

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 – HIGHWAYS

Transport – Roads

810TH – Retrofitting of noise barriers on Tuen Mun Road (Town Centre Section)

Members are invited to recommend to the Finance Committee the upgrading of **810TH** to Category A at an estimated cost of \$826.5 million in money-of-the-day prices.

PROBLEM

The existing dwellings adjacent to the Tuen Mun Road (Town Centre Section) between Rose Dale Garden and Lakeshore Building are exposed to excessive traffic noise.

PROPOSAL

2. The Director of Highways, with the support of the Secretary for the Environment, proposes to upgrade **810TH** to Category A at an estimated cost of \$826.5 million in money-of-the-day (MOD) prices for the retrofitting of noise barriers on Tuen Mun Road (Town Centre Section) between Rose Dale Garden and Lakeshore Building.

PROJECT SCOPE AND NATURE

3. The proposed scope of works under the project includes –
- (a) retrofitting of semi-enclosure of about 25 metres (m) in length and 7m in height over the southbound carriageway with a 4.5m cantilevered section extending over the northbound carriageway between the noise barrier constructed under **819TH** “Traffic Improvements to Tuen Mun Road Town Centre Section” and the existing San Hui Footbridge;
 - (b) retrofitting of full enclosure of about 130m in length and variation from 7m to 12m in height spanning both bound carriageways between the existing San Hui Footbridge and the car park on Tsing Yin Street;
 - (c) retrofitting of semi-enclosure of about 80m in length and variation from 7m to 12m in height over the northbound carriageway with a 5.5m cantilevered section extending over the southbound carriageway between Tsing Yin Street and Yuk Hong Street;
 - (d) retrofitting of cantilevered noise barrier of about 125m and 60m in length, and about 7m in height along the central median and the verge of the southbound carriageway respectively between Yuk Hong Street and the flyover of Tuen Mun Heung Sze Wui Road including 3m in height of vertical noise barrier underneath the flyover;
 - (e) retrofitting of semi-enclosure of about 325m in length and variation from 7m to 12m in height over the southbound carriageway with a 4.5m cantilevered section extending over the northbound carriageway between the flyover of Tuen Mun Heung Sze Wui Road and Lakeshore Building;
 - (f) retrofitting of cantilevered noise barrier of about 30m in length and 7m in height along the verge of the southbound carriageway near Lakeshore Building;
 - (g) retrofitting of vertical noise barrier of about 40m in length and 3m in height along the verge of the northbound carriageway near the caretakers’ quarters of Church of Christ in China Tam Lee Lai Fun Memorial Secondary School;

- (h) associated drainage, roadworks, utilities diversions, street lighting, traffic aids and landscaping works; and
- (i) implementation of an environmental monitoring and audit (EM&A) programme for the works in (a) to (h) above.

— A layout plan and cross-section plans of the proposed works are at Enclosure 1.

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 and provide roadside planters to improve aesthetics as well as to promote green surroundings. The artist impressions of the proposed works are at Enclosure 2.

5. Subject to funding approval of the Finance Committee, we plan to commence the construction works in the third quarter of 2015 for completion in the first quarter of 2019.

JUSTIFICATION

6. To mitigate the traffic noise impact of existing roads on neighbouring residents, it is the Government's 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 residents in the neighbourhood of Tuen Mun Road (Town Centre Section) between Rose Dale Garden and Lakeshore Building, there are a total of about 1 900 dwellings exposed to traffic noise level exceeding 70 dB(A). The project comprises retrofitting of noise barriers, semi and full noise enclosures on this road section. The project will benefit about 1 800 dwellings with reduction in traffic noise levels of about 1 to 25 dB(A). A breakdown of the number of dwellings sorted by the respective level of reduction in traffic noise is at Enclosure 3.

/FINANCIAL.....

¹ Road traffic noise level is specified in terms of $L_{10}(1 \text{ hour})$ 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 project to be \$826.5 million in MOD prices (see paragraph 11 below), broken down as follows –

| | \$ million | |
|---|-------------------|----------------------------|
| (a) Noise barriers and enclosures | 460.5 | |
| (i) superstructure | 270.6 | |
| (ii) foundation | 189.9 | |
| (b) Associated drainage, roadworks, utilities diversions, street lighting, traffic aids and landscaping | 104.8 | |
| (c) Consultants' fees | 1.8 | |
| (i) contract administration | 1.1 | |
| (ii) management of resident site staff (RSS) | 0.7 | |
| (d) Remuneration of RSS | 51.0 | |
| (e) Contingencies | 56.5 | |
| Sub-total | 674.6 | (in September 2014 prices) |
| (f) Provision for price adjustment | 151.9 | |
| Total | 826.5 | (in MOD prices) |

9. In respect of paragraph 8(a) above, the estimated cost of \$460.5 million (in September 2014 prices) for constructing the noise barriers covers the installation of full enclosure of about 130m in length and 7m to 12m in height, semi-enclosures of 430m in length and 7m to 12m in height, cantilevered noise barriers of 215m in length and 7m in height and vertical noise barrier of about 40m in length and 3m in height. A breakdown of the estimated cost is at Enclosure 4.

