Annex B

HERITAGE IMPACT ASSESSMENT IN RESPECT OF THE PROPOSED UPGRADING/IMPROVEMENT WORKS FOR FEATURE NO. 11SW-B/R93 (SUB-DIVISION NO. 1) NEAR DUDDELL STREET STEPS AND GAS LAMPS

SUPPLEMENTARY PAPER ON THE REVISED DESIGN OF THE PROPOSED UPGRADING/IMPROVEMENT WORKS FOR FEATURE NO. 11SW-B/R93 (SUB-DIVISION NO. 1), DUDDELL STREET

Introduction

1. This supplementary paper presents the revised design of the captioned Upgrading/Improvement ("U/I") works ("the revised design") in response to the following concerns raised by Members of the Antiquities Advisory Board ("AAB") at its meeting held on 27 June 2013:

(a) possible visual impact on the declared monument and interference such as vibration induced by the works (Paragraph 15 of the minutes refers);

(b) type of masonry for covering the skin wall (Paragraphs 12 & 13 of the minutes refer);

(c) potential impact on the disused tunnels as well as the portals at Duddell Street (Paragraphs 11 & 14 of the minutes refer);

(d) exploration of other methods/design options to avoid backfilling of disused tunnels and construction of the skin wall (Paragraph 20 of the minutes refers); and

(e) potential adverse impact on the roots of the existing wall trees due to the proposed works and further consultation with independent tree experts on the proposed works (Paragraphs 12, 18 & 19 of the minutes refer).

2. In light of Members' comments and in consultation with the relevant government departments, we have amended the U/I design for the retaining wall with Feature No. 11SW-B/R93 (Sub-division No. 1), and recommend the revised design for Members' consideration.

The Revised Design

3. After thorough study and review, a revised design, which mainly consists of installation of 6 nos. of soil nails of approximately 14m long at about 1m centre-to-centre horizontal and vertical grid pattern with vertical **recessed** soil nail head beams, is proposed to improve the safety standards of the man-made Feature No. 11SW-B/R93 (Sub-division No. 1). The major design revisions are:

(a) The number and length of the proposed soil nails are reduced;

(b) The originally proposed skin walls are replaced by vertical recessed soil nail head beams;

(c) The affected masonry blocks of the retaining wall will be salvaged and reinstated as the proposed masonry facing; and

(d) The existing portal entrances of the disused tunnels under the retaining wall will be preserved in situ.

A section showing the major features of the proposed U/I works and photomontages illustrating the appearance of the retaining wall upon completion of works are enclosed in **Attachment 1**.

4. Responses to Members' comments (as summarised in the above Paragraph 1) are highlighted below:

(a) Possible visual impact on the declared monument and interference

such as vibration induced by the works (Paragraph 15 of the minutes refers)

As the affected masonry blocks of the retaining wall will be reinstated with the salvaged masonry blocks, no visual impact is anticipated on the declared monument (i.e. Duddell Street Stone Steps and Gas Lamps) with the revised design. During the construction, the vibration induced will be continuously monitored by devices and will be minimised with a mix of hand coring and drilling. It is anticipated that the impact due to vibration on the declared monument is insignificant. In addition, ground settlement markers and building settlement markers will be installed in the vicinity and at the monument to closely monitor any adverse effects occurred due to the works.

(b) Type of masonry for covering the skin wall (Paragraphs 12 & 13 of the minutes refer)

The revised design consists of **recessed** vertical tie beams instead of the originally proposed skin walls. This significantly reduces the extent of the retaining wall to be affected by the proposed works. The affected masonry blocks will firstly be taken down, labelled, protected and stored before the proposed recessed vertical tie beams are constructed. After the completion of the works, the retaining wall will be reinstated with the salvaged masonry blocks trimmed to match the existing finishing surface with the recessed vertical tie beams covered by the masonry blocks. There will only be minor change to the appearance of the retaining wall upon completion of works due to proximity of cutting of the masonry blocks to the tree roots locations. The proposed works will echo with the existing appearance of the retaining wall and avoid damage to the wall tree roots as far as practicable.

(c) Potential impact on the disused tunnels as well as the portals at Duddell Street (Paragraphs 11 & 14 of the minutes refer)

During the construction, all soil nails will be constructed with hand coring (first 6m depth) and left-in casing (at least 4m in length). The tips of the lowest rows of soil nails will not penetrate the disused tunnels as well as the portals. The vibration generated will be minimised during construction of soil nails. No significant disturbance will be induced to the existing disused tunnels, which were backfilled decades ago, and Portals Nos. 43 & 44 during and after the proposed U/I works which will be further discussed in sub-section (d) below.

(d) Exploration of other methods/design options to avoid backfilling of disused tunnels and construction of the skin wall (Paragraph 20 of the minutes refers)

Under the revised design, construction of skin wall is not required for the proposed U/I works.

