For discussion **PWSC(2016-17)9**
on 20 April 2016

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 – HIGHWAYS
Transport – Roads
814TH – Retrofitting of noise barriers on Tuen Mun Road (Fu Tei Section)

Members are invited to recommend to the Finance Committee the upgrading of **814TH** to Category A at an estimated cost of $786.2 million in money-of-the-day prices.

PROBLEM

The existing dwellings adjacent to the Tuen Mun Road (Fu Tei Section) between the footbridge to Fung Tei Station and Lam Tei Raw Water Pumping Station are exposed to excessive traffic noise.

PROPOSAL

2. The Director of Highways, with the support of the Secretary for the Environment, proposes to upgrade **814TH** to Category A at an estimated cost of $786.2 million in money-of-the-day (MOD) prices for the retrofitting of noise barriers on the section of Tuen Mun Road (Fu Tei Section) between the footbridge to Fung Tei Station and Lam Tei Raw Water Pumping Station.

/ PROJECT …..

PROJECT SCOPE AND NATURE

3. The proposed scope of works under the project includes –

(a) retrofitting of semi-enclosures from 7 metres (m) to 12 m in height over the southbound carriageway with a 3 m cantilevered section extending over the northbound carriageway between –

(i) Fung Tei Station and the Fung Tei Station light rail bridge of about 95 m in length;

(ii) the Fung Tei Station light rail bridge and the vehicular bridge to Castle Peak Road – San Hui of about 82 m in length;

(iii) the vehicular bridge to Castle Peak Road – San Hui and the footbridge to Tuen Fu Road of about 379 m in length; and

(iv) the footbridge to Tuen Fu Road and Lam Tei Raw Water Pumping Station in two sections of about 91 m in total length;

(b) retrofitting of cantilevered noise barriers of about 19 m in length and about 7 m in height along the central median between the two sections of semi-enclosures near Lam Tei Raw Water Pumping Station;

(c) retrofitting of vertical noise barriers of 3 m in height along –

(i) the verge of the southbound carriageway underneath the Fung Tei Station light rail bridge, the vehicular bridge to Castle Peak Road – San Hui and the footbridge to Tuen Fu Road in three sections of 31 m in total length; and

(ii) the central median underneath the Fung Tei Station light rail bridge, the vehicular bridge to Castle Peak Road – San Hui and the footbridge to Tuen Fu Road in three sections of 33 m in total length;

/ (d) …..

(d) associated drainage, geotechnical, roadworks, utilities diversions, street lighting, traffic aids and landscaping works; and

(e) implementation of an environmental monitoring and audit (EM&A) programme for the works in (a) to (d) above.

4. The aesthetic design of the proposed noise barriers will be in harmony with the surrounding environment. We will install absorptive, transparent and translucent panels for the noise barriers to improve aesthetics. Layout plan and section plan of the proposed works are at Enclosures 1 and 2. The artist impressions of the proposed works are at Enclosure 3.

5. Subject to funding approval of the Finance Committee (FC), we plan to commence the proposed works in the second quarter of 2016 for completion in the fourth quarter of 2019.

JUSTIFICATION

6. To mitigate the traffic noise impact of existing roads on neighbouring residents, it is a government policy to consider the implementation of direct engineering solutions, where practicable, by way of retrofitting of noise barriers and enclosures, and resurfacing with low noise material on existing roads with a traffic noise level exceeding the limit of 70 dB(A)[1].

7. For Tuen Mun Road (Fu Tei Section) between the footbridge to Fung Tei Station and Lam Tei Raw Water Pumping Station, there are a total of about 860 dwellings in the neighbourhood that are exposed to traffic noise level exceeding 70 dB(A). The proposed project comprises retrofitting of semi-enclosures, cantilevered noise barriers and vertical noise barriers on this road section with a view to reducing traffic noise levels by about 1 to 14 dB(A), thereby benefiting about 830 dwellings in the neighbourhood. A breakdown of the number of dwellings based on the respective level of reduction in traffic noise is at Enclosure 4.

/ **FINANCIAL** …..