10. A breakdown of the estimated consultants' fees and resident site staff costs is at Enclosure 5.

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

| Year | \$ million (Sept 2014) | Price adjustment factor | \$ million (MOD) |
|-------------|---------------------------|----------------------------|---------------------|
| 2015 – 2016 | 35.0 | 1.06000 | 37.1 |
| 2016 – 2017 | 135.0 | 1.12360 | 151.7 |
| 2017 – 2018 | 175.0 | 1.19102 | 208.4 |
| 2018 – 2019 | 187.0 | 1.26248 | 236.1 |
| 2019 – 2020 | 87.0 | 1.32876 | 115.6 |
| 2020 – 2021 | 55.6 | 1.39519 | 77.6 |
| | 674.6 | | 826.5 |

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 2015 to 2021. 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. Since March 2012, we have consulted the Traffic and Transport Committee (T&TC) and the Environment, Hygiene and District Development Committee (EH&DDC) of the Tuen Mun District Council (TMDC) on several occasions on the project. Members urged for its early implementation to relieve the residents from traffic noise impact.

15. With the support of the T&TC on 16 March 2012, we gazetted the proposed works under the Roads (Works, Use and Compensation) Ordinance (Cap. 370) (the Ordinance) in September 2012.

16. We received objections against the non-provision of noise mitigation measures on Tuen Mun Road fronting the existing Church of Christ in China Tam Lee Lai Fun Memorial Secondary School. The objection resolution was completed in April 2013 and a modified noise barrier scheme was proposed to provide additional vertical noise barriers fronting the caretakers' quarters of the secondary school. EH&DDC of the TMDC was consulted on the proposed works on 19 July 2013, and was supportive of the modified noise barrier scheme and urged for early implementation. The Chief Executive in Council authorised the road scheme together with the modification for the Town Centre Section under the Ordinance and the notice of authorisation was gazetted on 27 September 2013.

17. We consulted the Advisory Committee on the Appearance of Bridges and Associated Structures² (ACABAS) in July 2012. Members supported and accepted the aesthetic design.

18. We consulted the Legislative Council Panel on Environmental Affairs on 26 May 2014 on the proposed works. Members supported submitting the project to the Public Works Subcommittee for consideration.

ENVIRONMENTAL IMPLICATIONS

19. 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 impacts.

20. To minimize 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.

/21.

² The ACABAS 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.

21. At the planning and design stages, we have considered the design and construction sequence of the project 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 minimize the disposal of inert construction waste at public fill reception facilities³. We will encourage the contractor to maximize the use of recycled/recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

22. 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.

23. We estimate that the proposed works will generate in total about 26 300 tonnes of construction waste. Of these, we will reuse about 10 100 tonnes (38%) of inert construction waste on site and deliver 14 600 tonnes (56%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 1 600 tonnes (6%) 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 \$0.6 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).

HERITAGE IMPLICATIONS

24. The project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

/LAND

³ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

LAND ACQUISITION

25. The project does not require land resumption.

INTERIM TRAFFIC DIVERSION PROPOSALS

26. We have conducted a traffic impact assessment (TIA) for the project 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 project would not cause significant adverse impact on road users with implementation of appropriate temporary traffic arrangements.

BACKGROUND INFORMATION

27. We upgraded the project to Category B in September 2010. In August 2011, we engaged consultants to carry out the investigation and subsequently the detailed design for the project 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 project was completed in November 2013.

28. Of the 152 trees within site boundary, 64 trees will be preserved. The project will involve removal of 88 trees, including 66 trees to be felled and 22 trees to be transplanted elsewhere. All trees to be removed are not important trees⁴. We will incorporate planting proposals as part of the proposed works, including planting of 199 trees and 12 600 shrubs and forming of 900 square metres of grassed area.

29. We estimate that the proposed works will create about 288 jobs (233 for labourers and 55 for professional/technical staff) providing a total employment of 10 600 man-months.

