

**Scoping Study for Providing
Direct Technical Remedies on Existing Flyovers**

**Final Report
Addendum No. 1**

This addendum contains the following:

- (a) Main Text, pages 11, 30, 32, 33 and 34;
- (b) Main Text, Figure 6.1jj;
- (c) Annex A, "Flyovers Checklist (Kowloon)", pages 4 and 5;
- (d) Annex A, "Flyovers Checklist (NT)", pages 1 to 4;
- (e) Annex A, a new page containing notes for Annex A.
- (f) Annex C, "Road Noise Calculation, Kowloon", pages 1 to 4;
- (g) Annex C, "Road Noise Calculation, NT", pages 1 to 4;
- (h) Responses to Comments on Final Report.

Flyover reference and name	Flyover within a CBD or an industrial area?	NSRs have been not identified in the vicinity?	Flyover with existing noise mitigation measures?	Flyover already subject to an EIA prior to completion?	Flyover with an EIA proposed during 1997?
K38 Tate's Cairn Tunnel Network (near Richland Gardens)			✓	✓	
K44 New Clear Water Bay Road		✓			
K46 Kai Fuk Road	✓	✓			
K49 Kai Cheung Road		✓			
K50 Kwun Tong Bypass (near Richland Gardens)			✓	✓	
K51 Kwun Tong Bypass (above Kai Fuk Road)	✓	✓		✓	
K52 Kwun Tong Bypass (along Hoi Bun Road)	✓	✓		✓	
K55 Kwun Tong Bypass (to Lam Tin Station)				✓	
K59 Lion Rock Tunnel Road (link to Waterloo Road)		✓			
NT1 Po Shek Wu Road		✓			
NT2 Fanling Highway (near Tai Tau Leng and Choi Po Court)			✓		
NT8 Tolo Highway (near Classical Gardens and Ma Wo)				✓	
NT12 Tolo Highway (overpass adjacent to University Station)		✓		✓	
NT13 UR T6 (link to Tolo Highway)		✓		✓	
NT20 Sand Martin Bridge		✓			
NT21 Fo Tan Road					✓
NT22 Lok King Street		✓			
NT26 Banyan Bridge		✓			
NT30 Sha Tin Wai Road				✓	

This section describes the assessment of the effectiveness of the proposed direct technical remedies.

6.1 ASSESSING THE EFFECTIVENESS OF DIRECT TECHNICAL REMEDIES

A total of 11 flyovers were shortlisted as presented below. The effectiveness of different direct technical remedies have been assessed. The concerned flyovers and nearby at-grade roads were divided up into road segments. A road layout defines the road width, surface type, traffic conditions and the height and location of roadside noise barriers. The segmentation process was carried out in accordance with the CRTN procedures and the noise models were built using the *HFANoise* traffic noise model which fully implements CRTN procedures and methodologies. Traffic noise impacts were assessed against the $L_{10, \text{peak hour}}$ 70 dB(A) limit.

Elevation of the flyovers and concerned NSRs have been determined by reference to 1:5000 survey maps and site survey. All other site-specific conditions such as angle of view, road gradient, nearby dominant at-grade road and features that could add noise screening were included in the modelling process. The effectiveness of direct technical remedies such as 3m noise barriers, 5m cantilevered barrier, semi-enclosure and full enclosure has been assessed using the traffic noise model. For the purpose of this assessment, the horizontal length of the direct technical remedies was determined by assuming the proposed direct technical remedies need to provide noise screening for a minimum angle of view of 135° measured from each NSR. Extent of the proposed direct technical remedies are shown in *Figure 6.1a* to *6.1j*. Details of the exact direct technical remedies configurations and arrangements will be considered during the following Stage 2 study.

6.2 PREDICTED NOISE LEVELS

Unmitigated and mitigated noise levels for the representative NSRs at each concerned flyovers have been predicted for the first floor (4.2m above ground), mid level and top floor level (based on 2.8m per floor level). The predicted noise levels with and without direct technical remedies are presented in *Annex D*.

- H26 IEC - from Oil Street to Tin Chui Street;
- H34 IEC - near Heng Fa Chuen;
- H41 Ap Lei Chau Bridge;
- K2 Kwai Chung Road - near Mei Foo Sun Chuen;
- K4 West Kowloon Corridor - between Willow Street & Tong Mi Road (near Nam Cheong Estate);
- K53 Kwun Tong Bypass - near Laguna City;
- K56 Tseung Kwan O Road - near Tsui Ping South Estate;
- NT25 Sha Tin Road - near City One Shatin;
- NT62 Tsuen Wan Road - near Clague Garden Estate;
- NT69 Kwai Chung Road - near Kwai Fong Estate; and
- NT71 Tsing Tsuen Road - near Riviera Gardens and Cheung On Estate.

Graphical presentation of the findings of this Study in the form of photographs and sketches are shown in *Figure 6.1jj* & *6.1k* to *6.1u* to provide an illustration of

7.1 PRIORITISED LIST OF FLYOVERS

The noise benefits of each types of direct technical remedies have been assessed for the shortlisted flyovers in *Section 6*. However, in some cases the HKPSG standards are not expected to be satisfied. The number of dwellings benefited has been calculated to give a clear indication of the most effective candidates. Site survey has been carried out for each of the shortlisted flyovers to estimate the number of dwellings benefited from each type of direct technical remedies.

The noise reduction effectiveness of each direct technical remedy has been estimated based on the noise reduction at receivers. The cost of the direct technical remedies has been based on data from previous EIA studies, *Reclamation and Servicing of Tuen Mun Area 38 for Special Industries - Improvement to Roads and Junctions within Tuen Mun Environmental Impact Assessment*, carried out by ERM. The unit costs are presented in *Table 7.1a*, the evaluation of cost are shown in *Annex E*. However, a detailed cost estimate on the noise mitigation measures covering both capital costs and recurrent maintenance and cleansing costs is recommended in the Stage 2 Study.

Table 7.1a Unit Costs for Direct Technical Remedies

Type	Description	Cost/linear meter (HK\$/meter)
3m High Noise Barriers	"Plexiglass" screen R C Plinth Steelwork	173,479.00
5m High Cantilever Noise Barriers	"Plexiglass" screen R C Plinth Steelwork	187,075.00
Semi-enclosure	"Plexiglass" sheet Steel Reinforcement	224,188.00
Full-enclosure	"Plexiglass" sheet Steel Reinforcement	224,820.00

Note : 15 percent for Preliminary & General Items have been included in the cost estimation.