[1] Road traffic noise level is specified in terms of L10(1 hour) which is the noise level exceeded for 10% of a one-hour period and is generally used for measuring road noise at peak traffic flow. The noise limit of 70 dB(A) for residential premises as stipulated in the Hong Kong Planning Standards and Guidelines is adopted as the administrative guideline for retrofitting projects identified under the policy introduced in 2000.

FINANCIAL IMPLICATIONS

8. We estimate the capital cost of the proposed works to be $786.2 million in MOD prices (please see paragraph 11 below), broken down as follows –

			$ million	
(a)	Noise barriers and enclosures		445.3	
	(i) Superstructure	261.6		
	(ii) Foundation	183.7		
(b)	Associated drainage, geotechnical, roadworks, utilities diversions, street lighting, traffic aids and landscaping		106.0	
(c)	Consultants' fees		1.8	
	(i) Contract administration	1.0		
	(ii) Management of resident site staff (RSS)	0.8		
(d)	Remuneration of RSS		60.7	
(e)	Contingencies		61.4	
	Sub-total		675.2	(in September 2015 prices)
(f)	Provision for price adjustment		111.0	
	Total		786.2	(in MOD prices)

9. In respect of paragraph 8(a) above, the estimated cost of $445.3 million (in September 2015 prices) for the noise barriers covers the installation of semi-enclosures of 647 m in length and 7 m to 12 m in height, cantilevered noise barriers of 19 m in length and 7 m in height, and vertical noise barriers of about 64 m in length and 3 m in height. A breakdown of the estimated cost is at Enclosure 5.

10. A breakdown of the estimated consultants' fees and RSS costs is at Enclosure 6.

/ 11. …..

11. Subject to funding approval, we will phase the expenditure as follows –

Year	$ million (Sept 2015)	Price adjustment factor	$ million (MOD)
2016 – 17	56.7	1.05775	60.0
2017 – 18	267.0	1.12122	299.4
2018 – 19	273.0	1.18849	324.5
2019 – 20	43.5	1.25980	54.8
2020 – 21	25.0	1.33539	33.4
2021 – 22	10.0	1.40549	14.1
	675.2		786.2

12. We have derived the MOD estimate on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period 2016 to 2022. The works contract will make provision for price adjustments.

13. We estimate the annual recurrent expenditure arising from the proposed works to be $2.8 million.

PUBLIC CONSULTATION

14. We consulted the Environment, Hygiene and District Development Committee (EH&DDC) of the Tuen Mun District Council (TMDC) on the proposed works on 15 November 2013. Members supported the proposed works and urged for early implementation to relieve the residents of traffic noise impact.

/ 15. …..

15. We gazetted the scheme for the proposed works of the project under the Roads (Works, Use and Compensation) Ordinance (Cap. 370) (the Ordinance) in January and February 2014. We received 141 public objections against the proposed noise barriers along Castle Peak Road – San Hui in front of the Brilliant Garden. The objectors were mainly concerned about the possible adverse impacts of the noise barriers on the Brilliant Garden in aspects such as obstruction to natural lighting, visual impact and security issue. They also expressed reservations about the need and effectiveness of the proposed noise barriers. To address these objections, we arranged four meetings with the objectors attempting to resolve the objections[2]. On the other hand, to address the objectors' concerns about obstruction to natural lighting, visual impact and security issue, we suggested various improvement measures, such as using more transparent and non-light reflecting materials for the proposed noise barriers, reducing the number of trees to be affected and increasing the separation distance between the proposed noise barriers and the Brilliant Garden. Despite all our efforts, 131 objectors still maintained their objections against the proposed noise barriers. After unsuccessful attempts to convince the objectors to withdraw their objections, we decided to amend the proposed works to exclude the proposed noise barriers along Castle Peak Road – San Hui to address the objections.

16. We further consulted the EH&DDC of the TMDC on the proposed works on 18 July 2014. Members supported the amendment scheme of noise barriers and urged for its early implementation. We gazetted the amendment scheme in September 2014 and no objection was received.

17. The Chief Executive in Council authorised the project under the Ordinance. The notice of authorisation was gazetted on 3 and 10 July 2015.

/ 18. …..

