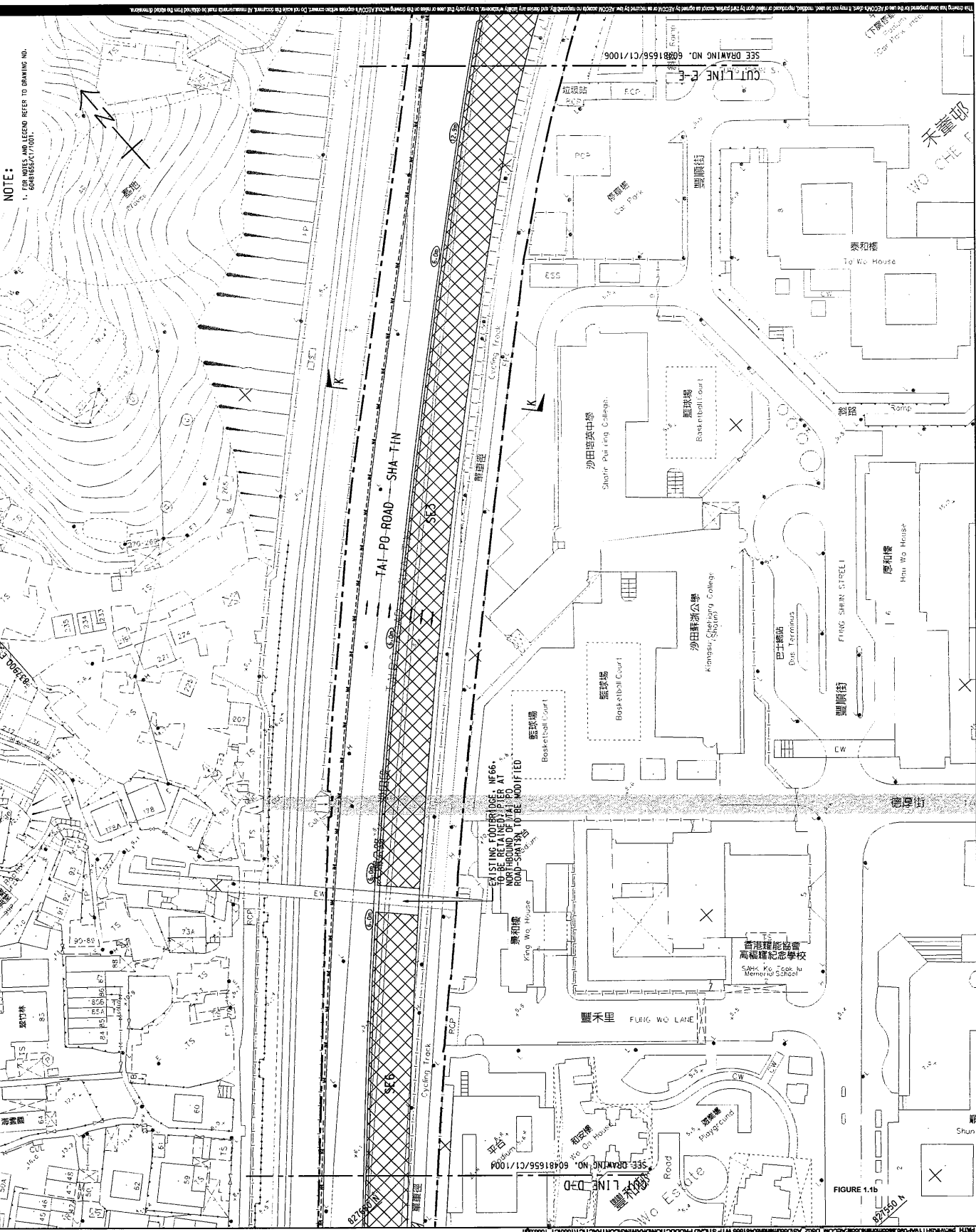
SHEET TITLE

GENERAL LAYOUT PLAN

FIGURE 1.1b

SHEET NUMBER

60481656/C1/1005



**NOTE:**  
1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60481656/C1/1001.



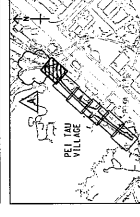
**ISSUE/REVISION**

NO.	DATE	DESCRIPTION	CHKD.	APPD.
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-	JAN. 18	TENDER DRAWING	BCC	
1	JAN. 18	ISSUE	CHK	CHK

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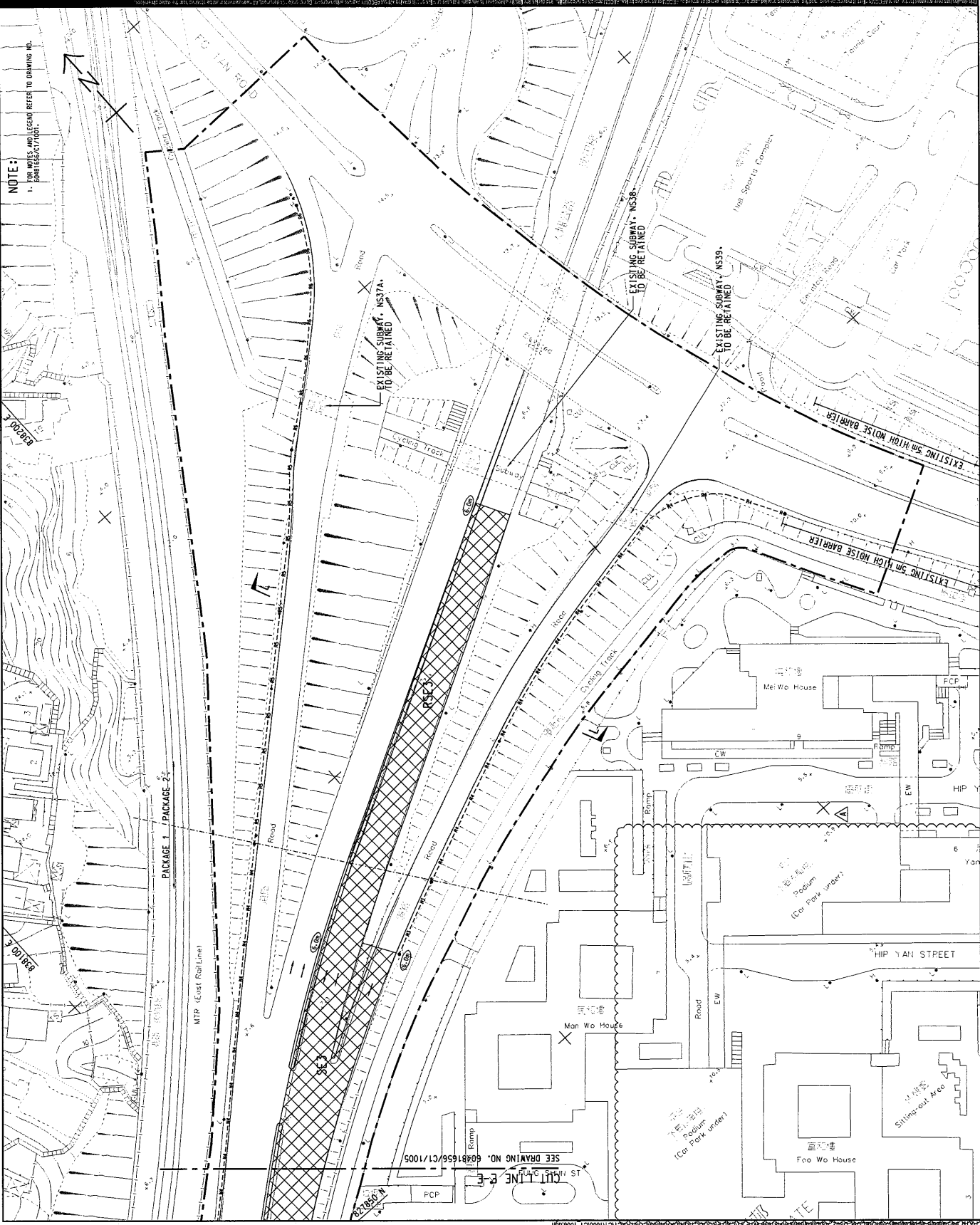
**NEW PLAN** A11-40000



**CONTRACT NO.**  
 NE/2017/05

**SHEET TITLE**  
 GENERAL LAYOUT PLAN  
**FIGURE 1.1b**

**SHEET NUMBER**  
 60481656/C1/1006A

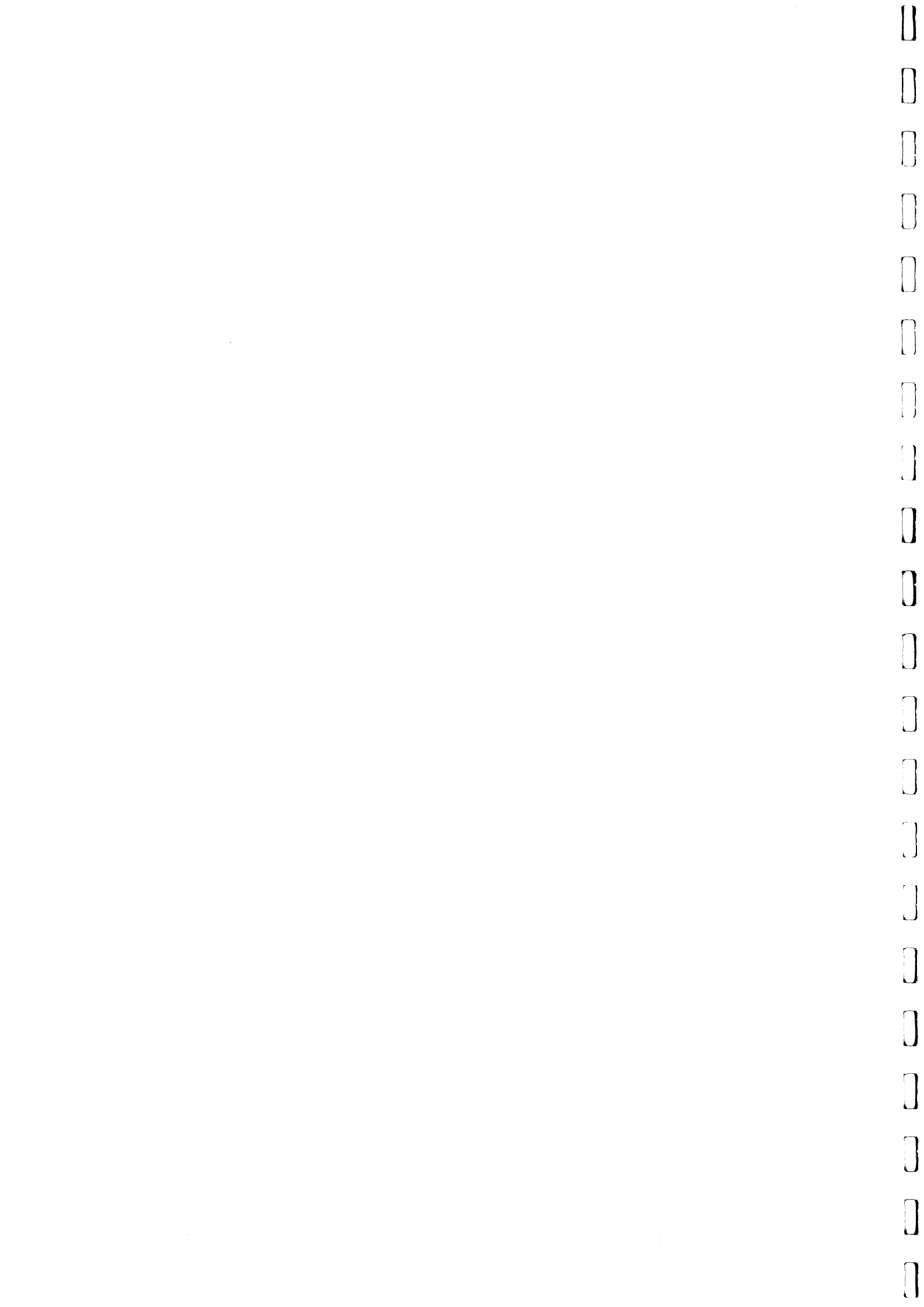


Project Management: [Name], Designer: [Name], Checker: [Name], Approver: [Name], Date: 22/07/18

ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

SEE DRAWING NO. 60481656/C1/1005

NOTE: FOR NOTES AND LEGEND REFER TO DRAWING NO. 60481656/C1/1001



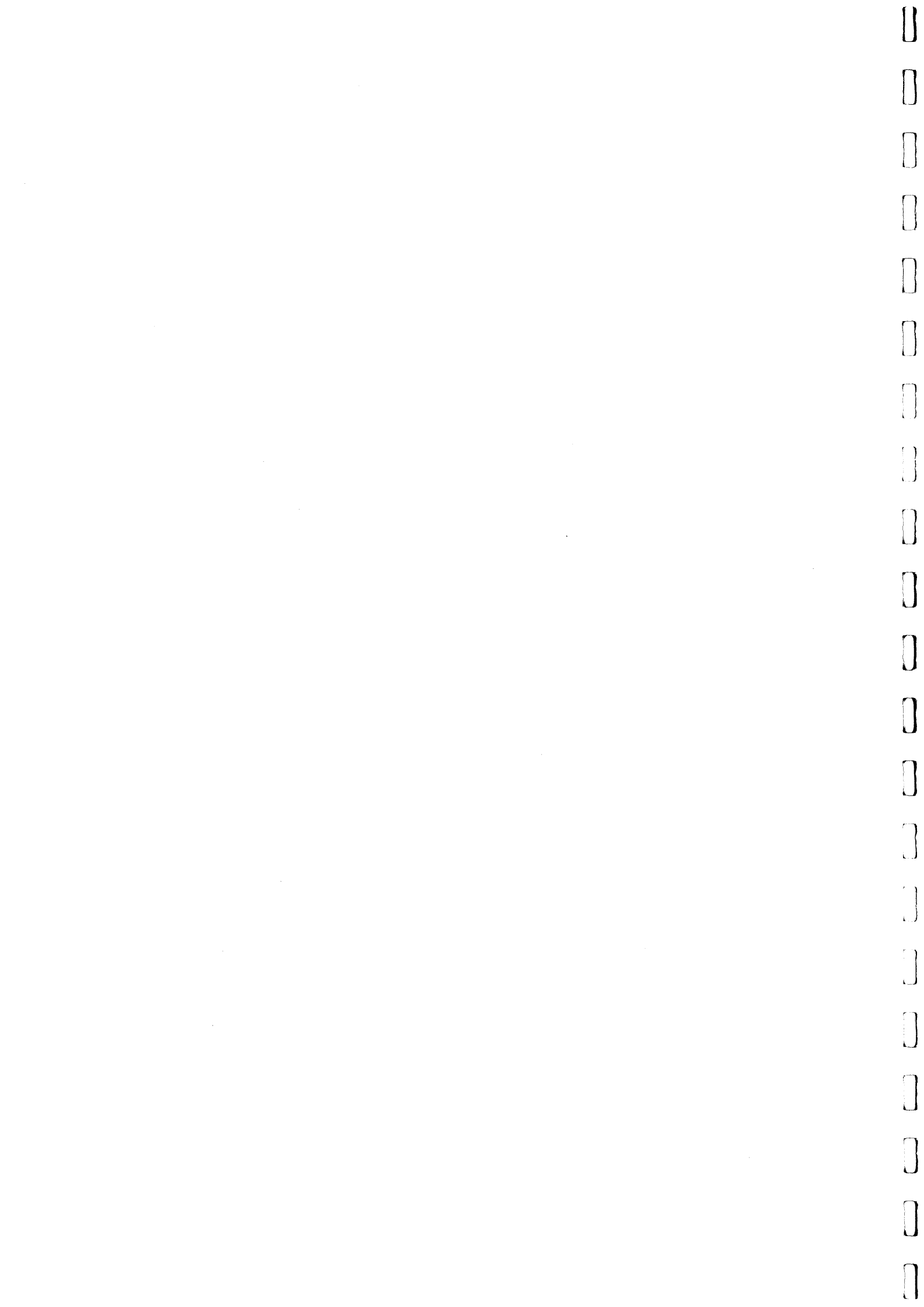
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Tuen Mun, N.T.,  
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Tel : +852 2450 8233  
Fax : +852 2450 6138  
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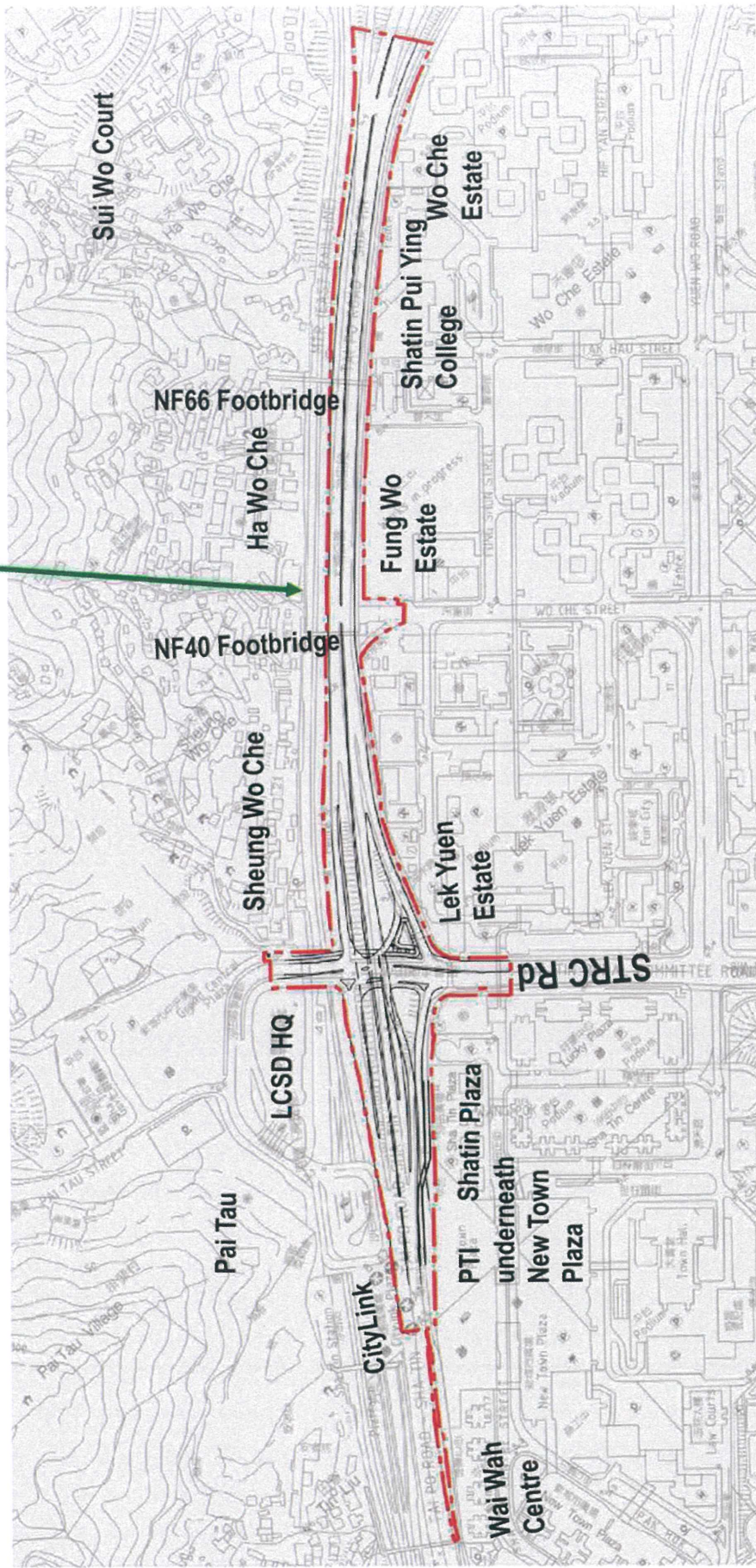