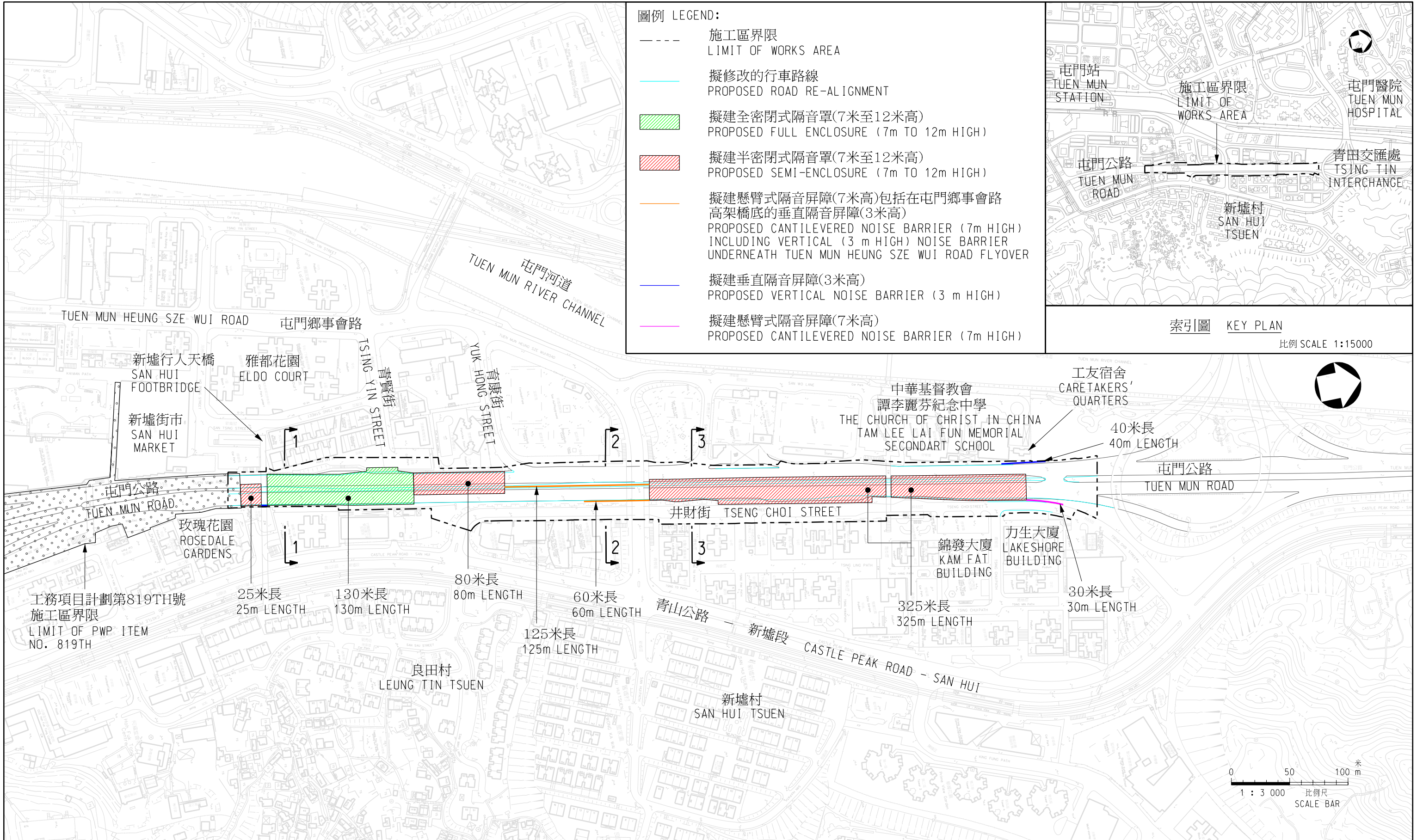
/30.

⁴ 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.

30. In June 2014, we issued PWSC(2014-15)30 which sought Members' support for this project at an estimated cost of \$623.3 million. The project was not discussed by the PWSC in the 2013-14 legislative session. We issued PWSC(2014-15)44 in October 2014 to update the programme, phasing of expenditure and estimated cost of the project (\$659.8 million) due to the lapse of time. Due to the expiry of the tender validity period of the contract under **810TH** in end January 2015, further updates to the aforesaid information are needed. This paper sets out the latest information of the project and replaces PWSC(2014-15)44.

