Agreement No. CE 26/2011(GE)
Landslip Prevention and Mitigation Programme, 2011, Package H
Natural Terrain Hazard Mitigation Works
Investigation, Design and Construction

Natural Terrain Hazard Mitigation Works at
Study Area 11NE-B/SA3,Razor Hill, Clear Water Bay Road
Project Profile

Fugro (Hong Kong) Limited
for
Civil Engineering and Development Department

MateriaLab Consultants Limited
In Association with CREW Limited

February 2018

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Document Ref. 120141/NTHS/C/01

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Date : 15th February, 2018

FUGRO (HONG KONG) LIMITED

TABLE OF CONTENTS

FIGURES

PLATES

APPENDICES

1. INTRODUCTION

1.1 Project Title

The project title is Natural Terrain Hazard Mitigation Works at the lower portion of Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road (hereinafter referred to as 'the Project'). The project is under Agreement No. CE26/2011(GE) – Landslip Prevention and Mitigation Program, 2011, Package H, Landslip Prevention and Mitigation Works – Investigation, Design and Construction.

1.2 Name of Project Proponent

The project proponent is the Geotechnical Engineering Office (GEO), Civil Engineering and Development Department (CEDD) of the Hong Kong Special Administrative Region (HKSAR).

Fugro (Hong Kong) Limited (FHK) is the appointed Consultant under Agreement CE26/2011(GE). MateriaLab Consultants Limited (MCL) in association with Coalition for Research on Ecology and Wildlife Limited (CREW), has been commissioned to prepare this Project Profile for permission to apply directly for an Environmental Permit (EP) under the Environmental Impact Assessment Ordinance (EIAO).

1.3 Name and Telephone Number of Contact Person(s)

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1.4 Purpose and Nature of Project

In 2010, the 10-year Extended Landslip Preventive Measures (LPM) Programme, which focused on known high-risk man-made slopes affecting major roads and developments in Hong Kong was completed. To continue with the LPM works an Extended LPM Programme was initiated by the Geotechnical Engineering Office (GEO) of the Civil Engineering and Development Department (CEDD) to launch a landslip Prevention and Mitigation Programme (LPMitP) to focus on man-made slopes with moderate risk and also to carry out hazard mitigation works for natural slopes. The objective of the LPMitP is to contain the landslide risks in Hong Kong within an "as low as reasonably practicable" level that is commensurate with the international best practice in risk management.

FHK was appointed by GEO of CEDD in 2012 under the Agreement to undertake Natural Terrain Hazard Study (NTHS) for the Study Area 11NE-B/SA3 – Razor Hill, Clear Water Bay Road (hereinafter referred to as "the Study Area"). The Study Area is a high priority natural terrain area that poses potential natural terrain hazards to the Clear Water Bay Road, a bus stop and a residence "Air House" located at its toe. Based on findings of the study carried out for the Study Area, it was concluded that hazard mitigation works (HMW) are required to mitigate the landslide risk of the Study Area. Proposed hazard mitigation works (HMW) include installation of soil nails and flexible barriers. Maintenance stairways and access would be provided to facilitate future maintenance at the proposed work locations. Landscaping works are also provided to reduce the visual impact of the mitigation works and to enable the works to blend in with surrounding areas.

The Study Area as shown in **Figure 1** is located in Sai Kung District near and to the west of the junction of Clear Water Bay Road and Hiram's Highway. The Study Area is a northeast-facing hillside above Clear Water Bay Road with elevations ranging from 165 mPD to 420 mPD. The Study Area encompasses about 8.8 ha of natural hillside from the summit of Razor Hill down to the crest of some registered man-made slopes at its toe. A private residence "Air House" is located at the northern side of Study Area near its toe. The Study Area is generally covered with moderate to dense vegetation.

The Study Area falls within a Conservation Area (CA) in the Outline Zoning Plan (OZP) S/SK-TLS/8. In order to mitigate the potential hazards resulting from natural terrain open hillside landslides, topographic depression failure and boulder falls at the Study Area, HMW are required at the lower portion of the Study Area (hereafter referred to as "the Works Area") above the Clear Water Bay Road. The Works Area is divided into Works Area A, Works Area B and Works Area C as shown in **Figure 2**.

The proposed HMW mainly include installation of soil nails and flexible barriers and the associated maintenance access as shown in **Figure 3**. The provision of the HMW at required locations would reduce the consequences of the landslides on nearby residential buildings or major transportation corridors.

1.5 Number and Types of Designated Project to be covered by the Project Profile

The Works Area of the Project falls within a Conservation Area under the approved Tseng Lan Shue Outline Zoning Plan S/SK-TLS/8. According to Item Q.1, Part 1 of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), the Project is a Designated Project (DP) requiring an Environmental Permit (EP) for its construction. This Project Profile is prepared for direct application of EP in accordance with the EIAO.

1.6 Location and Scale of Project

The Works Area (approximately 24680 m^2) is shown in **Figure 1**. The Works Area is subdivided to 3 Works Areas (i.e. Works Areas A, B and C) as shown in **Figure 2** for ease of illustration. **Plate 1** shows an overview of the surrounding environment of the Study Area. **Plate 1A** shows the approximate location of the proposed HMW and views around the Works Area. General gradients of the Works Area are shown in four cross-sections (**Figures 4, 5, 5A and 5B**), at locations as shown in **Figure 2**.

The proposed HMW include the following with the extent shown in **Figure 3**:

- Installation of approximately 845 nos. soil nails with drillhole size of 150mm diameter at 1.0 to 2.0m spacing (drilling depth is about 5 – 8m) at the western portion of the Works Area.
- Provision of approximately 340m long, 4-6m high flexible barriers at the toe portion of the Works Area.
- Installation of approximately 168 nos. anchors with drillhole size of 100mm diameter for flexible barriers.
- Construction of concrete maintenance access with masonry as surfacing, or steel maintenance staircase with subdued colour paint adjacent to the flexible barriers (600mm wide, approximately 365m long), and concrete / steel maintenance staircase with subdued colour paint leading to the flexible barriers (600mm wide, approximately 165m long).

  (Note: With a view to reduce permanent vegetation loss, steel maintenance staircases adjacent to and leading to the flexible barriers are proposed and are subject to the final acceptance by the relevant Maintenance Parties.

- Landscaping works (hydroseeding of grass mix and planting of shrubs in soil nailing areas, planting of shrubs in pits in front of the flexible barriers and provide subdued colour paint to the flexible barriers).

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

The proposed HMW in the Works Area will be implemented as part of the Agreement No. CE26/2011 (GE). GEO/CEDD is the Project Proponent with overall responsibility for the planning, design and construction works. FHK, as the appointed Consultant of GEO, will undertake the detailed design, tendering and construction supervision of the proposed natural terrain hazard mitigation works. The proposed works will be implemented by a Contractor to be appointed by CEDD.

Engineering design of the proposed HMW at the Works Area is shown in **Figure 3** and illustrated in **Appendix A**. It is envisaged that the proposed HMW at the Works Area will involve the following main activities:

1. **Site preparation:** involves general site clearance and erection of hoarding/ chain link fence.

2. **Installation of soil nails:** involves drilling into soil/rock, followed by installation of steel bar and grouting at required locations. The methodology for installation of soil nails is given in **Appendix H**.

3. **Construction of flexible barriers and provision of maintenance access/ staircases:** involves the erection of tensioned wire mesh fences across posts supported on anchor foundation. The anchor foundation will be formed by drilling into soil/rock, followed by installation of steel bar and grouting. Steel maintenance access / staircases with subdued colour paint are preferably be adopted. The steel access / staircases are very flexible method which can be constructed to "bridge over" the area where extensive tree roots are identified on site.

   The locations and the footprint of the proposed HMW have been selected in the detailed design to avoid tree felling. There is flexibility to adjust the exact locations of the flexible barriers, maintenance access/ staircases and installation of soil nails in accordance with the findings of topographical survey to avoid affecting existing trees.

4. **Landscaping works:** involves the possible provision of aesthetic and landscape treatments to the flexible barriers, soil nailed areas such as hydroseeding, planting of native seedlings and provide subdue colour painting to the flexible barriers.

Public consultation with Sai Kung District Council and the owner of Air House had been made and there had been no objections to the proposed HMW received from both parties. The concern raised by the owner of Air House has been addressed in **Section 4.3** of this Project Profile. The owner of Air House will be notified of the commencement of construction works.

2.2 Tentative Project Timetable

The construction period is expected to last for 22 months. The project is scheduled to commence in February 2019 and to be completed in November 2020. The estimated durations of various construction activities in each Works Area are summarized in **Table 2.1, 2.2 and 2.3** respectively and some of the construction activities occurred in each Works Area may be carried out concurrently. The tentative Construction Programme of the Project is detailed in **Appendix B**.

Table 2.1 Duration of Construction Activities for Works Area A

Item	Construction Activities	Estimated Duration (months)
1	Site preparation	2
2	Installation of soil nails	-
3	Construction of flexible barriers and provision of maintenance access/ staircases	8
4	Landscaping works	3

Table 2.2 Duration of Construction Activities for Works Area B

Item	Construction Activities	Estimated Duration (months)
1	Site preparation	3
2	Installation of soil nails	3
3	Construction of flexible barriers and provision of maintenance access/ staircases	9
4	Landscaping works	3

Table 2.3 Duration of Construction Activities for Works Area C

Item	Construction Activities	Estimated Duration (months)
1	Site preparation	3
2	Installation of soil nails	6
3	Construction of flexible barriers and provision of maintenance access/ staircases	-
4	Landscaping works	3

2.3 Interactions with Other Projects

The Works Area is located at Razor Hill next to Clear Water Bay Road, which is located at a significant distance (at least 700m) away from other Study Areas being studied/ construction works in progress (11NE-B/SA2, 11NE-B/SA1, 11NE-B/SA5, 11NE-A/SA2, 11NE-B/SA4, 11NE-D/SA1, 12NW-C/SA3), such that the potential interactive environmental impact from concurrent construction works is not a concern, The locations of other Study Areas are shown in **Appendix C**.

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 General

This section presents an outline of the major elements of the surrounding environment which might have an effect on the existing environmental condition of the Works Area and its vicinity. It also identifies the existing and planned sensitive receivers that might be affected by the Project.

3.2 Noise

The Noise Sensitive Receivers (NSRs) within 300m of the Works Area have been considered. The nearest NSRs from the site are located immediately at the toe of Razor Hill (Air House) and on the opposite side of Clear Water Bay Road which consists of a number of residential village houses. The representative NSRs have been identified and summarized in **Table 3.1**. **Figure 2** shows the locations of the representative NSRs.

Table 3.1 Representative Noise Sensitive Receivers (NSRs)

NSR	Description	Type	No. of Storey	Distance* from Temporary Storage Area (m)	Distance* from Works Area A (m)	Distance* from Works Area B (m)	Distance* from Works Area C (m)
N1	The Green Villa House No. 11	Residential	3	244	102	114	179
N2	Las Pinadas House No. E1	Residential	3	118	51	156	242
N3	Air House	Residential	2	177	56	30	75
N4	Las Pinadas House No. E16	Residential	3	40	50	148	292

* Distance is the shortest distance between Individual Works Areas/Temporary Storage Area and NSRs

The major source of existing noise would be road traffic from the Clear Water Bay Road in this district. According to "The Annual Traffic Census 2016" published by the Transport Department, the traffic density of this section of Clear Water Bay Road is moderate and it is expected relative higher during weekends and public holidays. Thus, the ambient noise level would be moderate.

3.3 Air Quality

Representative air sensitive receivers (ASRs) identified within 300m of the Works Area are listed in **Table 3.2** and illustrated in **Figure 2**.

Table 3.2 Representative Air Sensitive Receivers (ASRs)

ASR	Description	Type	No. of Storey	Distance from Temporary Storage Area (m)	Distance from Works Area A (m)	Distance from Works Area B (m)	Distance from Works Area C (m)
A1	The Green Villa House No. 11	Residential	3	244	102	114	179
A2	Las Pinadas House No. E1	Residential	3	118	51	156	242
A3	Air House	Residential	2	177	56	30	75
A4	Las Pinadas House No. E16	Residential	3	40	50	148	292

In the absence of on-site air quality monitoring data for the Works Area of the Project at Razor Hill, the annual average concentrations of pollutants measured at the nearest air monitoring station of Environmental Protection Department (EPD) at Tseung Kwan O would be used as a reference to provide information on the background air pollutant levels.

The annual average concentrations of SO_2, RSP(PM10), FSP(PM2.5) and NO_2 recorded at Tseung Kwan O Air Monitoring Station as reported in the "Air Quality in Hong Kong 2016" published by EPD are compared against the annual Air Quality Objectives (AQOs) under the Air Pollution Control Ordinance. The results are summarized in **Table 3.3**.

Table 3.3 The Annual Averages of Gaseous Pollutants Recorded at EPD's Tseung Kwan O Air Monitoring Station

Pollutant	2016 Annual Average Concentration ($\mu g/m^3$)	Annual AQOs
Sulphur Dioxide (SO_2)	7	----
Respirable Suspended particulates (PM10)	27	50
Fine Suspended Particulates (PM2.5)	17	35
Nitrogen Dioxide (NO_2)	29	40

Vehicle travelling on Clear Water Bay Road is the major source of air pollution in the vicinity of the Works Area for the Project. No other source of existing air pollution has been identified. The level of air pollution from vehicular emissions is expected to be relatively low given the Project is located in rural area with relatively lower traffic flow. It is expected the background air pollution levels at the Works Area are lower than those obtained at the Tseung Kwan O Air Monitoring Station since the source of the pollutants at Tseung Kwan O monitoring station are mainly due to heavy traffic flow in commercial area comparing to the relatively low traffic flow on Clear Water Bay Road. Therefore the air pollution levels at the Works Area should meet the current AQOs.

3.4 Water Quality

There is no existing stream or sensitive water body within the Works Area. Surface runoff is collected by the surface channel at the toe of the Study Area and along Clear Water Bay Road, flows through underground culverts across Clear Water Bay Road towards the northeast, then ultimately discharging into the Hebe Haven at the area near Royal Bay.

3.5 Ecology

Habitat

The Works Area is a secondary forest dominated by *Symplocos glauca* (羊舌樹) and *Machilus chekiangensis* (浙江潤楠), with the understory occupied by some dominant local shrub and herbaceous species, e.g. *Sarcandra glabra* (草珊瑚), *Cyclosorus parasiticus* (華南毛蕨), *Cibotium barometz* (金毛狗) and *Psychotria asiatica* (山大刀) (**Plate 5.1**). Tree age and size decrease with increased altitude. The canopy cover of the woodland is moderately dense in general. The height of the forest is ranged from 5m to 10m.

Aerial map shows continuous vegetation of woodland at the Razor Hill. Field surveys were conducted on 31st January 2015 and 4th July 2015 for the Works Area (see **Plates 5.2 and 5.3**). The continuous forest was verified with the same dominant plant composition. There is an ephemeral drainage line at the east of the Works Area. It was found dry even in wet season and this natural section is full of rock and stones. Very slow flow of shallow water from groundwater seepage was observed at the end point at a culvert passing through Clear Water Bay Road.

Flora

Vegetation and plant species surveys of the Works Area were conducted on 31st January 2015 and 4th July 2015. All plants including ferns, gymnosperms and angiosperms found in the Works Area were recorded by direct observation. Plant individuals which were hard to approach were identified using a pair of 10 x 42 binoculars. The relative abundance of each plant species in the Works Area was also estimated and presented in **Appendix D**. For all the plant species recorded, its status in Hong Kong was

assessed according to Corlett *et al*. (2000) with updates from published and unpublished data and personal observations.