**Figure 1.2**  
**Portions of Works Under EP-463/2013/B**





Works Boundary under EP-463/2013/B (in red dotted line)



Project Title: Widening and Reconstruction of Tai Po Road (Sha Tin Section)

工程項目名稱: 大埔公路 (沙田段) 擴闊及重建工程

Figure 1.2 : Location of the Project

工程項目位置圖



Environmental Permit No:

環境許可證編號:

EP-463/2013/B





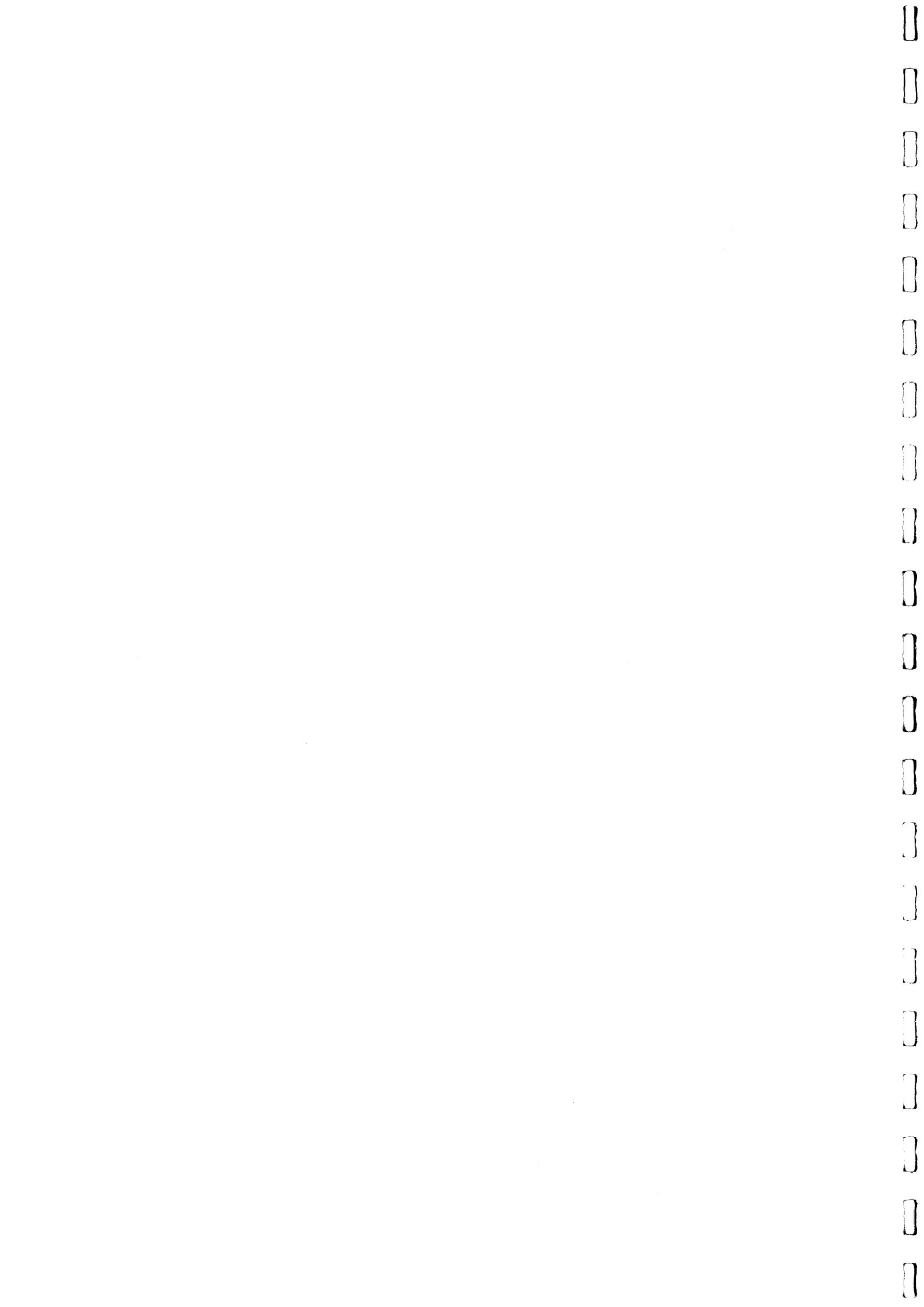
**FUGRO TECHNICAL SERVICES LIMITED**

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Fax : +852 2450 6138  
E-mail : matlab@fugro.com  
Website : www.fugro.com



**Figure 2.1  
Proposed Construction Noise Monitoring Locations**



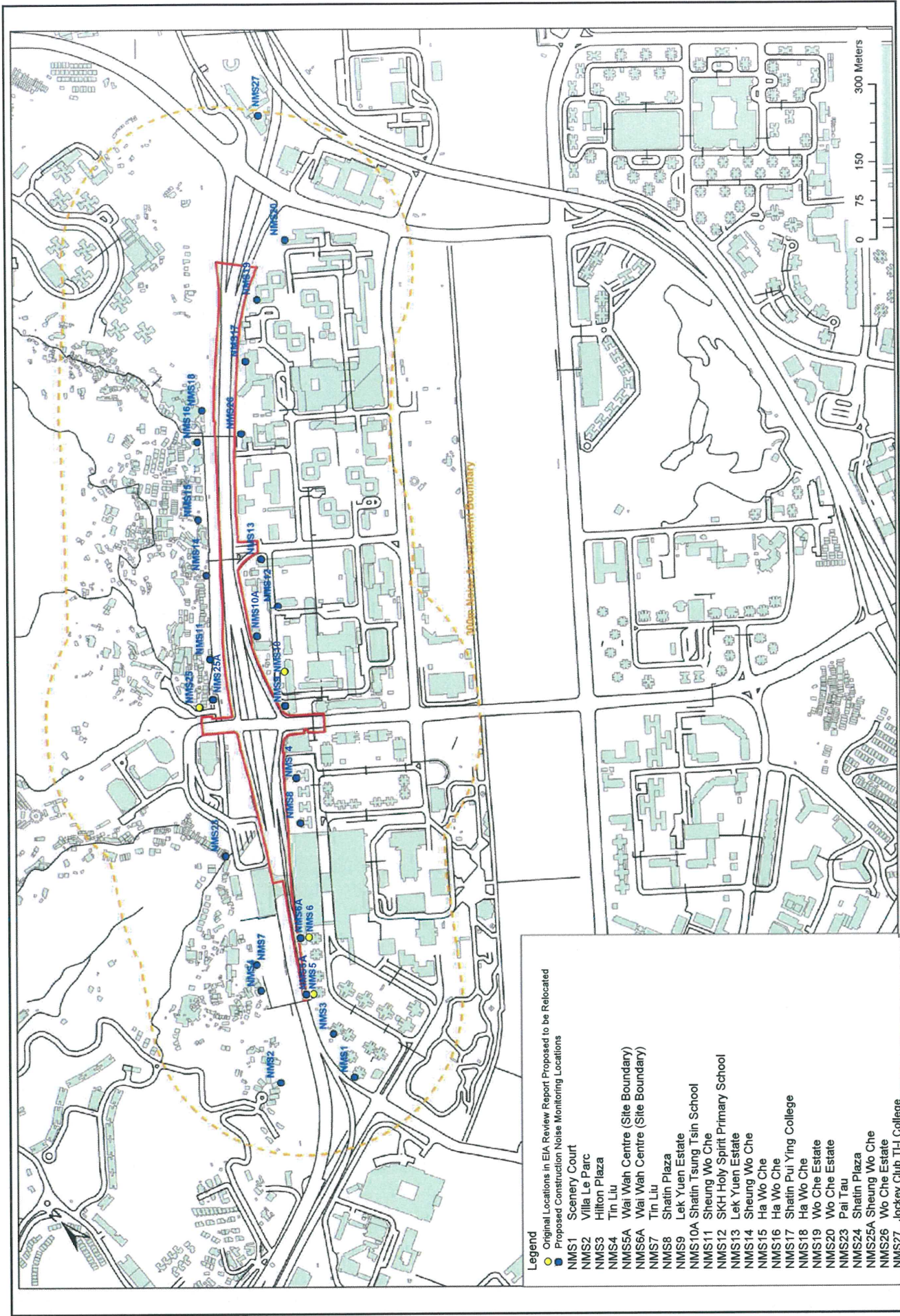
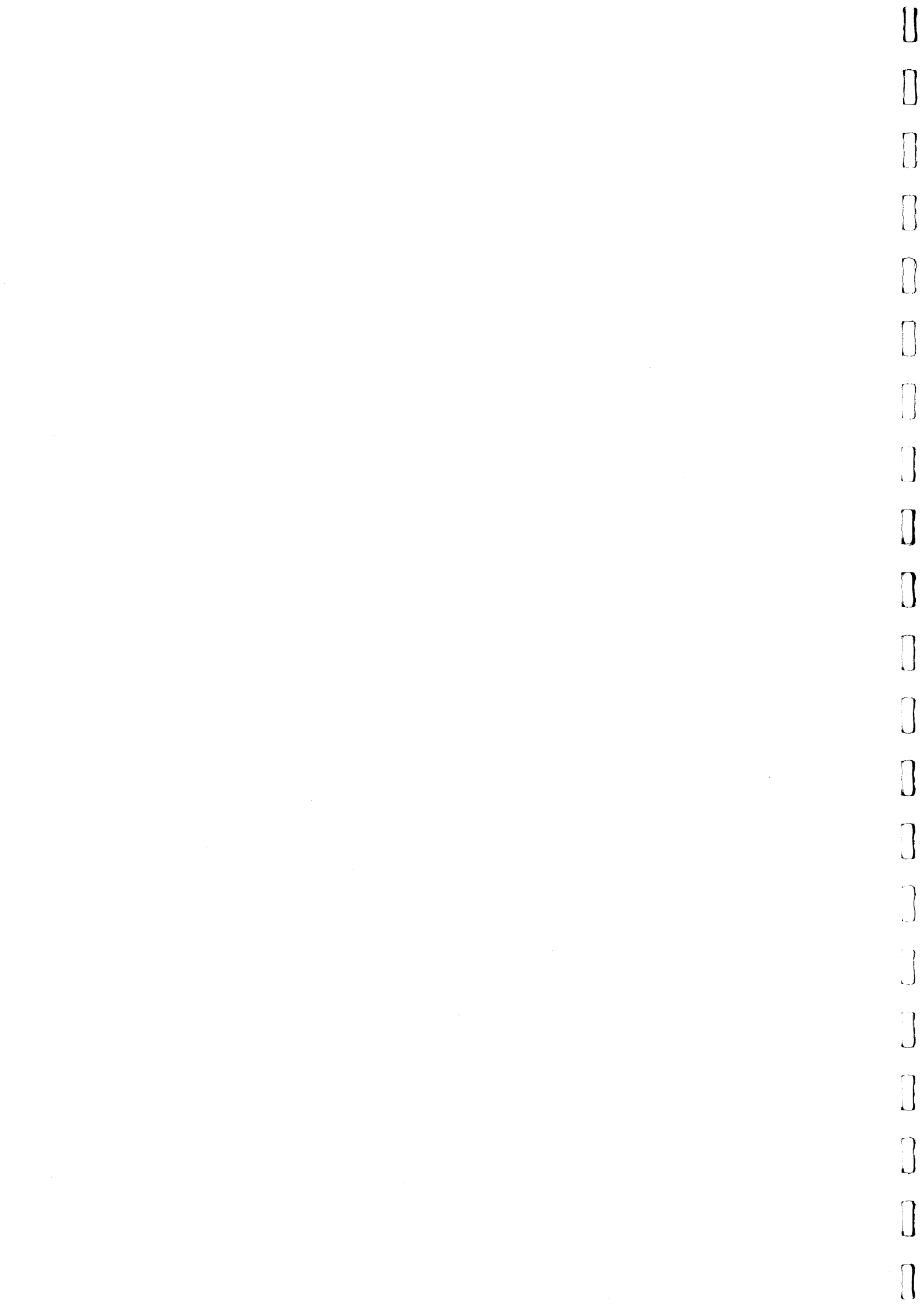


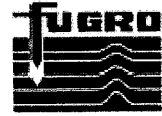
Figure 2.1 Proposed Construction Noise Monitoring Locations



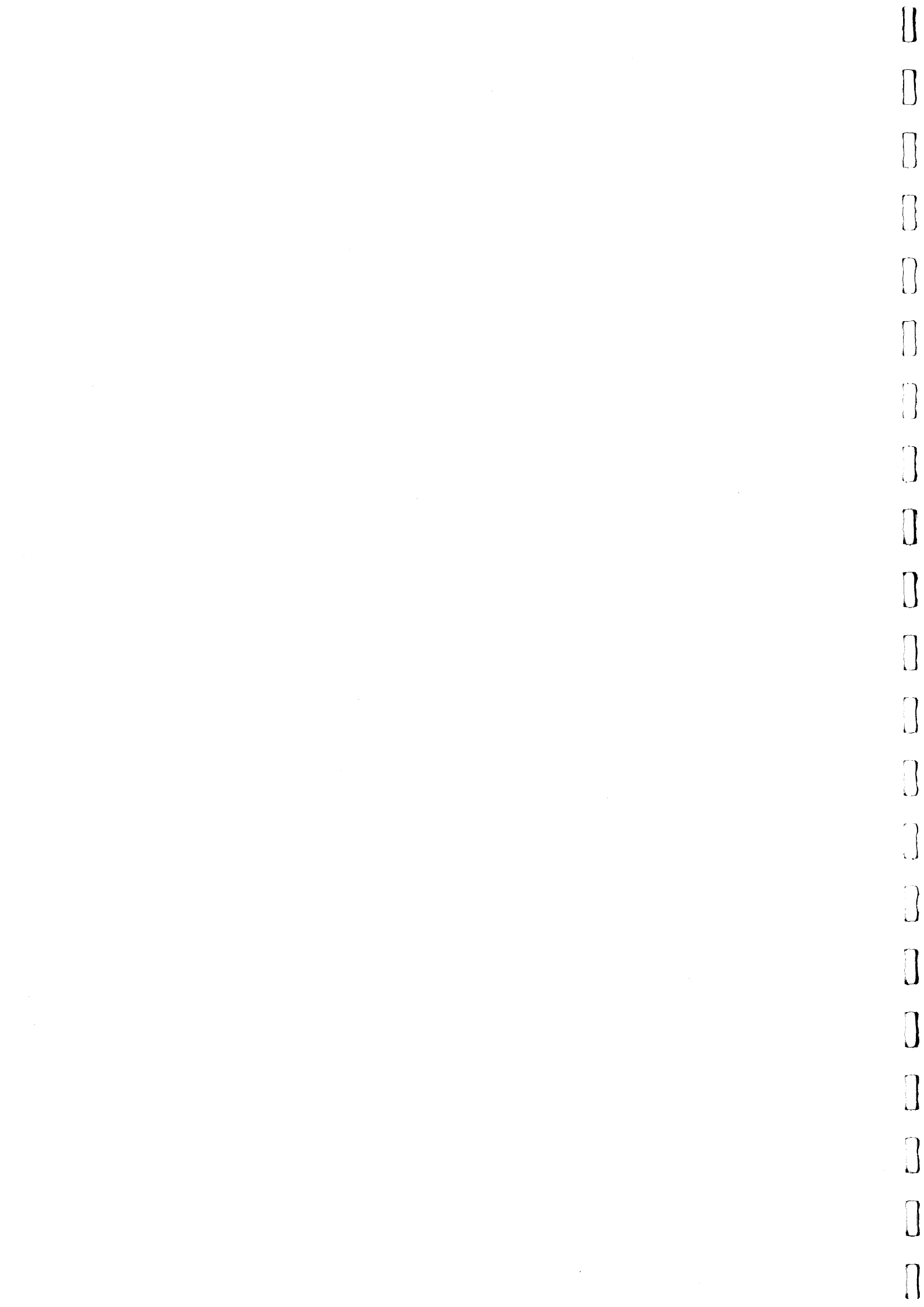
## FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,  
5 Lok Yi Street, Tai Lam,  
Tuen Mun, N.T.,  
Hong Kong.