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[2] We explained to the objectors that the proposed semi-enclosures along Tuen Mun Road (Fu Tei Section) were mainly for mitigating traffic noise generated from that road section, and would benefit dwellings in the Parkland Villas, Napa Valley, Siu Hong Court and Brilliant Garden, etc. That said, seventy-odd dwellings in the Brilliant Garden would remain exposed to traffic noise level between 71 to 74 dB(A). The proposed noise barriers along Castle Peak Road – San Hui would not only reduce the number of the dwellings affected by excessive traffic noise but also help further alleviate traffic noise problem faced by the dwellings in the Brilliant Garden.

18. We consulted the Advisory Committee on the Appearance of Bridges and Associated Structures[3] (ACABAS) in June 2015. Members supported and accepted the aesthetic design.

19. We consulted the Legislative Council Panel on Environmental Affairs on 22 February 2016 on the proposed works. Members supported submitting the funding proposal to the Public Works Subcommittee for consideration. The supplementary information requested by Panel Members is provided in paragraph 29 of this paper.

ENVIRONMENTAL IMPLICATIONS

20. The project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have conducted an environmental review which concluded that the proposed works would not cause adverse long term environmental impact.

21. To minimise short-term impacts during construction, we will control the nuisances caused by noise, dust and site run-off to within the established standards and guidelines through the implementation of mitigation measures. We will also carry out EM&A programmes to ensure proper implementation of the recommendations of the environmental review.

22. At the planning and design stages, we have considered the design and construction sequence of the proposed works to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities[4]. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

/ 23. …..

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[3] The Advisory Committee on the Appearance of Bridges and Associated Structures, which comprises representatives of the Hong Kong Institute of Architects, the Hong Kong Institution of Engineers, the Hong Kong Institute of Planners, an academic institution, Architectural Services Department, Highways Department, Housing Department and Civil Engineering and Development Department, is responsible for vetting the design of bridges and other structures associated with the highway system, including noise barriers and enclosures, from the aesthetic and visual impact points of view.

[4] Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

23. At the construction stage, we will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

24. We estimate that the proposed works will generate in total 37 000 tonnes of construction waste. Of these, we will reuse 10 200 tonnes (27%) of inert construction waste on site and deliver 22 500 tonnes (61%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 4 300 tonnes (12%) of non-inert construction waste at landfills. The total cost for accommodating the construction waste at public fill reception facilities and landfill sites is estimated to be about $1.1 million for the proposed works (based on a unit charge rate of $27 per tonne for disposal at public fill reception facilities and $125 per tonne at landfills as stipulated in the Waste Disposal (Charge for Disposal of Construction Waste) Regulation) (Cap. 354N).

HERITAGE IMPLICATIONS

25. The proposed works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

26. The proposed works do not require land resumption.

INTERIM TRAFFIC DIVERSION PROPOSALS

27. We have conducted a traffic impact assessment (TIA) for the proposed works, including assessment of the impact on traffic during the construction stage. We will maintain the same number of existing traffic lanes in the northbound and southbound carriageways of Tuen Mun Road during the peak hours throughout the construction period. The TIA concluded that the proposed works would not cause significant adverse impact on road users with implementation of appropriate temporary traffic arrangements.

/ **BACKGROUND** …..

BACKGROUND INFORMATION

28. We upgraded the proposed works to Category B in September 2010. In August 2011, we engaged consultants to carry out the investigation and subsequently the detailed design for the proposed works at an estimated cost of about $1.8 million under **Subhead 6100TX** "Highway works, studies and investigations for items in Category D of the Public Works Programme". The detailed design of the proposed works was completed in January 2016.

29. Of the 229 trees within site boundary, 227 trees will be preserved. The proposed works will involve felling of two trees which block the construction of noise barriers. The trees to be felled are not important trees[5]. Both trees are Bombax ceiba (commonly known as cotton tree) and found to be in poor condition, and hence not feasible to be transplanted. We will incorporate planting of four trees as part of the proposed works.

30. We estimate that the proposed works will create about 300 jobs (250 for labourers and 50 for professional/technical staff), providing a total employment of 9 900 man-months.