In respect of the disused tunnels, we consulted Geotechnical Engineering Office (GEO) of Civil Engineering and Development Department and the Geotechnical Advisory Unit (GAU) of our Department, and obtained the advice as extracted below:

GEO's Advice: "*The concerned wall is situated directly above the disused tunnel…*" (Portals 43 & 44), and "*In this connection, the stability of the wall and the disused tunnel is inter-related. An integrated approach should preferably be adopted to upgrade the wall and at the same time strengthen the disused tunnel lining where appropriate.*"

GAU's Advice: "*…the reinforced lintel was found corroding at that time* (during a tunnel network investigation carried out in 1982)…", and "*These two sections of disused tunnel* (i.e. Portals 43 & 44) *if not properly maintained may*

> *eventually collapse, leading to surface subsidence at Ice House Street. As such, it is advisable and appropriate to backfill these two disused tunnel* (i.e. Portals 43 & 44) *as part of the current slope upgrading work.*"

With due consideration of overall stability, public safety and heritage conservation for the disused tunnels in the long term, **reversible methods** will be employed to backfill the disused tunnels, while the portal entrances will be retained in situ.

(e) Potential adverse impact on the roots of the existing wall trees due to the proposed works and further consultation with independent tree experts on the proposed works (Paragraphs 12, 18 & 19 of the minutes refer)

According to the tree surveys carried out by the Project Consultant (Ove Arup & Partners Hong Kong Ltd), the conditions of the existing wall trees (Ficus virens var. sublanceolata) along the crest of Feature No. 11SW-B/R93 are considered to be fair with no significant defect observed. During the setting out for the proposed U/I works, all soil nail holes will be formed by hand coring (for the first 6m) with sufficient clearance from the adjacent tree roots. If necessary, landscape architect will be consulted on any trimming of tree roots. In order to reduce the threat of grout to tree roots and tree growth, left-in casing (at least 4m in length) would be provided for each soil nail for prevention of leakage of grout contaminating the surrounding soil.

The original design scheme was submitted to Tree Management Office (TMO) of the Greening, Landscape and Tree Management Section of Development Bureau for comment in 2013. It offered the following advice for minimising impact on the existing wall trees:

1. Avoid building a skin wall to cover the surface roots on stone wall;
2. Minimise no. of soil nails and avoid installing soil nails too close to the surface roots on retaining wall;
3. Propose measures that can minimise the adverse effect to the soil and roots behind the retaining wall during grouting while installing soil nails; and
4. Pruning at the major tree roots is not recommended.

TMO has no further comment on the revised design which has duly incorporated the above comments.

To further assess the impact on the existing trees on site and identify appropriate protective measures in respect of management of trees on site, a Tree Preservation and Removal Proposal with the revised design scheme was submitted and approved by Lands Department in mid-2016.

5. The revised design has taken into account Members' concerns as detailed above and addressed other relevant government departments' comments. The impacts of the revised design on the existing masonry wall will be kept minimal and therefore considered acceptable.

Implementation and Documentation

6. A detailed photographic and cartographic survey will be conducted by experienced surveyors/conservationists before, during and after the completed U/I works to provide important reference/record. These survey reports/records, together with all Heritage Impact Assessment (HIA) studies and site inspection records, will be kept at the site office and made available to the users and professionals who are responsible for up-keeping the declared monument and managing the changes of the heritage site during the construction period.

7. Documentation of the whole U/I works and mitigation measures, from conceptualisation to construction stages, will also be required, so that an understanding of the changes to the heritage site is recorded to inform all relevant parties. Such documentation, such as construction drawings and photos of the U/I works in process, may also form educational materials displayed to the public as part of the interpretation strategies. Upon the completion of the U/I works, all these documents will be submitted to Antiquities and Monuments Office (AMO) for record.

Conclusion

8. The revised design consists of installation of soil nails with vertical recessed soil nail head beams. The masonry blocks affected will be reinstated by the salvaged existing masonry facings with similar pattern, of which the impact is minimal and acceptable to AMO, with a view to integrating the proposed works with the existing Feature. The revised design has addressed Members' comments expressed at the meeting held on 23 June 2013 (Board Minutes AAB/3/2013-14 refer) and is considered visually harmonious with the Duddell Street Steps and Gas Lamps.