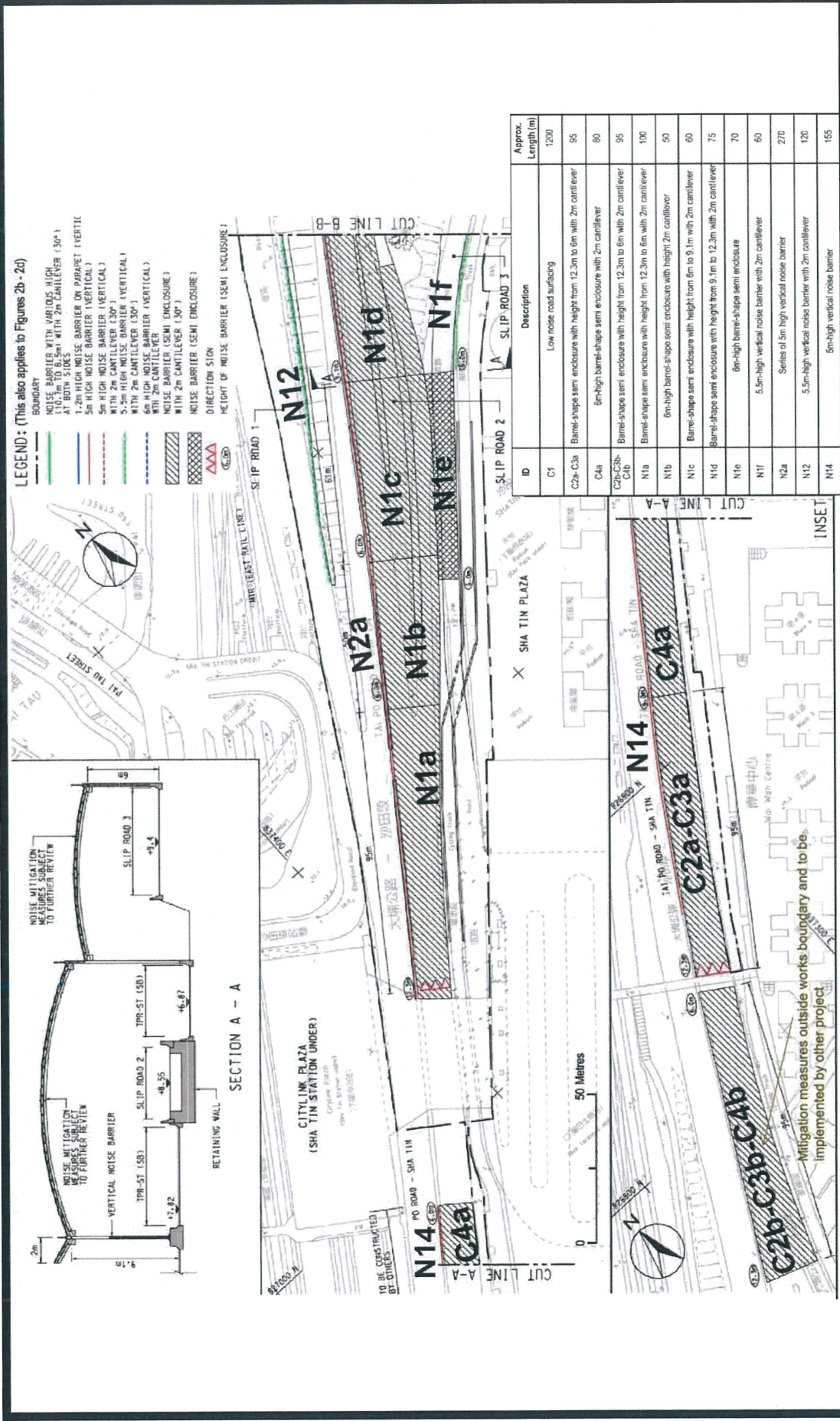
Tel : +852 2450 8233  
Fax : +852 2450 6138  
E-mail : matlab@fugro.com  
Website : www.fugro.com



**Figure 2.2**  
**Locations of Noise Mitigation Measures at Operational Phase**





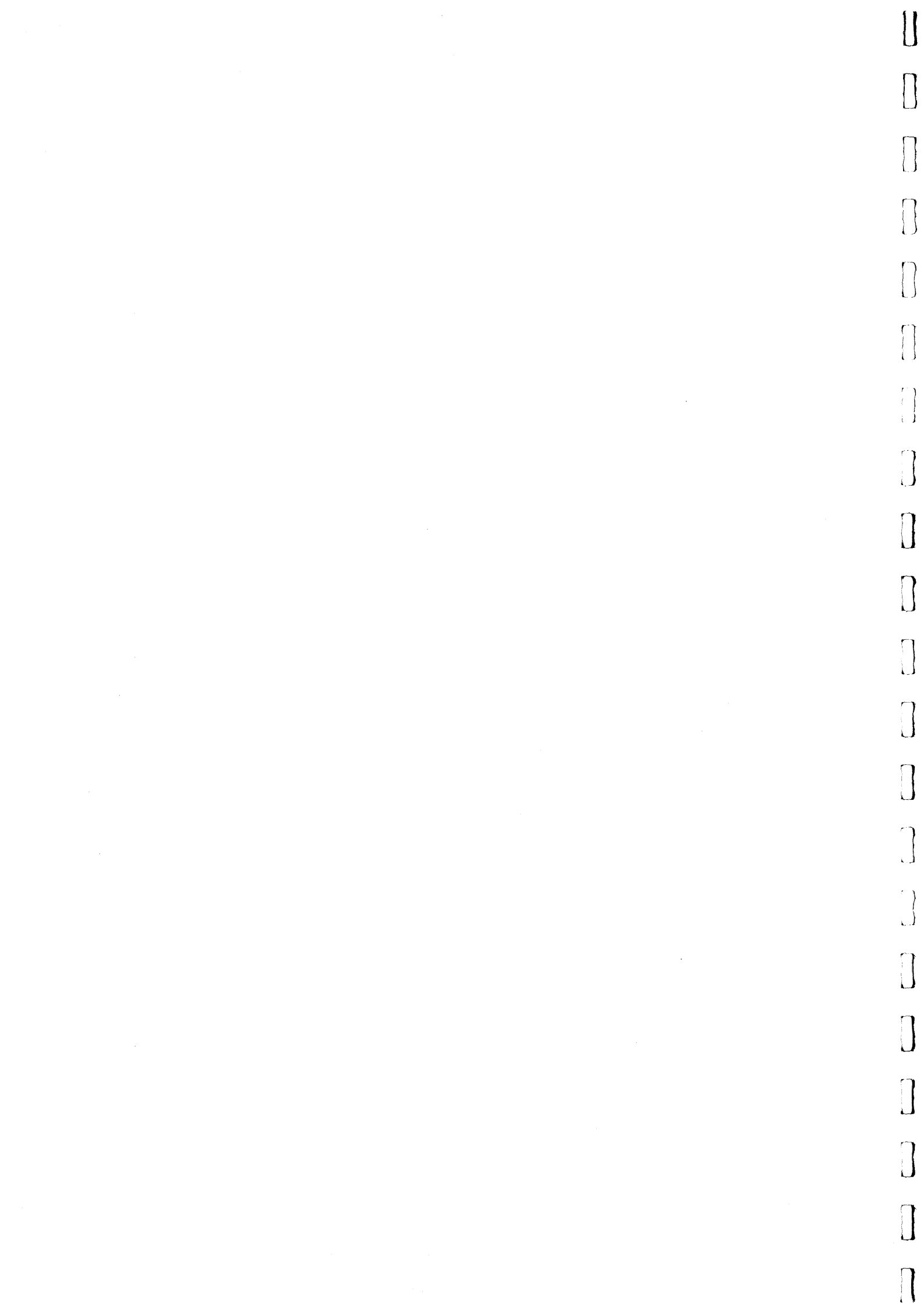


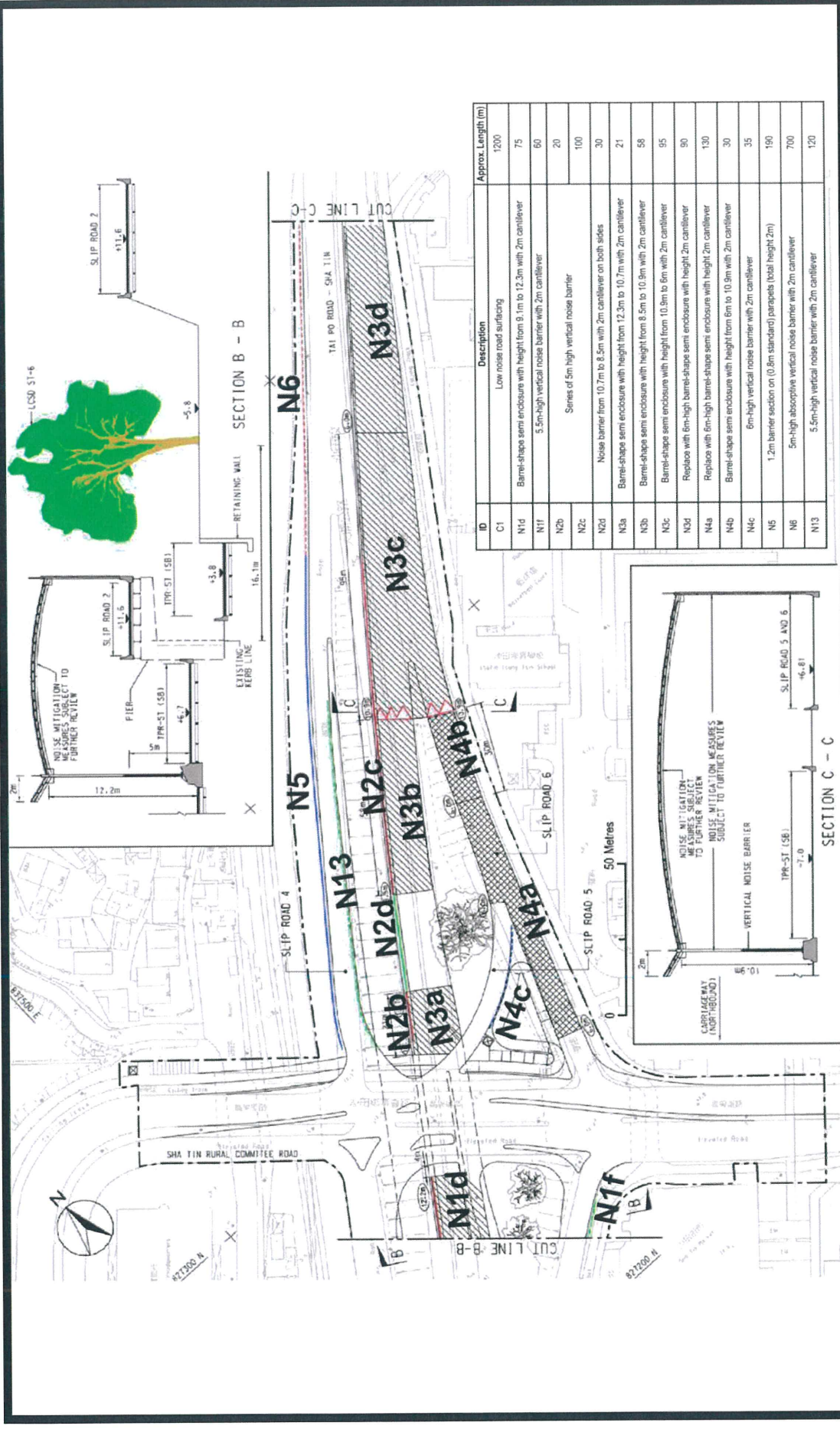
**Environmental Permit No:**  
 環境許可證編號:  
 EP-463/2013/B

**Project Title: Widening and Reconstruction of Tai Po Road (Sha Tin Section)**  
 工程項目名稱: 大埔公路 (沙田段) 擴闊及重建工程  
**FIGURE 2.2a : Location of Noise Mitigation Measures (1 of 4)**

Extracted from EP-463/2013/B Figure 2a  
 Source: Environmental Protection Department







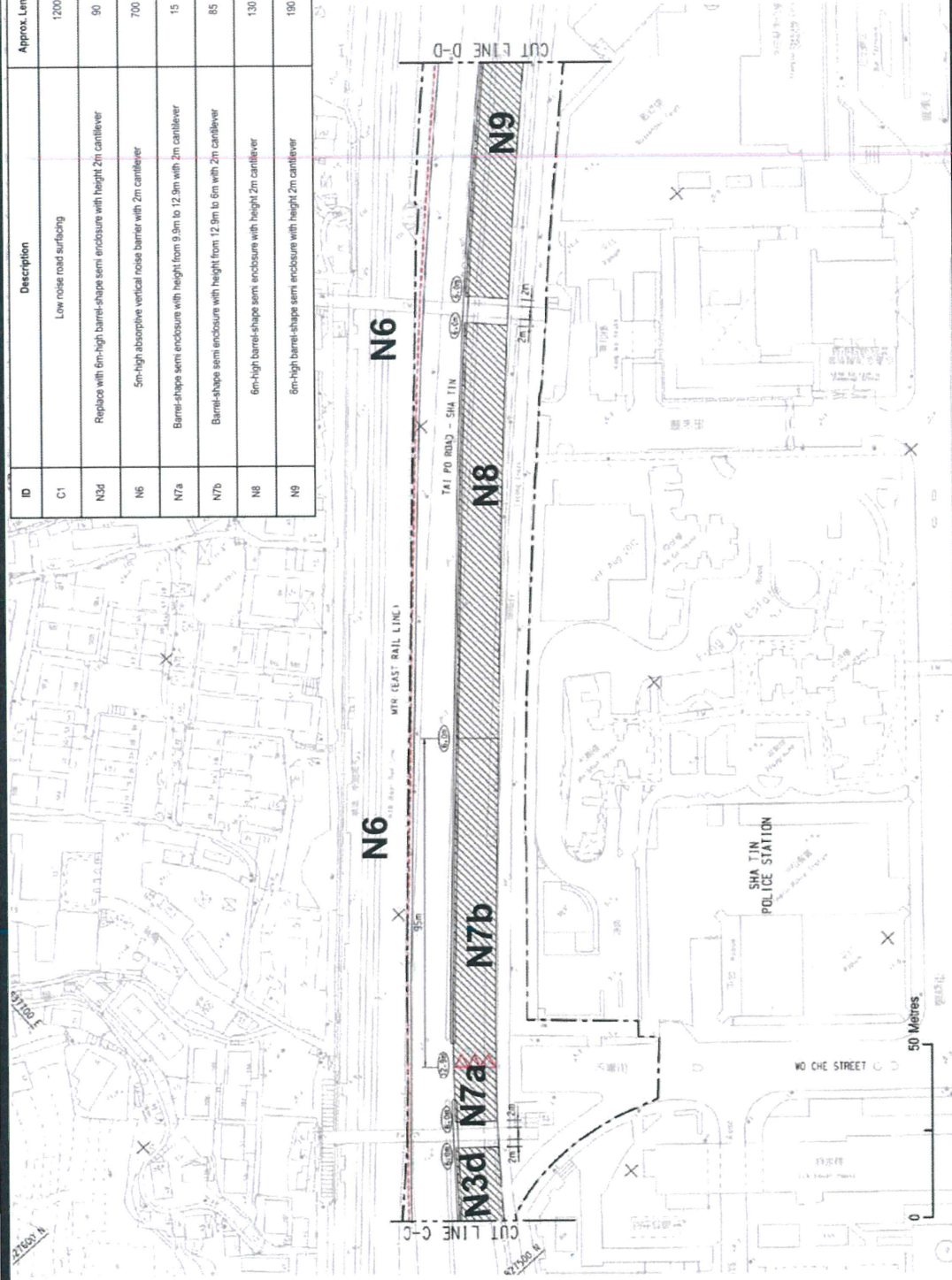
Environmental Permit No:  
 環境許可證編號:  
 EP-463/2013/B