A total of 108 plant species were recorded on the Works Area, including 55 woody species, 35 climbers, 9 herbaceous species, 8 fern species and 1 parasitic species. The most abundant tree species are *Symplocos glauca* (羊舌樹) and *Machilus chekiangensis* (浙江潤楠). *Sarcandra glabra (*草珊瑚), *Cyclosorus parasiticus* (華南毛蕨), *Cibotium barometz* (金毛狗) and *Psychotria asiatica* (山大刀) are abundant understory species in the Works Area. Majority of the recorded species is either very common or common in Hong Kong.

Upon the field surveys carried out on 31st January 2015 and 4th July 2015, a total of five kinds of plant species of conservation importance have been identified in the Proposed Works Area, namely *Aquilaria sinensis* (土沉香), *Pavetta hongkongensis* (香港大沙葉), *Cibotium barometz* (金毛狗), *Ania hongkongensis* (香港安蘭) and *Gnetum luofuense* (羅浮買麻藤) and their locations are shown in **Figure 3** and **Plate 5.2**. Details of the findings for these five kinds of plant species of conservation importance are described in the following 5 paragraphs. Consideration on the location of proposed HMW to avoid affecting these species has been taken into account.

(i) *Aquilaria sinensis* (土沉香)

A total of 19 individuals of *Aquilaria sinensis* (土沉香) were recorded in the Works Area. In terms of both healthiness and form (refer to **Appendix D)**, among these 19 individuals, 11 mature individuals were generally in good to fair condition, whilst 5 individuals were generally in fair to poor condition with three of which observed being damaged or harvested, and 3 saplings / seedlings were generally in good condition. On the other hand, among these 19 individuals, 17 of which were observed locate at the western portion of the Works Area, indicating that a small population exists in a small area within the woodland. This population mainly occurs on the lower portion of the Works Area as it is much steeper on the upper portion which is mostly avoided by the species. Further, trees are sparser on the upper portion of the Works Area which implies that an earlier successional stage is present in the upper portion. *Aquilaria sinensis* (土沉香) is of conservation importance according to the Technical Memorandum on Environmental Impact Assessment Process of the EIA Ordinance (Cap 499) as it is listed as rare and precious plant of Hong Kong (AFCD, 2003) and listed as vulnerable in both IUCN Red List (IUCN, 2014) and China Plant Red Data Book (Fu and Jin, 1992).

(ii) Pavetta hongkongensis (香港大沙葉)

Two saplings of *Pavetta hongkongensis* (香港大沙葉) was recorded at the eastern portion of the Works Area. This species is protected by the Forestry Regulations under the Forests and Countryside Ordinance (Cap 96).

All the identified *Aquilaria sinensis* (土沉香) and *Pavetta hongkongensis* (香港大沙葉) will be protected and retained *in-situ* and none of them will be pruned or damaged due to the mitigation works. Protective measures for these two species are provided in Section 5.5. The proposed flexible barriers and soil nailing area will be far away from these 2 kinds of identified species.

(iii) *Cibotium barometz* (金毛狗)

Herbaceous species of conservation importance was also recorded during the surveys. *Cibotium barometz* (金毛狗) are relatively abundant on the western and eastern portions of the Works Area. At least 63 individuals were recorded during the survey. This species is protected by the Protection of Endangered Species of Animals and Plants Ordinance (Cap 586). However it is very common locally and often forms large patches under forest in most parts of Hong Kong despite it has been extensively collected outside Hong Kong for medicinal uses.

(iv) Ania hongkongensis (香港安蘭)

Further, one individual of *Ania hongkongensis* (香港安蘭) was recorded in the western part of the Works Area near the population of *Aquilaria sinensis* (土沉香). All wild orchids are protected by law (Forestry Regulation Cap. 96A) in Hong Kong despite *A. hongkongensis* (香港安蘭) is very common locally.

All individuals or patches of *Cibotium barometz* (金毛狗) and *Ania hongkongensis* (香港安蘭) appeared healthy and are undisturbed. The proposed flexible barriers and soil nailing area will be far from these 2 kinds of identified species. All individuals or patches will be retained *in-situ* and protected during the course of work.

(v) *Gnetum luofuense* (羅浮買麻藤)

One patch of *Gnetum luofuense* (羅浮買麻藤), a climbing gymnosperm, was recorded in the western part of the Works Area which is close to the *Aquilaria sinensis* (土沉香) population. This species is listed as “Near Threatened” in IUCN Red list (IUCN 2014) due to the potential declining threat caused by habitat loss. However, it is not protected under Cap. 96A nor Cap. 586 and is common in the forest in Hong Kong (Corlett *et al*., 2000).

Fauna

All wild birds are protected in Hong Kong by the law Cap. 170 Wild Animals Protection Ordinance. Transect survey detected two acoustic records of Rufous-capped Babbler (*Stachyridopsis ruficeps*; 紅頭穗鶥), which was listed as Local Concern according to Fellowes *et al*. (2002). No signs of breeding birds or nests were recorded during both day and night surveys. This small-sized species would not be affected by the works as the continuous woodland surrounding the Works Area would provide plenty of suitable habitats and resources for its inhabitation. An individual of Crested Serpent Eagle (*Spilornis cheela*; 蛇鵰) was further recorded in the survey in July which is of Local Concern according to Fellowes *et al*. (2002). However this individual was recorded flying over but not directly associated with the woodland. It is unlikely to be affected by the mitigation works in the Works Area. Bird species and abundance recorded during the surveys are listed in **Appendix D**.

Based on the ecological surveys that were carried out in both wet and dry season, including night surveys, revealed that there is no species of mammals and herpetofauna,

butterflies and Odonates within the Works Area. The natural rock section of the ephemeral drainage line was found dry even in wet season. Very slow flow of shallow water from groundwater seepage was observed at the end point at a culvert passing through Clear Water Bay Road (**Plates 5.2 and 5.3**). However, no amphibians were detected.

3.6 Landscape and Visual

The Works Area is located at the lower portion of the Study Area, which is a north-facing natural hillside of Razor Hill along Clear Water Bay Road behind the Air House, with natural vegetation coverage.

Based on desktop study on maps and photographs, the major landscape elements lied within the 100m extent of the surrounding area from the Proposed Works Area. Field survey assessment has identified four landscape resources (LRs) and three landscape characters areas (LCAs). The Zone of Visual Influence (ZVI), LRs and LCAs are illustrated in **Figure 6**. Photographic records of the various LRs and LCAs are shown in **Plate 6**.

LR1 Hillside Woodland:

The Works Area is embedded in the woodland of Razor Hill, details of habitat and vegetation refer to “Habitat” and “Flora” in Section 3.5. Another patch of woodland at Ta Ku Ling is separated by the Clear Water Bay Road which is downhill from road level of Clear Water Bay Road. The LR is characterised by various species of native plant dominated by *Symplocos glauca* (羊舌樹), *Machilus chekiangensis* (浙江潤楠), *Schefflera heptaphylla* (鵝掌柴) and *Ardisia quinquegona* (羅傘樹), as well as the recorded five kinds of plant species of conservation importance which include *Aquilaria sinensis* (土沉香), *Pavetta hongkongensis* (香港大沙葉), *Cibotium barometz* (金毛狗), *Ania hongkongensis* (香港安蘭) and *Gnetum luofuense* (羅浮買麻藤) as shown in **Figure 3**. Dominant undergrowth vegetation includes *Sarcandra glabra (*草珊瑚), *Cyclosorus parasiticus* (華南毛蕨), *Cibotium barometz* (金毛狗) and *Psychotria asiatica* (山大刀) are abundant understory species in the Proposed Works Area. Majority of the recorded species is either very common or common in Hong Kong. Area with plant species of conservation importance would be excluded from HMW. The sensitivity of undergrowth vegetation to the overall hillside woodland in LR1 and to the soil nailing area would be high. Previous tree surveys estimated that approximately 1240 number of trees are located within the Works Area (**Figure 3A**), with diameter at breast height (DBH), tree height and crown spread in the range of 0.1m - 1m, 0.6m - 16m and 1m - 10m respectively. Tables to present the percentage of trees in DBH range groups, tree schedule and tree group of common tree species found within Works Area A, B and C are presented in **Appendix D1**. For simplicity, tree group of common tree species found within Works Area A, B and C is given in **Table 3.4**.

Table 3.4 Tree group of common tree species found within Works Area A, B and C

Works Area	DBH Range	Range of Height	Range of Tree Crown Spread	Approx. percentage
A	<0.3m	3 – 8m	1 – 6m	76.5%
	0.3 – 0.75m	3 – 11m	2 – 8.5m	23%
	>0.75m	9m	7 – 8m	0.5%
B	<0.3m	0.6 – 8m	1.5 – 6m	80%
	0.3 – 0.75m	4 – 11m	2 – 8.5m	19.5%
	>0.75m	13 - 16m	9 – 10m	0.5%
C	<0.3m	1.5 – 8m	2 – 6m	82.5%
	0.3 – 0.75m	4 – 11m	2 – 8.5m	17.5%
	>0.75m	N/A	N/A	0%

Most of this area is designated as Conservation Area therefore the overall sensitivity of this natural woodland is considered as high.

LR2 Rural Development Area:
Aiming at conserving natural landscape and rural character under the Tseng Lan Shue OZP, residential developments surrounding the Works Area are confined to a residence "Air House"; and the opposite Ta Ku Ling San Tsuen, which includes Las Pinadas, the Green Villa, Capital Villa, Capital Garden, Grandview Villa and Celestial Villa (grouped as "the Villas" hereafter). This LR is characterised by the low rise and low density residential areas with ornamental gardens. This LR is readily capable of accommodating change and its sensitivity is considered to be low.

LR3 Major Transportation Corridor:

Clear Water Bay Road is the main traffic road alongside the Works Area. It separates Razor Hill and the Air House at the south from Ta Ku Ling and the Villas at the north. The roadside trees are dominated by the exotic *Acacia confusa* (台灣相思) and *Melaleuca cajuputi cumingiana* (白千層). This LR is readily capable of accommodating change and its sensitivity is considered to be low.

LR4 Ephemeral Drainage Line

There is an ephemeral drainage line at the east of the Works Area (see **Plates 5.2 and 5.3**). It was found dry even in wet season and this natural section is full of rock and stones. Very slow flow of shallow water from groundwater seepage was observed at the end point at a culvert passing through Clear Water Bay Road. Therefore its sensitivity is considered to be low.

LCA1 Natural Hillside Landscape:

This LCA comprises of the natural hillside and green belt of Razor Hill and Ta Ku Ling. The overall sensitivity of this LCA is considered as High.

LCA2 Urban Fringe Village Landscape:

This LCA encompasses the low density residential area including the Air House and Ta Ku Ling San Tsuen. This developed residential area is a common landscape and the overall sensitivity is considered as low.

LCA3 Transportation Corridor Landscape:

This LCA refers to the transportation network of Clear Water Bay Road and the access roads connecting the Air House and Ta Ku Ling San Tsuen. The overall sensitivity of this road, which receives high traffic disturbance, is considered as low.

For visual impact assessment, the Zone of Visual Influence (ZVI) is defined which includes all areas from which the Works Area can be seen or the viewshed formed by natural/ manmade features such as existing ridgelines, built development or woodland. Cross-sections demonstrating various degree of visibility in the ZVI are shown in **Figure 4 and Figure 5.** The visibility of the Works from key Visually Sensitive Receivers (VSR) is verified through field surveys and desktop study of topographical plans and aerial photographs.

The continuous patch of wooded hillside terrain along Clear Water Bay Road forms the major scenic backdrop within the ZVI (**Figure 6**). The proposed HMW are located within the dense hillside woodland in which the topography, existing trees and building blocks will screen the construction works from much of the surrounding areas. The ZVI is restricted to the three Visually Sensitive Receivers (VSR) identified and described as below.

The three VSR are identified as the residents of the Air House (VSR1), the localized residents of the Villas in the Green Villa, Las Pinadas and Capital Garden, with those blocks close to and facing the Clear Water Bay Road (VSR2) and the highly mobile travellers along Clear Water Bay Road (VSR3). Location and visual area of each VSR are presented in **Figure 7**. The locations of Vantage Point (VP) are mapped on **Figure 8** and the corresponding photographs are shown in **Plate 7**.

The village houses near the Ta Ku Ling San Tsuen Public Toilet are located west to the Villas, which are far away (>200 m) and at further lower elevation with respect to the Villas. With further screening by the existing woodland in between the separation distance, these residents are hardly experience a glimpsed view towards the Works Area (**Plate 6.2**).

3.7 Cultural Heritage

Desktop review and field survey found no declared monuments and proposed or Grade 1–3 historic buildings listed by the Antiquities and Monument Office (AMO) at the Proposed Works Area and the surrounding environment. There is also no Sites of Archaeological Interest (SAI) listed by the AMO, where the nearest SAI locates at least 1km from the Works Area. Therefore no essential terrestrial archaeological survey is considered.

One grave was found (see **Plates 5.2 and 7.6**) and a precautionary engineering design on the location of anchors and the alignments would be adopted to minimise the impact on the grave.

4. POSSIBLE IMPACTS ON ENVIRONMENT

4.1 General

The potential environmental impacts from the proposed HMW during the construction and operational phases are reviewed in Section 4.2 and Section 4.3 respectively.

4.2 Potential Environmental Impact during Construction Phase

Noise

Construction of the proposed HMW will be carried out during Monday to Saturday between 7:00am and 7:00pm, the working hours will be specified in the contract document. Currently, it is not envisaged that any construction works will need to be carried out outside the non-restricted hours. If at a later stage the appointed Contractor finds that it is necessary to carry out night time work, he must apply a Construction Noise Permit (CNP) and ensure full compliance with the requirements under the Noise Control Ordinance (NCO).

During the construction, the major noise source will be vehicular visits for transportation of equipment and materials to the site as well as powered mechanical equipment (PME) being used. The noise impact from vehicular visits to the site is not considered significant as only up to approximately 5 vehicle visits are expected per day and therefore not assessed.

The items of PME that are likely to be required for the proposed works have been identified and summarized in **Table 4.1** in accordance with the methodology specified in the Technical Memorandum on Noise from Construction Work Other than Percussive Piling (EPD, 1998).

Table 4.1 Identified Sources of Noise for Each Construction Activity

Works	PME	ID code	SWL, dB(A)
Site preparation	Breaker, hand-held, mass >10kg and <20kg	CNP 024	108
	Dump truck, with grab, 5.5 tonnes < gross vehicle weight <38 tonnes	See note (1)	105
Installation of soil nails	Air compressor, air flow <10m^3/min	CNP 001	100
	Generator, super silenced, 70 dB(A) at 7m	CNP 103	95
	Concrete mixer (petrol)	CNP 046	96
	Drill rig, rotary type (diesel)	See note (1)	110
	Grout mixer	See note (1)	90
	Grout pump	See note (1)	105
	Shotcrete pump	See note (1)	109
Construction of flexible barriers and	Air compressor, air flow <10m^3/min	CNP 001	100
	Generator, super silenced, 70 dB(A) at 7m	CNP 103	95

provision of maintenance access / staircase	Breaker, hand-held, mass >10kg and <20kg	CNP 024	108
	Drill rig, rotary type (diesel)	See note (1)	110
	Grout mixer	See note (1)	90
	Grout pump	See note (1)	105
Landscaping works	Lorry, with crane, 5.5 tonnes < gross vehicle weight < 38 tonnes	See note (1)	105

Note (1):

The Sound Power Levels (SWLs) of the PMEs presented are based on the "Technical Memorandum on Noise from Construction Work Other Than Percussive Piling" and EPD's guidance "Sound power levels of other commonly used PME" available at the website below:

http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

A summary of unmitigated construction noise levels to the identified NSRs is presented in **Table 4.2** by calculating the noise generated by each construction activity at each Works Area. The results indicate that the predicted noise levels at N3 (Air House) and N4 (Las Pinadas House No. E16 will slightly exceed the required noise standard 75dB(A). Therefore, noise mitigation measures are required to reduce the noise received at N3 and N4 to acceptable levels. Detailed noise assessment calculations are presented in **Appendix E**. Proposed noise mitigation measures are shown in **Appendix F**.