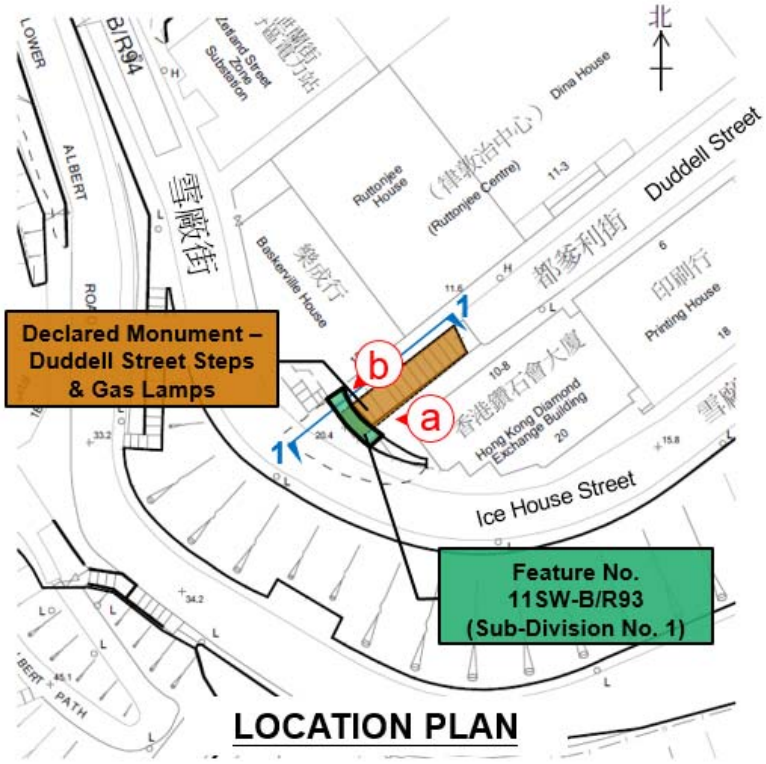
9. We invite Members' support and approval of the HIA Report for the captioned project.

Highways Department
September 2018

Attachment 1

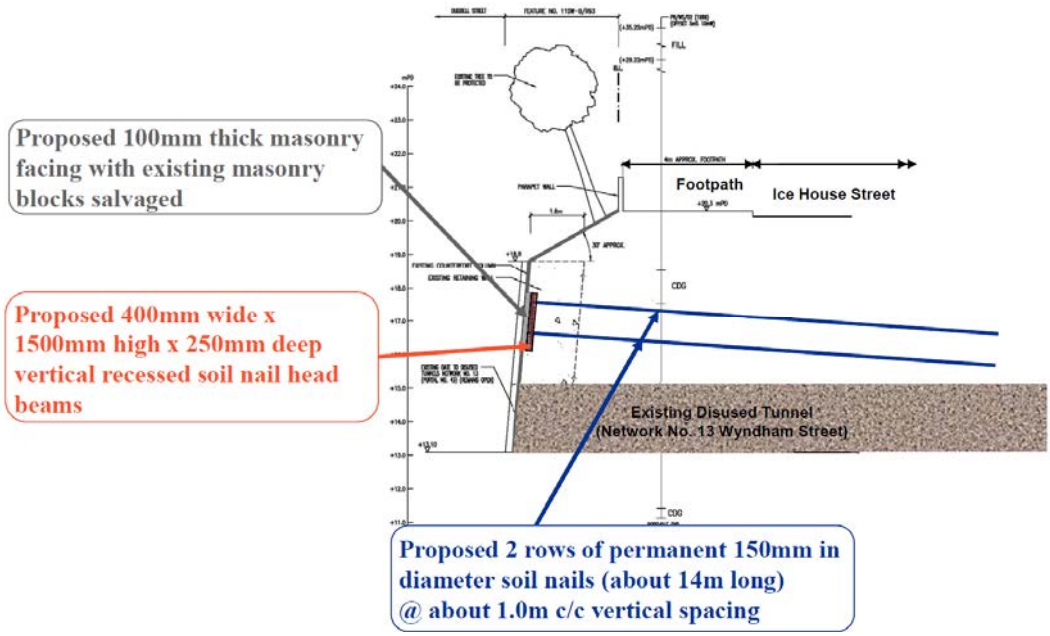
Feature No. 11SW-B/R93, Duddell Street

- Slope Height: Maximum about 7m; Length: About 17m



LOCATION PLAN

- Proposed upgrading works (at Sub-Division No. 1):
  - ➢ Installation of soil nails with vertical recessed soil nail head beams



SECTION 1-1: TYPICAL CROSS-SECTION

Annex B

General View of South-eastern Side of the Feature (View a)

General View of North-western Side of the Feature (View b)

General View of Declared Monument (Duddell Street Steps and Gas Lamps)

Annex B

View a:

Before Slope Upgrading Works

Feature No. 11SW-B/R93

After Slope Upgrading Works

Vertical Recessed Soil Nail Beam Covered with Existing Masonry Blocks

View b:

Before Slope Upgrading Works

Feature No. 11SW-B/R93

After Slope Upgrading Works

Vertical Recessed Soil Nail Beam Covered with Existing Masonry Blocks