Project Title: Widening and Reconstruction of Tai Po Road (Sha Tin Section)  
 工程項目名稱: 大埔公路 (沙田段) 擴闊及重建工程  
 FIGURE 2.2b : Location of Noise Mitigation Measures (2 of 4)

Extracted from EP-463/2013/B Figure 2b  
 Source: Environmental Protection Department



ID	Description	Approx. Length (m)
C1	Low noise road surfacing	1200
N3d	Replace with 6m-high barrel-shape semi enclosure with height 2m cantilever	90
N6	5m-high absorptive vertical noise barrier with 2m cantilever	700
N7a	Barrel-shape semi enclosure with height from 9.9m to 12.9m with 2m cantilever	15
N7b	Barrel-shape semi enclosure with height from 12.9m to 6m with 2m cantilever	85
N8	6m-high barrel-shape semi enclosure with height 2m cantilever	130
N9	6m-high barrel-shape semi enclosure with height 2m cantilever	190



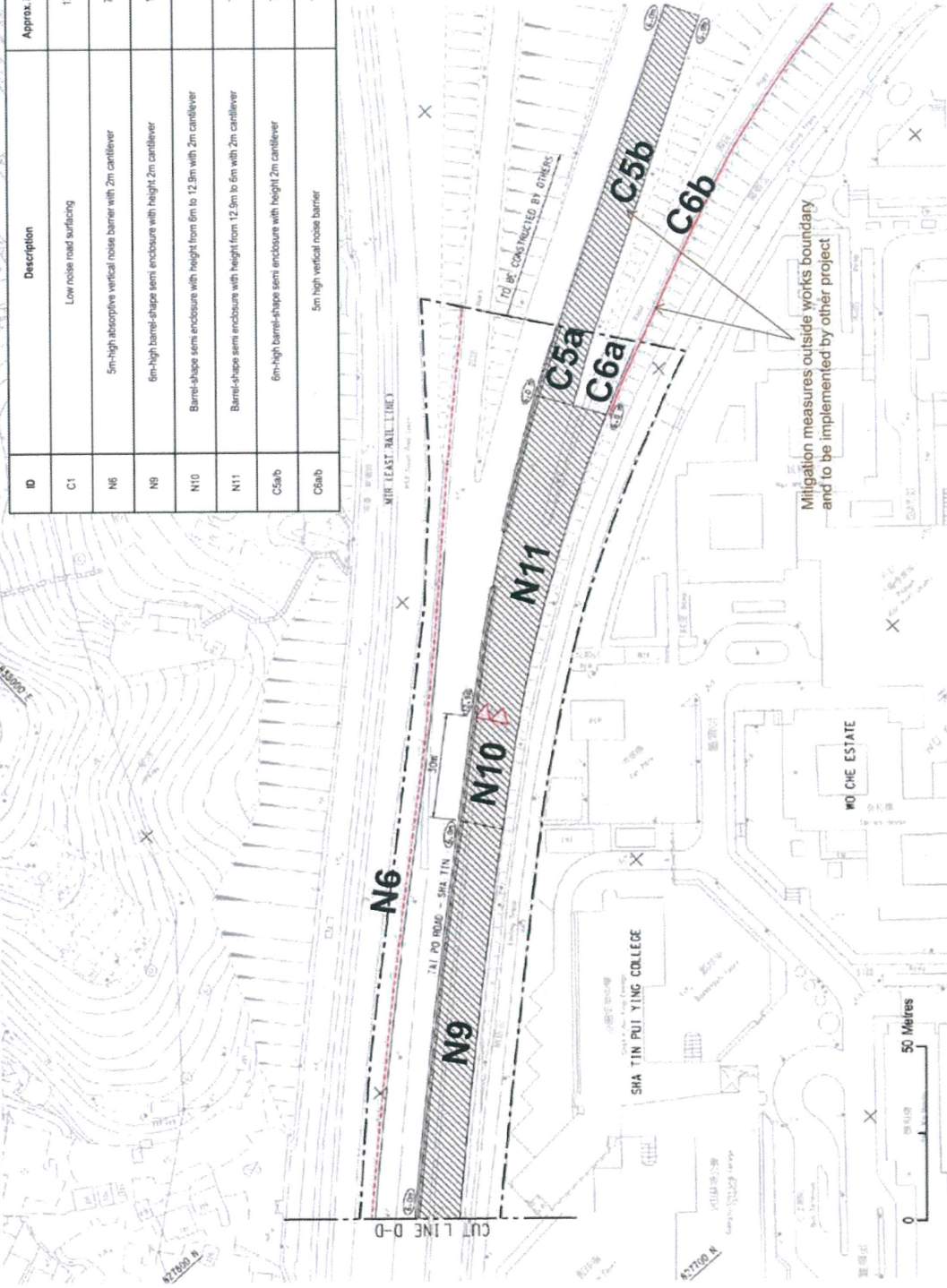
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 環境許可證編號:  
 EP-463/2013/B

Project Title: Widening and Reconstruction of Tai Po Road (Sha Tin Section)  
 工程項目名稱: 大埔公路 (沙田段) 擴闊及重建工程  
 FIGURE 2.2c : Location of Noise Mitigation Measures (3 of 4)





ID	Description	Approx. Length (m)
C1	Low noise road surfacing	1200
N6	5m-high absorptive vertical noise barrier with 2m cantilever	700
N9	6m-high barrel-shape semi enclosure with height 2m cantilever	190
N10	Barrel-shape semi enclosure with height from 6m to 12.9m with 2m cantilever	30
N11	Barrel-shape semi enclosure with height from 12.9m to 6m with 2m cantilever	100
C5ab	6m-high barrel-shape semi enclosure with height 2m cantilever	120
C6ab	5m high vertical noise barrier	170



Environmental Permit No:  
 環境許可證編號:  
 EP-463/2013/B

Project Title: Widening and Reconstruction of Tai Po Road (Sha Tin Section)  
 工程項目名稱: 大埔公路 (沙田段) 擴闊及重建工程  
 FIGURE 2.2d : Location of Noise Mitigation Measures (4 of 4)



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E-mail : [matlab@fugro.com](mailto:matlab@fugro.com)  
Website : [www.fugro.com](http://www.fugro.com)



### **Figure 3.1 Proposed Construction Dust Monitoring Locations**





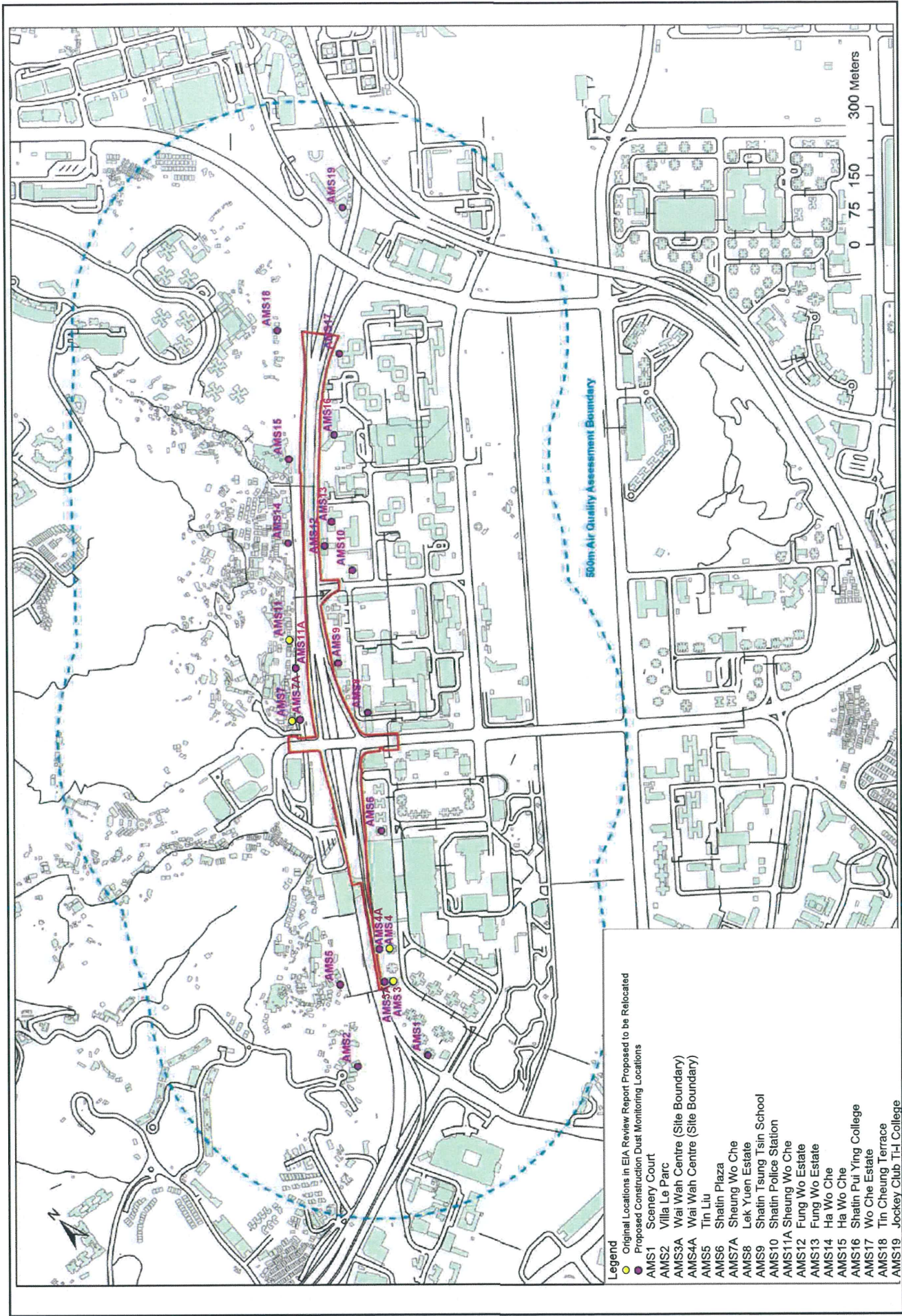


Figure 3.1 Proposed Construction Dust Monitoring Locations

Revised from  
EIA Review Report (Figure 8.2)



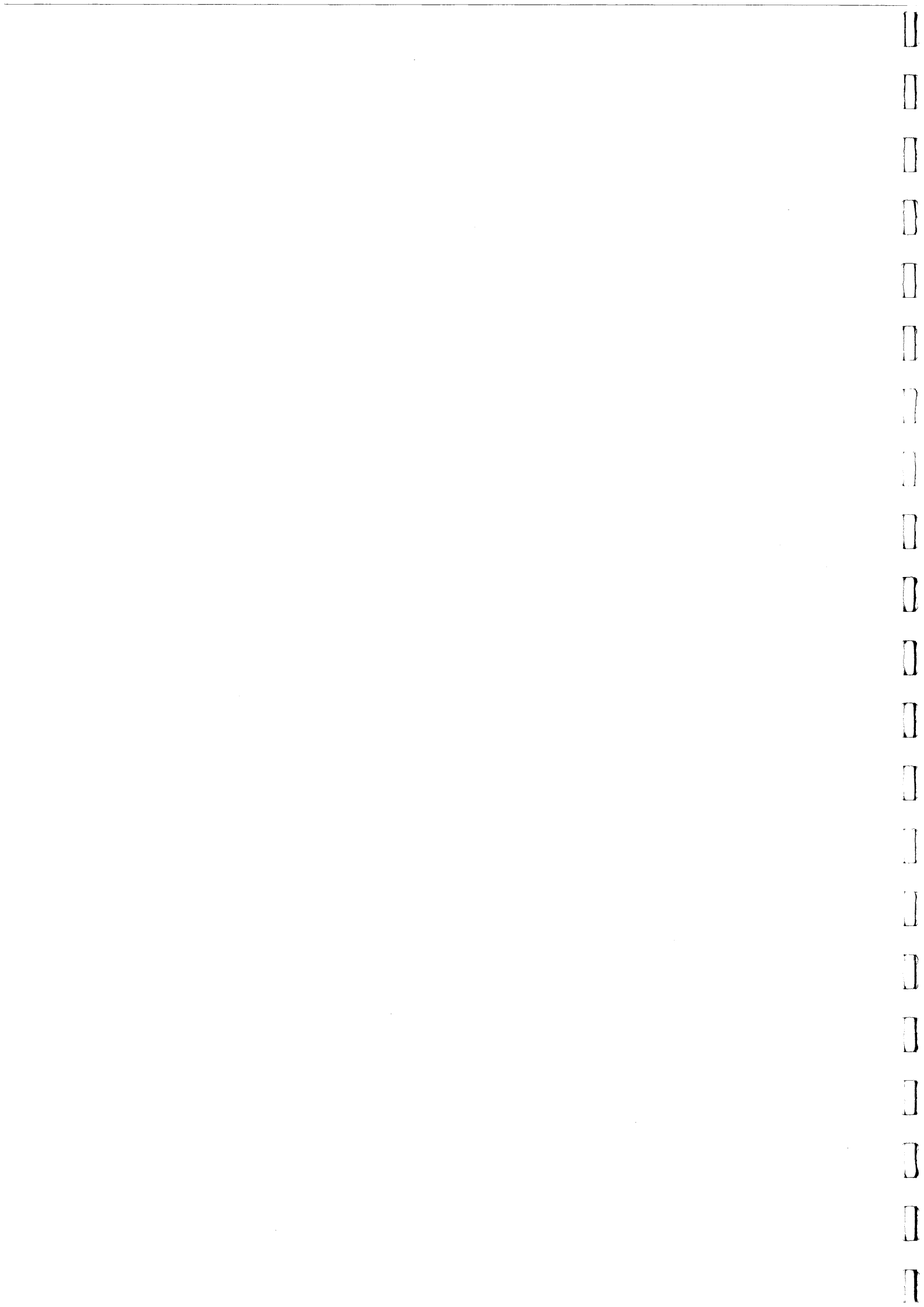
## **FUGRO TECHNICAL SERVICES LIMITED**

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5 Lok Yi Street, Tai Lam,  
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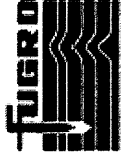


### **Appendix A Environmental Mitigation Implementation Schedule**



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EIA Review Ref	Environmental Protection Measures/Mitigation Measure	Implementation Stage (D: Design/ C: Construction/ O: Operation)	Implementation Agent	Location
<u>Noise</u>				
Section 3 3.10.2	<p>Construction Mitigation Measures</p> <p>A number of available construction noise mitigation measures have been considered, including:</p> <ul style="list-style-type: none"> <li>• The construction activities should be carried out in the daytime hours (0700-1900) wherever possible. If construction is required during evening or night time hours, a Construction Noise Permit (CNP) will be required to be obtained by the Contractor.</li> <li>• use of good site practice to limit noise emission from construction site;</li> <li>• selection and optimization of construction programmes, avoidance of parallel operation of noisy PME, and/or reduction in number during noise sensitive periods such as school examination period;</li> <li>• use of "quiet" PME and working methods; and</li> <li>• use of temporary at-source noise mitigation measures such as noise barriers, noise enclosures, noise jacket and mufflers</li> </ul>	C	Contractor	Within the boundaries of all construction sites



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3.10.4	<p>Use of "Quiet" Alternative Plant and Working Methods</p> <p>The use of particular plant with equipment noise levels quieter than those specified in the GW-TM can result in reduction of noise levels generated by the plant. The level of noise reduction achieved is dependent on the contractor's chosen methods of working. It is possible for the contractor to achieve noise reductions from the adopted working methodologies by specifying maximum limits of sound power level for specific equipment.</p>	C	Contractor	Within the boundaries of all construction sites
3.10.5 and Table 3.3	<p>"Quiet" plant is defined as a PME having actual Sound Power Levels (SWLs) lower than the values specified for PME in the GW - TM. SWLs for typical PME provided in the GW - TM and that for equivalent "quiet" plants are presented in Table 3.3. The type of quiet PME adopted in this assessment is for reference only and to be confirmed by the contractors, based on the actual construction conditions and programmes. The contractors are allowed to use other type of quiet PME to meet their needs</p>	C	Contractor	Within the boundaries of all construction sites
3.10.6 to 3.10.9	<p>Temporary noise barriers provide noise attenuation by screening NSRs from stationary and mobile plants from direct line-</p>	C	Contractor	Within the boundaries of all construction sites