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[5] An "important tree" refers to trees on the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria -

(a) trees of over 100 years old or above;

(b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument, and trees in memory of an important person or event;

(c) trees of precious or rare species;

(d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or

(e) trees with trunk diameter equal or exceeding 1.0 metre (measured at 1.3 metre above ground level), or with height/canopy spread equal or exceeding 25 metres.

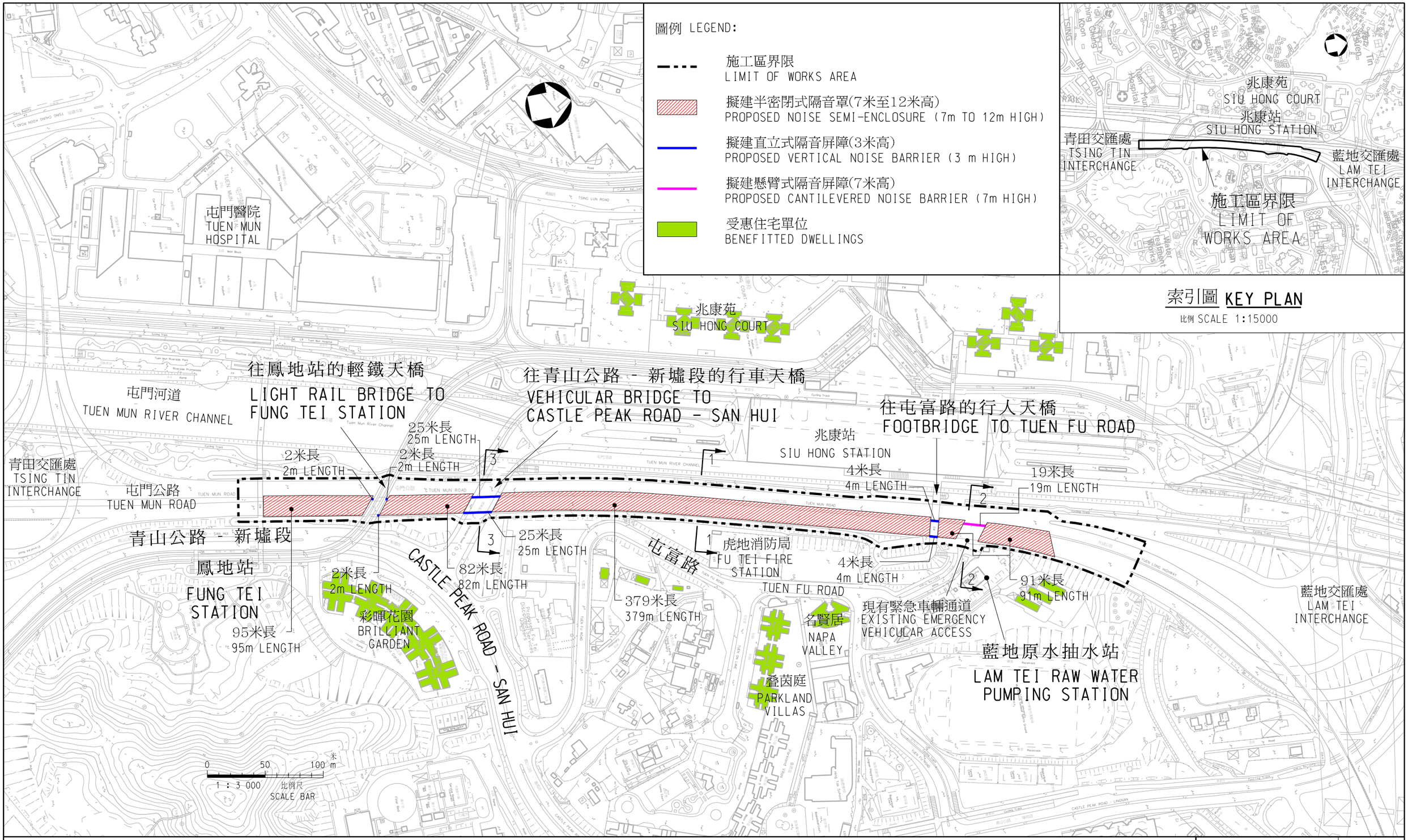
Environment Bureau
April 2016

圖例 LEGEND:

- 施工區界限 LIMIT OF WORKS AREA
- 擬建半密閉式隔音罩(7米至12米高) PROPOSED NOISE SEMI-ENCLOSURE (7m TO 12m HIGH)
- 擬建直立式隔音屏障(3米高) PROPOSED VERTICAL NOISE BARRIER (3 m HIGH)
- 擬建懸臂式隔音屏障(7米高) PROPOSED CANTILEVERED NOISE BARRIER (7m HIGH)
- 受惠住宅單位 BENEFITTED DWELLINGS

索引圖 KEY PLAN

比例 SCALE 1:15000



圖則名稱 drawing title

工務項目計劃第814TH號 - 屯門公路（虎地段）加建隔音屏障工程 - 平面圖

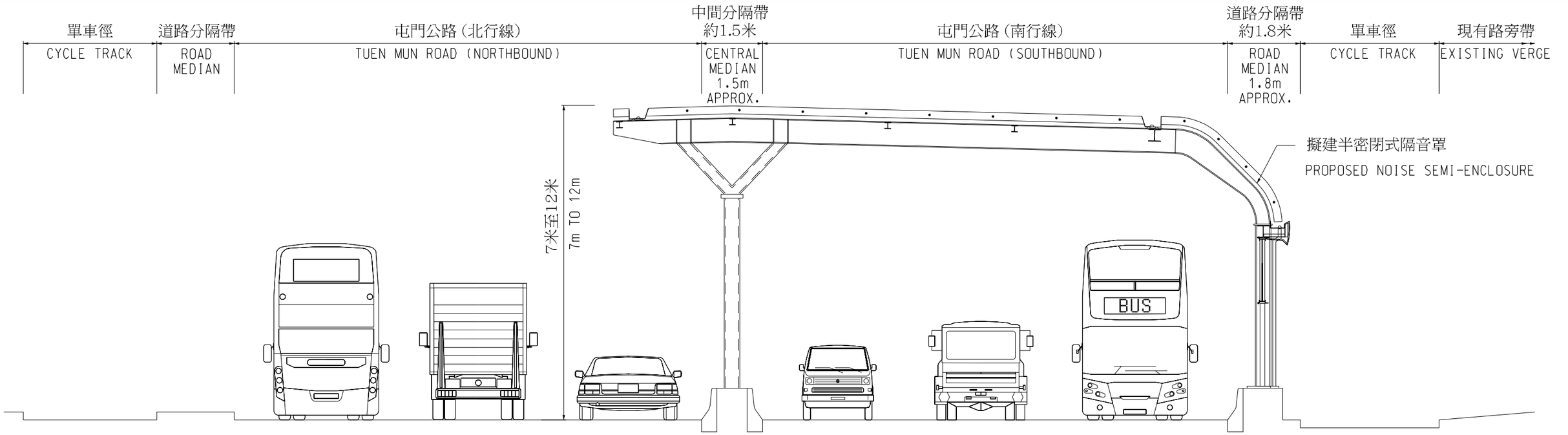
PUBLIC WORKS PROGRAMME ITEM NO. 814TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (FU TEI SECTION) - LAYOUT PLAN