Table 4.2 Summary of Unmitigated Construction Noise Levels

NSR	Description	Predicted Sound Pressure Level (SPL)[1] dB(A)	Standard dB(A)[2,3]	Exceedance
N1	The Green Villa House No. 11	62 – 69	75	No
N2	Las Pinadas House No. E1	66 – 74	75	No
N3	Air House	67 – 77	75	Yes
N4	Las Pinadas House No. E16	74 - 77	75	Yes

1) Refer to **Appendix E** for the detailed assessment

2) Table 1B of Annex 5 of Technical Memorandum under EIAO

3) 75dB(A) refer to limit level during 0700-1900 hours on weekdays not being Sundays or general holidays

Air Quality

The vehicle visits to the site for the Project will be as few as five per day, therefore the exhaust emission from the vehicles is considered minor.

Dust and gaseous emissions may result from site excavation, drilling operation, trucks mobilization and material handling when the proposed HMW are carried out.

Concerning the nature of the proposed HMW, no major earthworks or open excavation will be required. Only some minor open excavation and concrete casting would be required for the foundation of flexible barrier and soil nail installation.

Dust could be generated from minor excavation, drilling operations and concrete casting. Other dust source may be generated from stockpiling of construction materials. Given the limited number of plants and equipment to be used, the dust impact should not be a concern and should be considered to be low impact. However, it would be important to ensure a good site practice on dust suppression to alleviate any potential dust emission impact on the ASRs to acceptable levels. The specific measures required are listed in Section 5.

Water Quality

One section of flexible barrier will be aligned across the ephemeral drainage line, whilst anchors will not be constructed on the ephemeral drainage line. The ephemeral drainage line was found dry from field survey. Only very slow flow of shallow water from groundwater seepage was observed at the end of the drainage line. The water quality impact is minimal. Nevertheless, potential sources of pollution may include runoff, erosion from exposed soil surface and stockpiles and wash water from dust suppression facilities. Good site practice is required to minimize the potential water quality impacts to the surrounding environment. The specific measures required are listed in Section 5.

Waste Management

The proposed HMW at the Works Area will generate the following types of waste:

- Construction and demolition (C&D) materials: mainly comprising inert excavated materials (e.g. soil, broken concrete) generated from construction of the flexible barriers and soil nailing works;
- A small quantity of non-inert C&D materials (C&D waste) that consist of timber, plastic and other solid waste would also be generated;
- General refuse mainly consists of packaging waste from construction materials and food waste from onsite workers;
- Any chemical waste such as lubricating oils generated from maintenance of construction equipment and vehicles.

A summary of estimated quantities of each type of waste materials generated from the proposed works is presented in **Table 4.3**.

Table 4.3 - Estimated Quantities of Waste Materials Generated from the Project

Type of Waste	Source	Estimated Volume (m^3)	Designated Waste Handling Facilities
Soil/rock	Drilling and excavation of foundation of flexible barriers	30	Public Fill at TKO Area 137
	Drilling of soil nails and excavation for soil nail head	165	
C&D waste	Site clearance	10	NENT Landfill
	Total	205	

C&D materials will be sorted into inert C&D materials and non-inert C&D materials (C&D waste) and transported to the designated area. The inert C&D materials will be disposed to Public Fill Reception Facility in Tseung Kwan O managed by CEDD and the C&D waste will be disposed to NENT landfill managed by EPD.

The quantities of general refuse and chemical waste arising from the proposed HMW in the Works Area is expected to be insignificant. Recyclable materials such as metals, papers and plastics in the general refuse (and in the construction waste) shall be segregated for recycling.

Provided that the wastes generated from the construction works are handled, transported, recycled as far as possible, and disposed of in accordance with the good site practices (as recommended in Section 5), it is not expected that the proposed works will generate any adverse environmental impact or waste management implications.

Ecology

Flexible barrier will be approximately 4m to 6m height and constructed along the toe of natural terrain within the Works Area as illustrated in **Figure 3**. The proposed works will also involve provision of 600mm wide maintenance access and staircases to the proposed flexible barriers. Soil nails (with drillhole size of 150mm diameter at 1m to 2m spacing and with drilling depth about 5 – 8m) will be installed mainly in the western part of the Works Area where it is naturally steeper than the other portions of the area. The locations and the footprint of the proposed HMW have been selected in the design to avoid tree felling. There is flexibility to adjust the exact locations of the flexible barriers, maintenance access/ staircases and installation of soil nails in accordance with findings of the topographical survey to avoid affecting existing trees.

Vegetation survey revealed that there are five kinds of plant species of conservation importance existing within the Proposed Works Area, namely *Aquilaria sinensis* (土沉香), *Pavetta hongkongensis* (香港大沙葉), *Cibotium barometz* (金毛狗), *Ania hongkongensis* (香港安蘭) and *Gnetum luofuense* (羅浮買麻藤). The proposed flexible barriers and soil

nailing area will be far from these five kinds of identified species. All individuals of these five kinds of species including mature individuals, saplings and seedlings will be protected and retained *in-situ*. Further, none of them will be pruned or damaged due to the HMW.

In order to minimize the impacts to existing trees, so that not more than one-third of its root system would be affected, tree protection zone (TPZ) for common tree species would be set either at least 1.5m from tree trunk or at half diameter of dripline, whichever is the greater. For existing trees with DBH 0.3m or above, full dripline for the downhill side would be maintained. TPZ would also be adjusted on site to include any observed anchor roots within dripline envelope. All the identified plant species of conservation importance will be enclosed within the protection zones/ exclusion zones which should include 1.5m setback from stems of mature individuals, and areas within 1m radius from the seedlings, ferns or herbs to be preserved on site. A minimum 1m setback from crown spread of the climbing species *Gnetum luofuense* (羅浮買麻藤) should be applied. Illustration of temporary protective fencing for the protected species is presented in Section 5.5 and shown in **Plate 8**.

In order to minimize potential adverse impact to existing trees, construction of steel maintenance access/ staircases to “bridge over” extensive tree roots on slope can be adopted wherever necessary and practical. This helps to avoid direct encroachment upon tree roots of any existing trees in the Works Area.

It is estimated that there will be temporary vegetation loss of approximately 373 m^2 of understorey area in order to facilitate the soil nailing activities. The temporary vegetation clearance is also aimed at providing sufficient working space for the workers to work safely on site. Further, construction of permanent structures, i.e. the flexible barrier and maintenance access and staircases, would result in permanent loss of approximately 80 m^2 of understorey area for any plant to grow. Majority of the understorey area is dominated by locally common or very common shrubs, herbs and saplings of tree species. Mitigation measures are proposed for reducing the environmental impact to both temporary and permanent loss of the understorey vegetation (see Section 5.5). None of any tree individual (diameter at breast height, DBH >= 95 mm) within the proposed works site will be fell based on the current design. No individual of plant species of conservation importance will be damaged by the proposed works. For temporary vegetation loss due to vegetation clearance for soil nailing activities and provision of working space, hydroseeding with shrub planting in soil nailing areas and shrub planting in front of flexible barrier will be applied as compensatory measure. The aim of hydroseeding is to allow the bare ground to be covered by fast growing grass, so that it helps to prevent erosion of soil, and loss of moisture and nutrients. This would facilitate natural recolonization of common plants. Besides, the greening work also mitigates landscape and visual impacts. Regarding the small area of permanent vegetation loss (approximately 80 m^2) due to construction of permanent structures, it is proposed to be mitigated by compensatory re-vegetation of the existing disturbed ground within the Works Area as far as practicable. Opportunities will also be sought for the compensatory re-vegetation on the existing disturbed area outside the Works Area.

No mammals and herpetofauna was detected in the ecological survey in the Proposed Works Area. A total of 10 bird species were recorded including two species with at least local concern (Fellowes *et al*., 2002). However, no sign of breeding birds or bird nest was found within the Proposed Works Area so no ecological impact was identified to the avifauna.

Landscape and Visual

The potential landscape and visual impacts include vegetation clearance, tree pruning (where found necessary and restricted to non-plant species of conservation importance only), temporary storage of construction materials and machinery operation for the construction of the flexible barriers, soil nailing and maintenance access in LR1. The construction of about 340m long, 4-6m high flexible barriers; approximately 845 nos. of soil nails with drillhole size of 150mm diameter at 1.0 to 2.0m spacing, and about 530m long, 600mm wide concrete / steel maintenance access result in approximately 373 m^2 of temporary and 80 m^2 of permanent loss of understory shrubs and herbaceous plants. The locations and the footprint of the proposed works have been revised and selected in the design to avoid any tree felling. There is flexibility to adjust the exact locations of the flexible barriers, maintenance access/ staircases and installation of soil nails in accordance with the findings of the topographical survey to avoid affecting existing trees. The following paragraphs explain how to minimise potential impacts on the tree roots in close vicinity. Details of pruning complied with “General Guidelines on Tree Pruning” promulgated by Greening, Landscaping and Tree Management Section (GLTMS) of Development Bureau (DEVB) and good site practice are mentioned in Sections 5.5 and 5.6.

In order to minimize the impacts to existing trees, so that not more than one-third of its root system would be affected, tree protection zone (TPZ) for common tree species would be set either at least 1.5m from tree trunk or at half diameter of dripline, whichever is the greater. For existing trees with DBH 0.3m or above, full dripline for the downhill side would be maintained. TPZ would also be adjusted on site to include any observed anchor roots within dripline envelope. The proposed soil nail arrangement, with the incorporation of TPZ, is shown in Figure 8A. All the identified plant species of conservation importance will be enclosed within the protection zones/ exclusion zones which should include 1.5m setback from stems of mature individuals, and areas within 1m radius from the seedlings, ferns or herbs to be preserved on site. A minimum 1m setback from crown spread of the climbing species *Gnetum luofuense* (羅浮買麻藤) should be applied. Illustration of temporary protective fencing for the protected species is presented in Section 5.5 and shown in **Plate 8**.

In order to minimize potential adverse impact to existing trees, construction of steel maintenance access/ staircases to “bridge over” extensive tree roots on slope can be adopted wherever necessary and practical. This helps to avoid direct encroachment upon tree roots of any existing trees in the Works Area. Temporary scaffolding, working platforms would be established during the construction work for work activities and mobilising equipment to further reduce impacts on existing trees.

All trees and any species of conservation concern will be retained during the works. No trees and plant species of conservation importance will be fell or transplanted. These existing trees together with the proposed shrubs act as a natural screen between the flexible barriers and VSR1, which is situated in front of the Proposed Works Area. Therefore the magnitude of change would be intermediate for LR1 and small to LCA1 in broader scale during construction phase. The impact significance to LR1 is moderate – significant and moderate to LCA1 and VSR1.

The natural screen of trees and the Air House itself also makes the flexible barriers and soil nails (which are installed below original slope profile) hardly visible to VSR3 coming from the east. The flexible barriers and soil nails are highly invisible to the opposite lane, which is at an elevation about 10m below the east–west lane. The Villas are situated 20m below Clear Water Bay Road. The natural terrain and roadside trees will make the flexible barriers and soil nails invisible from the south facing view of VSR2.

One of the flexible barriers would align across the natural section of the ephemeral drainage line. However this section was found dry and minimal impact to water quality is anticipated. Temporary access for manual delivery of equipment and construction of flexible barrier will be bridged over the ephemeral drainage line to maintain its drainage condition (see **Figure 9**). Orange net will be erected with a minimum clearance of 1.5m from both sides of the ephemeral drainage line as warning purpose. Anchor locations will be selected to avoid drilling at the ephemeral drainage line. Therefore the overall impact during construction phase is considered to be slight to LR2, LR3, LR4, LCA2, LCA3, VSR2 and VSR3. The overall impact significance to various receptors due to the proposed HMW is considered to be slight to moderate.

Based on the discussions above, the overall impact significance to various receptors due to the proposed HMW is considered to be slight to moderate and is summarised in **Table 4.4**.

Table 4.4 Impact significance to various receptors due to the installation of flexible barriers

Receptor Code	Name	Sensitivity	Magnitude of Change	Impact Significance
LR1	Hillside Woodland	High	Intermediate	Moderate – Significant
LR2	Rural Development Area	Low	Negligible	Slight
LR3	Major Transportation Corridor	Low	Negligible	Slight
LR4	Ephemeral Drainage Line	Low	Negligible	Slight
LCA1	Natural Hillside Landscape	High	Small	Moderate
LCA2	Urban Fringe Village Landscape	Low	Negligible	Slight
LCA3	Transportation Corridor Landscape	Low	Negligible	Slight
VSR1	Residents of the Air House	Medium	Small	Moderate
VSR2	Residents of the Villas	Low	Negligible	Slight
VSR3	Travellers along Clear Water Bay Road	Low	Negligible	Slight

Overall Impact Significance: Slight – Moderate

Although all trees will be retained and provide a natural screen blocking the view of the physical structure of the works, unsightly work activity and mobilisation of equipment may be momentarily visible to the resident of Air House (VSR1) and travellers along Clear Water Bay Road (VSR3).

In summary, potential landscape impacts during construction phase include changes due to temporary and permanent vegetation loss; potential impacts to existing trees, especially those within soil nailing areas; and one section of the flexible barriers would align across the natural section of the ephemeral drainage line. Potential visual impacts include unsightly work activities and mobilisation of equipment might be seen.

Cultural Heritage

No cultural heritage resources would be affected by the proposed HMW.

4.3 Potential Environmental Impact during Operational Phase

Following the HMW, there will be no constructive activities related to the Project during operational phase. Therefore, there will be no adverse environmental impacts on noise, air quality, water quality, waste and ecology impact to the sensitive receivers during the operational phase. Although the flexible barriers and soil nailing would change part of the landscape, as all trees and plant species of conservation importance will be retained, while most VSR are situated along the naturally downslope terrain with roadside trees

and man-made slope features in between, such change basically poses very insignificant landscape and visual impacts during operational phase. Flexible barriers would likely be non-visible at the Air House under long term mitigated situation. Photomontage of Year 10 is illustrated in **Plate 7.1A**. The function of the ephemeral drainage line would not be affected as that particular section of flexible barrier would actually bridge over it. As there are no cultural heritage resources in the vicinity of the Works Area, there will be no impact during operational phase.

5. ENVIRONMENTAL PROTECTION MEASURES

During the construction phase, the requirement specified in EPD's "Recommended Pollution Control Clause for Construction Contracts" will be followed. This document has covered areas of noise control, air pollution control, water pollution control and waste management. Specific control requirement during construction and operation are reviewed and presented below.

5.1 Noise

Construction Phase:

As revealed from the quantitative noise impact assessment presented in Section 4, while the proposed HMW at the Works Area will not require any major civil engineering works, potential construction noise impact would be expected at the nearby NSRs given to their proximity to the Site. Therefore, it is important to ensure that sufficient noise mitigation measures are implemented to alleviate the predicted noise impact to acceptable levels. The recommended construction noise mitigation measures are described as below.

Good Site Practices

Good site practices will considerably reduce any potential noise impact from construction works on NSRs. The following measures shall be implemented during the construction phase for the proposed works in the Works Area:

- The contractor shall submit the method of work, including the PME and sound-reducing measures intended to be used to the Engineer for approval before the commencement of any construction works;
- The number of PME used shall be kept to a minimum. Only well-maintained plant and equipment shall be used;
- Regular maintenance shall be provided to all plant and equipment;
- Equipment shall be shut down or throttled down to a minimum when they are not in use;
- Silencer and/or mufflers shall be used on the construction equipment to reduce noise without impairing machine efficiency. Purpose-built movable noise barriers shall be employed as necessary;
- No construction activities will be allowed during 7pm to 7am on weekdays and anytime on Sundays and Public Holidays.

