3 NOISE MONITORING

Introduction

3.1 In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of noise impacts during the construction phase of the Project are presented. As the construction noise is the prime concern, noise levels shall be monitored to evaluate the construction noise impact during the construction phase.

Noise Parameters

3.2 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq\ (30\ minutes)}$ shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, $L_{eq\ (5\ minutes)}$ shall be employed for comparison with the Noise Control Ordinance (NCO) criteria.

3.3 As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference. A sample data record sheet is shown in **Appendix B** for reference.

3.4 The locations of noise sensitive receivers (NSRs) for the Peng Chau STW Upgrade are shown in **Figure 3-1**.

Monitoring Equipment

3.5 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 6651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. 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 1.0 dB.

3.6 Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

3.7 The ET is responsible for the provision of the monitoring equipment. He 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.

Monitoring Locations

3.8 Based on the EIA report, the worst affected location was Block D of Sea Crest Villa (**Figure 3-2**). The status and location of noise sensitive receivers may change after issuing this Manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from ER and agreement from the IC(E) and EPD.

3.9 If, for example, there are difficulties obtaining access to the proposed noise monitoring locations, alternative monitoring locations may be proposed. The selection of these alternative monitoring locations shall be based on the following criteria:

(a) At locations close to the major site activities which are likely to have noise impacts;

(b) Close to the NSRs (any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public workshop, library, court of law, performing arts center shall be considered as an NSR); and

(c) For monitoring locations located in the vicinity of the NSRs, care shall be taken to cause minimal disturbance to the occupants during monitoring.

3.10 The monitoring station shall normally be at a point 1m from the exterior of the sensitive receiver building façade and be at a position 1.2m above the ground or at the height that has the least obstructed view of the construction activity in relation to the receiver. 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. For reference, a correction of +3 dB(A) shall be made to the free field measurements. The ET shall agree with the IC(E) and EPD on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

Baseline Monitoring

3.11 The ET shall carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring shall be carried out daily for a period of at least two weeks. A schedule on the baseline monitoring shall be submitted to the IC(E) for approval before the monitoring starts.

3.12 There shall not be any construction activities in the vicinity of the stations during the 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 be recorded.

3.13 As the current programme of the Peng Chau Helipad project will be commenced 1 to 2 months before this Project and both projects are using the same noise monitoring location, it is therefore recommended to adopt the baseline monitoring

results from the Helipad project without repeating the works unless a further delay is observed from the Helipad project.

3.14 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with the IC(E) and EPD to agree on an appropriate set of data to be used as baseline reference and submit to the ER for approval.

Impact Monitoring

3.15 Noise monitoring shall be carried out at the designated monitoring station. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for the station on a weekly basis when noise generating activities are underway:

- one set of measurements between 0700 and 1900 hours on normal weekdays.

3.16 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 3-2**, shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

Event and Action Plan

3.17 The Action and Limit levels for construction noise are defined in **Table 3-1**. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 3-2 shall be carried out.

Table 3-1 Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When are documented complaint is received	75 dB(A) *

Note: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.
* Reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

Table 3-2 Event/Action Plan for Construction Noise

Event	Action			
	ET	IC(E)	ER	Contractor
Action Level	1. Notify IC(E) and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IC(E), ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IC(E); 2. Implement nose mitigation proposals.
Limit Level	1. Identify sources; 2. Inform IC(E), ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IC(E), ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Mitigation Measures

Construction Phase

3.18 As detailed in the EIA report, extension of inlet mains (Tai Lei Island portion) and site formation construction activities would likely cause adverse noise impacts on some of the noise sensitive receivers. Appropriate mitigation measures such as use of quiet equipment have been recommended. Other good site practices are recommended to be performed:

(a) Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program.

(b) Mobile plant, if any, should be sited as far away from NSRs as possible.

(c) Machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.

(d) Plant known to emit noise strongly in one direction should, wherever possible, be oriented so that the noise is directed away from the nearby NSRs.

(e) Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Operational Phase

3.19 According to the EIA report, the operation of the Project would have no adverse impact on the identified NSRs with mitigation. The recommended mitigation measures include enclosing all noisy equipment to reduce the noise levels.