To prioritise the shortlisted flyovers candidates, a cost-effectiveness factor C has been used, where C is define as:

$$C = \frac{\text{Number of dwellings protected} \times \text{dB(A) Noise reduction}}{\text{Cost of implementation}}$$

Assuming the cost of implementation remains constant for the same category of direct technical remedies, a higher value of C would represent a more effective solution in terms of noise protection provided for more dwellings and larger degree of noise reduction. Using the C values, the types of direct technical remedies recommended for each flyover and the prioritized list of implementation have been selected. *Table 7.1b* presents the prioritized list. Details of the calculations are shown in *Annex F*.

Table 7.1b *Prioritization of Direct Technical Remedies*

Priority	Flyover	Direct Technical Remedies Recommended	Cost Effective Factor (C) x 10 ⁴	Cost Implementation (HK\$) in million
1	NT71 Tsing Tuen Road - near Riviera Gardens & Cheung On Estate	semi-enclosure	114.4	224
2	K2 Kwai Chung Road - near Mei Foo Sun Chuen	5 m cantilevered barrier	76.5	122
3	K4 West Kowloon Corridor - between Willow Street & Tong Mi Road	3 m barrier	70.4	130
4	NT62 Tsuen Wan Road - near Clague Garden Estate	semi-enclosure	69.9	95
5	K53 Kwun Tong Bypass - near Laguna City	5 m cantilevered barrier	69.3	131
6	NT25 Sha Tin Road - near City One Garden	enclosure	62.8	112
7	H26 IEC - Oil Street to Tin Chiu Street	semi-enclosure	61.5	336
8	H34 IEC - near Heng Fa Chuen	semi-enclosure	58.0	90
9	K56 Tseung Kwan O Road - near Tsui Ping South Estate	semi-enclosure	54.5	81
10	NT69 Kwai Chung Road - near Kwai Fong Estate	semi-enclosure	36.7	224
11	H41 Ap Lei Chau Bridge	3 m barrier	8.0	30

7.2

REQUIREMENTS FOR FURTHER STUDIES

A progressively extensive set of direct technical remedies for the affected NSRs have been investigated for eleven short-listed candidate flyovers. On the basis of the above cost-effectiveness analysis, semi-enclosure are recommended for H26, H34, K56, NT25, NT62, NT69 and NT71, 5 m high cantilever barrier for K2 and K53, and 3 m high barrier for H41 and K4.

Apart from considering the concerns of various Government Departments, it is recommended that further considerations (other than discussed in *Section 4.2*)

should be given to detailed cost estimation for noise mitigation measures, further investigation of the application of central barriers, air quality and ventilation, public and traffic disruption, loss of sunlight, visual impact, maintenance and structural impacts during the detailed engineering design of direct technical remedies in the Stage 2 Study. The following constraints need to be further considered in providing direct technical remedies on the structures of existing flyovers :

(i) Air quality

The air quality for lower floor residents of buildings adjacent to a flyover with a noise barrier or enclosure need to be examined.

(ii) Loss of road space

The independent support for direct technical remedies structures will occupy road space at ground level thereby reducing traffic lanes and affecting road capacities.

(iii) Traffic disruption

For road safety, the construction and subsequent recurrent maintenance and cleansing of noise barriers and enclosure would necessitate lane closures and affect traffic flow. The recurrent maintenance and cleansing of the soffit of an enclosure would necessitate the closure of the carriageway.

(iv) Loss of sunlight

Loss of sunlight to lower floor residents of buildings adjoining the direct technical remedies.

(v) Visual impact

The overall appearance of the flyover. Advice may have to be sought from the Advisory Committee on the Appearance of Bridges and Associates Structures (ACABAS).

(vi) Maintenance

Availability of replacement parts for proprietary noise mitigating products.

(vii) Structural impact

Structure loading on the direct technical remedies structures.

Flyovers Checklist (Kowloon)

K32	Po Kong Village Road		Lung Poon Court	Not effective (due to traffic on at grade Lung Cheung Rd)	No
K33	Prince Edward Road East	near San Po Kong (to Choi Hung Rd.)	Nil	No NSR found	No
K34	Prince Edward Road East	Choi Hung Estate	Choi Hung Estate	Not effective (due to traffic on at grade Prince Edward Road)	No
K35	Prince Edward Road East	King Hong St. to Concorde Rd.	Nil	No NSR around	No
K36	Tate's Cairn Tunnel Network	Sheung Yuen Leng	Choi Hung Estate	EIA conducted	No
K37	Tate's Cairn Tunnel Network	near Pik Hoi House Choi Hung Est	Choi Hung Estate	Noise Mitigation has been incorporated	No
K38	Tate's Cairn Tunnel Network	near Richland Gardens	Choi Hung Estate	Noise Mitigation has been incorporated	No
K39	Wai Yip St	Access road to Telford Garden	Telford Gardens	Private Access Road	No
K40	Ngau Tau Kok Rd	Kai Cheung Rd to Ngau Tau Kok Rd	Telford Gardens	Over MTRC railway	No
K41	Ngau Tau Kok Rd	near Ngau Tau Kok Upper Estate	Ngau Tau Kok Estate	Not effective due to traffic on Ngau Tau Kok and Kwun Tong Rd	No
K42a	Shun Lee Tsuen Road	near Shun Lee Estate	Shun Lee Estate	Not effective (due to traffic on at grade New Clear Water Bay Rd)	No
K42b	Shun Lee Tsuen Road	near Shun Tin Estate	Shun Tin Estate	* Embankment Road	No
K43	Lee On Road		Shun Lee Estate	Not effective (due to traffic on at grade New Clear Water Bay Rd)	No
K44	New Clear Water Bay	Between Choi Wan Est & Shun Lee Est	Shun Lee Estate	No NSR around	No
K45	Ferry Street	over Tong Mei Road	building on both side	Fire fighting at the nearby building from both at grade road and flyover is required + A minimum clearance between the outer edge of the building to the flyover is less than 4.5 m	No
K46	Kai Fuk Road	Kai Fuk Rd to Kwun Tong Rd	Nil	No NSR found	No

Flyovers Checklist (Kowloon)

K47	Siu Yip St.	from Telford Garden to Tai Yip St.	Telford Garden	Insufficient space	No
K48	Kwun Tong Road	Kai Tai Court	Kai Yiu THA, Kai Yip Est., Kai Tai Court & Kai Wo THA	Not effective (due to traffic on at grade Kwun Tong Rd)	No
K49	Kai Cheung Road	near International Trademart	Nil (section near Telford is regard as Ngau Tau Kok Rd)	No NSR around	No
K50	Kwun Tong Bypass	near Richland Gardens	Richland Gardens	Enclosure incorporated & EIA conducted	No
K51	Kwun Tong Bypass	above Kai Fuk Road	Nil	No NSR around & EIA conducted	No
K52	Kwun Tong Bypass	along Hoi Bun Road	Nil	No NSR around & EIA conducted	No
K53	Kwun Tong Bypass	near Laguna City	Laguna City	N/A	Yes
K54	Kwun Tong Bypass	parallel to Wang Kwong Rd	Kai Lok THA	Low-rise nature of the NSR in a shadow zone of the flyover	No
K55	Kwun Tong Bypass	connect to Lam Tin Station	Kwun Tong Estate	EIA conducted	No
K56	Tseung Kwan O Road	Tsui Ping South Estate	Tsui Ping South Estate	N/A	Yes
K57	Lin Tak Road		Lam Tin Est	Not effective due to the topography of the flyover	No
K58	Sceneway Road	Sceneway Garden	Sceneway Garden	Private Access Road	No
K59	Lion Rock Tunnel Road	link to Waterloo Rd	Nil	No NSR found	No