Use of Quiet PME

Use of quiet PME is recommended for reducing the excessive construction noise predicted at the affected NSRs. Quiet PME have been identified based on the inventory on Quality Powered Mechanical Equipment (QPME) established by EPD. It should be noted that the types of quieter PME adopted in the assessment have been selected for the purpose of the quantitative assessment only. The Contractor may use other types of PME, which have the same or lower total sound power levels (SWLs), to meet its needs.

Use of Temporary Noise Barrier

Movable noise barriers are proposed for noise screening. Drilling rigs, air compressor, concrete pump and concrete mixer shall be operated behind movable noise barriers comprised of acoustic barrier material with a minimum of 10mm thick plywood (or 1mm thick steel outer skin) and a minimum of 50mm thick sound absorbing lining. The surface density of barrier materials shall be at least 10kg/m^2 to achieve maximum screening effect. Height of the movable barriers varies to suit the equipment and location, and that there will be no direct line of sight to the equipment. In general, movable noise barrier can achieve a 5dB(A) reduction for movable PME and 10dB(A) reduction for stationary PME depending on the actual design.

The Contractor may adopt alternative design of movable noise barrier which has demonstrated success to achieve at least same screening effects upon approved by the Engineer.

A schematic configuration of the sectional drawing showing the location of the proposed movable noise barrier and the identified NSRs are shown in **Appendix F**.

The environmental protection measures for various types of PME assumed in the construction noise assessment is proposed in **Table 5.1**. The noise reductions of typical movable barrier are referred to EIAO Guidance Note No. 9/2010, Preparation of Construction Noise Impact Assessment under the Environmental Impact Assessment Ordinance, http://www.epd.gov.hk/eia/hb/materials/GN9.pdf.

Table 5.1 Proposed Mitigation Measures for Different PMEs

PME	Proposed Mitigation Measures	Reduction, dB(A)
Breaker, hand-held, mass >10kg and <20kg	Movable Barrier	5
Dump truck, with grab, 5.5 tonnes < gross vehicle weight <38 tonnes	Movable Barrier	5
Air compressor, air flow <10m^3/min	Movable Barrier	10
Generator, super silenced, 70 dB(A) at 7m	Movable Barrier	10
Concrete mixer (petrol)	Movable Barrier	10
Drill rig, rotary type (diesel)	Movable Barrier	5
Grout mixer	Movable Barrier	10
Grout pump	Movable Barrier	10
Shotcrete pump	Movable Barrier	10
Lorry, with crane, 5.5 tonnes < gross vehicle weight < 38 tonnes	Movable Barrier	5

Table 5.2 presents the range of the predicted noise levels with the mitigation measures at the same representative NSRs for the construction works at the Works Area. Detailed assessment results are presented in **Appendix E**. The mitigated noise levels predicted at all representative residential NSRs are within the day-time noise criterion of Leq(30min) 75dB(A) according to Table 1B of Annex 5 of Technical memorandum under EIAO. A maximum sound level of 75 dB(A) will be specified during the construction works as per the "Recommended Pollution Control Clauses for Construction Contracts" provided by EPD. With the implementation of the noise mitigation measures, noise level at all NSRs will adequately comply with the EIAO-TM Noise Criterion throughout the construction period.

Table 5.2 Range of Predicted Construction Noise Levels (Mitigated Scenario)

NSR	Description	Predicted Noise Levels, Leq(30min) dB(A)	EIAO-TM Noise Criterion, Leq(30min) dB(A)	Exceedance
N1	The Green Villa House No. 11	57 – 66	75dB(A) during 0700 to 1900 hours on any day not being a Sunday or general holiday	No
N2	Las Pinadas House No. E1	57 – 70		No
N3	Air House	63 – 74		No
N4	Las Pinadas House No. E16	64 – 71		No

Operational Phase:

There will be no activities relating to the Project during operational phase, therefore mitigation measures are not required.

5.2 Air Quality

Construction Phase:

The dust mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation shall be implemented to minimize fugitive dust emissions from the Works Area during the drilling and excavation for foundation of flexible barriers as well as soil nailing works. These dust control measures include:

- Erection of hoarding of approximately 2.4m high from ground level along the Works Area that adjoins a road or other area accessible to the public, where appropriate;

- Spray work area of any excavation or earth moving operation, dusty materials, exposed soil surfaces and unpaved areas with water to maintain the entire surface wet;

- Cover stockpile of dusty materials and debris by impervious sheeting or sprayed with water to maintain the entire surface wet.

Operational Phase:

- There will be no activities relating to the Project during operation phase, therefore mitigation measures are not required.

5.3 Water Quality

Construction Phase:

The Contractor shall comply with the Water Pollution Control Ordinance (WPCO) and its subsidiary regulations. Site runoff shall be controlled in accordance with the guidelines stipulated in EPD's Professional Persons Environmental Consultative Committee Practice Note (ProPECC PN 1/94) "Construction Site Drainage".

Good site practice and management to site runoff shall be implemented to minimize water impact as below:

- All surface runoff from the Works Area generated from construction works such as dust control, shall be collected and directed towards de-silting facilities for treatment before discharging into storm water drains or natural drainage line;

- No excavated materials, silt, debris, rubbish, cement slurry or construction waste shall be deposited into drainage line;

- Exposed earth surface and open stockpile of construction materials are avoided as far as practicable, or, where unavoidable, should be covered with tarpaulin or similar fabrics as necessary during rainstorm;

- Regular environmental inspections shall be carried out during the construction period to ensure the site cleanliness and tidiness;

- Tool box talk about run-off control shall be carried out by the Contractor to increase the awareness of the workers;

- Position of the anchors will be adjusted to avoid drilling at the ephemeral drainage line.

Although the impact to the water quality is low, the contractor should notify the potentially affected residential area including Air House and village houses on the opposite side of Clear Water Bay Road when works will be carried out around the ephemeral drainage line.

One section of the flexible barrier will be aligned across the ephemeral drainage line. With a view to minimize any adverse impact, the following temporary measures as illustrated in **Figure 9** will be implemented:

- Temporary access for manual delivery of equipment and construction of flexible barrier will be bridged over the ephemeral drainage line to maintain its drainage condition (Mitigation Measure MC7a during Construction Phase as stated in **Section 5.6**);

- Orange net will be erected with a minimum clearance of 1.5m from both sides of the ephemeral drainage line to act as a no construction zone (Mitigation Measure MC7b during Construction Phase as stated in **Section 5.6**);

- Anchor locations will be selected to avoid drilling at the ephemeral drainage line (Mitigation Measure MC7c during Construction Phase as stated in **Section 5.6**);

Operational Phase:

There will be no activities relating to the Project during operational phase, therefore mitigation measures are not required.

5.4 Waste

Construction Phase:

The Contractor shall comply with the Waste Disposal Ordinance and its subsidiary regulations and the Waste Disposal (Chemical Waste) (General) Regulation. Provided that good site practices are strictly followed, adverse environmental impacts related to waste management are not expected from the proposed works at the Works Area. The following waste management practices are recommended:

- The Contractor shall submit a waste management plan with appropriate mitigation measures to the Engineer for approval;

- The Contractor shall be responsible to identify whether the waste materials could be reused or recycled prior to disposal. For offsite reuse or recycling, the contractor shall arrange for the collection of the recyclable materials;

- Surplus C&D materials (inert and non-inert) generated from the proposed works requiring disposal shall be properly transported to the designated disposal facilities managed by CEDD and EPD. In order to monitor the proper disposal of C&D materials and to control fly-tipping, a trip-ticket system shall be implemented by the Contractor and monitored as a standard item in the relevant technical audit, in accordance with the requirements specified in DEVB TC(W) No. 6/2010 Trip Ticket System for Disposal of Construction & Demolition Materials;

- The Contractor shall register as a Chemical Waste Producer if chemical wastes such as spent lubricants are generated onsite. All chemical waste shall be properly handled, stored, labelled, packaged and collected in accordance with the requirements of the Waste Disposal (Chemical Waste) (General) Regulation;

- The Contractor shall ensure that a sufficient number of covered bins are provided onsite for containment of general refuse. These bins shall be emptied on a daily basis and collected waste shall be disposed of properly;

- The Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Works Area onto any adjoining land; and

- The Contractor shall arrange toolbox talks to workers on relevant topics including site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling.

Operational Phase:

There will be no activities relating to the Project during operational phase, therefore mitigation measures are not required.

5.5 Ecology

Construction Phase

Alignments of the flexible barriers and soil nails have been optimized to preserve all the plant species of conservation importance recorded in the Works Area as far as practicable. No mammals or herpetofauna was considered to be affected by the proposed HMW. The two bird species of conservation importance are also unlikely to be affected. The Serpent Eagle (*Spilornis cheela*; 蛇鵰) was only flying over but not directly associated with the woodland. While no signs of breeding or nests were recorded for Rufous-capped Babbler (*Stachyridopsis ruficeps*; 紅頭穗鸐) during the surveys. Continuous woodland surrounding the Works Area would provide plenty of suitable habitats and resources for inhabitation of this small-sized bird. Regarding flora, none of

any tree individual (DBH >= 95mm) within the proposed works site will be fell. All plant species of conservation importance, a total of five kinds of species, within the Works Area will be retained *in-situ*.

As mentioned in the 'Ecology' part of Section 4.2, there will be temporary and permanent vegetation loss due to the construction works. For temporary vegetation loss due to vegetation clearance for soil nailing activities and provision of working space, hydroseeding with shrub planting in soil nailing areas and shrub planting in front of flexible barrier will be applied as compensatory measure. The aim of hydroseeding is to allow the bare ground to be covered by fast growing grass, so that it helps to prevent erosion of soil, and loss of moisture and nutrients. This would facilitate natural recolonization of common plants. Besides, the greening work also mitigates landscape and visual impacts. Regarding the small area of permanent vegetation loss (approximately 80 m^2) due to construction of permanent structures, it is proposed to be mitigated by compensatory re-vegetation of the existing disturbed ground within the Works Area as far as practicable. Opportunities will also be sought for the compensatory re-vegetation on the existing disturbed area outside the Works Area.

During installation of soil nails (including drilling works), anchors and standing posts of flexible barriers; as well as construction of maintenance access/ staircases, a clearance from trees by tree protection zones will be maintained as far as possible, especially those structural roots generally larger than 20 mm in diameter (see **Figure A5 of Appendix A**). In order to minimize the impacts to existing trees, so that not more than one-third of its root system would be affected, tree protection zone (TPZ) for common tree species would be set either at least 1.5m from tree trunk or at half diameter of dripline, whichever is the greater. For existing trees with DBH 0.3m or above, full dripline for the downhill side would be maintained. TPZ would also be adjusted on site to include any observed anchor roots within dripline envelope. For any existing trees located close to the proposed works, those tree trunks should be wrapped in hessian (as a form of protective wrapping) in accordance with GEO Publication No. 1/2011 to avoid mechanical damage to the tree trunks (see **Plate 4**). Hessian should be provided by the Contractor prior to the commencement of site clearance, demolition and construction of the HMW. The contractor will also be required to comply with specifications on Preservation and Protection of Trees in the General Specification for Civil Engineering Works (GS). Reference will also be made to Development Bureau's Technical Circular (Works) No. 7/2015 on Tree Preservation and Guidelines on Tree Preservation during Development.

Construction of steel maintenance access/ staircases to "bridge over" extensive tree roots on slope can be adopted wherever necessary and practical. This helps to avoid direct encroachment upon tree roots of any existing trees in the Works Area.

For plant species of conservation importance, a minimum 1.5m setback from stems for mature individuals and 1m radius for seedlings, ferns or herbs should be maintained to avoid potential impacts to the roots of the existing trees. A minimum 1m setback from crown spread of the climbing species *Gnetum luofuense* (羅浮買麻藤) should be applied. All individuals of *Aquilaria sinensis* (土沉香; a total of 19 individuals), *Pavetta*

hongkongensis (香港大沙葉; a total of two individuals), *Cibotium barometz* (金毛狗; at least 63 individuals) and *Ania hongkongensis* (香港安蘭; one individual) and *Gnetum luofuense* (羅浮買麻藤; one individual) can be retained *in-situ*, as all hazard mitigation works have been proposed at a minimum of 1.5 m away from these individuals. The following measures are proposed to mitigate any potential impact resulted from the HMW:

- Based on topographical survey, a detailed baseline tree survey in accordance with Development Bureau's Technical Circular (Works) No. 7/2015 on Tree Preservation and Guidelines on Tree Preservation during Development with provision of tree tags will be conducted by qualified arborist to update the number, locations and conditions of all existing trees within the Works Area prior to commencement of construction works.

- A baseline survey will be carried out by plant specialist to confirm and assess the conditions of all plant species of conservation importance within the Works Area prior to commencement of construction works. A final survey to re-assess their conditions will be carried out upon completion of works.

- All plant species of conservation importance within the Works Area will be tagged and fenced off either in group or individually as protection zones to prevent from being damaged or disturbed during construction. Fence of orange nets with at least 1m height are recommended as protection fences to surround the protection zones/ exclusion zones to alert the construction workers/ site staff. Illustration of temporary protective fencing for the protected species is shown in **Plate 8**.

- Same protection measures will be implemented to protect any additional individuals of plant species of conservation importance identified during monthly monitoring/ site audit and likely to be affected by the works during construction phase.

- An induction training should be provided to all site personnel (both supervisory staff and workers) in order to brief them on the importance of protecting plants of conservation importance within and adjacent to the Works Area.

- Monitoring of every individual of the plant species of conservation importance and all existing trees within the Works Area should be performed on monthly basis to ensure their condition and healthiness. Such monthly monitoring works/ site audit will be carried out by plant specialist during construction phase.

- The monthly monitoring reports shall include photographic records to present the updated conditions of the protected plant species and all existing trees within the Works Area. All the baseline survey reports (prepared prior to commencement of construction works) and the monitoring reports (prepared over the construction phase) shall be endorsed by an Independent Environmental Checker (IEC) before submission to relevant government department(s). A Final Monitoring Report summarizing major findings of the baseline report and all the monthly monitoring

reports to document the plant protection and monitoring works throughout construction phase will be submitted.

- For area affected by vegetation clearance for soil nailing activities and provision of working space, hydroseeding and shrub planting will be applied as compensatory measure to vegetation loss.

Tree pruning may be required for the HMW as the tree density of the Works Area is high, especially at the lower portion. Tree pruning, if required, shall be kept to a minimum. The extent of tree pruning will be determined on site by the Engineer together with the qualified arborist. Tree pruning shall be complied with "General Guidelines on Tree Pruning" promulgated by GLTMS of DEVB. Application would be submitted to the relevant District Lands Office should tree pruning be required. The pruning works will be carried out by qualified personnel and supervised by qualified arborist on site. This is important to ensure no trees' canopies will be over-pruned or adversely impacted due to malpractice of tree works. If any trees deteriorate after pruning and need to be removed due to safety reason during construction phase, formal tree removal application with compensatory planting proposal(s) should be prepared in accordance with Development Bureau's Technical Circular (Works) No. 7/2015 on Tree Preservation and submitted to relevant authorities for approval before any tree removal on site. No plant species of conservation importance could be pruned or affected by this work.

Good Site Practices

The following good site practice shall be implemented during the construction phase for the proposed works to avoid and minimize the potential disturbance to the surrounding habitats:

- Temporary works area for stockpile and access routes to be selected shall be far away from the identified plant species of conservation importance and shall at existing disturbed land where possible to minimize disturbance to vegetation;

- Construction activities will be restricted within the Works Area;

- Temporary works area will be reinstated immediately after completion of the construction works;

- Disposal and treatment of waste will be carried out timely and properly. Reference is also made to Section 5.4;

- Open fires will be strictly prohibited to prevent any risk of hill fire;

- Fire-fighting equipment should be provided in the Works Area before the commencement of works;

- Proper implementation of the above mitigation measures shall be supervised by the resident site personnel.