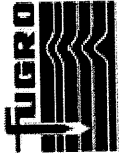
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	<p>of-sight in shadow zone. The use of 3m high moveable barriers with skid footing and a small cantilevered upper portion can be adopted. The barrier material shall have a surface mass of not less than 14kg/m<sup>2</sup> on skid footing with 25mm thick internal sound absorptive lining to achieve the maximum screening effect. Whist screening effects can be achieved at upper floors of NSRs, greater benefits result at lower floors where screening is the most effective. These temporary noise barriers will become more effective when located immediately adjacent to working area, and can reduce the noise level by up to 5 dB(A) and 10 dB(A) for mobile and stationary plant, respectively. The temporary noise barriers should also be located along the working area in order to make sure that the construction plant could be screened during all kinds of construction activities as far as practicable. Depending on site situation, when temporary noise barriers are not practicable or noise reduction achieved is insufficient, noise jacket/muffler can be applied to cover the noisy part of the engine or at the engine exhaust of particular mobile plants</p>			





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3.10.10	<p>respectively. With reference to other approved EIA Report, it is assumed that temporary noise barriers of this type can provide partial screening effect of -5 dB(A) for these mobile plants in the assessment.</p> <p>For the stationary plant bored pile oscillator, temporary noise barriers of sufficient height with skid footing and small cantilevered upper portion can provide total screening to the NSRs. It is estimated that temporary noise barriers of this type can provide full screening of 10 dB (A) to the NSRs. This is considered achievable by careful selection of insulation material, and, if necessary, acoustic mats at noisy mechanical parts of the equipment. Barrier material of surface density of at least 14 kg/m<sup>2</sup> is recommended in order to achieve the necessary screening effect.</p> <p>Full noise enclosures, which completely cover the PME, can provide significant noise reduction up to 20 dB(A). The degree of reduction will vary depending on the nature of the material used for the enclosures. As a conservative approach, a 10 dB(A) noise attenuation is generally applied to fixed plants in this assessment for air compressor.</p>	C	Contractor	Within the boundaries of all construction sites

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3.10.3	<p>The use of good site practice/techniques can provide considerable reductions in noise emissions. Examples of these site practice include:</p> <ul style="list-style-type: none"> <li>• use of well-maintained and regularly-serviced plant during the works;</li> <li>• plant operating on intermittent basis should be turned off or throttled down when not in active use;</li> <li>• plant that is known to emit noise strongly in one direction should be orientated to face away from the NSRs;</li> <li>• silencers, mufflers and enclosures for plant should be used where possible and maintained adequately throughout the works;</li> <li>• where possible fixed plants should be sited away from NSRs; and</li> <li>• stockpiles of excavated materials and other structures such as site buildings should be used effectively to screen noise from the works.</li> </ul>	C	Contractor	Within the boundaries of all construction sites
3.10.14 and Table 3.10	<p>The timing and sequencing of the various construction activities can also be carefully arranged according to the actual site work situation, in order to limit the amount of concurrent activities and where applicable</p>	C	Contractor	Within the boundaries of all construction sites



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3.10.15	<p>for construction works immediately fronting the affected schools, to avoid parallel operation of noisy PME in order to minimize the total noise generated (max as 102dB(A). Sub-grouping of some PME to be operated is recommended, and different sub-groups shall not be operated concurrently within any half hour period</p> <p>More detailed construction work programme should be considered before actual construction work is undertaken by the contractor, and applicable noise mitigation measures should be implemented according to the actual site condition and constraints, in order to minimize the potential construction noise impact. In particular, special arrangement on PME operations should be determined during school examination period</p>	C	Contractor	Within the boundaries of all construction sites
3.10.16 and Table 8.1	<p>Construction Noise Monitoring</p> <p>Construction noise monitoring is recommended at representative monitoring locations during the construction period</p>	C	Environmental Team	At selected monitoring locations during construction
Table 3.6	<p><u>Operational Mitigation Measures</u></p> <p>Proposed noise mitigation measures of the</p>	D&C&O	CEDD/HyD	At selected section of TPR-ST during the TPR-ST operation

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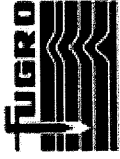
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	<p>project include:</p> <p>(C1) Low noise road surfacing along both widening and reconstruction sections, length approx. 1,400m</p> <p>(C2) "Top-bent" barrier, 11m high (at tip) approximately 7m wide, length approx. 70m</p> <p>(C3) 8.5m high (at tip) approximately 7m wide, length approx. 60m</p> <p>(C4) 6m high (at tip) approximately 10m wide, open on the side away from the NSR in front of Wai Wah Centre on the reconstruction section, length approx. 150m</p> <p>(N1) "Top-bent" barrier, 11m high (at tip) approx. 5.2m wide (horizontal extent from carriageway), open on the side away from the NSR near Shatin Plaza, length approx. 230m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N2) 5m high barrier on the central median along the widening section near Pai Tau, Sheung Wo Che, Sha Tin Plaza and Lek</p>			

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	<p>Yuen Estate, length approx. 270m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N3) "Top-bent" barrier, 11m high (at tip) and approximately 5m wide (open on the side away from the NSR) near Lek Yuen Estate, length approx. 320m. Due to current tree growing condition, a 25m section of semi-enclosure shall be replaced by a 5m high barrier. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N4) 6m high with approx. 3m (open on the side away from NSR) near Lek Yuen Estate, length approx. 130m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N5) 1.2m barrier section on (0.8m standard) parapets (total height 2m) along slip road to the diamond interchange near Sheung Wo Che (absorptive), length approx. 190m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p>			

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	<p>(N6) 6m high barrier along widened section between Sheung Wo Che and Ha Wo Che in front of Siu Wo Court (absorptive barrier), length approx. 630m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N7) 11m high (at tip) 10m wide (horizontal extent from carriageway), length approx. 90m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N8) 6m (at tip) high 10m wide (horizontal extent from carriageway), length approx. 200m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N9) 6m high (at tip) 7m wide (horizontal extent from carriageway), At the widened and reconstructed section near Lek Yuen Estate and Wo Che Estate, length approx. 210m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N10) 11m high (at tip) 3m wide (horizontal extent from carriageway), length</p>			



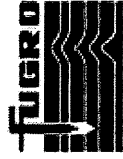
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	<p>approx. 40m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(N11) 8.5m (at tip) high 4m wide (horizontal extent from carriageway), length approx. 40m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(C5) 6m high (at tip) 5m wide (horizontal extent from carriageway), at the reconstructed section towards eastern-end of Wo Che Estate, length approx. 90m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(C6) 5m high barrier along slip road connecting Fo Tan Road and TPR along the reconstructed section, length approx. 210m. (switch to absorptive panels avoiding multi-reflection effect on parallel barrier)</p> <p>(S1) 4m high vertical noise barrier (with absorptive panels) on the North bound of Shatin Rural Committee Road, length approx. 40m</p>			

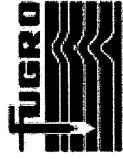
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3.9.29 and Table 8.1	(S2) 4m high vertical noise barrier (with absorptive panels) on the South bound of Shatin Rural Committee Road, length approx. 40m Operation Noise Monitoring Road traffic noise monitoring is recommended at representative monitoring locations during the first year of the road opening.	O	Contractor/Environmental Team	At selected monitoring locations during the TPR-ST operation.
Section 4 4.12.1	<u>Construction Mitigation Measures</u> Dust mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation should be implemented to control dust emissions from all construction work sites. • The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. Dust suppression measures such as the water spraying are necessary and should be installed to ensure that the air quality at the boundary of the site and at any sensitive receivers complies with the Hong Kong Air	C	Contractor	Within the boundaries of all construction sites





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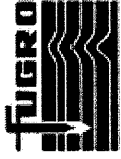
EIA Review Ref	Environmental Protection Measures/Mitigation Measure	Implementation Stage (D: Design/ C: Construction/ O: Operation)	Implementation Agent	Location
	<p>Quality Objectives.</p> <ul style="list-style-type: none"> <li>The Contractor shall notify any specific construction works as stated in the Air Pollution Control (Construction Dust) Regulation to the Authority before the commencement of such work.</li> <li>The Contractor shall apply for a license or permit under the requirements of the relevant legislation (e.g. Air Pollution Control Ordinance and its subsidiary regulations) wherever applicable.</li> <li>Watering of unpaved areas, access roads, construction areas and dusty stockpiles shall be undertaken at least eight times daily during dry and windy weather. Watering of the haul road shall be undertaken four to eight times daily during dry or windy weather.</li> <li>Water sprays may be either fixed or mobile to follow individual areas to be wetted as and when required. Application of suitable wetting agents, such as dust suppression chemicals, shall be used in addition to water, especially during the dry season (October to</li> </ul>			

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	<p>December).</p> <ul style="list-style-type: none"> <li>Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate, and other similar materials, wet dust is likely to be created and to dampen all stored materials during dry and windy weather.</li> <li>Stockpiles of sand, aggregate or any other dusty materials greater than 20m<sup>3</sup> shall be enclosed on three sides, with walls extending above the pile and 1 metre beyond the front of the pile.</li> <li>Suitable chemical wetting agent such as dust suppression chemical shall be used on completed cuts and fills to reduce wind erosion.</li> <li>Areas within the construction site where there is a regular movement of vehicles shall have a paved surface and be kept clear of loose surface material.</li> <li>The Contractor shall restrict all motorized vehicles within the construction site, excluding those on public roads, to maximum speed of 20</li> </ul>			



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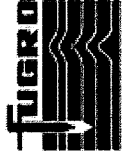
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	<p>km per hour and confine haulage and delivery vehicles to designated roadways inside the Site.</p> <ul style="list-style-type: none"> <li>• Construction working areas will be restricted to a minimum practicable size.</li> <li>• The Contractor shall ensure that no earth, rock or debris is deposited on public or private rights of way as result of his activities, including any deposits arising from the movement of plant or vehicles.</li> <li>• The Contractor shall provide a wheel washing facility at the exits from work areas to the satisfaction of the Engineer and to the requirements of the Commissioner of Police.</li> </ul> <p>Water in wheel washing facilities and sediment shall be changed and removed respectively at least once a month.</p> <ul style="list-style-type: none"> <li>• The Contractor shall submit details of the wheel washing facilities, which shall be usable prior to any earthworks excavation activity on the construction site. The Contractor shall also provide a hard-surfaced</li> </ul>			

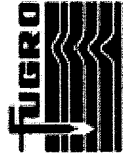
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	<p>road between any washing facility and the public road.</p> <ul style="list-style-type: none"> <li>• In the event of any spoil or debris from construction works being deposited on adjacent land, or streams, or any slit being washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Engineer.</li> <li>• If spoil cannot be immediately transported out of the Site, stockpiles should be stored in sheltered areas.</li> <li>• Plant and vehicles shall be inspected annually to ensure that they are operating efficiently and that exhaust emissions are not causing a nuisance. All site vehicle exhausts should be directed vertically upwards or directed away from ground.</li> <li>• Path for complaints and handling procedures should be set up and implement.</li> </ul>			



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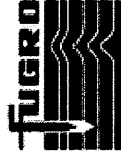
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4.12.2	Watering with complete coverage of active construction area eight times a day is suggested.	C	Contractor	Within the boundaries of all construction sites
4.13.1 and Table 8.2	Construction Dust Monitoring Construction dust monitoring is recommended at representative monitoring locations during the construction period.	C	Environmental Team	At selected monitoring locations during construction
<b>Water Quality</b>				
Section 5	Construction Mitigation Measures	C	Contractor	Within the boundaries of all construction sites
5.7	Silt-laden surface run-off should be prevented from directly entering the sensitive receivers during the construction works. The mitigation measures described below for the construction phase are in accordance with ProPECC PN 1/94:  (A) Surface Water Run-off  (i) Construction works should be programmed so as to minimise excavation during the wet season (April to September). If this is not possible then measures should be taken to minimise the areas exposed by covering temporary exposed slopes with tarpaulins or similar			

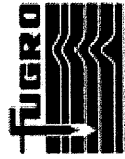
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	<p>material, the protection of temporary road surfaces with gravel or crushed stone and the early reinstatement of final surfaces with hydroseed grass/shrub mixture. This latter measure would have the added benefit of reducing the windblown dust during the dry season. Where temporary covering of slopes is required this should be carried out before the onset of the rainfall or storm.</p> <p>(ii) Existing and newly constructed open manholes should be covered and sealed to prevent run off and water borne debris entering the drainage network without having previously passed through a sediment trap.</p> <p>(iii) Stock piles of construction materials, sand and gravel or excavated material should be covered with tarpaulins prior to rainstorms. The washing of material from the stockpiles directly into the storm drains should be prevented by passing the run off through a sediment trap.</p> <p>(iv) The surface water from the site should be discharged into storm water drain after passing through sand and silt traps designed</p>			



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	<p>to accommodate the maximum discharge from the site. Within the site channels, bunds or sandbags should be used to direct run off into the traps. Storm water from outwit the site should be prevented from washing over the site by the construction of interceptor channels at the site boundary. Both perimeter channels and the sedimentation traps should be constructed prior to the commencement of site formation and earthworks.</p> <p>(v) The efficiency of the interceptor channels, traps and sedimentation chambers should be maintained by regular cleaning of accumulated silt and sand. Particular attention should be paid to maintenance following heavy rainfall and immediately after the issue of heavy rainfall warning by the Hong Kong Observatory.</p> <p>(vi) The ingress of rainwater into trenches should be minimised by the construction of bunds to prevent water flowing into the trench and covering by tarpaulins to prevent direct entry. The lengths of excavated trenches should be minimised and backfilled at the</p>			

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	<p>earliest opportunity. Water pumped from the trenches should be discharged to the storm water drains following passage through a suitable silt trap.</p> <p>(B) Groundwater</p> <p>Any ground water seeping into any trenches or foundation works should be passed through a silt trap prior to discharge to the storm water drains.</p> <p>(C) Wastewater from Concrete Batching</p> <p>The water used for the washing down of mixing drums used for onsite batching of concrete and delivery lorries for off-site batched concrete should be recycled whenever possible. Wastewater generated from the washing which is discharged should be passed through a silt trap before discharge to the storm water system.</p> <p>(D) Water from Wheel and Subframe Washing</p> <p>The wastewater from the washing of the wheels and subframe of vehicles returning</p>			





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	<p>from the site onto public roads will contain suspended solids and debris. A washing bay should be provided at the exit from the site and should, where practicable, incorporate water recirculation. Water from the washing bay which is discharged to the storm water system should first be passed through a silt trap which also includes an oil/grease removal weir.</p> <p>(E) Wastewater from Site Facilities</p> <p>(i) Run off from plant maintenance area will carry fuel and lubricating and hydraulic oils adsorbed on the suspended solids. Plant maintenance areas should be paved to prevent waste oils soaking into the ground. Where possible the area should be undercover to minimise the formation of runoff and any runoff from the paved area passed through an oil trap before being discharged to the storm drains. Fuel storage tanks should be surrounded by bunds with a capacity of at least 150% of the storage capacity. The bunded areas should be able to be drained of rain water through the petrol interceptor and accumulated rain removed at regular</p>			

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	<p>intervals.</p> <p>(ii) Waste oils from the site should be collected and stored for recycling or disposal in accordance with the Waste Disposal Ordinance and absorbent cloths and granules should be available for the cleanup of spillages.</p> <p>(iii) Sewage from toilets and kitchens should be discharged directly into a foul sewer. If it is not possible to locate the site offices within easy access of a foul sewer a septic tank and soakaway should be constructed before the offices are occupied. If only toilets are provided then chemical toilets will be more appropriate. Chemical toilets should be emptied on a daily basis and the contents taken to a foul sewer or the Sha Tin Sewage Treatment Works for disposal. Wastewater collected from canteen kitchens should be discharged to the foul sewers via grease traps which provide a minimum of 20 minutes retention during peak flow. All discharges into foul sewers and storm sewers would have to be complied with TM standards under WPCO.</p>			



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	<p>(iv) Run off from roofed surfaces of site facilities should be collected and diverted to a storm water drain. Passage through a silt trap is only required if the water is diverted via open channels which might accumulate solids during non rainy periods or which intercept surface run off from unpaved areas.</p> <p>(F) Licensing of Site Discharges</p> <p>Discharges into foul sewers or storm water drains, other than domestic sewage and unpolluted water, and the discharge of septic tank effluent into the ground are controlled under the Water Pollution Control Ordinance (WPCO). The discharge from the construction site will therefore be controlled under the Ordinance. Discharges from the site will be required to meet the terms and conditions of a valid WPCO license. The application for a WPCO license is made through the EPD or District Office. The application for the license should contain details of the points of discharge of the wastewater and storm water, and the volumes to be discharged and should be made before</p>			