Environment Bureau
January 2015

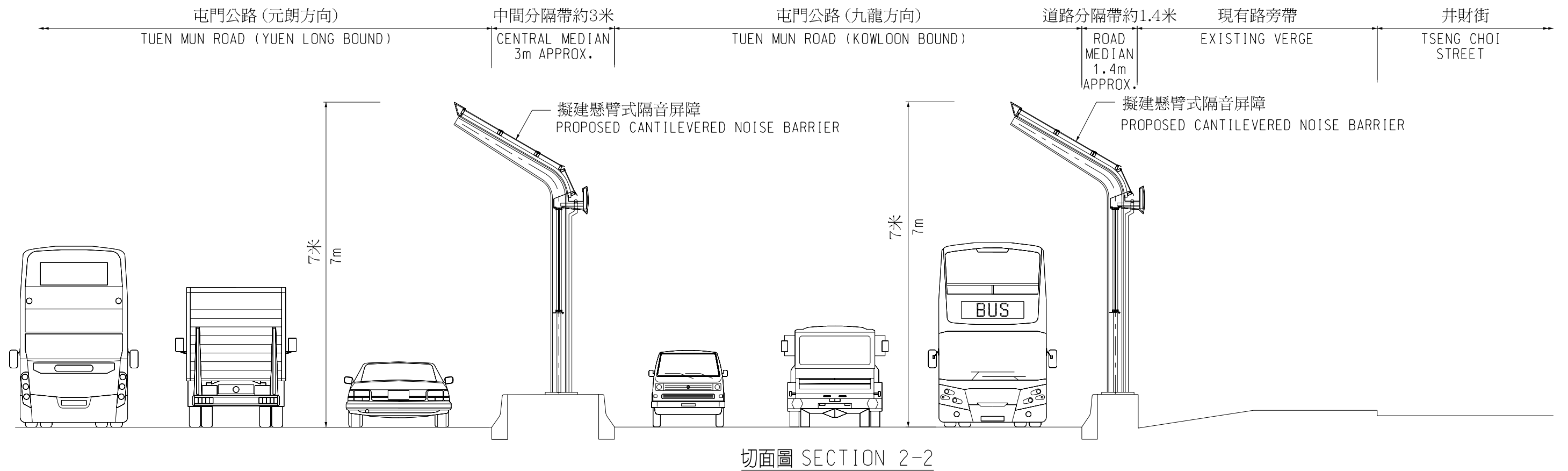
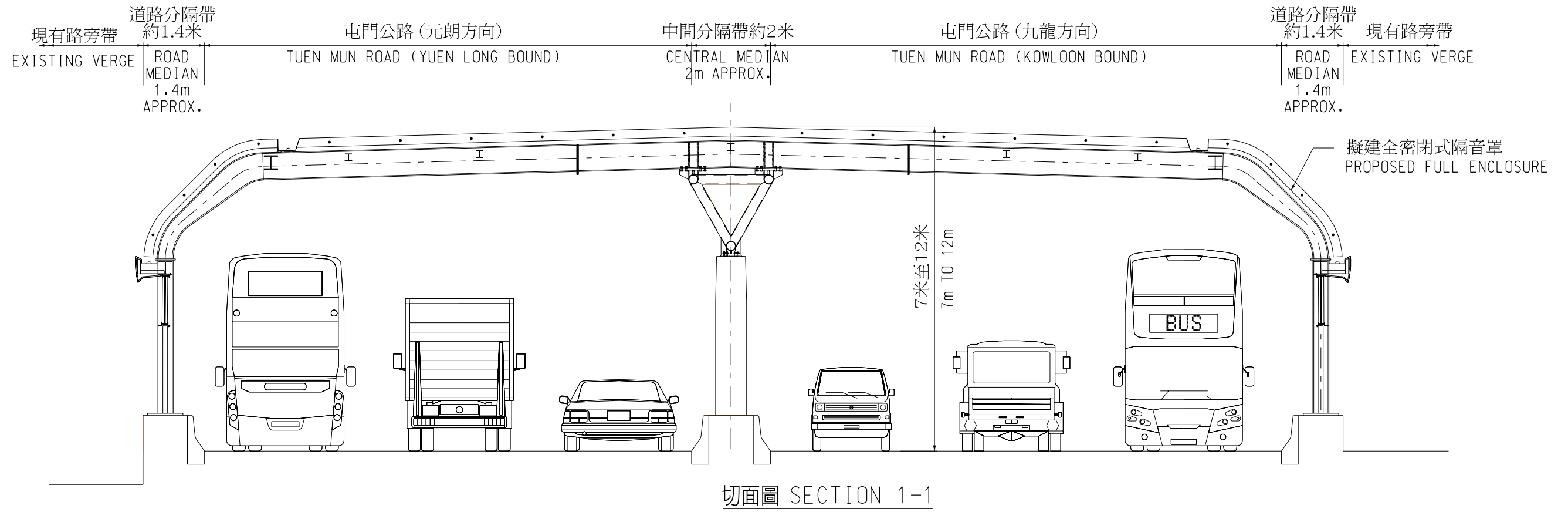