Operational Phase:

Ecological impact during operational phase is not anticipated when the proposed mitigation measures are implemented during the construction phase.

5.6 Landscape and Visual

The following mitigation measures will be adopted:

Construction Phase:

MC1: All trees (with DBH >= 95mm) and plant species with conservation importance will be retained. The dense continuous canopy would provide natural green screening effect to various VSR. The change of natural vegetation (LR1 and LCA1) is anticipated to be temporary and reversible. Permanent vegetation loss would be due to the construction of permanent structures (refers to Section 4.2). With implementation of the mitigation measures proposed for ecology in Section 5.5, construction of the flexible barriers, soil nailing and maintenance access and staircases would minimise vegetation clearance in LR1 and confined to non-protected shrubs and herbs.

MC2: There is flexibility to adjust the exact locations of the flexible barriers, maintenance access/ staircases and installation of soil nails in accordance with the findings of the topographical survey to avoid affecting existing trees, which is detailed in Section 5.5.

MC3: In order to minimize the impacts to existing trees, so that not more than one-third of its root system would be affected, tree protection zone (TPZ) for common tree species would be set either at least 1.5m from tree trunk or at half diameter of dripline, whichever is the greater. For existing trees with DBH 0.3m or above, full dripline for the downhill side would be maintained.

MC4: All the identified plant species of conservation importance will be enclosed within the protection zones/ exclusion zones which should include 1.5m setback from stems of mature individuals, and areas within 1m radius from the seedlings, ferns or herbs to be preserved on site. A minimum 1m setback from crown spread of the climbing species *Gnetum luofuense* (羅浮買麻藤) should be applied.

MC5: In order to minimize potential adverse impact to existing trees, construction of steel maintenance access/ staircases to “bridge over” extensive tree roots on slope can be adopted wherever necessary and practical.

MC6: Temporary scaffolding, working platforms would be established during the construction work for work activities and mobilising equipment to further reduce impacts on existing trees.

One of the flexible barriers would align across the natural section of the ephemeral drainage line (LR4; **Plate 5.3**). This section was found dry and minimal impact to water quality is anticipated. Only very slow flow of shallow water from groundwater seepage was found at the culvert at the end of the drainage line. Mitigation measures mentioned under Section 5.3 on water quality will be applied (see **MC7a, MC7b** and **MC7c** below) in order to minimize the impacts arise from the works:

MC7a: Temporary access for manual delivery of equipment and construction of flexible barrier will be bridged over the ephemeral drainage line to maintain its drainage condition.

MC7b: Orange net will be erected with a minimum clearance of 1.5m from both sides of the ephemeral drainage line to act as a no construction zone.

MC7c: Anchor locations will be selected to avoid drilling at the ephemeral drainage line.

MC8: To minimise the visual impact as far as practicable, hoarding of approximately 2.4m high can be erected at the temporary storage area and along the works boundary where construction or working area may be visible from the tree layers along Clear Water Bay Road. As the hoarding itself and the temporary noise barriers mentioned in Section 5.1 would also be a potential source of visual impact to the key VSR, decorative panels in accordance with the standard of CEDD as illustrated in **Appendix G** will be applied on hoarding and subdued colour paint will be applied on the surface of the temporary noise barriers as mitigation measures to reduce visual impact.

Compensatory tree planting would be provided in case there is any loss of existing trees incurred by the proposed soil nailing works within the soil nailing areas in Works Areas B and C under the following strategy:

(i) Perform baseline survey of initial condition of existing trees before commencement of mitigation works by qualified arborist;
(ii) Remove any identified dead trees;
(iii) Carry out planting of native seedling trees at gentle slope areas with subsequent maintenance before commencement of soil nailing works as compensatory measure (see **MC9** below);
(iv) Conduct monitoring of existing trees condition by qualified arborist on a monthly basis (as detailed in **Section 5.5**);
(v) Remove identified dead trees due to impact from soil nailing works.

Temporary access ladder will be erected on site to facilitate dead trees removal works and compensatory seedling trees planting works. In order to allow time to enhance habitat quality and establishment, the compensatory seedling trees planting works will be carried out before commencement of soil nailing works as detailed in **MC9** below.

MC9: Planting of native seedling trees with the composition of species, size and density as given in **Table 5.3** at the tentative planting areas shown in **Figure 10**. Native species that already exist in the Works Area and also available in the market shall be adopted as far as possible. Advice shall be made from the qualified arborist. The Contractor that is to be appointed by GEO of CEDD under this LPMit project will implement planting and maintenance of the seedling trees.

Table 5.3 Composition of native seedling trees if compensatory tree planting is required in accordance with Development Bureau's Technical Circular (Works) No. 7/2015 (for reference and advice shall be made from the qualified arborist)

Seedling trees	Size	Spacing	% mix	Remarks
a. *Cinnamomum camphora* (樟)	Each 400(H) x 300(S) mm	2000 mm for each species	20%	Potted
b. *Mallotus paniculatus* (白楸)			20%	
c. *Schefflera heptaphylla* (鵝掌柴)			20%	
d. *Garcinia oblongifolia* (黃牙果)			20%	
e. *Elaeocarpus sylvestris* (山杜英)			20%	

Note[1]: The above composition of native seedling trees is recommendation only and actual size and composition may be adjusted based on availability of nursery stock during construction phase.

Operational Phase:

MO1: Although the flexible barriers and soil nailing would change part of the landscape, as most VSR are situated along the naturally downslope terrain with roadside trees and man-made slope features in between, such change basically poses very insignificant operational landscape and visual impacts. Subdued colour paint will be provided to the posts of flexible barriers to further reduce visual impact, if any.

MO2: Hydroseeding and shrub planting will be applied to the soil nailing areas. Native species shall be used in the hydroseeding mix and the shrubs selection as far as possible (**Table 5.4**).

MO3: Shrubs will be provided in front of the flexible barriers for screening purpose. Native species shall be used in the shrubs selection as far as possible (**Table 5.4**).

Table 5.4 Composition of grass mix for hydroseeding in soil nailing areas and shrub planting in soil nailing areas and in front of flexible barriers

In Soil Nailing Areas					
Hydroseeding Mix		Specification			
Between April and August: a. *Cynodon dactylon* (狗牙根) b. *Paspalum notatum* (百喜草) c. *Chloris gayana* (非洲虎尾草) d. *Eragrostis curvula* (彎葉畫眉草) e. *Eremochloa ophiuroides* (假儉草) f. *Cenchrus echinatusI* (蒺藜草)		Composition (%) by rate (min. seed mix in total of 25g/sq. meters)[1] a. 55% b. 35% c. 2.5% d. 2.5% e. 2.5% f. 2.5%			
Between September and March: a. *Cynodon dactylon* (狗牙根) b. *Paspalum notatum* (百喜草) c. *Lolium perenne* (黑麥草)		Composition (%) by rate (min. seed mix in total of 30g/sq. meters)[1] a. 50% b. 35% c. 15%			
Shrub	Size	Quantity	Spacing	% mix	Remarks
a. *Ardisia crenata* (朱砂根) b. *Gardenia jasminoides* (梔子) c. *Litsea rotundifolia* var. *oblongifolia* (豺皮樟) d. *Psychotria asiatica* (山大刀)	Each 350(H) x 200(S) mm	2250 no. 2250 no. 2250 no. 2250 no.	1000 mm for each species	25% 25% 25% 25%	Potted
In Front of Flexible Barriers					
Shrub	Size	Quantity	Spacing	% mix	Remarks
a. *Ardisia crenata* (朱砂根) b. *Gardenia jasminoides* (梔子) c. *Litsea rotundifolia* var. *oblongifolia* (豺皮樟) d. *Psychotria asiatica* (山大刀)	Each 350(H) x 200(S) mm	170 no. 170 no. 170 no. 170 no.	1000 mm for each species	25% 25% 25% 25%	Potted

Note[1]: Native species shall be used as far as possible. The composition of hydroseeding mix and shrubs are recommendation only and the actual composition may be adjusted based on the availability of nursery stock during the construction / operational stage.

In connection with MO2 and MO3 above, a schematic diagram of landscape treatment works for flexible barrier and an illustration of mitigation measures are shown in **Plates 2 and 3** respectively.

MO4: After completion of the HMW, the Contractor that is to be appointed by GEO of CEDD under this LPMit project will look after the new planting works (include the condition and effectiveness of hydroseeding and shrub planting under **MO2** & **MO3** as well as the compensatory seedling trees within the soil nailing areas under **MC9**) during the operational phase (i.e. the 12-month Establishment/Maintenance Period), before the handing over process to the Maintenance Parties.

Remark: Only flexible barriers under this LPMit project will be handed over to Maintenance Parties. Soil-nailed hillsides will no longer be registered and no Maintenance Parties will be involved.

A Landscape Mitigation Plan is provided in **Figure 10**.

As mentioned in **Section 5.5**, tree pruning works may be required for the HMW. Tree pruning shall be complied with "General Guidelines on Tree Pruning" promulgated by GLTMS of DEVB, and if required, shall be kept to a minimum. The extent of tree pruning will be determined on site by the Engineer together with the qualified arborist. The pruning works will be carried out by qualified personnel and supervised by qualified arborist on site. If any trees deteriorate after pruning and need to be removed due to safety reason during construction phase, formal tree removal application with compensatory planting proposal(s) should be prepared in accordance with Development Bureau's Technical Circular (Works) No. 7/2015 on Tree Preservation and submitted to relevant authorities for approval before any tree removal on site. No plant species of conservation importance could be pruned or affected by this work.

5.7 Cultural Heritage

Construction Phase:

No cultural heritage resources would be affected by the proposed HMW. However, a precautionary engineering design on the location of anchors and the alignments would be adopted to minimise the impact on the grave.

Operational Phase:

No adverse impact during operational phase is anticipated.

6. USE OF PREVIOUSLY APPROVED EIA REPORTS AND PROJECT PROFILES

Relevant Project Profiles submitted for application for permission to apply directly for an Environmental Permit (EP) are listed below:

- Agreement No. CE 37/2008 (GE) Landslip Prevention and Mitigation Programme, 2008, Package J, Natural Terrain Hazard Mitigation Works, Kowloon, New Territories and Outlying Island – Investigation, Design and Construction, Project Profile for Study Area 12NW-C/SA1, Above Leung Fai Tin along Clear Water Bay Road, Sai Kung

- Agreement No. CE 30/2009 (GE) Landslip Prevention and Mitigation Programme, 2009, Package D, Natural Terrain Hazard Mitigation Works, Hong Kong Island and Sai Kung, Project Profile for Study Area 12SW-A/SA1, Tai Wan Tau Road, Sai Kung

- Agreement No. CE 30/2009 (GE) Landslip Prevention and Mitigation Programme, 2009, Package D, Natural Terrain Hazard Mitigation Works, Hong Kong Island and Sai Kung, Project Profile for Study Area 12NW-C/SA2, Sheung Yeung, Sai Kung

- Agreement No. CE 31/2004 (GE) Natural Terrain Hazard Mitigation Works in Luk Keng Wong Uk

7. CONCLUSION

The potential environmental impacts arising from this Project and the key proposed mitigation measures and good site practices are summarised in **Table 7.1**.

Table 7.1 Summary of potential environmental impacts and key proposed mitigation measures

Potential Impact	Proposed Mitigation Measures and Good Site Practices
Noise	
Construction Phase: Noise generated from the construction activities **Operational Phase:** No impact	**Construction Phase:** Movable noise barrier with subdued colour which matches the hillside background will be used. Use quiet PME Implement good site practice **Operational Phase:** Not required
Noise impact: With implementation of the proposed mitigation measures, no adverse noise impacts are anticipated.	
Air Quality	
Construction Phase: Dust generated from the construction activities and stockpiling of soil/ rock **Operational Phase:** No impact	**Construction Phase:** Dust suppression measures, cover stockpile & implement good site practice **Operational Phase:** Not required
Air quality impacts: With implementation of the proposed mitigation measures, no adverse air quality impacts are anticipated.	
Water Quality	
Construction Phase: Potential site run-off to the ephemeral drainage line affecting water quality One section of the flexible barrier will be aligned across the ephemeral drainage line	**Construction Phase:** Implement good site practice to control runoff Temporary access for manual delivery of equipment and construction of flexible barrier will be bridged over the ephemeral drainage line to maintain its drainage condition Orange net will be erected with a minimum

Potential Impact	Proposed Mitigation Measures and Good Site Practices
	clearance of 1.5m from both sides of the ephemeral drainage line as warning purpose Anchor locations will be selected to avoid drilling at the ephemeral drainage line
Operational Phase: No impact	**Operational Phase:** Not required
Water quality impacts: Given the ephemeral drainage line was found dry even in wet season, with implementation of the proposed mitigation measures, water quality impacts is anticipated to be minimal.	
Waste	
Construction Phase: Estimated 10m^3 of non-inert C&D waste and 195 m^3 of C&D inert materials are estimated to be generated from the Project	**Construction Phase:** On site sorting of surplus C&D materials. Proper handling of waste at storage area Surplus C&D materials (inert and non-inert) generated from the proposed works requiring disposal shall be properly transported to the designated disposal facilities managed by CEDD and EPD. Arrange for the collection of the recyclable materials for offsite reuse or recycling. Implementation of trip ticket system and waste management plan
Operation Phase: No impact	**Operation Phase:** Not required
Waste impacts: With implementation of the proposed mitigation measures, no adverse waste impacts are anticipated.	
Ecology	
Construction phase: Temporary vegetation loss of 373 m^2 and permanent vegetation loss of 80 m^2 due to the soil nailing activities, installation of flexible barriers and construction of maintenance access/ staircases	**Construction phase:** Implement good site practice to minimize site clearance and disturbance to existing vegetation Tree protection zones (TPZ) for common tree species would be set either at least

Potential Impact	Proposed Mitigation Measures and Good Site Practices
	1.5m from tree trunk or at half diameter of dripline, whichever is the greater. For existing trees with DBH 0.3m or above, full dripline for the downhill side would be maintained. TPZ would also be adjusted on site to include any anchor roots observable within dripline envelope. Tree trunks should be wrapped in hessian as protective wrapping when any of them are close to the proposed works. Construction method by "bridge over" tree roots would be adopted wherever necessary and practical. For temporary vegetation loss due to vegetation clearance for soil nailing activities and provision of working space, hydroseeding with shrub planting in soil nailing areas and shrub planting in front of flexible barrier will be applied as compensatory measure. Regarding the permanent vegetation loss due to construction of permanent structures, it is proposed to be mitigated by compensatory re-vegetation of the existing disturbed ground within the Works Area as far as practicable. Opportunities will also be sought for the compensatory re-vegetation on the existing disturbed area outside the Works Area.
Pruning of non-protected tree species, if required, to be kept to a minimum, in order to facilitate the construction activities	Pruning of non-protected tree species, if required, will be supervised by site staff and qualified arborist. Application would be submitted to the relevant District Lands Office should tree pruning be required.
Potential damage to the five plant species of conservation importance, including *Aquilaria sinensis* (土沉香), *Pavetta hongkongensis* (香港大沙葉), *Cibotium barometz* (金毛狗), *Ania hongkongensis* (香港安蘭) and	A detailed baseline tree survey will be carried out to update the number, locations and conditions of all existing trees within the Works Area. A baseline survey will be carried out to confirm and assess the conditions of all plant species of

Potential Impact	Proposed Mitigation Measures and Good Site Practices
Gnetum luofuense (羅浮買麻藤)	conservation importance within the Works Area. Every individual of such species will be monitored during the works. All plant species of conservation importance will be tagged and fenced off. The tree protection zone shall be at least 1.5m setback from stems for mature specimens and 1m radius for seedlings, ferns or herbs. A minimum 1m setback from crown spread of the climbing species *Gnetum luofuense* (羅浮買麻藤) should be applied.
Operational phase: No impact	**Operational phase:** Not required
Ecological impacts: With proper implementation of the proposed mitigation measures on tree protection, no unacceptable adverse ecological impacts would be anticipated.	
Landscape & Visual	
Construction phase: • Landscape change due to temporary and permanent vegetation loss • Potential impacts to existing trees	**Construction phase:** MC1: Retain all trees (DBH >= 95 mm) and plant species of conservation importance MC2: Adjustable alignment/ location of flexible barriers, maintenance access/ staircases and soil nails according to topographical survey MC3: Tree protection zones (TPZ) for common tree species would be set either at least 1.5m from tree trunk or at half diameter of dripline, whichever is the greater. For existing trees with DBH 0.3m or above, full dripline for the downhill side would be maintained. TPZ would also be adjusted on site to include any anchor roots observable within dripline envelope. MC4: Protection zones/ exclusive zones to plant species of conservation importance will be provided

Potential Impact	Proposed Mitigation Measures and Good Site Practices
	MC5: "Bridging over" extensive tree roots by steel maintenance access/ staircases (as per Ecology section above) MC6: Establish temporary scaffolding and working platforms to further reduce impacts to trees
• One section of the flexible barriers would align across the natural section of the ephemeral drainage line	MC7a: Temporary access for manual delivery of equipment and construction of flexible barrier to bridge over the ephemeral drainage line MC7b: Erect orange net with minimum clearance of 1.5m from both sides of the ephemeral drainage line MC7c: Anchor locations will be selected to avoid drilling at the ephemeral drainage line
• Unsightly work activities and mobilisation of equipment might be visible	MC8: Hoarding with decorative panels erected at temporary storage area and works boundary
• Impact of soil nailing works to existing trees within soil nailing areas	MC9: Planting of native seedling trees with subsequent maintenance before commencement of soil nailing works as compensatory measure by LPMit Contractor. Monthly monitoring of existing common tree species by qualified arborist
Operational phase: Physical structure of the flexible barriers	**Operational phase:** MO1: Apply subdued colour paint to the posts of flexible barriers MO2: Aesthetic landscape work of hydroseeding and shrub planting in soil nailing area. Native species shall be used as far as possible.