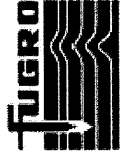
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	<p>the commencement of any discharge. A minimum of twenty days is required for the processing of a license for a discharge into any waters of Hong Kong and a minimum of fifty days for public notification as required by the WPCO.</p> <p><u>Operation Phase Mitigation Measures</u></p> <p>(A) Normal Runoff</p> <p>(i) Contaminants present in the runoff during normal operation normal will, by their chemical nature, be strongly adsorbed onto the particulate phase. Standard HyD road gullies with silt traps would be installed in the road drainage systems along the alignment to intercept and enable removal of residual grit, particulate matter and pollutants in road runoff. These facilities serve as a control to minimise the pollutants from discharging to the Tolo Harbour. Regular cleaning of rubbish and sediment from the drainage systems following the normal highway maintenance practices is required to maintain the normal operation of the systems at all times,</p>			



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	<p>such that accumulation of solids with the resultant reduction in retention time and thus efficiency can be avoided.</p> <p>(ii) Carriageway would discharge to inland drainage systems similar to the existing highways and urban areas. HyD undertakes routine road inspection, maintenance and cleaning for public roads, expressways, trunk roads, and other roads. With the routine cleaning practices adopted by HyD in place, the potential water quality impacts due to road runoff are expected to be low. In addition, road runoff would be discharged into the Tool Harbour waters via Shing Mun Main Channel. The pollutants would be rapidly diluted by tidal flows near the outlets of the channel/river minimising the water quality impacts. Special mitigation measures to deal with road runoff would not be required.</p> <p>(B) Accidental Spillage</p> <p>In the event of an accident giving rise to the spillage of fuel or vehicle load from a vehicle permitted to use the roadway, the primary objective should be to contain the spillage</p>			

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	<p>for removal from the road and its subsequent safe disposal. If this is not possible and the spillage enters the surface water drainage system, it should be held back by interceptor tanks with both under and overspill weirs to retain floating and settling material. These should be readily accessible for emptying in the event of an accident. The issue for TPR is similar to all highways and roads in Hong Kong. Government through the emergency services and relevant works departments have appropriate procedures for dealing with accidental spillage. These are specific to the nature of the spillage and the impacts and hazards the spillage presents. As far as practical containment and collection of the spillage is preferred for appropriate disposal. The following issues require to be considered and appropriate action taken on a case by case basis:</p> <p>(i) measures to prevent the potential pollution to the local stream courses and the downstream water body in case of an accident;</p>			



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	<p>(ii) requirements to inspect the drainage systems to ensure that the channels or drain pipes are in normal function;</p> <p>(iii) procedures and guidelines to deal with different categories of spillage;</p> <p>(iv) actions to inspect and monitor the water quality of the nearby receiving water body after an accident;</p> <p>(v) provision of pollution control equipment; and</p> <p>(vi) actions to restore the affected water body.</p>			
Section 12.6 of the Approved EIA Report	<p><u>Water Quality Monitoring</u></p> <p>Water Quality Inspection</p> <p>A more practical approach is to carry out regular site inspection of the construction works to determine compliance with the recommended mitigation measures.</p> <p>Monitoring Activities</p>	C	Contractor/Environmental Team	Within the boundaries of all construction sites

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	<p>The inspection should pay particular attention to:</p> <ul style="list-style-type: none"> <li>(i) The functioning of onsite surface water collection channels and sediment traps.</li> <li>(ii) The functioning of interception channels at the boundary of the works areas</li> <li>(iii) The covering of stockpiles of fill and construction materials and the routing of any run off through the sediment traps.</li> <li>(iv) The pumping procedures for emptying trenches and other excavations and the use of silt traps prior to the discharge of the water to the storm water system.</li> <li>(v) The use of washwater for hosing down concrete mixing and delivery vehicles and other vehicles leaving the site and the routine of excess water from the facility through sediment traps.</li> <li>(vi) The operation of the plant maintenance areas to control small spillages and the</li> </ul>			





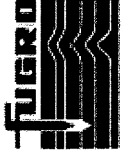
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	<p>correct management of the fuel storage banded area.</p> <p>(vii) The connection of the site office wastewater discharge to an existing foul sewer if appropriate or the operation of the kitchen wastewater grease trap and the regular emptying of the chemical toilets</p> <p>(viii) The operation of the roof rain water collection and drainage system.</p>			
Landscape and Visual Mitigation Measures				
Section 6	Construction Phase	D&C	Contractor	During construction within the Project Boundary
Table 6.5	<p>CM1 - Protection of retained trees, transplanting of transplanted trees and conservation of topsoil</p> <p>Existing trees shall be preserved as much as possible. Detailed tree preservation and transplanting proposals shall be submitted to relevant government departments for approval in accordance with DEVB TC(W) No. 7/2015.</p> <p>Topsoil will be conserved as far as possible during the road improvement works and utilized during the replanting</p>			

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	operations. The stock piling height of the topsoil will not be more than 2m.			
	CM2 - Protection of OVTs OVTs identified in the Project Boundary shall be protected in accordance with ETWB TCW no. 29/2004.	D&C	Contractor	During construction within the Project Boundary
	CM3 - Control of Night-time Lighting Glare Night-time lighting glare shall be properly managed and control during construction so as to minimize any adverse visual impact on adjacent VSRs.	D&C	Contractor	During construction within the Project Boundary
	CM4 - Erection of Decorative Screen Hoarding Decorative screen hoarding with design compatible with the surrounding landscape setting shall be erected along the southern boundary of Tai Po Road to mitigate any potential adverse impact on adjacent Pedestrian and Cyclists on Footpath/Bicycle Track.	D&C	Contractor	During construction within the Project Boundary
	Operation Phase OM1 - Compensatory planting for loss of existing trees	D&C&O	Contractor	During construction within the Project Boundary

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	<p>Compensatory planting shall be provided within and outside the project boundary where possible. Detailed compensatory planting proposal will be prepared in accordance with DEVB TC(W) No. 7/2015.</p> <p>OM2 - Planting of engineered slopes, road verges, central divider and around Structures</p> <p>Planting shall be undertaken at the earliest practical time in the construction period. The planting proposal shall aim to strengthen the existing tree species and supplement the existing tree planting to provide an effective screen to ameliorate any potential landscape and visual impacts. The proposed species to be utilized for road improvement works shall be agreed with LCSD and future maintenance authorities. All the proposed species for compensatory planting shall be suitable for roadside streetscape planting.</p> <p>OM3 - Provision of visually pleasing aesthetic treatment on noise barriers and enclosures Provision of visually pleasing noise barriers and enclosures design shall be proposed. The design of these structures aims to</p>	D&C&O	Contractor	During construction within the Project Boundary

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	<p>minimize any potential visual impact and visually integrate the proposed structures into the adjacent landscape context. This should be achieved through the use of form, color, tones, materials and planting materials.</p> <p>OM4 - Hard Landscape Treatment of Carriageway, Structures and Roadside Furniture</p> <p>Aesthetically pleasing hard landscape treatment of the carriageway and roadside furniture, including development of chromatic themes in the architectural treatment of engineering structures, and the consideration of landscape lighting and special landscape features.</p>	D&C&O	Contractor	During construction within the Project Boundary
	<p>OM5 - Shrubs and Climbers Planting proposed along the facade of Noise Enclosures and Barriers</p> <p>Shrubs and climbers planting are proposed on the facade of Noise Enclosures and Barriers to mitigate any adverse impact on adjacent VSRs in area where space for tree planting is not feasible.</p>	D&C&O	Contractor	During construction within the Project Boundary
<b>Waste Management Measures</b>				
Section 7	The Contractor is responsible for the	C	Contractor	Within the boundaries of all



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7.6.2 to 7.6.4	<p>management of materials and wastes during construction. This includes control of wastes on site, removal of the waste materials from the site and the implementation of any mitigation measures to minimise waste or redress any problems that arise from waste associated with the works.</p> <p>This sets out the measures to be adopted to avoid or minimise potential adverse impacts associated with waste arising from the works under the headings of each waste type. The Contractor should incorporate these recommendations into a comprehensive on-site Waste Management Plan, (WMP). If, for any reason, the recommendations cannot be implemented, full justification should be given in the WMP.</p> <p>In accordance with ETWB TC (W) No. 19/2005 - Environmental Management on Construction Sites", the Contractor shall prepare and implement a WMP as part of the EMP. The EMP shall describe the arrangements for avoidance, reuse, recovery, recycling, storage,</p>			construction sites



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7.6.5 to 7.6.6	<p>collection, treatment and disposal of different categories of waste to be generated from the construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Engineer for approval. The Contractor should implement the waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor.</p> <p><u>Waste Management Hierarchy</u></p> <p>The waste management hierarchy has been applied in the assessment and development of mitigation measures for waste which aims at evaluating the desirability of waste management methods and includes the followings in descending preference:</p> <p>(a) Avoidance and reduction of waste generation;            (b) Reuse of materials as far as practicable;            (c) Recovery and recycling of residual</p>	C	Contractor	Within the boundaries of all construction sites



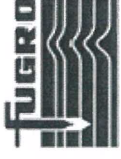
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Section 7 7.6.7	<p>materials where possible; and (d) Treatment and disposal according to relevant laws, guidelines and good practices.</p> <p>Based on the waste management hierarchy, waste reduction measures are recommended as follow to reduce impacts and costs arisen from the Project. Recommendations of good site practices and waste reduction measures would be stated in order to achieve avoidance and minimization of waste generation in the hierarchy. Environmental Management Plan (EMP) and trip-ticket system are recommended for monitoring management of waste. Specific measures targeting the mitigation of impacts in works areas and the transportation of spoil off-site would be provided to minimize the potential impacts to the surrounding environment.</p> <p><u>Training</u></p> <p>To facilitate adoption of the best-practice philosophy, training shall be provided to all personnel working on site. The training shall promote the concept of general site cleanliness and clearly explain the appropriate</p>	C	Contractor	Within the boundaries of all construction sites as well as transportation routes to designed areas for off-site disposal of materials/Prior to and during construction activities.

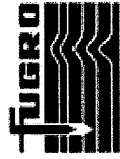
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7.6.8 to 7.6.9	<p>waste management procedures defined in the EMP. Overall, the training should encourage all workers to reduce, reuse and recycle wastes.</p> <p><u>Records of Waste and Management</u></p> <p>The contractor's environmental performance is monitored and controlled through the weekly environmental walks. The items after the environmental walks shall include:</p> <p>(a) A review of the EMP in particular the suitability of the environmental measures on nuisance abatement and waste management adopted by the contractor;</p> <p>(b) the environmental performance of the contractor and his sub-contractors;</p> <p>(c) the effectiveness of the environmental measures on nuisance abatement and waste management implemented on the site, and any complaints received; and</p>	C	Contractor	Within the boundaries of all construction sites as well as transportation routes to designed areas for off-site disposal of materials/Prior to and during construction activities.





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7.6.10	<p>(d) the promptness of rectification or improvement actions of the Contractor on the defects and deficiencies identified during inspections of the site.</p> <p>Waste shall only be disposed of at licensed sites and the WMP should include procedures to ensure that illegal disposal of wastes does not occur. Only waste haulers authorized to collect the specific category of waste concerned should be employed and a trip ticket system shall be implemented for offsite disposal of inert C&amp;D materials and non-inert C&amp;D materials at public fill reception facilities and landfills, respectively.</p> <p>Appropriate measures should be employed to minimize windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers.</p> <p><u>Site Planning</u></p> <p>Work site(s) shall be arranged and managed to facilitate the proper management of wastes and materials. The WMP shall include plans indicating specific areas designated for the storage of particular types of waste, reusable and recyclable</p>	C	Contractor	Within the boundaries of all construction sites as well as transportation routes to designated areas for off-site disposal of materials/Prior to and during construction activities.

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7.6.11 to 7.6.14	<p>materials as well as areas and management proposals for any stockpiling areas. Waste storage areas should be well maintained and cleaned regularly. Specific provisions for different types of material are outlined below. In general, these areas should be designed to avoid cross contamination of materials as well as pollution of the surrounding environment.</p> <p><u>Construction and Demolition (C&amp;D) Material</u></p> <p>In order to minimize the impact resulting from collection and transportation of C&amp;D material for off-site disposal, it is recommended that the excavated fill material should be reused on site as backfill material as far as possible. Also, careful design, planning and good site management should be maintained in order to minimise over ordering and generation of surplus materials such as concrete, mortars and cement grouts. The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.</p> <p>C&amp;D materials should be segregated on site</p>	C	Contractor	Within the boundaries of all construction sites as well as transportation routes to designed areas for off-site disposal of materials/Prior to and during construction activities.



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	<p>into different waste and material types. This will increase the feasibility of certain components of the waste stream being recycled by specialised contractors. The Contractor should clearly demonstrate in the EMP how he intends to maximise the reuse of C&amp;D material on-site. Where reuse of materials on site is not feasible, the Contractor should explore opportunities for recycling materials off-site, and inert C&amp;D materials shall be reused on site as much as possible.</p> <p>Potential opportunities for recycling and reuse of C&amp;D materials from the Project include:</p> <ul style="list-style-type: none"> <li>(a) paving bricks arising from existing pavement could be recycled on site;</li> <li>(b) existing marginal roadside barriers comprise pre-cast units, which may be possible to be reused in the following widening works; and</li> <li>(c) existing bridge parapets comprise aluminum post and railings, which have a recyclable value and could be sold for</li> </ul>			

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7.6.15 to 7.6.17	<p>reconditioning or reused for scrap metal.</p> <p>Any stockpile should be sited away from existing watercourses and suitably covered to prevent wind erosion and impacts on air and water quality.</p> <p><u>Chemical Waste</u></p> <p>Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows. Containers used for the storage of chemical wastes should:</p> <p>(a) be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;</p> <p>(b) have a capacity of less than 450L unless the specifications have been approved by the EPD; and</p> <p>(c) display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C).</p>	C	Contractor	Within the boundaries of all construction sites as well as transportation routes to designated areas for off-site disposal of materials/Prior to and during construction activities.



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	<p>The storage area for chemical wastes should:</p> <ul style="list-style-type: none"> <li>(a) be clearly labelled and used solely for the storage of chemical waste;</li> <li>(b) be enclosed on at least 3 sides;</li> <li>(c) have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;</li> <li>(d) have adequate ventilation;</li> <li>(e) be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and</li> <li>(f) be arranged so that incompatible materials are adequately separated.</li> </ul> <p>The Contractor shall register with EPD as a Chemical Waste Producer. Waste oils and other chemical wastes as defined in the</p>			



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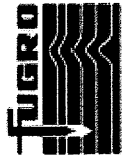
EIA Review Ref	Environmental Protection Measures/Mitigation Measure	Implementation Stage(D: Design/ C: Construction/ O: Operation)	Implementation Agent	Location
7.6.18 to 7.6.20	<p>Waste Disposal (Chemical Waste) (General)            Regulation will require disposal by appropriate means and could require pre-notification to EPD prior to disposal. Appropriate means include disposal:</p> <ul style="list-style-type: none"> <li>(a) via a licensed waste collector; and</li> <li>(b) to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers; or</li> <li>(c) to a reuser of the waste, under approval from EPD.</li> </ul> <p><u>General Refuse</u>            General refuse generated on-site should be stored in enclosed bins or compaction units separate from construction and chemical wastes. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily or every second day basis to minimize odour, pest and litter</p>	C	Contractor	Within the boundaries of all construction sites as well as transportation routes to designated areas for off-site disposal of materials/Prior to and during construction activities.



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EIA Review Ref	Environmental Protection Measures/Mitigation Measure	Implementation Stage(D: Design/ C: Construction/ O: Operation)	Implementation Agent	Location
7.7.1	<p>impacts. The burning of refuse on construction sites is prohibited by law. General refuse is generated largely by food service activities on site, so reusable rather than disposable dishware should be used if feasible. Aluminum cans are often recovered from the waste stream by individual collectors if they are segregated or easily accessible. Therefore separate, labelled bins for their deposit should be provided if feasible.</p> <p>Office waste can be reduced through recycling of paper if volume is large enough to warrant collection. Participation in a local collection scheme should be considered if one is available.</p> <p><u>Waste Monitoring</u></p> <p>It is the Contractor's responsibility to ensure that all wastes produced during the construction of the Project are handled, stored, and disposed of in accordance with good waste management practices and relevant regulations and requirements.</p> <p>The mitigation measures recommended in the</p>	C	Contractor/Environmental Team	Within the boundaries of all construction sites as well as transportation routes to designated areas for off-site disposal of materials/Prior to and during construction activities.