圖則編號 drawing no.	比例 scale
HMW6814TH-SK0019	1:3000 OR AS SHOWN

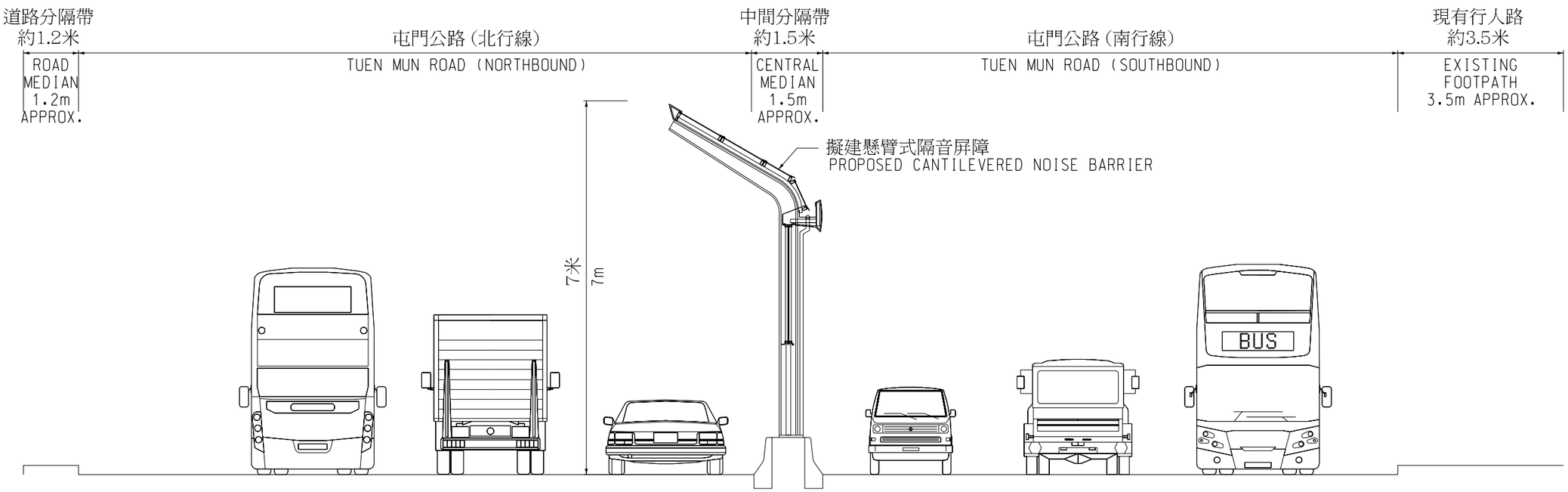
HIGHWAYS DEPARTMENT HONG KONG 香港 路政署

design path and filename

A3 420 x 297



切面圖 SECTION 1-1



切面圖 SECTION 2-2

圖則名稱 drawing title

工務項目計劃第814TH號 - 屯門公路（虎地段）加建隔音屏障工程 - 切面圖

PUBLIC WORKS PROGRAMME ITEM NO. 814TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (FU TEI SECTION) - SECTION

圖則編號 drawing no.	比例 scale
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HIGHWAYS DEPARTMENT HONG KONG 路政署 香港

design path and filename

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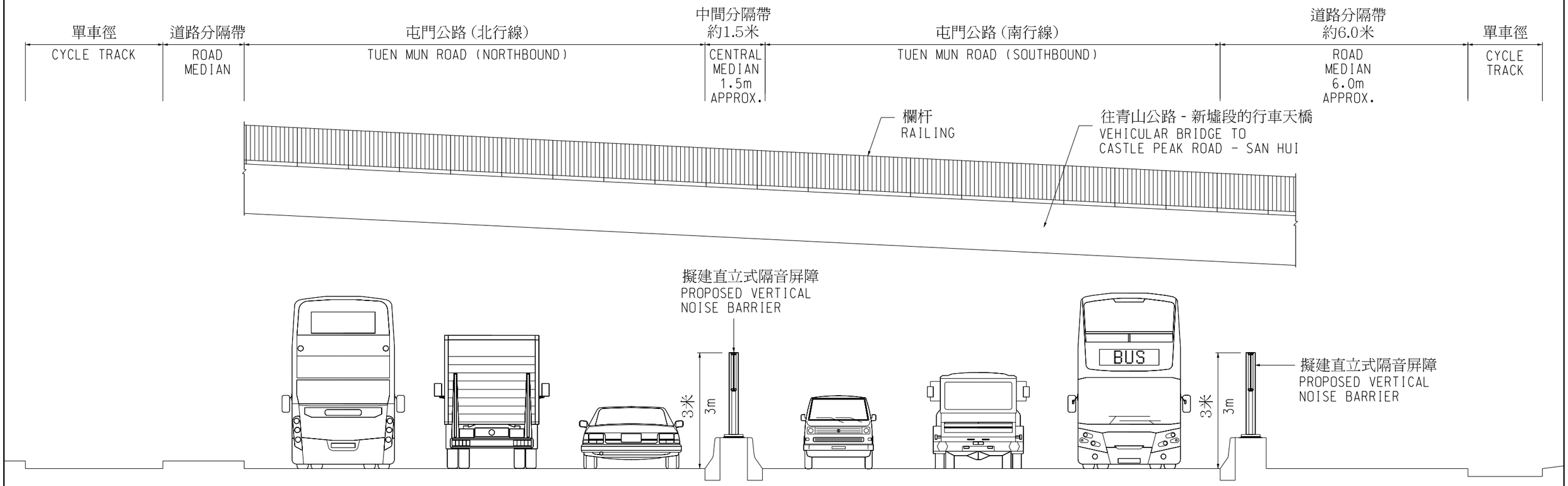