圖例 LEGEND:

- 施工區界限
LIMIT OF WORKS AREA
- 擬修改的行车路線
PROPOSED ROAD RE-ALIGNMENT
- █ 擬建全密閉式隔音罩(7米至12米高)
PROPOSED FULL ENCLOSURE (7m TO 12m HIGH)
- █ 擬建半密閉式隔音罩(7米至12米高)
PROPOSED SEMI-ENCLOSURE (7m TO 12m HIGH)
- 擬建懸臂式隔音屏障(7米高)包括在屯門鄉事會路
高架橋底的垂直隔音屏障(3米高)
PROPOSED CANTILEVERED NOISE BARRIER (7m HIGH)
INCLUDING VERTICAL (3 m HIGH) NOISE BARRIER
UNDERNEATH TUEN MUN HEUNG SZE WUI ROAD FLYOVER
- 擬建垂直隔音屏障(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)

索引圖 KEY PLAN
比例 SCALE 1:15000

| | |
|---|---|
| <p>圖則名稱 drawing title</p> <p>工務項目計劃第810TH號 - 屯門公路(市中心段)加建隔音屏障工程 - 平面圖 PWP ITEM NO. 810TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (TOWN CENTRE SECTION) - LAYOUT PLAN</p> | <p>圖則編號 drawing no. HMW6810TH-SK0024</p> <p>比例 scale 1:3000</p> <p>© 版權所有 COPYRIGHT RESERVED</p> <p>HIGHWAYS DEPARTMENT HONG KONG 路政署 香港</p> |
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圖則名稱 drawing title

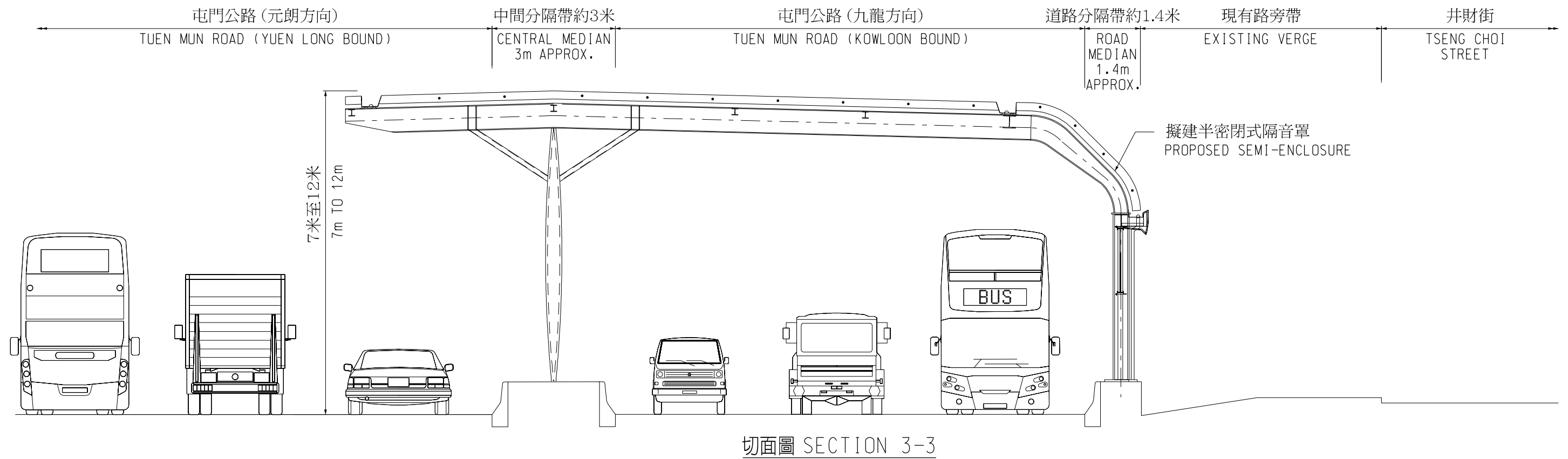
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PWP ITEM NO. 810TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (TOWN CENTRE SECTION)
- SECTION

圖則編號 drawing no.
HMW6810TH-SK0025

比例 scale
1:100

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圖則名稱 drawing title

工務項目計劃第810TH號 - 屯門公路 (市中心段) 加建隔音屏障工程 - 切面圖
PWP ITEM NO. 810TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (TOWN CENTRE SECTION)
- SECTION