Flyovers Checklist (NT)

	Flyover Name	Flyover Description	Residential Potentially Affected	Reason for excluding	Detailed Assessment Requirement
NT1	Po Shek Wu Rd.	over the KCR railway and join to Choi Yuen Rd.	Nil	No NSR around	No
NT2	Fanling Highway	near Tai Tau Leng and Choi Po Court	Tai Tau Leng	Barrier Installed	No
NT3	Pak Wo Rd	over Fanling Highway and next to Tai Ping Est	Tai Ping Estate	Not effective (due to traffic on Fanling Highway)	No
NT4	So Kwun Po Rd Network	link to Fanling Highway	Venniza Garden	Not effective (due to traffic on Fanling Highway)	No
NT5	Jockey Club Rd	adjacent to Wo Hop Shek	Tin Sam THA	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT6	Tai Po Tai Wo Rd	near Kam Shek San Tsuen	Kam Shek San Tsuen	Embankment road	No
NT7	Po Heung St	over Lam Tsuen River and join Tai Po Tai Wo Rd	Tai Po Centre and private residential	Not effective (due to traffic on Tai Po Tai Wo Road)	No
NT8	Tolo Highway	near Classical Gardens and Ma Wo	Classical Gardens	EIA conducted	No
NT9	Tai Po Rd Yuen Chau Tsai	near Wang Fuk Court and link too Tai Po Rd Tai Po Kau	Wang Fuk Court	Not effective (due to traffic on Tolo Highway)	No
NT10	Tai Po Rd. Yuen Chau Tsai	link to Tolo Highway	Wang Fuk Court	Not effective (due to traffic on Tolo Highway)	No
NT11	Yuen Shan Rd.	join Tolo Highway	Wang Fuk Court	* Embankment	No
NT12	University Station	over Tolo Highway and near Sha Tin Hoi	Nil	No NSR around	No
NT13	UR T6	link to Tolo Highway and next to Sha Tin STWs and Marine Police North Division Base	Nil	No NSR around	No
NT14	Tsun King Rd	over Tai Po Rd and near Royal Ascot	Royal Ascot	Private Access Road	No
NT15	Ma On Shan Rd Network		Chevalier Garden	Noise level below 70dB(A) at nearest NSR	No
NT16	Sai Sha Road	link to Hang Tak St	Shing On T.H.A.	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT17	Hang Tak St	over branch of Shing Mun River and near Chevalier Garden	Chevalier Garden	Not effective due to traffic on at grade Ma On Shan Road Network	No

Flyovers Checklist (NT)

NT18	Tai Po Road - Sha Tin	near Hilton Centre	Lai Chi Yuen	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT19	Sha Tin Rural Committee Rd	over Tai Po Rd Sha Tin and near Lek Yuen Estate	Lek Yuen Estate	Over KCRC railway	No
NT20	Sand Martin Bridge	over Shing Mun River and join Tai Chung Kiu Rd	Nil	No NSR around	No
NT21	Fo Tan Rd	over Fo Tan Nullah and Tai Po Rd Sha Tin and T-I College	Wo Che Estate	EIA will be conducted	No
NT22	Lok King St	over Fo Tan Nullah	Nil	No NSR around	No
NT23	Sha Tin Road	Near KCRC House and link to Sha Tin Rd	Jockey Club Quarters	Not effective (due to traffic on Tai Po Road - Sha Tin Section)	No
NT24	Sha Tin Road	near Sah Tin Wai	Sha Tin Wai	* Embankment road	No
NT25	Sha Tin Road	near City One Shatin	City One Shatin	N/A	Yes
NT26	Banyan Bridge	over Shing Mun River and next to Sha Tin Rd	Nil	No NSR around	No
NT27	Tai Chung Kiu Rd	near Ravana Garden	Ravana Garden	Not effective (due to traffic on at grade Tai Chung Kiu Rd)	No
NT28	Sha Tin Wai Rd	near Chap Wai Kon New Village	Chap Wai Kon New Villa	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT29	Shek Mun Roundabout	near Pictorial Garden	Pictorial Garden	Not effective due to traffic on Tate's Carin Highway	No
NT30	Sha Tin Wai Rd	from Sha Tin Wai New village to Chap Wai Kon	Sha Tin Wai New Village	EIA conducted	No
NT31	Tate's Cairn Highway	connect to Sha Tin Wai Rd from Tai Shek Kwu	Siu Lek Yuen	EIA conducted	No
NT32a	Shing Mun Tunnel Rd	connect to Tai Po Rd Tai Wai	Mei Lam Estate	EIA conducted	No
NT32b	Shing Mun Tunnel Rd	connect to Tai Po Rd Shatin	Mei Lam Est	EIA conducted	No
NT33	Tai Po Rd Tai Wai	Shung Ho Rd to Mei Tin Rd	Mei Lam Est	EIA conducted	No
NT34	Lion Rock Tunnel Rd	over Shing Mun River	Sha Tin Tau THA	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT35	Lion Rock Tunnel Rd	near Hung Mui Kuk and Worldwide Garden	Worldwide Garden	Not effective (due to traffic on at grade Lion Rock Tunnel Road)	No
NT36	Sha Tin Road	from Tse Uk Village to Fung Shing Court	Pok Hong Est	Barrier installed	No

Flyovers Checklist (NT)