切面圖 SECTION 3-3

圖則名稱 drawing title

工務項目計劃第814TH號 - 屯門公路（虎地段）加建隔音屏障工程 - 切面圖

PUBLIC WORKS PROGRAMME ITEM NO. 814TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (FU TEI SECTION) - SECTION

圖則編號 drawing no. HMW6814TH-SK0043

比例 scale 1:100

HIGHWAYS DEPARTMENT HONG KONG 香港路政署

design path and filename

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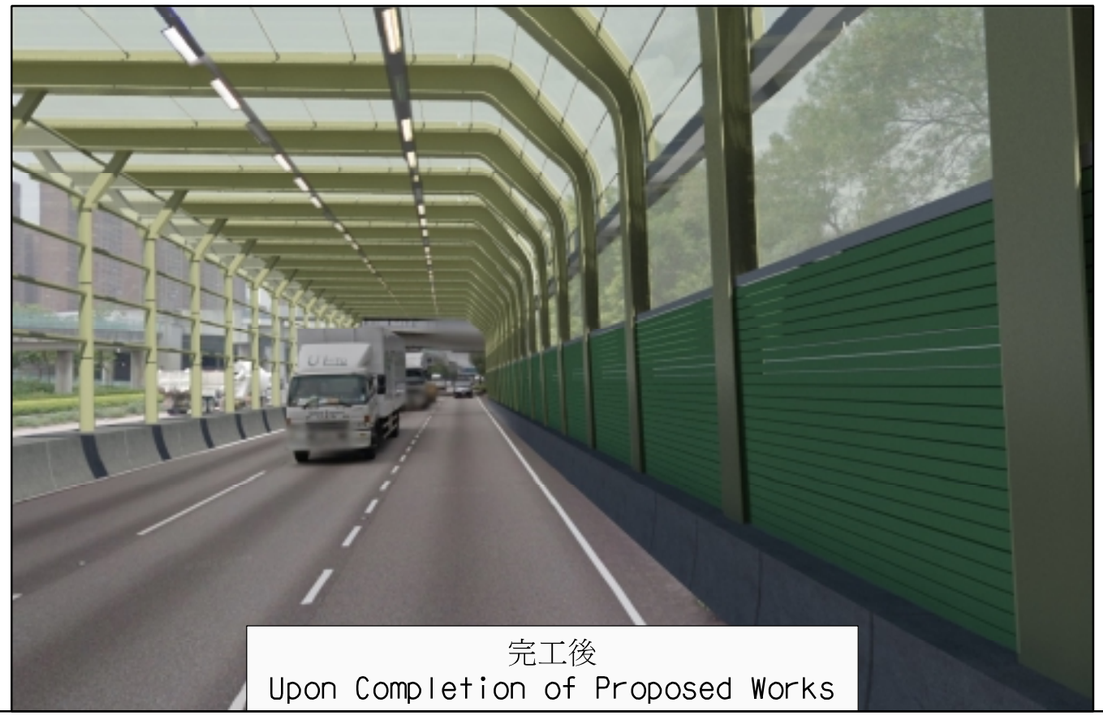
現況
Present Situation



完工後
Upon Completion of Proposed Works

圖則名稱 drawing title

工務項目計劃第814TH號 - 屯門公路（虎地段）加建隔音屏障工程 - 半密閉式隔音罩的構思圖
PWP ITEM NO. 814TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (FU TEI SECTION)
- ARTIST'S IMPRESSION OF PROPOSED SEMI-ENCLOSURE