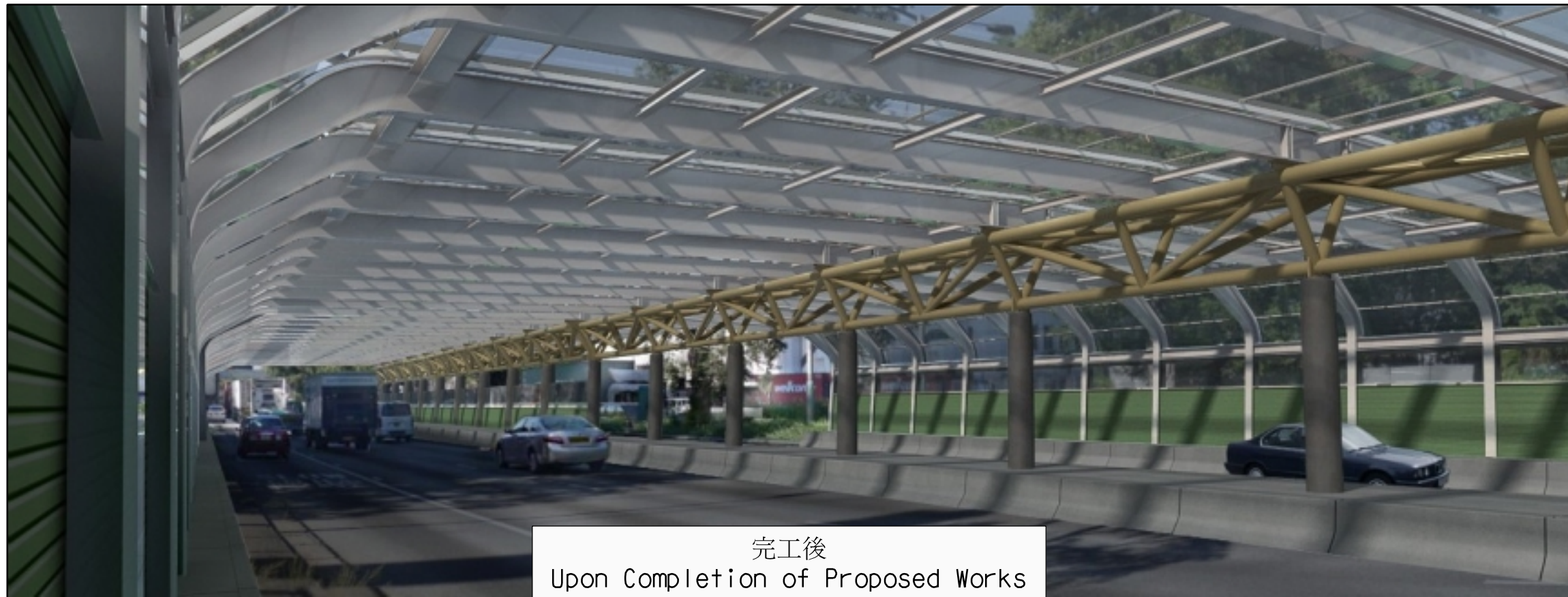
圖則編號 drawing no. HMW6810TH-SK0026 比例 scale 1:100

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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810TH號 - 屯門公路 (市中心段) 加建隔音屏障工程 - 全密閉式隔音罩的構思圖
PWP ITEM NO. 810TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (TOWN CENTRE SECTION)
- ARTIST'S IMPRESSION OF PROPOSED FULL ENCLOSURE

