3. NOISE MONITORING

Monitoring Requirements

3.1 Noise monitoring was conducted at two monitoring stations as specified in the EM&A Manual. Appendix B shows the baseline noise levels and established Action/Limit Levels for the environmental monitoring works.

Monitoring Equipment

3.2 An Integrating Sound Level Meter used for noise monitoring. It was Type 1 sound level meter capable of giving a continuous readout of the noise level readings including equivalent continuous sound pressure level ($L_{eq}$) and percentile sound pressure level ($L_{x}$). They comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Also a portable electronic wind speed indicator capable of measuring wind speed in m/s was used to check wind speed. Table 3.1 below shows the noise monitoring equipment used.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrating Sound Level Meter</td>
<td>• Rion Brand NL-31</td>
</tr>
<tr>
<td>Calibrator</td>
<td>• Rion Brand NC-73</td>
</tr>
</tbody>
</table>

Monitoring Parameter, Frequency and Schedule

3.3 The monitoring schedule is shown in Appendix C. The frequency and parameters of noise measurement are presented in Table 3.2.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Duration (min.)</th>
<th>Parameters</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime (07:00 to 19:00)</td>
<td>30</td>
<td>$L_{eq}$, $L_{90}$ &amp; $L_{10}$</td>
<td>Once per week</td>
</tr>
</tbody>
</table>

* Noise monitoring was conducted at two monitoring stations NMC1 & NMC5 as specified in the EM&A Manual
**Monitoring Locations**

3.4 In accordance with the revised PS, two monitoring stations as shown in Figure 3.1a & 3.1b were selected for noise measurements. Table 3.3 describes the locations of the noise monitoring stations.

3.5 All the noise monitoring stations were set up at the proposed locations in accordance with PS and two EM&A Manuals.

**Table 3.3 Location of the Noise Monitoring Stations**

<table>
<thead>
<tr>
<th>Monitoring Station</th>
<th>Description</th>
<th>Type of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMC5</td>
<td>Ground level, Pinehill, Taipo Road</td>
<td>Façade</td>
</tr>
</tbody>
</table>

**Monitoring Procedures**

3.6 The field monitoring procedures were as follows:

- The microphone of the sound level meter was positioned 1m away from the external façade of each Noise Sensitive Receiver.
- The battery condition was checked to ensure good functioning of the meters.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
  - frequency weighting : A
  - time weighting : Fast
  - time measurement : Leq (30 mins) for Regular Noise Monitoring
    Leq(5 mins) by 3 consecutive Leq(5 mins) for Restricted Hour Noise Monitoring
- Prior to and after each noise measurement, the meter was calibrated using the Calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1.0 dB, the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
• The weather condition including wind speed and rainfall was collected from the Hong Kong Observatory.

• At the end of the monitoring, the Leq, L10 and L90 were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.

• All the monitoring data within the sound level meter was downloaded to a computer.

• No noise monitoring was cancelled due to fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

• Noise measurement would be paused during periods of high intrusive noise and observation would be recorded when intrusive noise could not be avoided.

3.7 Regular equipment maintenance and calibration was performed as follows:

• The microphone of the sound level meter and calibrator would be cleaned with a soft cloth at quarterly intervals.

• The meter would be sent to the supplier to check and calibrate at yearly intervals.

3.8 Calibrations certificates for the equipment employed are presented in Appendix D.
Results and Observations

3.9 As Miu Kong Tsuen would be demolished for another Contract (Route 9 – Eagle’s Nest Tunnel & Associated Works), all the residents had moved out and the village is no longer considered as a noise sensitive receiver. ER proposed termination of the noise monitoring at NMC1 (Miu Kong Tsuen) on 18 November 2003 and was approved by IEC in 1 December 2003. Therefore, the noise monitoring station NMC1 had ceased since 1 December 2003.

3.10 As informed by the Contractor there was no activity carried out during the restricted time period (19:00 – 23:00 on all weekdays and 07:00 – 19:00 on general holiday) at Portion IIA before 1 January 2004. Therefore, no noise monitoring event was conducted for restricted hours at NMC5 in this reporting month.

3.11 Noise monitoring events were only conducted for normal hours (07:00 – 19:00) at NMC5. All the monitoring results in this reporting month complied with the AL levels. Noise monitoring results and graphical presentations are provided in Appendix F. Summaries of all the noise monitoring results are presented in Table 3.4.

| TABLE 3.4 SUMMARY OF IMPACT NOISE LEVELS DURING 07:00 – 19:00 |
|-----------------------------|-----------------------------|
| Noise Level, dB(A)          |                             |
| **L eq (30 min)**          |                             |
| **Range**                  | **Limit Level**             |
| NMC5*                      | 70.7 – 74.8                | 75                           |

* Remarks: Noise levels corrected by the adopted noise projection method

3.12 Since commencement of the Project, continuous invalid noise exceedances were recorded at NMC5 due to heavy traffic on Tai Po Road. In order to obtain a representative noise level, which was attributable to the construction activities at Portion IIIA as received at NMC5, simultaneous noise measurement was being conducted at the Shell Petroleum Station (SPS) during regular noise monitoring event at Pinehill in March and April 2003.

3.13 As the noise level recorded at SPS was dominantly attributable to the construction activities at Portion IIIA, the noise level as received at Pinehill due to construction activities was estimated with the application of noise projection method. In order to validate this estimated noise level, the noise level difference between field
measurement and estimation was checked and was observed persistently within the baseline range. ET proposed the projection method for noise monitoring at Pine Hill (NMC5), which was verified by IEC on 17 June 2003, had been applied since 18 June 2003. Details of the projection method are annexed in Appendix O.

3.14 Upon the adoption of projection method, the representative noise levels at NMC5 complied with the limit level for daytime monitoring. The representative noise levels in December are shown in Appendix F.

3.15 The major activities in this reporting month included construction of box culvert at Portion IA, rock breaking and installation of soil nail at Portion IIIA. These activities might increase the measured noise levels. The Contractor was recommended to implement all necessary mitigation measures for these works.

3.16 The other major noise sources included heavy traffic near Government Quarter along Tai Po Road and construction activities such as soil nail installation, building construction and road excavation by others on Caldecott Road.