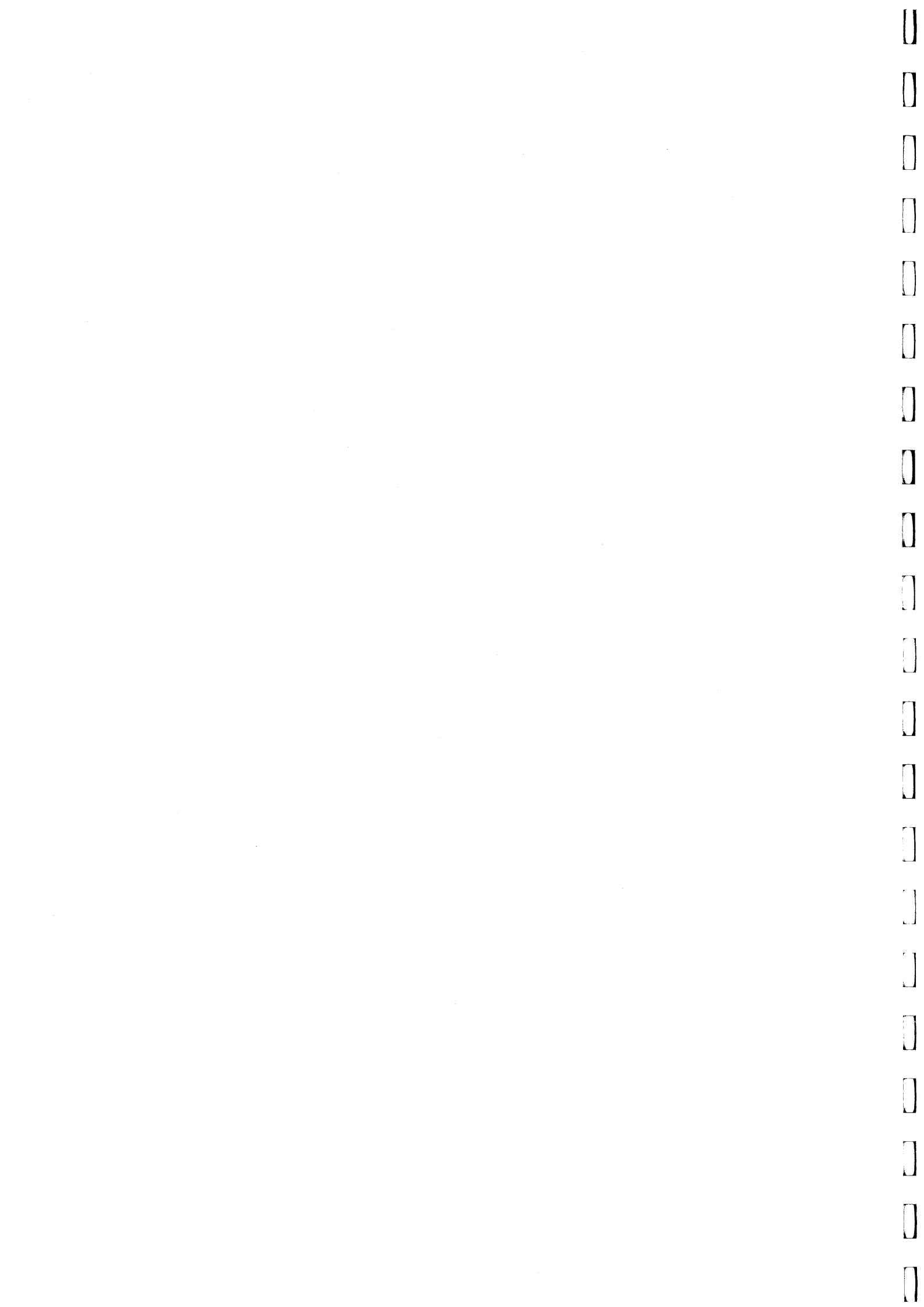


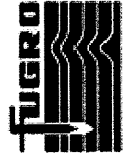
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EIA Review Ref	Environmental Protection Measures/Mitigation Measure	Implementation Stage(D: Design/ C: Construction/ O: Operation)	Implementation Agent	Location
	EIA/EIA review report should form a basis of the WMP to be developed by the Contractor in the construction phase of the Project.			







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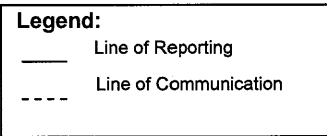
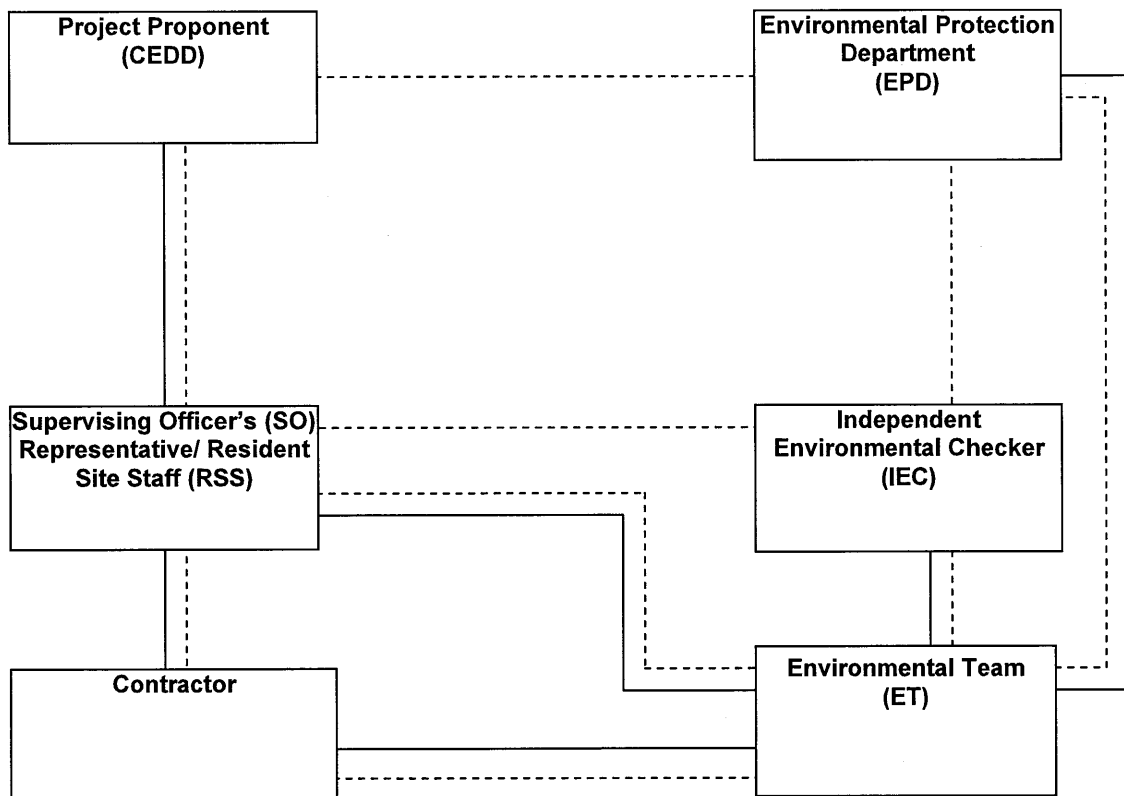
### **Appendix B Project Organization**



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### Appendix C Sample Data Record Sheet





**APPENDIX C  
Data Record Sheet for TSP Monitoring**

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		Sunny / Fine / Cloudy / Rainy
Site Conditions		
Initial Flow Rate, Qsi	Pi (mmHg)	
	Ti ( C)	
	Hi (in.)	
	Qsi (Std. m <sup>3</sup> )	
Final Flow Rate, Qsf	Pf (mmHg)	
	Tf ( C)	
	Hf (in.)	
	Qsf (Std. m <sup>3</sup> )	
Average Flow Rate (Std. m <sup>3</sup> )		
Total Volume (Std. m <sup>3</sup> )		
Filter Paper Identification No.		
Initial Wt. of Filter Paper (g)		
Final Wt. of Filter Paper (g)		
Measured TSP Level ( g/m <sup>3</sup> )		
Other Dust Emission Source(s) Observed		
Remarks /Other Observations		

	<u>Name &amp; Designation</u>	<u>Signature</u>	<u>Date</u>
Field Operator:	_____	_____	_____
Laboratory Staff:	_____	_____	_____
Checked by:	_____	_____	_____

**APPENDIX C  
Construction Noise Monitoring Field Record Sheet**

Monitoring Location		
Description of Location		
Date of Monitoring		
Measurement Start Time (hh:mm)		
Measurement Time Length (min.)		
Noise Meter Model/Identification		
Calibrator Model/Identification		
Measurement Results	L <sub>90</sub> (dB(A))	
	L <sub>10</sub> (dB(A))	
	L <sub>eq</sub> (dB(A))	
Major Construction Noise Source(s) During Monitoring		
Other Noise Source(s) During Monitoring		
Remarks / Other Observations		

	<u>Name &amp; Designation</u>	<u>Signature</u>	<u>Date</u>
Recorded by:	_____	_____	_____
Checked by:	_____	_____	_____

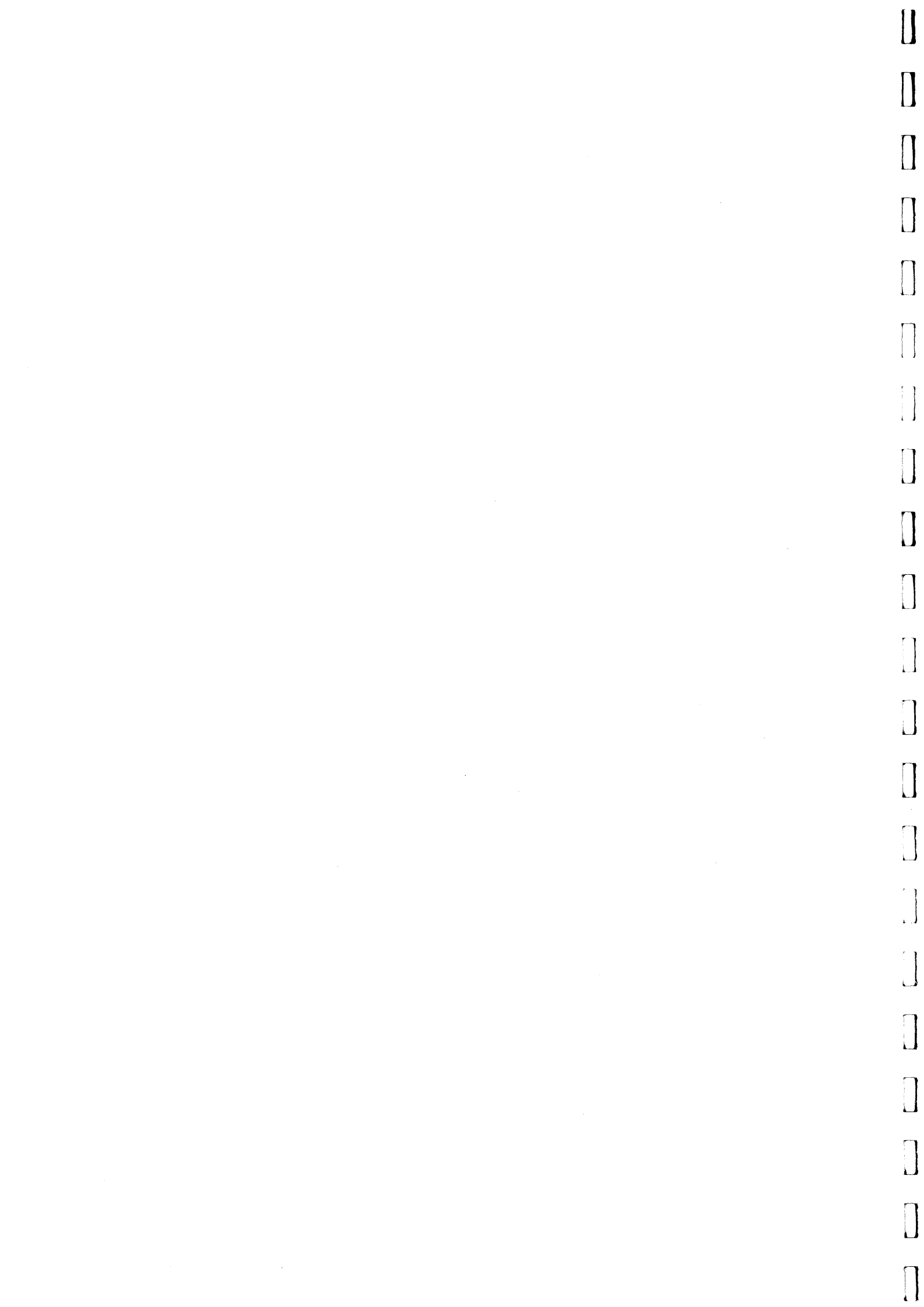
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**Appendix D**  
**Sample Template for the interim Notifications**



Appendix D Template for Interim Notifications of Environmental Quality Limits Exceedances

Incident Report on Action Level or Limit Level Non-compliance

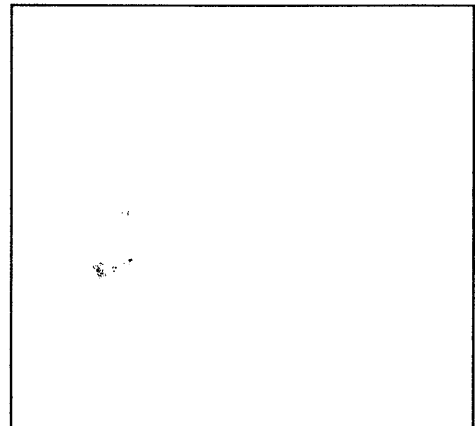
Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