3.20 The implementation for the recommended noise mitigation measures is presented in Appendix A.

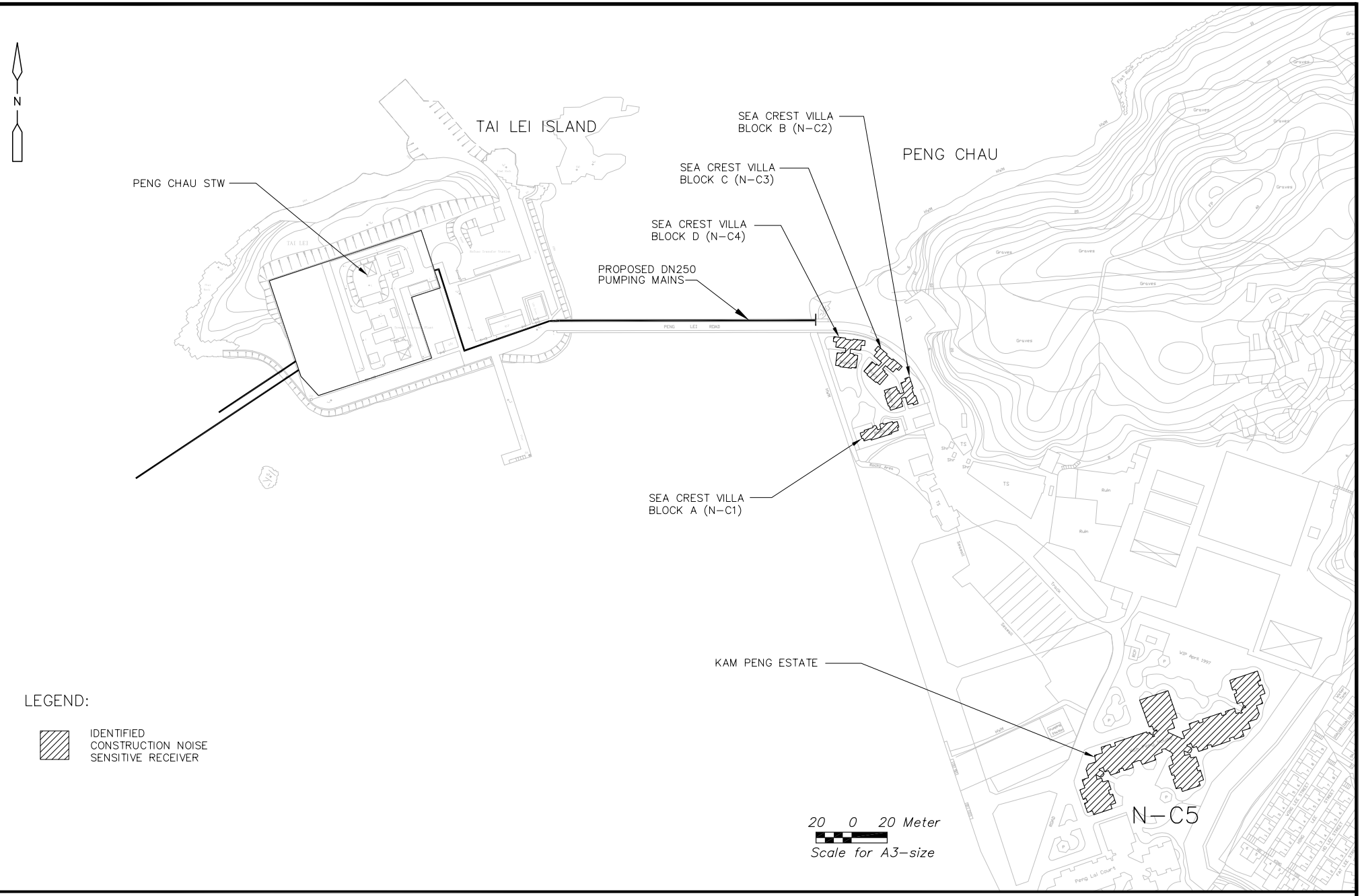