NT37	Hung Mui Kuk Road	near King Tin Court	olden Lion Garden	A minimum clearance bet the outer edge of the building to the flyover is less than 4.5m	No
NT38	Tseung Kwan O Road	near Hong Sing Garden	Hong Sing Garden	Embankment road	No
NT39	Tai Po Rd Tai Wo	near Hong Lok Yuen	Wai Tau Tsuen	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT40	Hong Lok Yuen Rd	in Hong Lok Yuen	Hong Lok Yuen	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT41	San Tin Road	near Fairview Park and Man Yuen Chuen	Chuk Yuen Tsuen	Not effective due to low-rise nature of the NSR in a shadow	No
NT42	Long Tin Rd	beside Yuen Long Park	Long Bin T.H.A.	Not effective due to low-rise nature of the NSR in a shadow zone of the flyover	No
NT43	Long Yip St & Yuen Long On St	near Sun Yuen Long Plaze	Sun Yuen Long Plaza	Fire fighting at the nearby building from both at-grade road and flyover is required	No
NT44	Hung Tin Rd	over Castle Peak Rd - Hung Shui Kiu	Nil	No NSR around	No
NT45	Yuen Long Highway	near To Yuen Wai and over Castle Peak Rd	To Yuen Wai	Barrier Installed	No
NT46	Tsing Tin Road	near Kin Sang Estate	Kin Sang Estate	Embankment road	No
NT47	Castle Peak Road - San Hui	near Ling Nam		Not effective (due to traffic on at grade San Hui Rd)	No
NT48	Pui To Rd	over Nullah and near San Fa Est	San Fat Est	Not effective (due to traffic on at grade Pui To Rd)	No
NT49	Pui To Rd	over Tuen Mun Rd	Kam Wah Garden	Not effective (due to traffic on at grade Tuen Fat and Tuen Hi Rd)	No
NT50	Tuen Mun Rd	near Siu Hong Court	Nil	No NSR around	No
NT51	Lung Mun Rd	connect to Wong Chu Rd	Nil	No NSR around	No
NT52	Wong Chu Rd	over Nullah	Yau Oi Estate	EIA conducted	No
NT53	Wong Chu Road	beside Yau Oi Estate and over Tuen Mun Heung Sze Wui Rd	Yau Oi Estate	EIA conducted	No
NT54	Hoi Wong Rd	over Nullah	Nil	No NSR around	No

Flyovers Checklist (NT)

NT55	Hoi Wong Rd.	over Wong Chu Rd	Yau Oi Estate	EIA conducted	No
NT56	Tuen Hing Rd	over Tuen Mun Road	Sun Shing	Not effective (due to traffic on Tuen Mun Road)	No
NT57	Tsing Hoi CIR	Wong Chu Rd to Chi Lok Garden	Chi Lok Garden	EIA conducted	No
NT58	Tsing Hoi CIR	Wong Chu Rd to Mount Parker Lodge	Mount Parker Lodge	EIA conducted	No
NT59	Tuen Mun Road	Castle Peak Rd. Castle Peak Bay to Siu Lam	Elegant Villa	Embankment road	No
NT60	Tuen Mun Road	Sham Tseng Section	Rhine Garden	Embankment road	No
NT61	Tuen Mun Rd	to Castle Peak Rd and near Chai Wan Kok	Nil	No NSR around	No
NT62	Tsuen Wan Road	Tuen Mun Rd to Tsing Tsuen Rd	Clague Garden Estate	N/A	Yes
NT63	Tsuen Wan Rd	near Kwai Chung Park	Lai King Estate	No NSR around	No
NT64	Tai Ho Rd	over Castle Peak Rd Tsuen Wan	nearby building	A minimum clearance bet the outer edge of the building to the flyover is less than 4.5 m	No
NT65	Texaco Road North	Shek Wai Kok Est to Tsuen Wan	nearby village	Embankment road	No
NT66	Texaco Rd	near Tai Wo Hau Estate	Nil	No NSR found	No
NT67	Wing Kei Rd	over Tsuen Wan Rd	Nil	No NSR found	No
NT68	Kwai Chung Rd	to Cheong Wing Rd	Kwai Hing Estate	No NSR found	No
NT69	Kwai Chung Rd	near Kwai Fong Estate	Kwai Fong Estate	N/A	Yes
NT70	Castle Peak Rd	near Kwai Hing Est	Nil	No NSR around	No
NT71	Tsing Tsuen Road	To Tsing Yi Bridge	Riviera Garden & Cheun	N/A	Yes
NT72	Tsing Yi Bridge	near Cheung Ching Estate	Cheung Ching Estate	No NSR around	No
NT73	Lai King Hill Rd Network	over Kwai Chung Rd	Lai King Terrace	No NSR around	No
NT74	Lai King Hill Rd Network	over Kwai Chung Rd and next to Kwai Fong Garden	Kwai Fong Garden	Not effective (due to traffic on Kwai Chung Rd)	No
NT75	Ching Cheung Road	near Ching Lai Court	Ching Lai Court	Embankment road	No
NT76	Wah Tai Rd.	near Lai Yiu Estate	Lai Yiu Estate	Not effective (due to traffic on Castle Peak Rd)	No

Notes:

- * Elevated roads not constructed on bridge piers are regarded as roads on embankments rather flyovers. To allow better utilisation of resource, these are excluded for further consideration in this study as considerations on direct technical remedies have previously been given for these roads in the *Scoping Study for Providing Retroactive Road Traffic Noise Mitigation Measures on Existing Road*.

Road Noise Calculation
Kowloon

Flyover ID	K2		K4		K6		K7a		K7b		K8
Receiver	Mei Foo Sun Chuen		Nam Cheong Estate		Chak On Estate		Beacon Heights		Choi Hung Estate		Beacon Heights
Noise Source	Flyover	Flyover	Flyover	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	Flyover
	Kwai Chung Road	Cheung Sha Wan Road	West Kowloon Corridor	Lung Cheung Road	Lung Cheung Road	Lung Cheung Road	Lung Cheung Road	Lung Cheung Road	Lung Cheung Road	Lung Cheung Road	Lung Ping Road
INPUTS											
Hourly Flow	8641	3392	5275	4167	4167	5428	4888	5428	4888	2690	
Av Speed (km/hr)	70	70	70	50	50	50	50	50	50	50	50
%HV	37.6	37.6	18.9	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2
Gradient %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Receiver-Carriageway Distance (m)	15.00	15.00	50.00	70.00	45.00	185.00	15.00	20.00	10.00	10.00	
Height of Carriageway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Angle of View (deg.)	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	
surface type (imprevious/pervious)	i	i	i	i	i	i	i	i	i	i	
Barrier (Y/N)	N	N	N	N	N	N	N	N	N	N	N
Height of Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier-carriageway Distance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Receiver Height (m)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS											
Basic Hourly Noise Level dB(A) (Includes speed and %HV correction, also gradient and road surface correction of 1 for imp/bit and speed <75km/hr)	85.70	81.64	81.60	79.68	79.68	80.82	80.37	80.82	80.37	80.37	77.78
<i>Distance Correction:</i>											
Slant Distance (m)	18.51	18.51	53.50	73.50	48.50	188.50	18.51	23.51	13.51	13.51	
Distance Correction dB(A)	-1.37	-1.37	-5.98	-7.36	-5.55	-11.45	-1.37	-2.41	0.00	0.00	
<i>Surface correction</i>											
Surface correction	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
<i>Calculation of Path Difference:</i>											
Possible Path Difference	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Path Difference Only if Barrier Exists	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Working out whether receiver is in the illuminated or shadow zone:</i>											
Source Receiver gradient	-0.03	-0.03	-0.01	-0.01	-0.01	0.00	-0.03	-0.02	-0.04	-0.04	
Height of Line at Barrier Position	0.41	0.41	0.47	0.48	0.46	0.49	0.41	0.43	0.37	0.37	
Illuminated / Shadow?	I	I	I	I	I	I	I	I	I	I	
<i>Calculation of barrier attenuation:</i>											
Barrier Atten Illuminated	-2.39	-2.39	-2.23	-2.21	-2.24	-2.18	-2.39	-2.33	-2.48	-2.48	
Barrier Atten Shadow	-7.51	-7.51	-7.68	-7.71	-7.67	-7.74	-7.51	-7.57	-7.41	-7.41	
Possible Barrier Attenuation	-2.39	-2.39	-2.23	-2.21	-2.24	-2.18	-2.39	-2.33	-2.48	-2.48	
Actual Barrier Attenuation based on whether there is a barrier or not	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Angle of View and Facade Corrections:</i>											
View Ange Correction dB(A)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Facade correction	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Hourly L10, dB(A)	86.83	82.77	78.12	74.82	76.62	71.88	81.50	80.92	82.87	80.27	
Detail Assessment required?	yes		yes	no		no		no		no	