Potential Impact	Proposed Mitigation Measures and Good Site Practices
	MO3: Aesthetic landscape work of shrub planting in front of flexible barriers for screening purpose. Native species shall be used as far as possible. MO4: Look after the aesthetic landscape work under operational phase (i.e. the 12-month Establishment/Maintenance Period) by LPMit Contractor
Landscape and visual impacts: Provided that the proposed mitigation measures are properly implemented, no unacceptable adverse landscape and visual impacts would be anticipated.	
Cultural Heritage	
Construction phase: No impact. **Operational phase:** No impact	**Construction phase:** Precautionary engineering design on the location of anchors and the alignments would be adopted to minimise the impact on the grave **Operational phase:** Not required
Cultural heritage impacts: With appropriate precautionary engineering design be undertaken, no adverse cultural heritage impacts are anticipated.	

7.1 Generic Good Site Practices for Incorporation into Construction Contract

During the "Investigation, Design and Construction" stage of Landslip Prevention and Mitigation Works at natural terrain, Country Parks/ Protected Area and Conservation Area, detection of species of conservation importance with high ecological concern can be common.

On the basis of the generic mitigation measures and good site practices set out in **Table 7.1**, a set of good site practices can be drawn up for incorporation into the construction contact as a good example for GEO/CEDD to be followed in future similar works for protection of species of conservation importance and existing trees. The following key practices modified from Section 5.5 ensure the proposed works would have no direct impact on the species of conservation importance and existing trees, based on the tentative Construction Programme (**Appendix B**) and methodology of soil nail installation (**Appendix H**):

- All plant and equipment will be delivered uphill by site workers. No haul road/ access road will be formed.

- All plant species of conservation importance shall be tagged by a plant specialist and fenced off. The fenced off area (i.e. tree/ plant protection zone) shall be at least 1.5m setback from stems for mature specimens and 1m radius for seedlings, ferns or herbs. A minimum of 1m setback from crown spread of the climbing species *Gnetum luofuense* (羅浮買麻藤) should be applied. Growing point and exact crown spread of climber can be difficult to trace among dense woodland. On-site recommendations should be noted and discussed with the terrestrial ecologist in such case.

- Provide adequate briefing to site staff to avoid trespassing or occupying the fenced off areas, and be careful at all time during construction.

- Employment of a plant specialist to take part in setting out the Works Area; monitor all plant species of conservation importance during site clearance, construction activities, landscape works, etc.; supervise the proper implementation of these good site practices and protective measures recommended in the Project Profile; and prepare a monthly monitoring report showing the site audit information and the updated conditions of the species of conservation importance and all existing trees within the Works Area. The monthly monitoring reports shall be checked by an Independent Environmental Checker (IEC).

- A detailed baseline survey should be conducted by the plant specialist before commencement of construction updating the number, locations and conditions of species of conservation importance and all existing trees within the Works Area.

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Figures

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喜頓別墅
GRANDVIEW VILLA

翠巒小築
THE GREEN VILLA

松濤苑
LAS PINADAS

歌賦花園
CAPITAL VILLA

歌賦花園
CAPITAL GARDEN

Clear Water Bay Road

清水灣道

AIR HOUSE

CONSERVATION AREA
自然保育區

Study Area No. 11NE-B/SA3

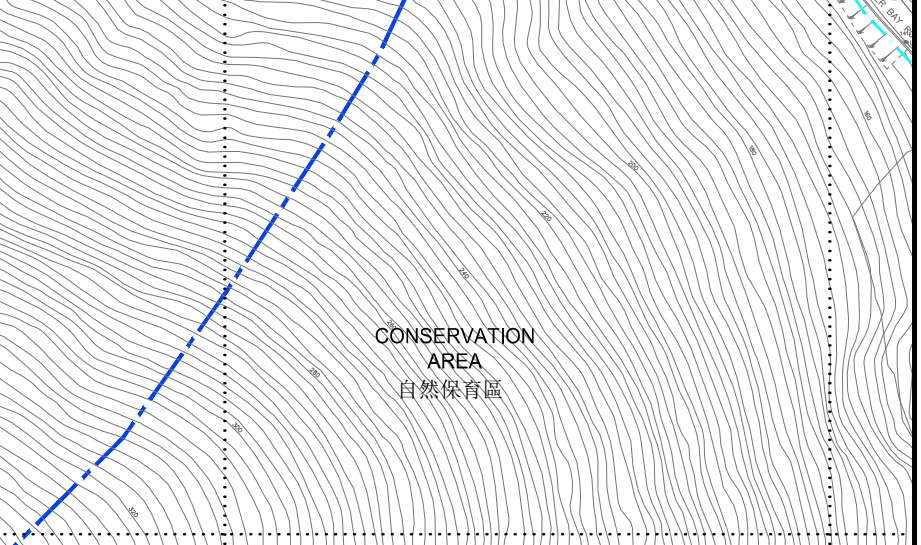
RAZOR HILL
鷓鴣山

PIK UK AU

Location Plan
Scale 1 : 2500

Legend :

- Boundary of Study Area
- Conservation Area
- Existing Ephemeral Drainage Line
- Works Area (Designated Project)
- Temporary Storage Area



Key Plan
Scale 1 : 25000

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme,
2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Study for
Study Area 11NE-B/SA3 - Razor Hill, Clear Water Bay Road

Location Plan of The Study Area 11NE-B/SA3

FUGRO (HONG KONG) LTD

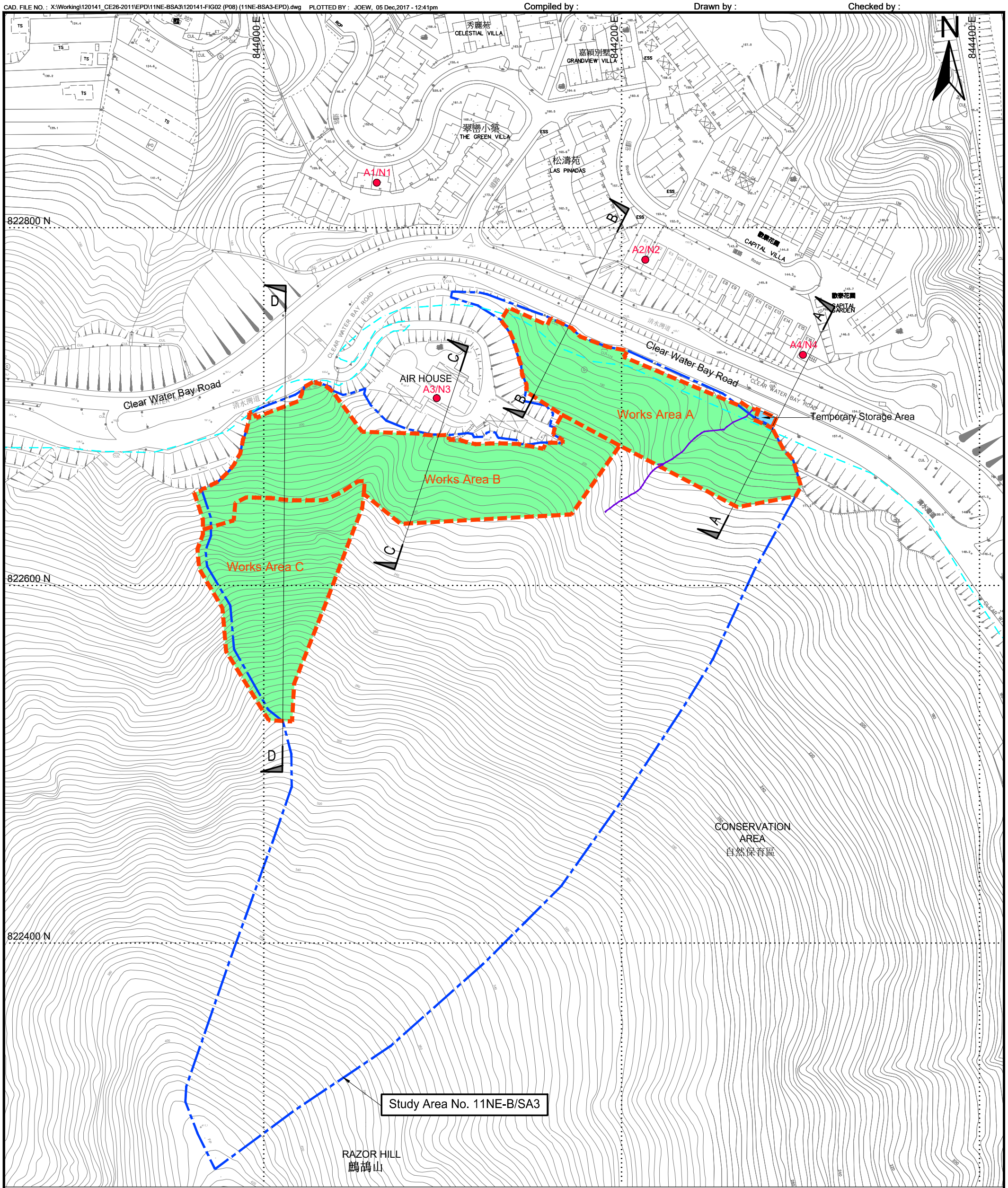
Scale :	AS SHOWN		
Drawn by : HON	Date : JAN-2017	Checked :	Approved :
Job No. : 120141	Figure No : 1		

CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-BSA3\120141-FIG02 (P08) (11NE-BSA3-EPD).dwg PLOTTED BY : JOEW, 05 Dec,2017 - 12:41pm

Compiled by :

Drawn by :

Checked :



Legend :

- Boundary of Study Area
- Conservation Area
- Existing Ephemeral Drainage Line
- Works Area
- Temporary Storage Area
- Cross Sections
- N1 / A1 — Noise Sensitive Receivers and Air Sensitive Receivers

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme,
2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Study for
Study Area 11NE-B/SA3 - Razor Hill, Clear Water Bay Road

Locations of the Noise and Air Sensitive Receivers

FUGRO (HONG KONG) LTD

Scale : 1 : 2000

Drawn by : HON | Date : JAN-2017 | Checked : | Approved :

Job No. : 120141 | Figure No : 2

Checked by :

Drawn by :

Compiled by :

CAD. FILE NO. : \\fugro-hk-13\drafting$\Working\120141_CE26-2011(EPD)\11NE-B\SA3\120141-FIG03 (P19)k03A (PLOTTED BY HON) 22 Feb 2018 - 3:53pm

844000 E

844200 E

822600 N

CLEAR WATER BAY ROAD

AIR HOUSE

EXISTING GRAVE

C20

C21

C19

C22

Works Area A

Temporary Storage Area

Works Area B

Works Area C

Existing Bus Stop

C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16 C17 C18 C23

Study Area No. 11NE-B/SA3

CONSERVATION AREA
自然保育區

RAZOR HILL
鷓鴣山

N

Legend :

- Boundary of Study Area
- Conservation Area
- Existing Ephemeral Drainage Line
- Works Area
- Temporary Storage Area
- * Proposed Flexible Barrier with Concrete/Steel Maintenance Staircase with Handrailing
- * Proposed Soil Nail and Hydroseeding with Biodegradable Erosion Control Mat and Wire Mesh
- * Proposed Concrete/Steel Maintenance Staircase with Handrailing

Species of Conservation Importance Location

- Cibotium barometz (金毛狗)
- Pavetta hongkongensis (香港大沙葉)
- Aquilaria sinensis (土沉香)
- Ania hongkongensis (香港安蘭)
- Gnetum luofuense (羅浮買麻藤)

Remark: 1) *Location of proposed works may be further adjusted during construction to suit the actual site condition and to avoid affecting existing trees.

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme, 2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Mitigation Works at
Study Area 11NE-B/SA3 - Razor Hill, Clear Water Bay Road

Proposed Natural Terrain Hazard Mitigation Works

FUGRO (HONG KONG) LTD

Scale : 1 : 1000

Drawn by : HON | Date : DEC-2017 | Checked : | Approved :

Job No. : 120141 | Figure No : 3

Checked by :

Drawn by :

Compiled by :

CAD FILE NO. : \\fugro-hk-13\drafting$\Working\120141 - CE26-2011(EP)\11NE-BSA3\120141-FIG03 (P19)&03A (P12)TTBEBSA3.dgn 20 Feb 2018 - 3:53pm

844000 E

844200 E

822600 N

CLEAR WATER BAY ROAD

AIR HOUSE

EXISTING GRAVE

Existing Bus Stop

Works Area A

Works Area B

Works Area C

Temporary Storage Area

Study Area No. 11NE-B/SA3

RAZOR HILL
鷓鴣山

CONSERVATION AREA
自然保育區

LEGEND FOR EXISTING TREE

C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24

Legend :

- Boundary of Study Area
- Conservation Area
- Existing Ephemeral Drainage Line
- Works Area
- Temporary Storage Area
- * Proposed Flexible Barrier with Concrete/Steel Maintenance Staircase with Handrailing
- * Proposed Soil Nail and Hydroseeding with Biodegradable Erosion Control Mat and Wire Mesh
- * Proposed Concrete/Steel Maintenance Staircase with Handrailing

Species of Conservation Importance Location

- Cibotium barometz (金毛狗)
- Pavetta hongkongensis (香港大沙葉)
- Aquilaria sinensis (土沉香)
- Ania hongkongensis (香港安蘭)
- Gnetum luofuense (羅浮買麻藤)

Remark: 1) *Location of proposed works may be further adjusted during construction to suit the actual site condition and to avoid affecting existing trees.