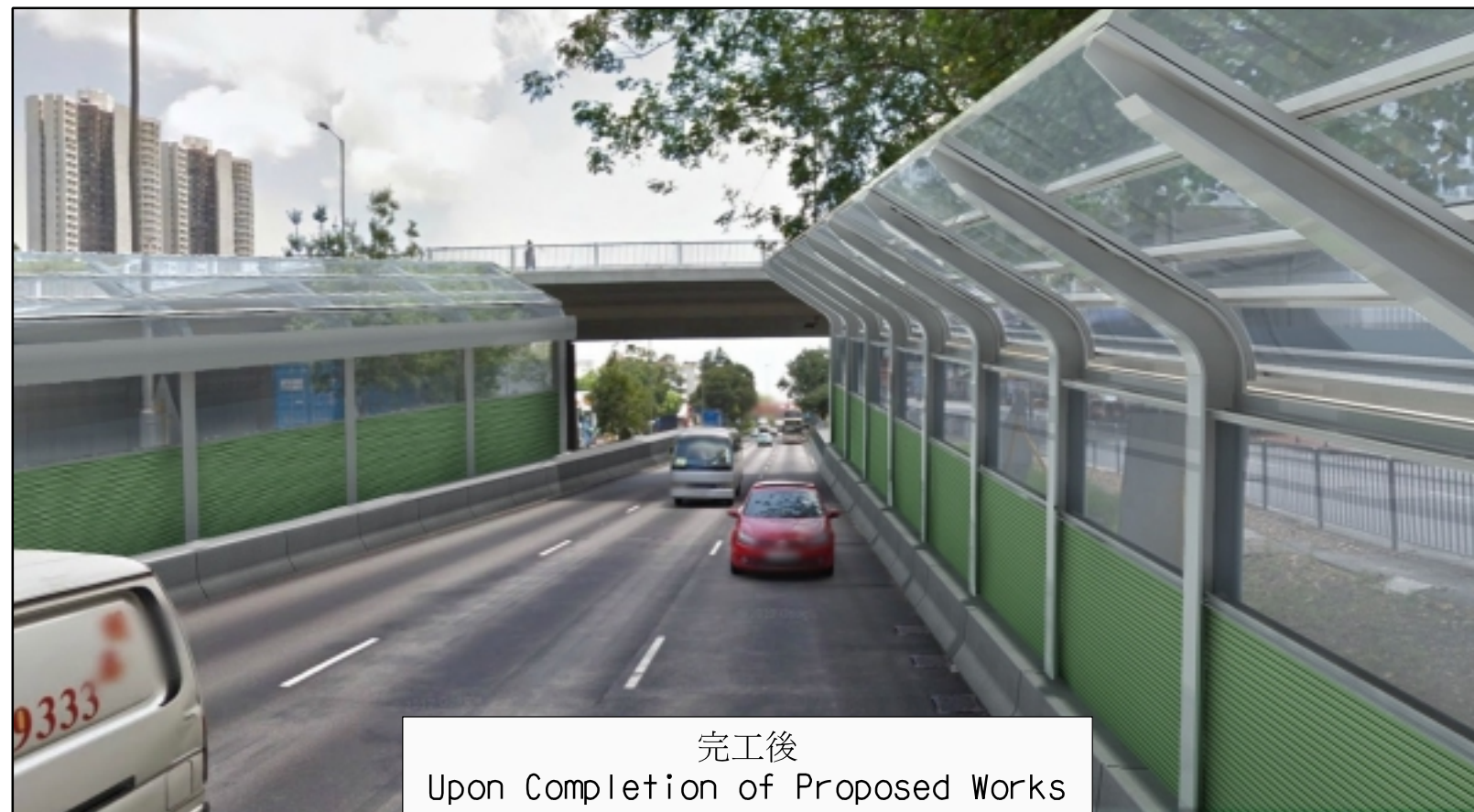
圖則編號 drawing no. HMW6810TH-SK0027 比例 scale 示意圖 DIAGRAMMATIC