Road Noise Calculation
Kowloon

K9		K10		K14		K16		K18		K26		
	Private Residential		Private Residential		Private Residential		Chun Seen Mei Chuen			Wylie Court		Bamboo Mansion
At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	At grade	Flyover	At grade	Flyover
Lung Cheung Road	Waterloo Road	Waterloo Road	Waterloo Road	Waterloo Road	Boundary Street	Boundary Street	Argyle Street	Argyle Street	Prince Edward Road West	Chatham Road South	Hong Chong Road	Dyer Avenue
4888	2266	2229	6847	6722	1840	2677	2081	2081	2956	2118	9314	126
50	50	50	50	50	50	50	50	50	50	50	50	50
22.2	22.2	22.2	22.2	22.2	22.2	22.2	14.8	14.8	22.2	22.2	22.2	22.2
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	30.00	15.00	20.00	10.00	15.00	5.00	20.00	10.00	50.00	20.00	70.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
i	i	i	i	i	i	i	i	i	i	i	i	i
N	N	N	N	N	N	N	N	N	N	N	N	N
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80.37	77.03	76.96	81.83	81.75	76.13	77.76	75.53	75.53	78.19	76.74	83.17	64.48
13.51	33.50	18.51	23.51	13.51	18.51	8.51	23.51	13.51	53.50	23.51	73.50	13.51
0.00	-3.95	-1.37	-2.41	0.00	-1.37	2.00	-2.41	0.00	-5.98	-2.41	-7.36	0.00
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.04	-0.01	-0.03	-0.02	-0.04	-0.03	-0.06	-0.02	-0.04	-0.01	-0.02	-0.01	-0.04
0.37	0.45	0.41	0.43	0.37	0.41	0.29	0.43	0.37	0.47	0.43	0.48	0.37
i	i	i	i	i	i	i	i	i	i	i	i	i
-2.48	-2.28	-2.39	-2.33	-2.48	-2.39	-2.73	-2.33	-2.48	-2.23	-2.33	-2.21	-2.48
-7.41	-7.63	-7.51	-7.57	-7.41	-7.51	-7.15	-7.57	-7.41	-7.68	-7.57	-7.71	-7.41
-2.48	-2.28	-2.39	-2.33	-2.48	-2.39	-2.73	-2.33	-2.48	-2.23	-2.33	-2.21	-2.48
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
82.87	75.58	78.09	81.93	84.25	77.26	82.26	75.62	78.02	74.71	76.83	78.31	66.98
	no		no		no		no			no		no

Road Noise Calculation
Kowloon

		K30		K31		K32		K34		K41		
		Tin Ma Court		Wang Tau Hom Estate			Lung Poon Court		Choi Hung Estate		Upper Ngau Tau Kok Est	
At grade	At grade	Flyover	At grade	Flyover	At grade	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade
Dyer Avenue	Hung Hom Road	Chuk Yuen Road	Lung Cheung Road	Fung Mo Street	Fung Mo Street	Lung Cheung Road	Po Kong Village Road	Lung Cheung Road	Prince Edward Road East	Prince Edward Road East	Ngau Tau Kok Road	Kwun Tong Road
126	1368	1033	4462	2010	2010	4356	899	4647	7721	7721	268	5864
50	50	50	50	50	50	50	50	50	50	50	50	50
22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	35.2	35.2
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	35.00	75.00	25.00	40.00	30.00	140.00	100.00	85.00	35.00	20.00	10.00	45.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
i	i	i	i	i	i	i	i	i	i	i	i	i
N	N	N	N	N	N	N	N	N	N	N	N	N
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
64.48	74.84	73.62	79.97	76.51	76.51	79.87	73.02	80.15	82.36	82.36	69.23	82.63
13.51	38.50	78.50	28.50	43.50	33.50	143.50	103.50	88.50	38.50	23.51	13.51	48.50
0.00	-4.55	-7.65	-3.25	-5.08	-3.95	-10.27	-8.85	-8.17	-4.55	-2.41	0.00	-5.55
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.04	-0.01	-0.01	-0.02	-0.01	-0.01	0.00	0.00	-0.01	-0.01	-0.02	-0.04	-0.01
0.37	0.45	0.48	0.44	0.46	0.45	0.49	0.48	0.48	0.45	0.43	0.37	0.46
I	I	I	I	I	I	I	I	I	I	I	I	I
-2.48	-2.26	-2.21	-2.30	-2.25	-2.28	-2.19	-2.20	-2.20	-2.26	-2.33	-2.48	-2.24
-7.41	-7.65	-7.71	-7.61	-7.66	-7.63	-7.74	-7.72	-7.72	-7.65	-7.57	-7.41	-7.67
-2.48	-2.26	-2.21	-2.30	-2.25	-2.28	-2.19	-2.20	-2.20	-2.26	-2.33	-2.48	-2.24
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
66.98	72.79	68.47	79.23	73.93	75.06	72.10	66.67	74.48	80.30	82.45	71.73	79.58
		no		no			no		no		no	