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme,
2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Mitigation Works at
Study Area 11NE-B/SA3 - Razor Hill, Clear Water Bay Road

Proposed Natural Terrain Hazard Mitigation Works
(Locations of Plant Species of Conservation Importance and Surveyed Trees Indicated)

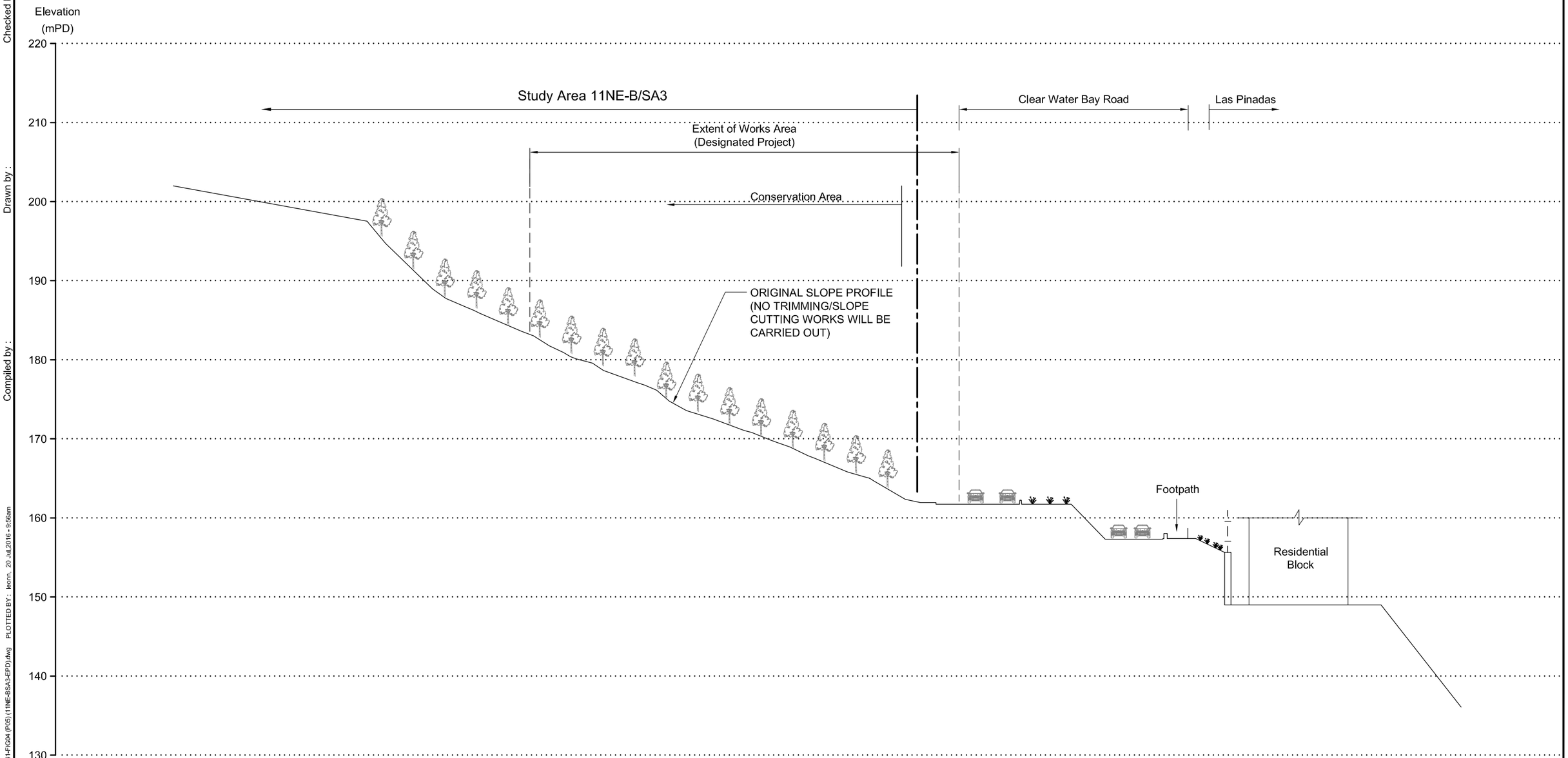
FUGRO (HONG KONG) LTD

Scale : 1 : 1000			
Drawn by : HON	Date : DEC-2017	Checked :	Approved :
Job No. : 120141		Figure No : 3A	

Checked by :

Drawn by :

Compiled by :



CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-B\SA3\120141-FIG04 (P05) (11NE-BSA3-EPD).dwg PLOTTED BY : leonn, 20 Jul 2016 - 9:56am

Job Title Agreement No. CE26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title Natural Terrain Hazard Study for Study Area 11NE-B/SA3 - Razor Hill at Clear Water Bay Road **Section A - A**

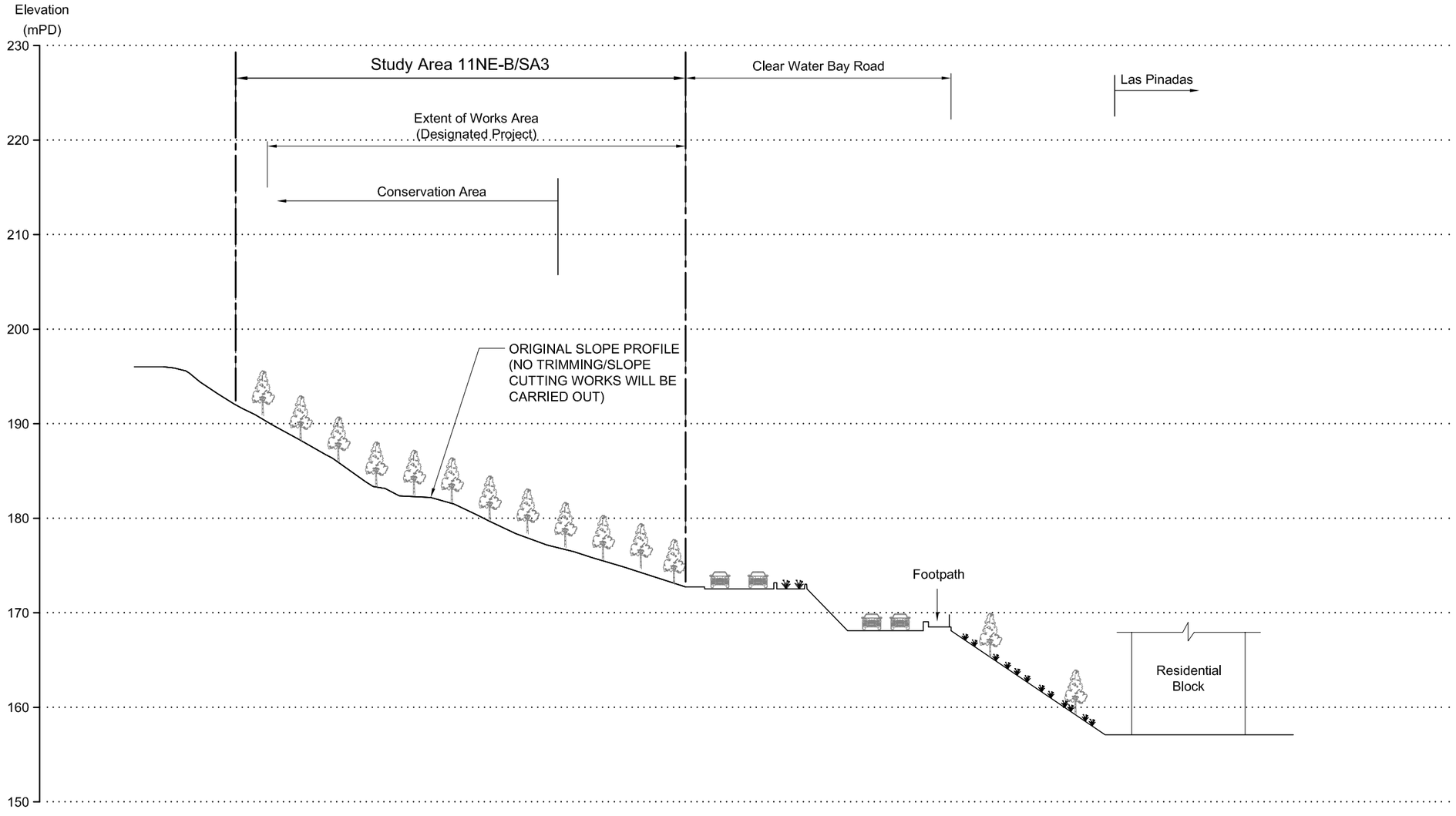
FUGRO (HONG KONG) LTD

Scale :	1 : 500		
Drawn by : HON	Date : JUL-2016	Checked :	Approved :
Job No. : 120141	Figure No :	4	

Checked by :

Drawn by :

Compiled by :



CAD. FILE NO.: X:\Working\120141_CE26-2011\EPD\11NE-B\SA3\120141-FIG05 (P04) (11NE-B\SA3-EPD).dwg PLOTTED BY : lkconn, 20 Jul,2016 - 9:57am

Job Title Agreement No. CE26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title Natural Terrain Hazard Study for Study Area 11NE-B/SA3 - Razor Hill at Clear Water Bay Road **Section B - B**

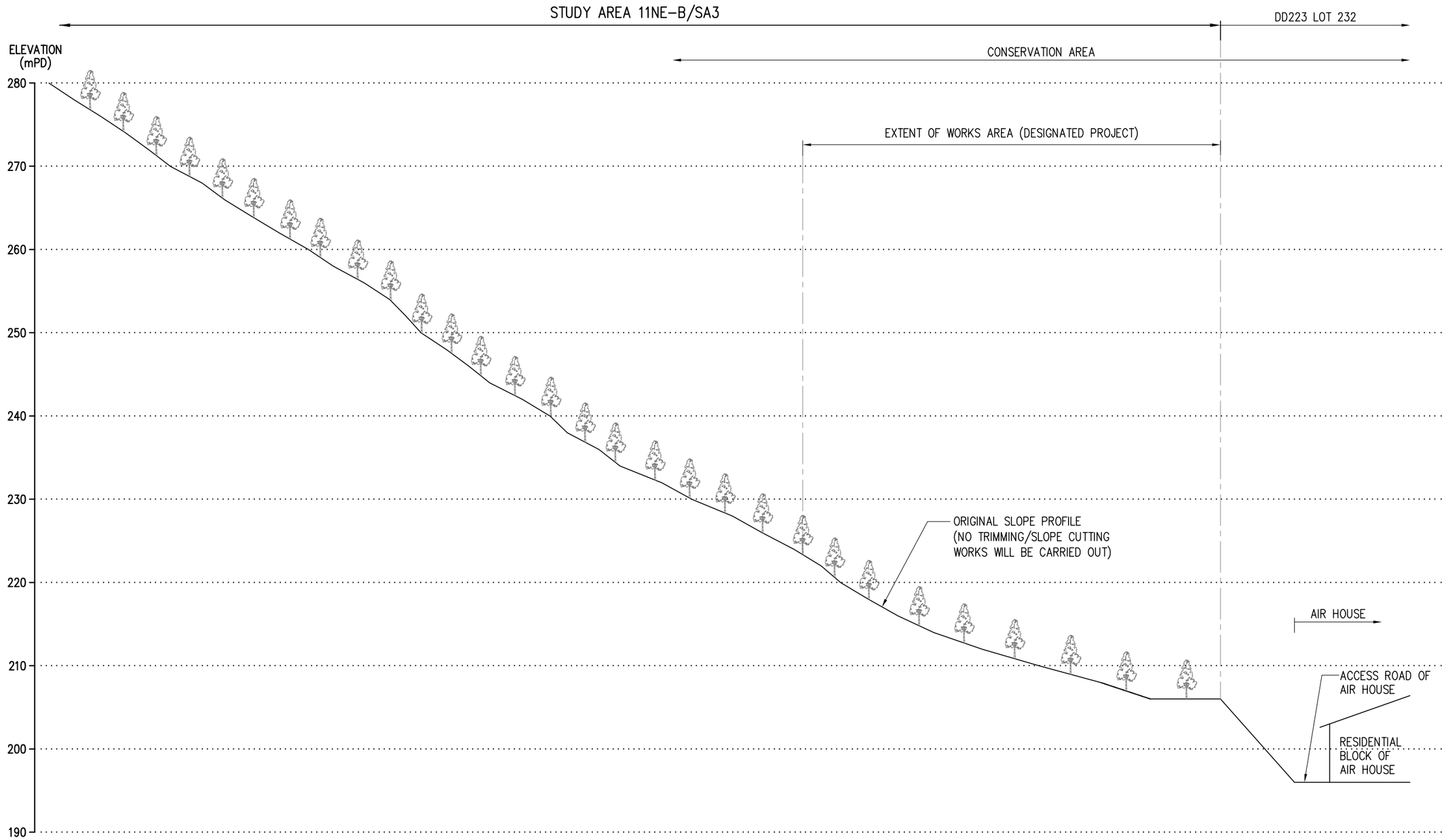
FUGRO (HONG KONG) LTD

Scale : 1 : 500			
Drawn by : HON	Date : JUL-2016	Checked :	Approved :
Job No. : 120141	Figure No : 5		

Checked by :

Drawn by :

Compiled by :



CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-BSA3\120141-FIG05A (P02) (11NE-BSA3-EPD).dwg PLOTTED BY : JOEW, 21 Jul,2016 - 10:43am

Job Title Agreement No. CE26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title Natural Terrain Hazard Study for Study Area 11NE-B/SA3 - Razor Hill at Clear Water Bay Road **Section C - C**	FUGRO (HONG KONG) LTD Scale : 1 : 500 Drawn by : HON Date : JUL-2016 Checked : Approved : Job No. : 120141 Figure No : 5A

STUDY AREA 11NE–B/SA3 AND EXTENT OF WORKS AREA (DESIGNATED PROJECT)

ELEVATION (mPD)

300
290
280
270
260
250
240
230
220
210
200
190

CONSERVATION AREA

ORIGINAL SLOPE PROFILE
(NO TRIMMING/SLOPE CUTTING
WORKS WILL BE CARRIED OUT)

CLEAR WATER
BAY ROAD

FOOTPATH

Checked by :

Drawn by :

Compiled by :

CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-B\SA3\120141-FIG05B (P02) (11NE-B\SA3-EPD).dwg PLOTTED BY : JOEW, 21 Jul,2016 - 11:01am

Job Title Agreement No. CE26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title Natural Terrain Hazard Study for Study Area 11NE-B/SA3 - Razor Hill at Clear Water Bay Road **Section D - D**	FUGRO (HONG KONG) LTD Scale : 1 : 500 Drawn by : HON Date : JUL-2016 Checked : Approved : Job No. : 120141 Figure No : 5B

CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-BSA3\120141-FIG06 (P01)(11NE-BSA3-EPD).dwg PLOTTED BY : JOEW, 11 Aug,2017 - 5:16pm Compiled by : Drawn by : Checked by :

844000 E

844200 E

822800 N

822600 N

822400 N

N

TA KU LING SAN TSUEN

秀麗苑
CELESTIAL VILLA

嘉景別墅
GRANDVIEW VILLA

翠巒小築
THE GREEN VILLA

LAS PINADAS

CAPITAL VILLA

CAPITAL GARDEN

CLEAR WATER BAY ROAD
清水灣道

AIR HOUSE

RAZOR HILL
鷓鴣山

Study Area No. 11NE-B/SA3

CONSERVATION AREA
自然保育區

Legend :

- Boundary of Study Area
- Works Area
- LCA1 Natural Hillside Landscape
- LCA2 Urban Fringe Village Landscape
- LCA3 Transportation Corridor Landscape
- Zone of Visual Influence
- LR1 Hillside Woodland
- LR2 Rural Development Area
- LR3 Major Transportation Corridor
- LR4 Ephemeral Drainage Line

Species of Conservation Importance Location

- Cibotium baromet□(金毛狗)
- Pavetta hongkongensis (香港大沙葉)
- A□uilaria sinensis (土沉香)
- Ania hongkongensis (香港安蘭)
- Gnetum luofuense (羅浮買麻藤)

