10

CONCLUSIONS AND RECOMMENDATIONS

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10.1. Summary of Findings

The above study has shown that the sixteen identified roads under investigation may be classified into four main categories: (a) expressway/trunk roads, (b) primary distributors in rural environment, (c) roads in new town environment and (d) roads in old district environment, in accordance with their characteristic and the local environment.

10.1.1. Expressway/Trunk Road Environment

10.1.1.1. The study sections of Tuen Mun Road, Cheung Pei Shan Road and Tseung Kwan O Road are subject to a limit of 70kph and possess the following characteristic:

- almost no conflict with existing utilities along expressway
- almost no conflict with existing EVA, road junction along expressway
- no conflict with pedestrian movement along expressway
- high quality requirement for visibility along expressway and truck road
- severe constraints in traffic diversion during the construction of noise mitigation measures.

10.1.2. Rural Primary Distribution

10.1.2.1. The study sections of Castle Peak Road at Hung Shui Kiu and Ping Shan are typical primary distributors in rural environment with site specific features such as adjacent LRT reserve. These road sections are subject to a limit of 50kph and possess the following characteristic:

- heavy traffic with fairly good alignment
- always with many minor road junctions
- with suburban environment in the vicinity
- mainly with low-rise developments such as villages and small houses

10.1.3. Roads in new town environment

10.1.3.1. The study sections of Yuen Wo Road, Tai Chung Kiu Road, Ma On Shan Road, Tin Sam Street, Che Kung Miu Road, Che Kung Miu Road J/O Hung Mui Kuk Road, Fung Shue Wo Road, Po Lam Road and Po Hong Road are typical roads in new town environment and possess the following characteristic and features:

- always with a combination of fairly wide amenity area, footpath and cycle track adjacent to the carriageway
- almost with proper planned road layout and less noise sensitive developments nearby
- almost with no severe constraints on land availability
- comparatively less road side commercial activities

10.1.4. Roads in Old District Environment

10.1.4.1. The study section of Tung Tau Tsuen Road is a typical road in old district environment possessing the following features and characteristic :

- severe land constraint
- always with poor sightline and sub-standard traffic arrangement
- existence of EVA to the affected facades, road junctions, pedestrian crossing, bus stopping, loading/unloading activities and road side commercial activities

10.2. Conclusions

10.2.1. The Study has examined 13 selected locations recommended by the "Scoping Study". A preliminary engineering feasibility study together with a detailed Noise Impact Assessment has been carried out for each of these locations, representing four categories of roads, namely expressway, primary distributors, roads in new towns and in existing old urban area.

10.2.2. Each location has different environment setting and different traffic noise problems. Likewise, the approach to the proposed mitigation measures is also different. The major differences are briefly summarized in the following:

- **Expressway/trunk roads environment** is represented by Tuen Mun Road(Route 2), Cheung Pei Shan Road(Route 5) and Tseung Kwan O Road(Route 6). Major characteristics are no major conflicts with kerb side activities, EVA or junctions, higher standards for road safety requirements in terms of visibility but with severe constraints traffic diversion for construction and maintaining the proposed barriers. The noise impact can usually be mitigated by plain vertical barriers, bend top barriers and enclosures.

- **Rural primary distributors environment** is represented by the sections of Castle Peak Road at Hung Shui Kiu, and Ping Shan. The road alignments are generally with higher standards. Traffic volumes are relatively high and heavy conflicts with side roads at junctions. With the suburban environment, the adjacent developments are generally low or medium rise buildings. Most of the problems could be overcome by simple vertical noise barrier.

- **New Town environment** is represented by those roads in Sha Tin, Ma On Shan, Tsing Yi and Tseung Kwan O. The towns are generally well planned. Retroactive measures mainly focus on areas where there was no planning for road traffic noise in the early years. In general, there is more space available or opportunity for the installation of vertical noise barriers by making use of amenity strips, footpaths and cycle tracks. Roadside activities are less than most of the urban areas.

- **Existing old urban environment** is represented by the road section of Tung Tau Tsuen Road. Limited land is available for possible noise barrier installation and conflicts with underground utilities are common. As a result, there is limit scope for providing any noise barriers to mitigate the affected properties. The other characteristics of the old urban areas are the high levels of roadside activities and ground level commercial developments, which would prohibit the provision of noise barriers along the road side.

10.2.3. The Study has developed detailed assessment procedures to investigate any roads which may be considered as noisy. These procedures cover aspects of engineering feasibility, environmental impact and visual impact. A detailed assessment should only be conducted after a preliminary screening of the road. A set of simplified working tools has been developed to assist the government in identifying potential for retroactive mitigation measures.

10.2.4. Based on the proposed ranking system and the recommended options for the 13 sites, a priority ranking has been established for consideration by the government.

10.3. Recommendations

10.3.1. A set of simplified assessment procedures is recommended for use as a working tool to enable an assessor such as EPD to perform a desk-top study without going through lengthy calculations to determine whether the required mitigation is at all feasible before committing to a detailed feasibility study.

10.3.2. Should there be a need to proceed with the detailed feasibility study, the procedures detailed in the flow chart in Section I provide appropriate guidelines for conducting the assessment.

10.3.3. A priority ranking has been established for consideration by the government for the implementation of the proposed direct noise mitigation measures at the 12 selected groups of roads. The ranking is based on population exposure but may be changed if other considerations, e.g. political issues, take priority.

10.3.4. During the detailed design stage, relevant authorities should be consulted for the likely impact, time and costs involved for the necessary diversion or re-provisioning of affected utilities. In particular the following requirements given by Drainage Services Department should be considered while preparing the detailed design of the noise barriers:

(a) no stress shall be induced to the drains from the foundation of the barrier;
(b) minimum horizontal and vertical clearance of 1.0m must be provided;
(c) the noise barriers shall in no case cause any obstruction to the future maintenance and reconstruction of the drains; and
(d) detailed layout of the barriers at such locations must be forwarded for comments.

10.3.5. For tunnel-like enclosure with length exceeding 230 metres, Fire Services Department must be consulted for the provision of fire safety requirements.