Road Noise Calculation
Kowloon

K42a	K43		K48		K53		K55		K56
Shun Lee Tsuen	At grade	Lee On Road	At grade	Kai Tak Court	At grade	Laguna City	Kwun Tong Estate	At grade	Tsui Ping South Estate
Flyover	New Clear Water Bay Road	Lee On Road	New Clear Water Bay Road	Kwun Tong Road	Kwun Tong Road	Kwun Tong Bypass	Kwun Tong Bypass	Kwun Tong Road	Tseung Kwan O Road
1863	1687	1095	1872	5864	9608	5765	5678	10443	5678
50	50	50	50	50	50	70	50	50	50
22.2	22.2	22.2	22.2	22.2	22.2	34.1	22.2	22.2	34.1
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90.00	40.00	85.00	20.00	70.00	50.00	70.00	20.00	10.00	35.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
i	i	i	i	i	i	i	i	i	i
N	N	N	N	N	N	N	N	N	N
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76.18	75.75	73.87	76.20	81.16	83.30	83.64	81.02	83.67	82.39
93.50	43.50	88.50	23.51	73.50	53.50	73.50	23.51	13.51	38.50
-8.40	-5.08	-8.17	-2.41	-7.36	-5.98	-7.36	-2.41	0.00	-4.55
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.01	-0.01	-0.01	-0.02	-0.01	-0.01	-0.01	-0.02	-0.04	-0.01
0.48	0.46	0.48	0.43	0.48	0.47	0.48	0.43	0.37	0.45
1	1	1	1	1	1	1	1	1	1
-2.20	-2.25	-2.20	-2.33	-2.21	-2.23	-2.21	-2.33	-2.48	-2.26
-7.72	-7.66	-7.72	-7.57	-7.71	-7.68	-7.71	-7.57	-7.41	-7.65
-2.20	-2.25	-2.20	-2.33	-2.21	-2.23	-2.21	-2.33	-2.48	-2.26
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
70.28	73.17	68.21	76.29	76.30	79.82	78.78	81.11	86.16	80.33
no		no		no		yes	no		yes

Road Noise Calculation
NT

Flyover ID	NT3		NT4		NT7		NT9		NT10		NT15
Receiver	Tai Ping Estate		Venniza Garden		Private Residential		Wang Fuk Court		Wang Fuk Court		Chevalier Gar
Noise Source	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover
	Pak Wo Road	Fanling Highway	So Kwun Po Rd Network	Fanling Highway	Po Heung Street	Po Heung Street	Tai Po Road Yuen Chau Tsai	Tolo Highway	Tai Po Road Yuen Chau Tsai	Tolo Highway	Ma On Shan P
INPUTS											
Hourly Flow	157	5290	2913	5290	2032	2032	937	5709	932	5709	1848
Av Speed (km/hr)	50	50	50	50	50	50	50	50	50	50	50
%HV	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	30.7
Gradient %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Receiver-Carriageway Distance (m)	60.00	50.00	105.00	90.00	65.00	50.00	50.00	140.00	95.00	150.00	200.00
Height of Carriageway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Angle of View (deg.)	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
surface type (impervious/pervious)	i	i	i	i	i	i	i	i	i	i	i
Barrier (Y/N)	N	N	N	N	N	N	N	N	N	N	N
Height of Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier-carriageway Distance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Receiver Height (m)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS											
Basic Hourly Noise Level dB(A) (Includes speed and %HV correction, also gradient and road surface correction of 1 for imp/bit and speed <75km/hr)	65.44	80.71	78.12	80.71	76.56	76.56	73.20	81.04	73.17	81.04	77.16
Distance Correction:											
Slant Distance (m)	63.50	53.50	108.50	93.50	68.50	53.50	53.50	143.50	98.50	153.50	203.50
Distance Correction dB(A)	-6.72	-5.98	-9.05	-8.40	-7.05	-5.98	-5.98	-10.27	-8.63	-10.56	-11.78
Surface correction											
Surface correction	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Calculation of Path Difference:											
Possible Path Difference	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Path Difference Only if Barrier Exists	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Working out whether receiver is in the illuminated or shadow zone:											
Source Receiver gradient	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	0.00	0.00
Height of Line at Barrier Position	0.47	0.47	0.48	0.48	0.47	0.47	0.47	0.49	0.48	0.49	0.49
Illuminated / Shadow?	I	I	I	I	I	I	I	I	I	I	I
Calculation of barrier attenuation:											
Barrier Atten Illuminated	-2.22	-2.23	-2.19	-2.20	-2.22	-2.23	-2.23	-2.19	-2.20	-2.18	-2.18
Barrier Atten Shadow	-7.70	-7.68	-7.73	-7.72	-7.70	-7.68	-7.68	-7.74	-7.72	-7.74	-7.75
Possible Barrier Attenuation	-2.22	-2.23	-2.19	-2.20	-2.22	-2.23	-2.23	-2.19	-2.20	-2.18	-2.18
Actual Barrier Attenuation based on whether there is a barrier or not	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Angle of View and Facade Corrections:											
View Angle Correction dB(A)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Facade correction	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Hourly L10, dB(A)	61.21	77.23	71.57	74.81	72.00	73.08	69.72	73.28	67.04	72.99	67.88
Detail Assessment required?	no		no		no		no		no		no

Road Noise Calculation
NT

NT17		NT23		NT25		NT27		NT29		NT35
Tai Shui Hang		KCRC Staff Quarter		City One		Ravana Garden		Pictorial Garden		Worldwide Garden
Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover
Hang Tak Street	Ma On Shan Network	Sha Tin Road	Tai Po Road Sha Tin	Sha Tin Road	Sha Tin Road	Tai Chung Kiu Road	Tai Chung Kiu Road	Shek Mun Interchange Slip Road	Tate's Cairn Highway	Lion Rock Tunnel Road
1848	2146	1247	6905	3287	2588	3153	3153	564	3796	5894
50	50	50	50	50	50	50	50	50	50	50
30.7	30.7	30.7	30.7	30.7	30.7	41.6	41.6	33	30.7	22.2
1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
85.00	100.00	80.00	60.00	35.00	70.00	30.00	15.00	75.00	80.00	110.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
i	i	i	i	i	i	i	i	i	i	i
N	N	N	N	N	N	N	N	N	N	N
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77.46	77.81	75.75	82.89	79.96	78.63	80.51	80.51	72.25	80.29	81.18
88.50	103.50	83.50	63.50	38.50	73.50	33.50	18.51	78.50	83.50	113.50
-8.17	-8.85	-7.91	-6.72	-4.55	-7.36	-3.95	-1.37	-7.65	-7.91	-9.25
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.03	-0.01	-0.01	0.00
0.48	0.48	0.48	0.47	0.45	0.48	0.45	0.41	0.48	0.48	0.48
I	I	I	I	I	I	I	I	I	I	I
-2.20	-2.20	-2.21	-2.22	-2.26	-2.21	-2.28	-2.39	-2.21	-2.21	-2.19
-7.72	-7.72	-7.71	-7.70	-7.65	-7.71	-7.63	-7.51	-7.71	-7.71	-7.73
-2.20	-2.20	-2.21	-2.22	-2.26	-2.21	-2.28	-2.39	-2.21	-2.21	-2.19
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
71.80	71.47	70.34	78.66	77.91	73.77	79.07	81.64	67.10	74.88	74.44
no		no		yes		no		no		no