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現況
Present Situation



完工後
Upon Completion of Proposed Works

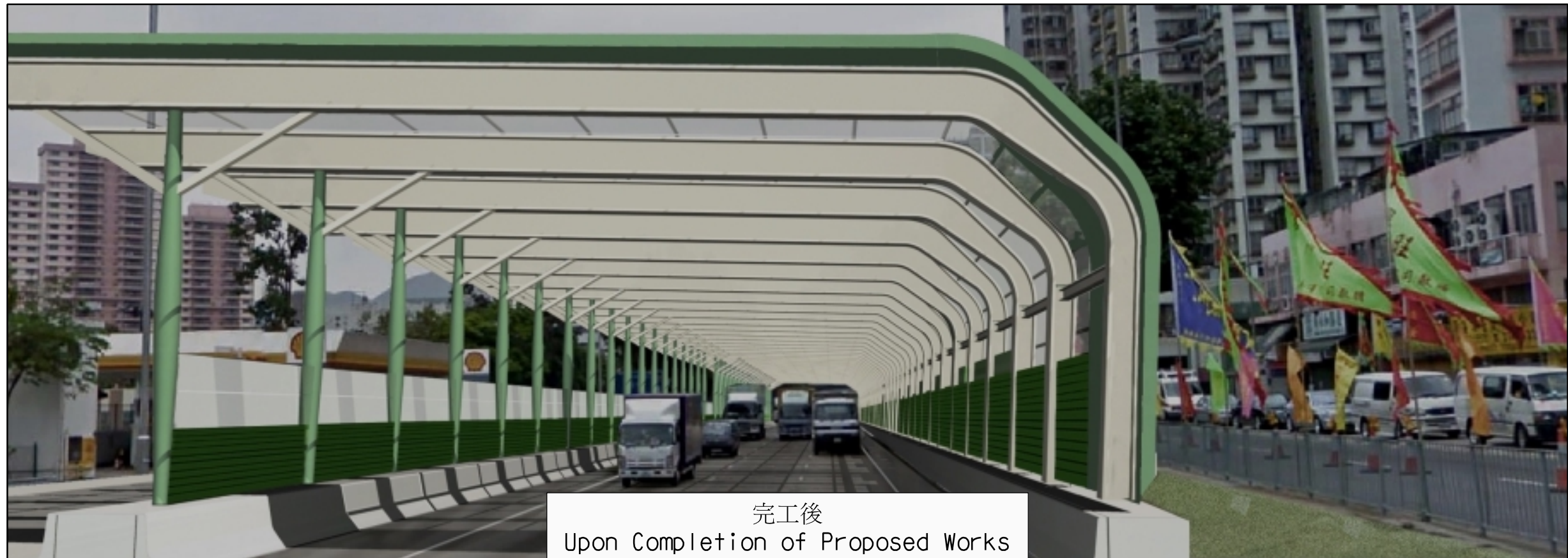
圖則名稱 drawing title

工務項目計劃第810TH號 - 屯門公路 (市中心段) 加建隔音屏障工程 - 懸臂式隔音屏障的構思圖
PWP ITEM NO. 810TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (TOWN CENTRE SECTION)
- ARTIST'S IMPRESSION OF PROPOSED CANTILEVERED NOISE BARRIER

圖則編號 drawing no. HMW6810TH-SK0028 比例 scale 示意圖 DIAGRAMMATIC

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圖則名稱 drawing title

工務項目計劃第810TH號 - 屯門公路 (市中心段) 加建隔音屏障工程 - 半密閉式隔音罩的構思圖
 PWP ITEM NO. 810TH - RETROFITTING OF NOISE BARRIERS ON TUEN MUN ROAD (TOWN CENTRE SECTION)
 - ARTIST'S IMPRESSION OF PROPOSED SEMI-ENCLOSURE

圖則編號 drawing no. 比例 scale
 HMW6810TH-SK0029 示意圖
 DIAGRAMMATIC

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**810TH - Retrofitting of noise barriers on
Tuen Mun Road (Town Centre Section)**

**Breakdown of the number of benefitted dwellings sorted
by the respective level of reduction in traffic noise**

| Reduction in traffic noise (dB(A)) | Dwelling benefitted (Units) |
|---|--|
| 21-25 | 69 |
| 16-20 | 25 |
| 11-15 | 222 |
| 6-10 | 537 |
| 2-5 | 748 |
| 1 | 157 |

Enclosure 4 to PWSC(2014-15)51

**810TH - Retrofitting of noise barriers on
Tuen Mun Road (Town Centre Section)**

**Breakdown of cost estimate for different types of noise barriers/enclosures
(in September 2014 prices)**

| Type of Noise Barriers | Cost Estimate (\$ million) | | |
|----------------------------|----------------------------|--------------|--------------|
| | Superstructure | Foundation | Sub-total |
| Full Enclosure | 65.5 | 46.0 | 111.5 |
| Semi-enclosure | 188.8 | 132.5 | 321.3 |
| Cantilevered Noise Barrier | 15.1 | 10.5 | 25.6 |
| Vertical Noise Barrier | 1.2 | 0.9 | 2.1 |
| | <hr/> | | |
| Sub-total | 270.6 | 189.9 | |
| | | Total | 460.5 |

Enclosure 5 to PWSC(2014-15)51

**810TH - Retrofitting of noise barriers on
Tuen Mun Road (Town Centre Section)**

**Breakdown of estimates for consultants' fees and resident site staff costs
(in September 2014 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 | – | – | – | 0.4 |
| | | | | Sub-total | <hr/> 1.1 |
| (b) Resident site staff costs (Note 3) | Professional | 180 | 38 | 1.6 | 20.6 |
| | Technical | 798 | 14 | 1.6 | 31.1 |
| | | | | Sub-total | <hr/> 51.7 |
| Comprising:- | | | | | |
| (i) Consultants' fees for management of resident site staff | | | | | 0.7 |
| (ii) Remuneration of resident site staff | | | | | 51.0 |
| | | | | Total | <hr/> 52.8 |

* 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. (Subject to approval of the Finance Committee, MPS salary point 38 = \$71,385 per month and MPS salary point 14 = \$24,380 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 **810TH** to Category A.
3. The actual man-months and actual costs will only be known after completion of the construction works.