圖則編號 drawing no.
HMW6814TH-SK0033

比例 scale
示意圖
DIAGRAMMATIC

HIGHWAYS DEPARTMENT HONG KONG 香港路政署

design path and filename

A3 420 x 297

現況
Present Situation

完工後
Upon Completion of Proposed Works

圖則名稱 drawing title

工務項目計劃第814TH號 - 屯門公路（虎地段）加建隔音屏障工程 - 半密閉式隔音罩的構思圖
PWP ITEM NO. 814TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (FU TEI SECTION)
- ARTIST'S IMPRESSION OF PROPOSED SEMI-ENCLOSURE

圖則編號 drawing no. HMW6814TH-SK0034

比例 scale 示意圖 DIAGRAMMATIC

HIGHWAYS DEPARTMENT HONG KONG 香港路政署

design path and filename

A3 420 x 297

現況
Present Situation

完工後
Upon Completion of Proposed Works

圖則名稱 drawing title

工務項目計劃第814TH號 - 屯門公路（虎地段）加建隔音屏障工程 - 懸臂式隔音屏障的構思圖
PWP ITEM NO. 814TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (FU TEI SECTION)
- ARTIST'S IMPRESSION OF PROPOSED CANTILEVERED NOISE BARRIER

圖則編號 drawing no.
HMW6814TH-SK0035

比例 scale
示意圖
DIAGRAMMATIC

HIGHWAYS DEPARTMENT HONG KONG 香港路政署

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A3 420 x 297

現況
Present Situation

完工後
Upon Completion of Proposed Works

圖則名稱 drawing title

工務項目計劃第814TH號 - 屯門公路（虎地段）加建隔音屏障工程 - 直立式隔音屏障的構思圖
PWP ITEM NO. 814TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (FU TEI SECTION)
- ARTIST'S IMPRESSION OF PROPOSED VERTICAL NOISE BARRIER

圖則編號 drawing no. HMW6814TH-SK0044

比例 scale 示意圖 DIAGRAMMATIC

HIGHWAYS DEPARTMENT HONG KONG 香港路政署

design path and filename

A3 420 x 297

814TH - Retrofitting of noise barriers on Tuen Mun Road (Fu Tei Section)

Breakdown of the number of benefitted dwellings based on the respective level of reduction in traffic noise

Reduction in traffic noise (dB(A))	Dwelling benefitted (Units)
11-15	39
6-10	463
1-5	328

Enclosure 5 to PWSC(2016-17)9

814TH - Retrofitting of noise barriers on Tuen Mun Road (Fu Tei Section)

Breakdown of cost estimate for different types of noise barriers/enclosures (in September 2015 prices)

	Cost Estimate ($ million)		
Type of Noise Barriers	**Superstructure**	**Foundation**	**Sub-total**
Semi-enclosure	256.5	180.2	436.7
Cantilevered Noise Barrier	1.5	1.0	2.5
Vertical Noise Barrier	3.6	2.5	6.1
Sub-total	**261.6**	**183.7**	
		Total	**445.3**

814TH - Retrofitting of noise barriers on Tuen Mun Road (Fu Tei Section)

Breakdown of estimates for consultants' fees and resident site staff costs (in September 2015 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fees ($ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	–	–	–	0.7
		Technical	–	–	–	0.3
					Sub-total	1.0
(b)	Resident site staff costs (Note 3)	Professional	206	38	1.6	24.5
		Technical	907	14	1.6	37.0
					Sub-total	61.5
	Comprising:-					
	(i) Consultants' fees for management of resident site staff				0.8	
	(ii) Remuneration of resident site staff				60.7	
					Total	62.5

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of resident site staff supplied by the consultants. (As at now, MPS salary pt. 38 = $74,210 per month and MPS pt. 14 = $25,505 per month.)

2. The consultants' fees for contract administration are estimated in accordance with Agreement No. CE 22/2012 (HY) titled "Retrofitting of Noise Barriers on Tuen Mun Road (Town Centre and Fu Tei Sections) – Design and Construction". The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade **814TH** to Category A.

3. The actual man-months and actual costs will only be known after completion of the construction works.