Road Noise Calculation
NT

	NT47		NT48		NT49		NT56		NT62		NT69		NT71
	Ling Nam		San Fat Estate		Kam Wah Garden		Sun Shing		Clague Garden Estate		Kwai Fong Estate		Riviera Garden
At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	At grade	Flyover	grade	Flyover
Lion Rock Tunnel Road	Castle Peak Road - San Hui	San Hui Road	Pui To Road	Pui To Road	Pui To Road	Tuen Fat Road	Tuen Hing Road	Tuen Mun Road	Tsuen Wan Road		Kwai Chung Road	Kwai Chung Road	Tsing Tsuen Road
5894	598	598	1721	1721	1397	4274	1180	4274	7552		1036	518	3487
50	50	50	50	50	50	50	50	50	70		50	50	50
22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	13.2		32.3	32.3	51.2
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
20.00	30.00	20.00	30.00	20.00	50.00	30.00	40.00	50.00	15.00		25.00	15.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00		180.00	180.00	180.00
i	i	i	i	i	i	i	i	i	i		i	i	i
N	N	N	N	N	N	N	N	N	N		N	N	N
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
81.18	71.25	71.25	75.84	75.84	74.93	79.79	74.20	79.79	82.33		74.82	71.81	81.69
23.51	33.50	23.51	33.50	23.51	53.50	33.50	43.50	53.50	18.51		28.50	18.51	28.50
-2.41	-3.95	-2.41	-3.95	-2.41	-5.98	-3.95	-5.08	-5.98	-1.37		-3.25	-1.37	-3.25
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1		-1	-1	-1
0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		0.03	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
-0.02	-0.01	-0.02	-0.01	-0.02	-0.01	-0.01	-0.01	-0.01	-0.03		-0.02	-0.03	-0.02
0.43	0.45	0.43	0.45	0.43	0.47	0.45	0.46	0.47	0.41		0.44	0.41	0.44
I	I	I	I	I	I	I	I	I	I		I	I	I
-2.33	-2.28	-2.33	-2.28	-2.33	-2.23	-2.28	-2.25	-2.23	-2.39		-2.30	-2.39	-2.30
-7.57	-7.63	-7.57	-7.63	-7.57	-7.68	-7.63	-7.66	-7.68	-7.51		-7.61	-7.51	-7.61
-2.33	-2.28	-2.33	-2.28	-2.33	-2.23	-2.28	-2.25	-2.23	-2.39		-2.30	-2.39	-2.30
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50		2.50	2.50	2.50
81.27	69.80	71.34	74.39	75.93	71.45	78.34	71.62	76.31	83.46		74.07	72.94	80.95
	no		no		no		no		yes		yes		yes

Road Noise Calculation
NT

		NT73		NT76	
		Lai King Terrace	Lai King Flyover	Lai Yiu Estate	Castle Peak Road
At grade	Flyover	At grade	Flyover	At grade	At grade
Cheung On Estate					
9624	3487	883	1007	2445	578
50	50	50	50	50	50
13.2	51.2	30.3	22.2	22.2	22.2
0.00	0.00	0.00	0.00	0.00	0.00
375.00	20.00	5.00	45.00	20.00	90.00
0.00	0.00	0.00	0.00	0.00	0.00
180.00	180.00	180.00	180.00	180.00	180.00
N	N	N	N	N	N
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
81.89	81.69	73.91	73.51	77.36	71.10
					77.31
378.50	23.51	8.51	48.50	23.51	93.50
-14.48	-2.41	2.00	-5.55	-2.41	-8.40
-1	-1	-1	-1	-1	-1
0.04	0.03	0.02	0.03	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.00
0.00	-0.02	-0.06	-0.01	-0.02	-0.01
0.50	0.43	0.29	0.46	0.43	0.48
I	I	I	I	I	I
-2.17	-2.33	-2.73	-2.24	-2.33	-2.20
-7.76	-7.57	-7.15	-7.67	-7.57	-7.72
-2.17	-2.33	-2.73	-2.24	-2.33	-2.20
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
2.50	2.50	2.50	2.50	2.50	2.50
69.91	81.78	78.41	70.45	77.45	65.19
yes			no		no
					72.76

*Response to Comments
Scoping Study for Providing Direct Technical Remedies on Existing Flyovers
Final Report*

No.	Department	Reference	Comments	Consultants' Response
1	Environmental Protection Department	EP 42/T6/1 A2 dated 16.7.97	<p><u>Tables 3.2a, 3.2b, 3.3a and 3.3b</u> (a) It is shown in the tables that Fung Ha Road (H36), Sha Tin Road (NT36) and Yuen Long Highway (NT45) are already provided with noise mitigation measures. Please clarify whether EIAs have been performed for these flyovers. If so, you are required to indicate that in Tables 3.2a/3.3a (column 5) and 3.2b/3.3b accordingly. Also refer to my earlier comments on the advanced copy of the Final Report.</p>	<p>We refer to the previous response to comments on DFR, we only could confirm those flyovers are already provided with noise mitigation measures as presented in EPD's publication <i>Screening Structures and Building Designs Against Transportation Noise in Hong Kong</i>.</p>
			<p><u>Section 6.2</u> (b) Photograph illustrating the recommended mitigation measures for Ap Lei Chau Bridge (H41) is outstanding. (c) Please add "and Cheung On Estate" at the end of the bullet for NT71.</p>	<p>Photograph for Ap Lei Chau Bridge (H41) is provided as <i>Figure 6.1jj</i>. Noted. Text amended in relevant page.</p>
			<p><u>Table 7.1b</u> (d) Description for cost effective factor should read "Cost Effective Factor (C) ($\times 10^6$)".</p>	<p>Noted. Text amended in relevant page.</p>
			<p><u>Table 7.2</u> (e) Recommendations on detailed cost estimate for noise mitigation measures and further investigation of the application of central barriers should be included in this section. Also refer to my earlier comments on the advanced copy of the Final Report.</p>	<p>Noted. The application of central barriers will be investigated in Stage 2 study. Text amended in relevant page.</p>
			<p><u>Annex A List of Flyovers</u> (f) Reasons for excluding Ferry Street (K45), Po Shek Wu Road (NT1) and Fanling Highway (NT2) from further investigation are different from that indicated in Tables 4.4a and 3.3a. Please clarify.</p>	<p>Noted. Table revised.</p>
			<p>(g) It is indicated that the exclusion of Tai Po Road - Sha Tin (NT18) and Sha Tin Road (NT41) from further investigation is due to "scattered villages in rural area". Please elaborate the rationale(s).</p>	<p>Noted. Table revised.</p>