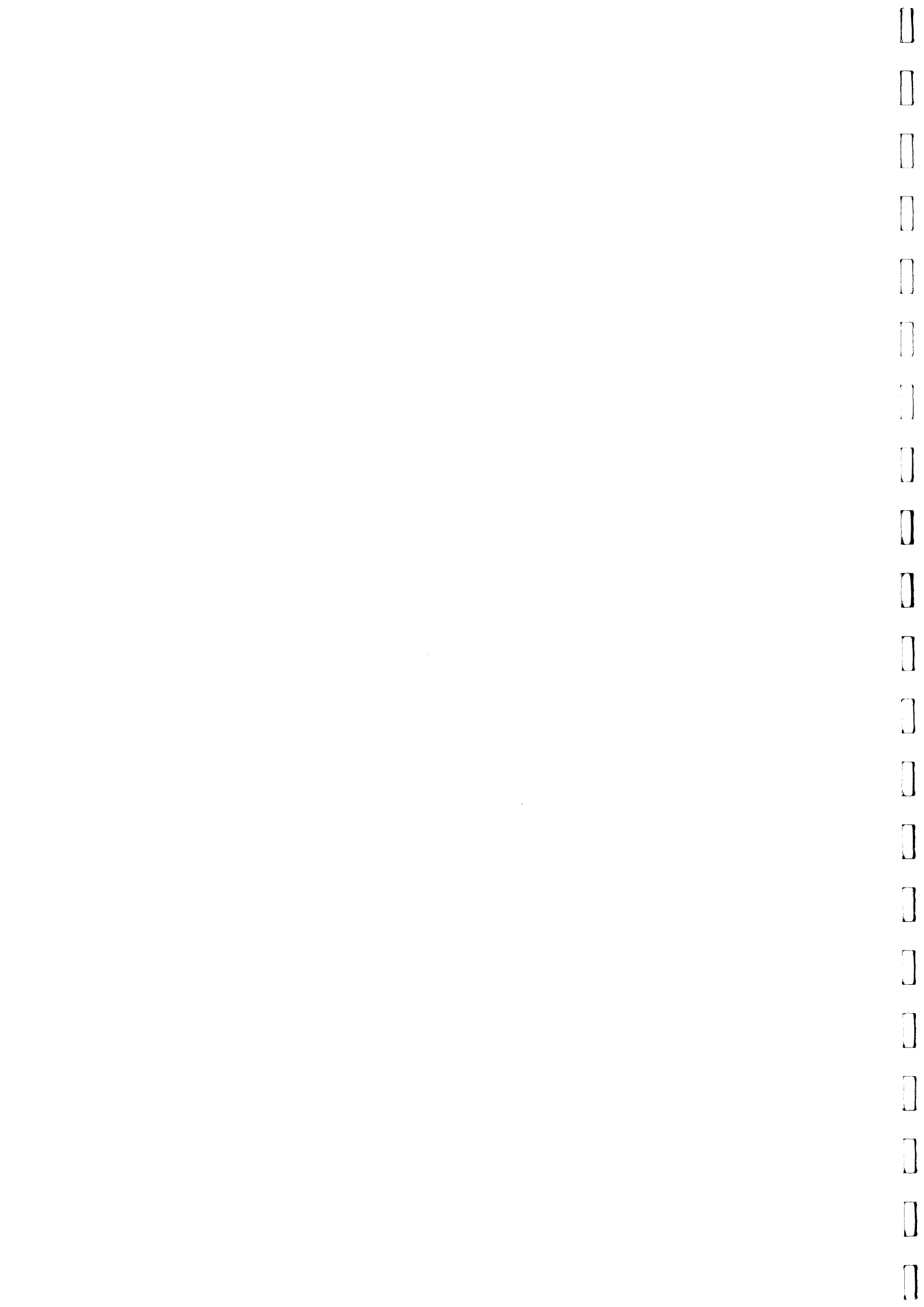
Prepared by: \_\_\_\_\_

Designation: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_





## FUGRO TECHNICAL SERVICES LIMITED

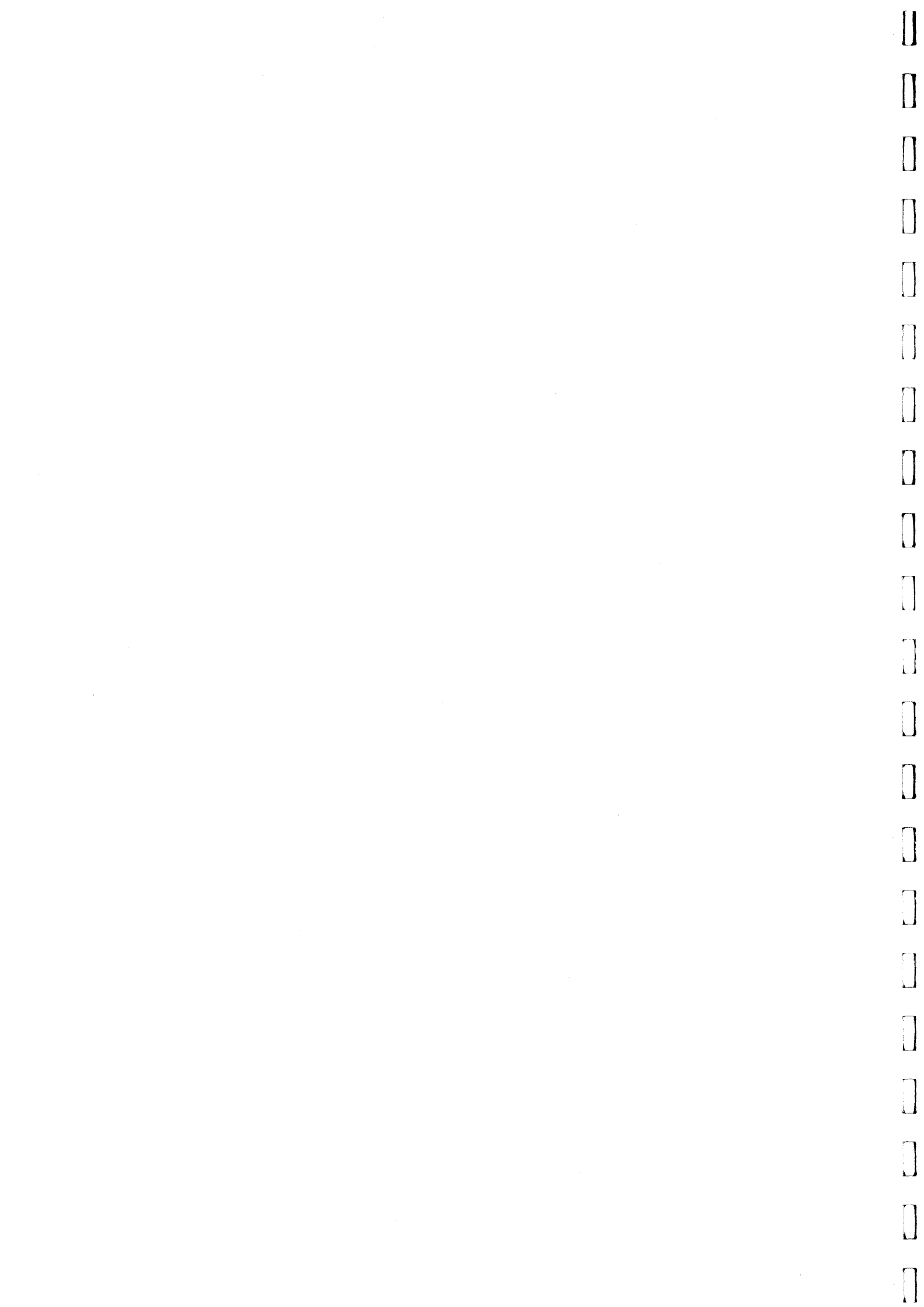
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### Appendix E Complaint Handling Procedure

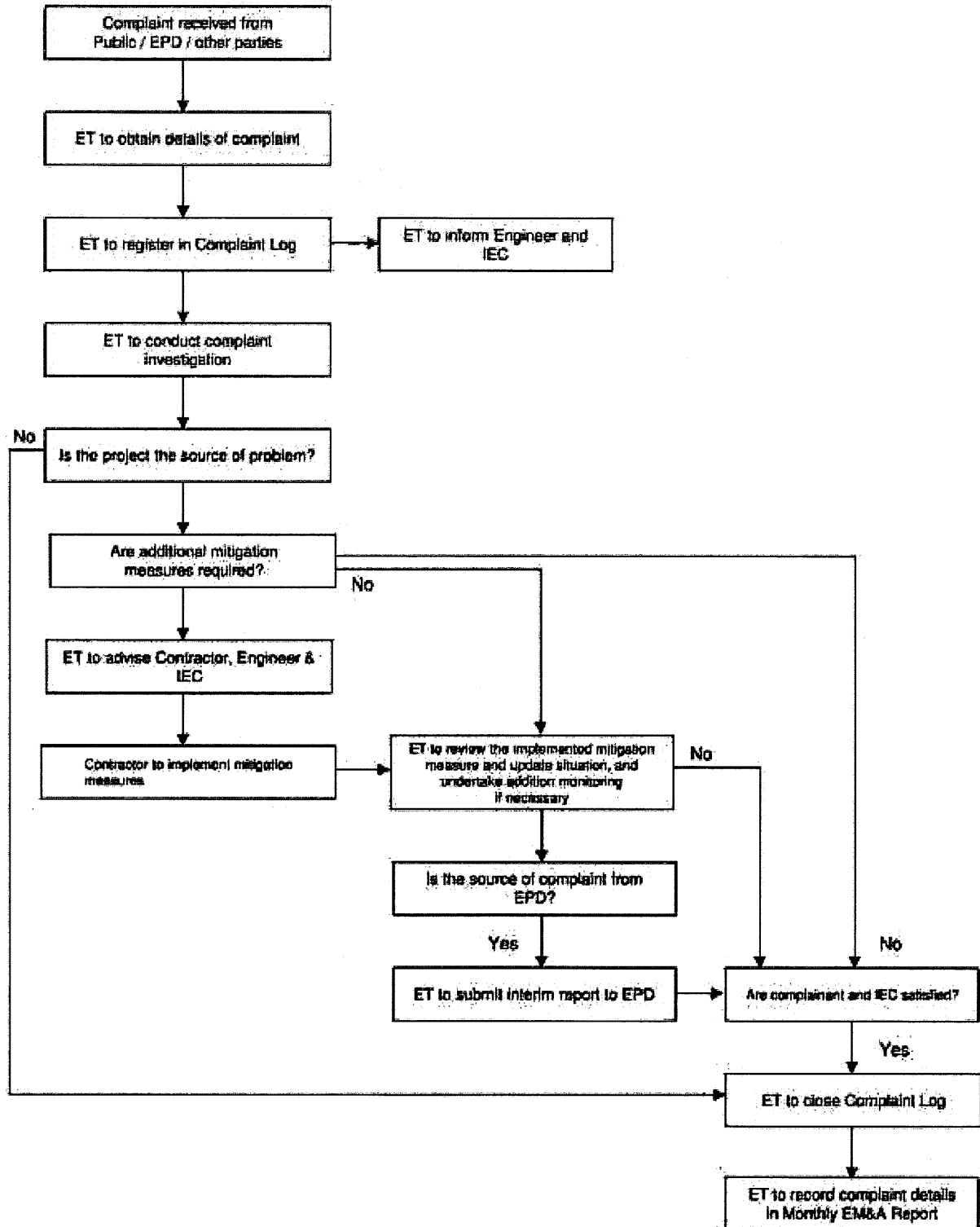


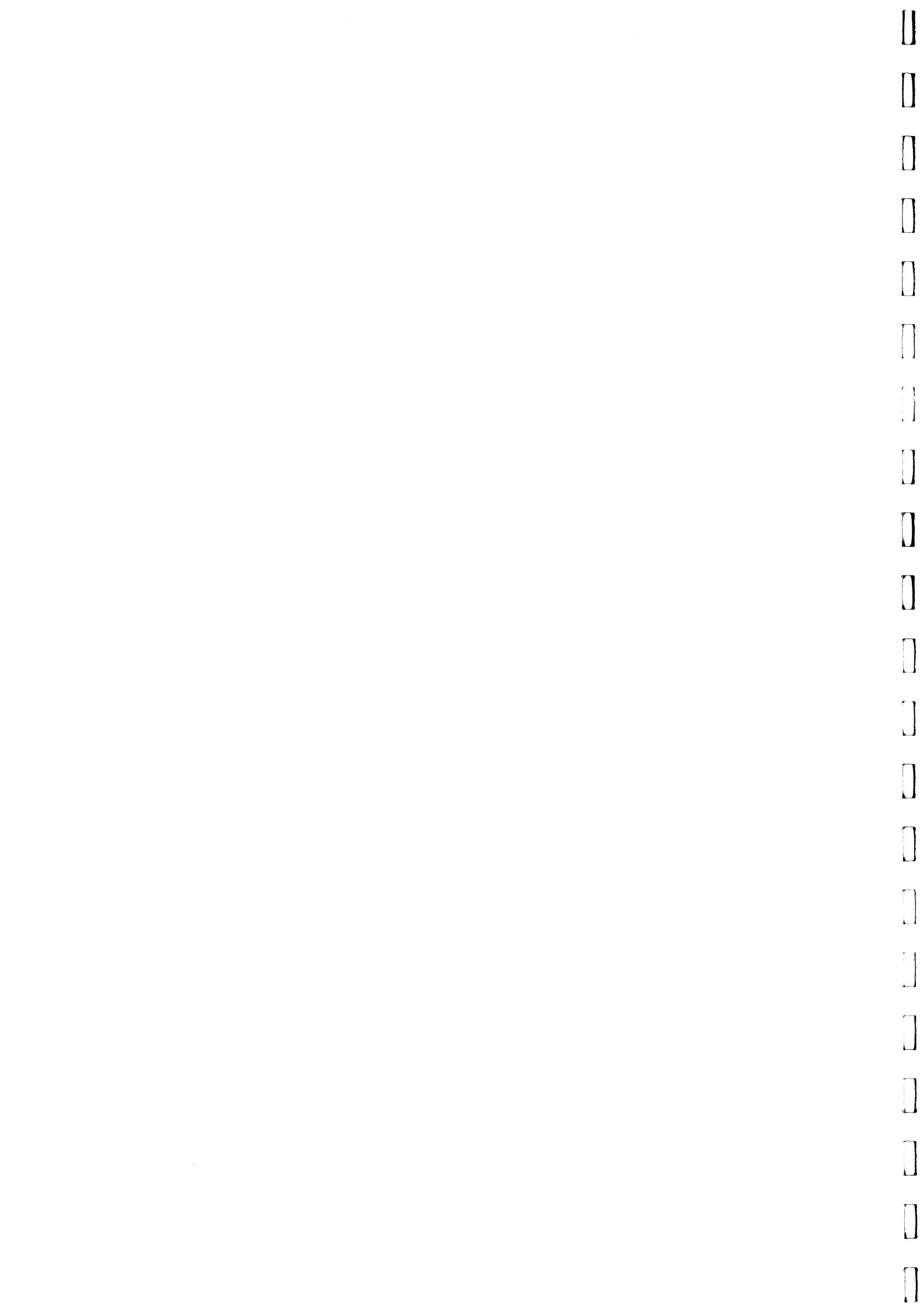


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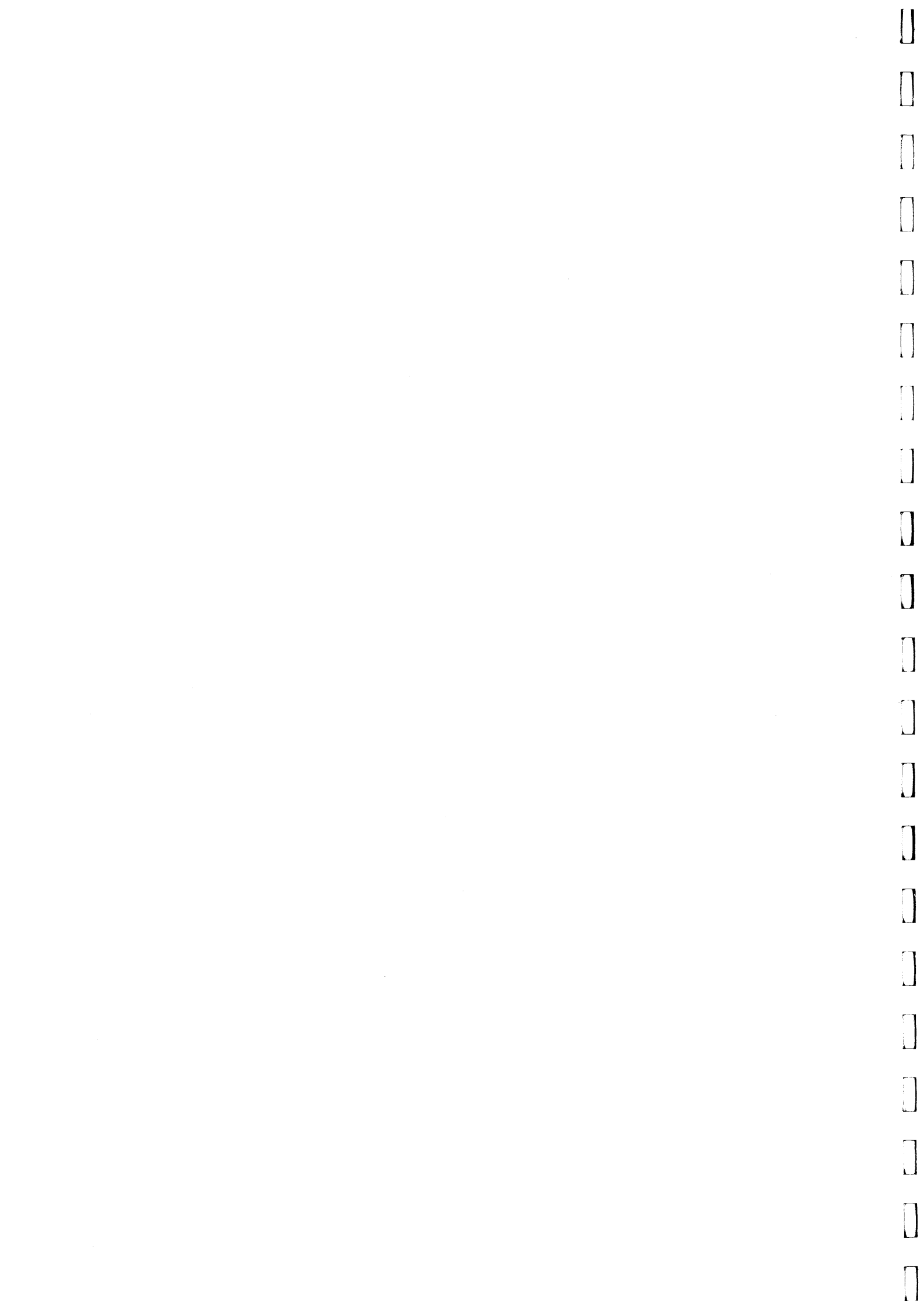
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**Appendix F**  
**Replies from Occupants' Representatives of Wai Wah Centre and Sheung Wo Che**




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 Profit Industrial Building,  
 1-15 Kwai Fung Crescent, Kwai Fong,  
 Hong Kong

大埔公路（沙田段）道路拓寬和加裝隔音屏障（合約編號:NE / 2017 / 05）

根據上述的工程要求，我方， 偉華中心，  
 決定

- (  ) 拒絕您的提議，不會許可 貴公司的環保小組訪問我們的場所進行上述監測工作
- (  ) 接受您的提議，並許可 貴公司的環境小組訪問我們的場所進行環境監測工作，並同意進一步與貴公司聯絡進行監測安排

此致

  
 \_\_\_\_\_  
 (業主立案法團/管理處的簽署和蓋章)

**Jo Jo To**  
 Assistant Property Manager  
 \_\_\_\_\_  
 (姓名、職銜)

輝固技術服務有限公司  
香港葵芳葵豐街  
1-15 號盈業大廈  
B 座 7 樓 723-726 號

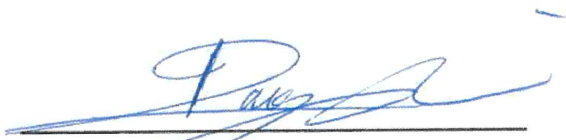
輝固技術服務有限公司 周先生：

大埔公路(沙田段)道路招寬和加裝隔音屏障 - 空氣和噪音監測點

關於 貴司 2018 年 8 月 29 日來函擬在本村上禾輦村內建立空氣和噪音監測點事。  
因有關設置地點涉及官地和私人土地，本人認為 貴司應透過地政總署等相關政府部門以諮詢各有關持份者的意見。

另，鑑於提議的設置地點均位於本村主要行人通道上，建議 貴司應考慮另覓其他地點或本村以外地方設立監測點，以免對村民出入造成不便。

沙田上禾輦村原居民代表 藍志祥



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日期：2018 年 8 月 31 日