Figure 3-1
Construction Phase
Noise Sensitive Receivers

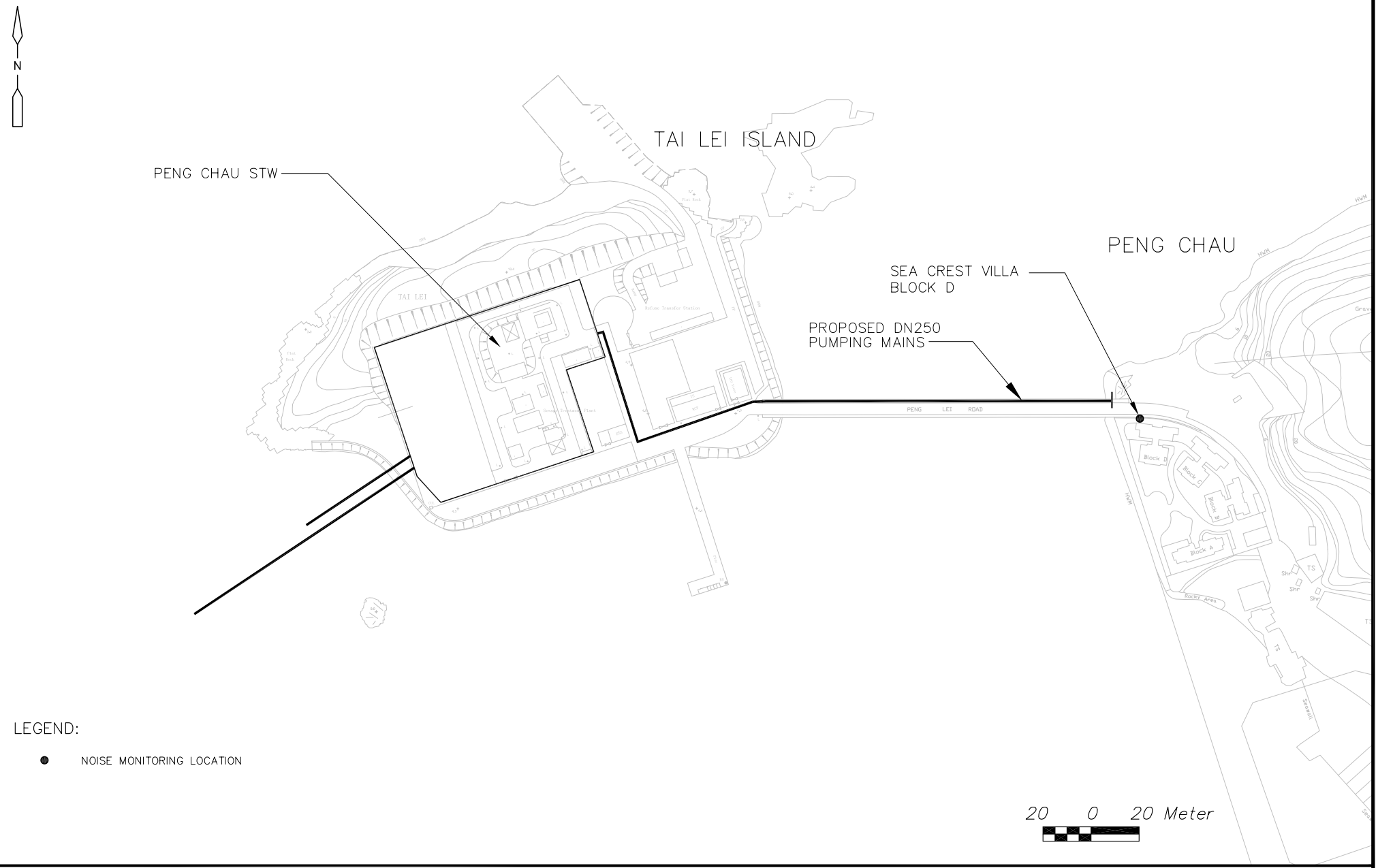

Figure 3-2
Noise Monitoring Location