No.	Department	Reference	Comments	Consultants' Response
			(h) Please provide a note to explain the meaning of "embankment road".	Noted. Footnote amended in the Table.
			<u>Annex C Calculation of Road Traffic Noise</u> (i) Noise calculations for Waterloo Road (K9), Po Heung Street (NT7), Hang Tak Street (NT17) and Sha Tin Road (NT23) are outstanding.	Noted. Table amended.
2	Transport Department, T.E. Division/HK	HR 171/31-01 dated 28.7.97	I have no adverse comment in general on the captioned report from traffic engineering point of view.	Noted.
			<p>However, I would draw your attention to the following during the Stage 2 Study mentioned in Chapter 7 of your report:</p> <p>(a) Designs of the direct technical remedies <u>should not</u> cause reduction of traffic lanes or reduction in road capacities.</p> <p>(b) Traffic impact both during construction and future maintenance of the direct technical remedies should be critically examined.</p>	Comments noted. On Comment (a), it is recommended that the Consultants for the Stage 2 Study should take these requirements into consideration during the Stage 2 Study. On Comment (b), please refer to EPD's memo ref (41) in EP42/T6/1 A1 II of 5.9.97.
3	Transport Department, Traffic Engineering (NTE) Division	NR 181/161-1 dated 25.7.97	In general, I am concerned that the provision of noise barrier and/or enclosures would render the installation of traffic signs and/or traffic aids very difficult, if not impossible, in the future. The provision of such noise mitigation measure should therefore be kept to the absolute minimum. All noise barriers should comply with our TPDM particularly on vertical and horizontal clearances.	TD's concern is noted. It is recommended that the Consultants for the Stage 2 Study should take these requirements into consideration during the Stage 2 Study.

No.	Department	Reference	Comments	Consultants' Response
4	Highways Department	HH 63/50 (DNP & QB) dated 1.8.97	<p>With reference to the 4 nos. "insurmountable constraints" described on p.20, my comments are as follows:</p> <p>i) Insufficient clearance between flyover & NSRs:-</p> <p>I am still not convinced that all flyovers with less than 4.5m clearance (which is an <u>existing</u> value) should be excluded from further investigation. By copy of this letter to D of FS please advise in this respect.</p> <p>ii) Insufficient space for barrier structure support:-</p> <p>We should be concentrating on whether there is adequate room <u>below</u> the flyovers for erection of barriers and if not, why not. In particular, the existing land usage below the flyovers should be specified. (In your Appendix A your reference to "the distance between the kerbline and the barrier on a flyover is less than 0.46m" is not understood. Perhaps you should illustrate with a sketch).</p>	<p>Flyovers with less than 4.5 m horizontal clearance have been excluded as a result of the advice given in FSD's letter ref (20) in FSD 4/130/94 of 6.1.1997.</p> <p>The reasons for excluding flyovers with insufficient space for barrier structure support have been clearly stated in the Flyovers Checklist Tables of Appendix A (e.g. K28 Hong Chong Road Flyover over the KCR line and K40 Ngau Tau Kok Road Flyover over the MTR).</p> <p>The constraint of "the distance between the kerbline and the barrier on a flyover is less than 0.46m" has been consulted in the Working Paper/Consultation Paper of the Study with reference to <i>Public Works Departmental Technical Circular No 31/73 (PWDTC No 31/73)</i>.</p>
			<p>With reference to para. 7.1, the score system for a cost-effective factor should take into account the costs of recurrent maintenance, cleansing and repair as well as the capital costs of construction. I note that you are suggesting to leave the detailed costs estimate to the Stage 2 Study. However, to allow future reference, it is recommended that the last sentence of para. 7.1 be amended to "However, a detailed cost estimate on the noise mitigation measures covering both capital costs and recurrent maintenance and cleansing costs is recommended in the Stage 2 Study."</p>	<p>Noted. Replacement page with amended text is provided.</p>
5	Fire Services Department	(9) in FSD 4/130/94 II	<p>I have no adverse comment on the captioned report.</p> <p>Since the project is still under study stage, I would reserve my final comments on relevant fire safety provisions upon receipt of detailed design at later stage.</p> <p>Due Fire Services advice/detailed fire safety requirements will be made/formulated upon receipt of detailed design.</p>	<p>Noted. It is recommended that FSD be consulted on the design of direct technical remedies during the detailed design stage.</p>

No.	Department	Reference	Comments	Consultants' Response
6	Transport Department, CTE/NTW	NR 181/161-1 dated 26 August	My comments on the issue is that provision of noise barriers will be accepted only if they will not have adverse effect to the sight-line of motorists/pedestrians. Moreover it should not cause obstruction to traffic signs.	Noted. It is recommended that the Consultants for the Stage 2 Study should take these requirements into consideration during the Stage 2 Study.
7	Transport Department, Traffic Engineering (KIn) Division	KR 146/60-1 dated 25 August	1. On the understanding that this Stage 1 Study only aims at providing a basis for the detailed investigations to be carried out in Stage 2, I have no particular comment on the captioned report and the draft executive summary from the traffic engineering point of view.	Noted.
			2. For both the flyover K2 (Kwai Chung Road - near Mei Foo Sun Chuen) and the flyover K4 (West Kowloon Corridor near Nam Cheong Estate), it appears reasonable that noise barrier, subject to the compliance of all requirements from concerned departments, should be proposed on both sides of the flyover as the existing residential buildings are close to the flyover on both sides.	Subject to FSD's advice, direct mitigation measures have been proposed on one side of the flyovers.
			3. Detailed traffic impact assessment should be included in the Stage 2 Study and this should form the critical factor in determining the feasibility of the proposed technical remedies. In general, reduction of traffic lanes or reduction in road capacities caused by proposed remedies should be examined. Details of the proposed and recommendation in the Stage 2 Study should be forwarded to this department for comments before finalisation.	Comments noted. Please refer to EPD's memo ref (41) in EP42/T6/1 A1 II of 5.9.97.
			4. I suggest that the consultant of the Stage 2 Study, with the assistance of your department, should be responsible for any necessary public consultation including the relevant DBs. Also I assume that the projects for the implementation of the proposed remedies would be processed by your department under your departmental vote.	Please refer to EPD's memo ref (41) in EP42/T6/1 A1 II of 5.9.97.



FIGURE 6.1jj -DIRECT TECHNICAL REMEDIES PROPOSED FLYOVER ON FLYOVER H41 - AP LEI CHAU BRIDGE

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