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme,
2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

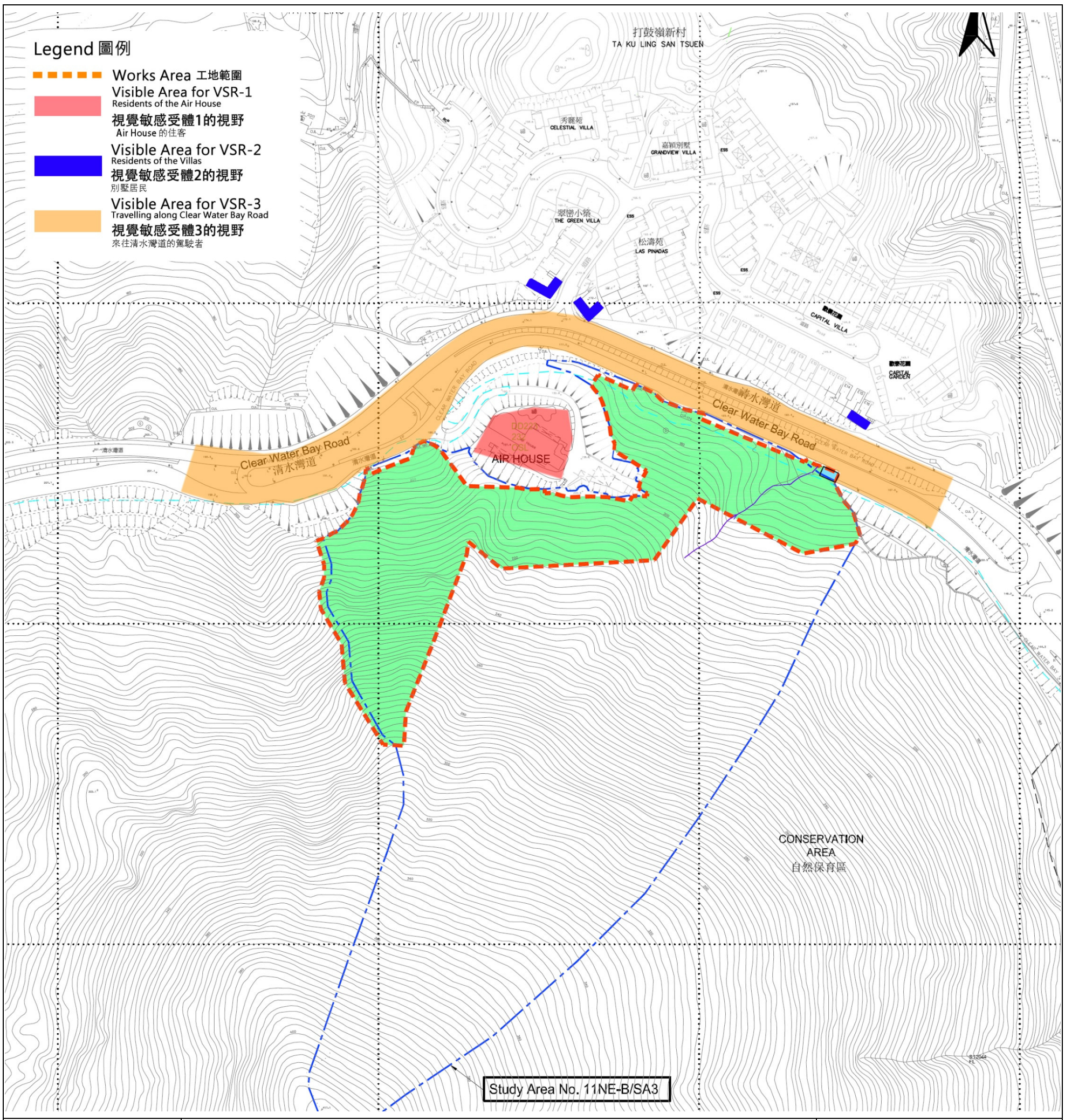
Study Area 11NE-B/SA3, Ra□or Hill, Clear Water Bay Road
Zone of Visual Influence (ZVI),
Locations of Landscape Resources (LRs) and
Landscape Character Areas (LCAs)

FUGRO (HONG KONG) LTD

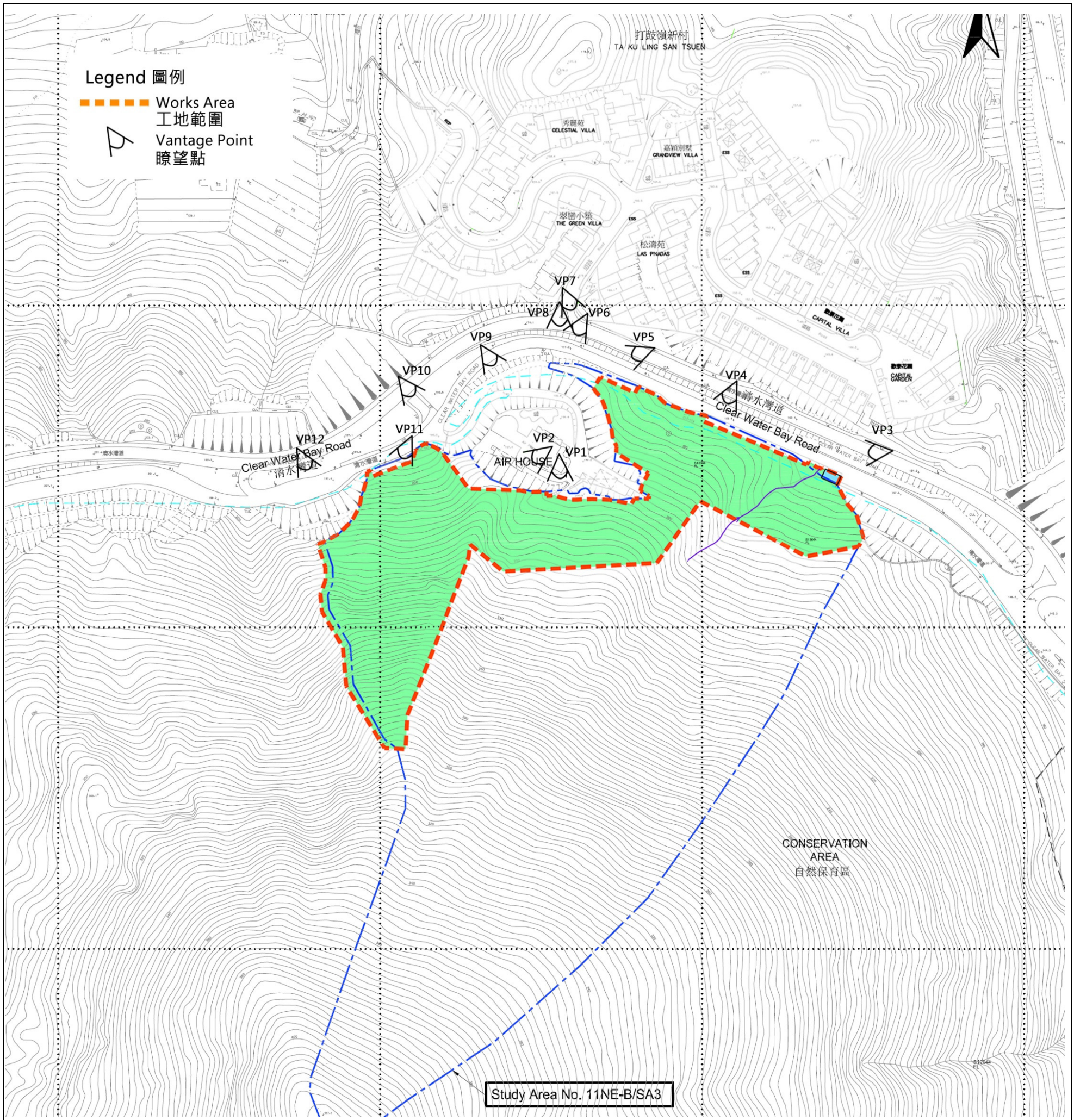
Scale : 1 : 2000

Drawn by : HON | Date : AUG-2017 | Checked : | Approved :

Job No. : 120141 | Figure No : 6

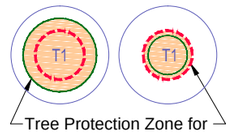
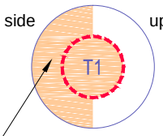


Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Locations of Visual Sensitive Receivers (VSRs)**	FUGRO (HONG KONG) LTD Scale 1:5000/ AS SHOWN Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Figure No :7



Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Locations of Vantage Points**	FUGRO (HONG KONG) LTD Scale 1:5000/ AS SHOWN Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Figure No :8

Provision of Tree Protection Zone

Condition 1A or 1B	Condition 2
 Tree Protection Zone for common tree species either at least 1.5 m from tree trunk or at half diameter of dripline whichever is greater	downhill side uphill side  Tree Protection Zone for common tree species with DBH ≥ 0.3 m

Legend :

- Boundary of Study Area
- Conservation Area
- Existing Ephemeral Drainage Line
- Existing Tree
- Tree Protection Zone based on Dripline
- 50% diameter of Dripline
- Tree Protection Zone based on 1.5 m from Tree Trunk
- Works Area
- Temporary Storage Area
- * Proposed Flexible Barrier with Concrete/Steel Maintenance Staircase with Handrailing
- * Proposed Soil Nail and Hydroseeding with Biodegradable Erosion Control Mat and Wire Mesh
- * Proposed Concrete/Steel Maintenance Staircase with Handrailing

Species of Conservation Importance Location

- Cibotium barometz (金毛狗)
- Pavetta hongkongensis (香港大沙葉)
- Aquilaria sinensis (土沉香)
- Ania hongkongensis (香港安蘭)
- Gnetum luofuense (羅浮買麻藤)

Remark: 1) *Location of proposed works may be further adjusted during construction to suit the actual site condition and to avoid affecting existing trees.

Job Title
Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme,
2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Study for Study Area 11NE-B/SA3 - Razor Hill, Clear Water Bay Road

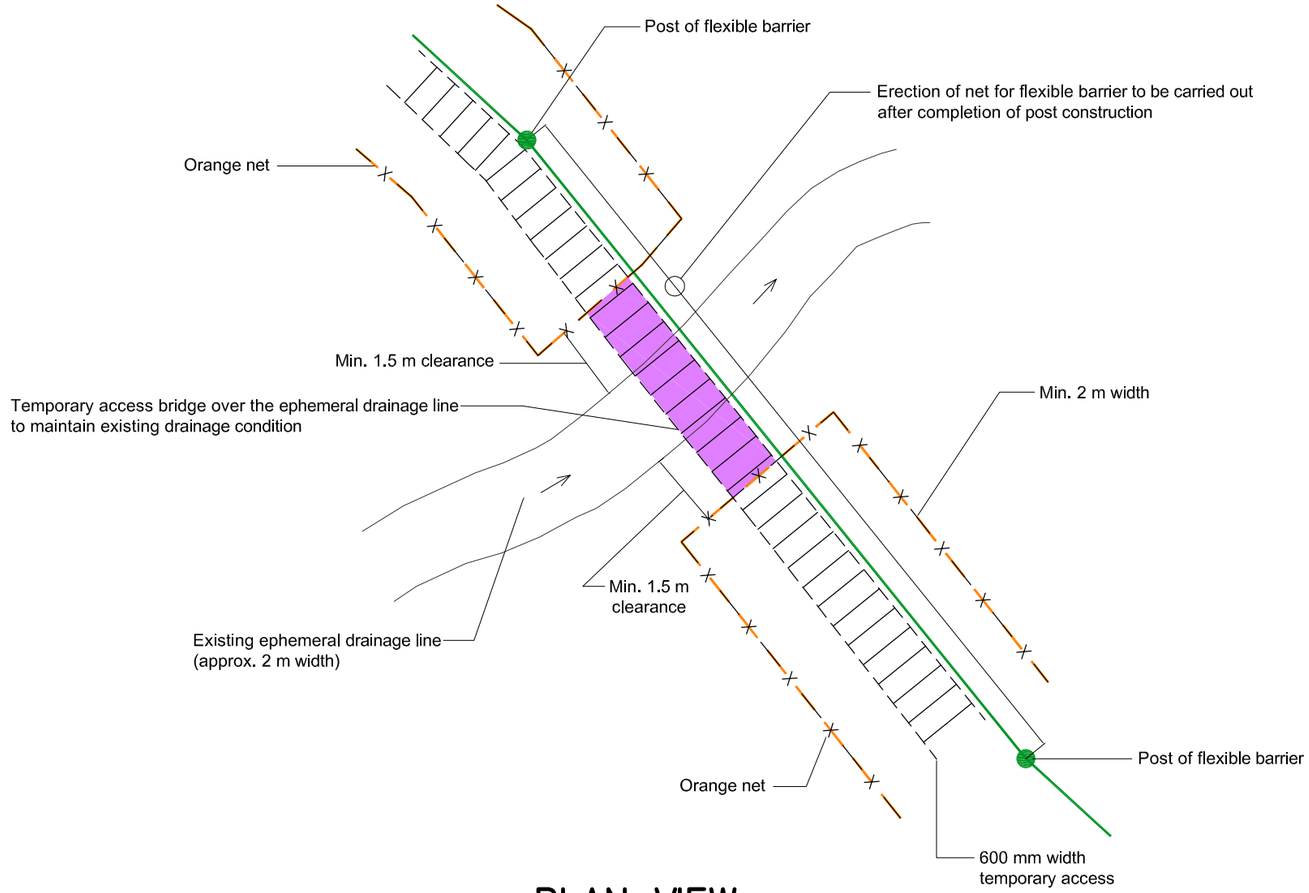
Proposed soil nail arrangement

FUGRO (HONG KONG) LTD

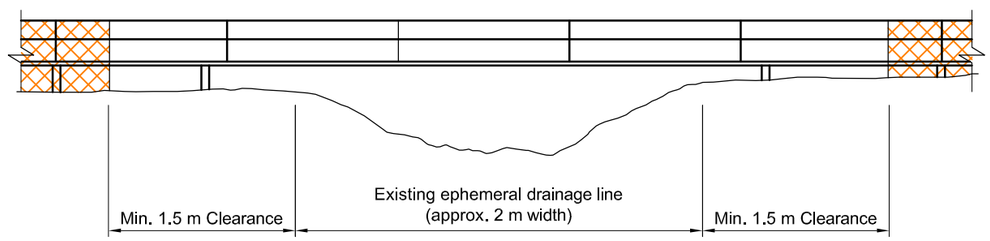
Scale :	1 : 500		
Drawn by : HON	Date : DEC-2017	Checked :	Approved :
Job No. : 120141	Figure No : 8A		

Checked by :
Drawn by :
Compiled by :

CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-BSA3\120141-0003-TPZ (P13) & FIG08A (P07) (11NE-B_SA3_EBD).dwg LEONN, 14 Dec.2017 - 3:06pm



PLAN VIEW



ELEVATION OF TEMPORARY ACCESS BRIDGE OVER PORTION

Checked by :

Drawn by :

Compiled by :

CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-BSA3\120141-FIG09 (P03) (11NE-BSA3-EPD).dwg PLOTTED BY : leonn, 16 Feb,2016 - 5:06pm

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme, 2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Protective Measure on Existing Ephemeral Drainage Line during Construction Phase

FUGRO (HONG KONG) LTD

Scale :	N.T.S.		
Drawn by : HON	Date : FEB-2016	Checked :	Approved :
Job No. : 120141	Figure No : 9		

Checked by :

Drawn by :

Compiled by :

844000 E

844200 E

822600 N

CLEAR WATER BAY ROAD

AIR HOUSE

EXISTING GRAVE

Works Area A

Works Area B

Works Area C

Study Area No. 11NE-B/SA3

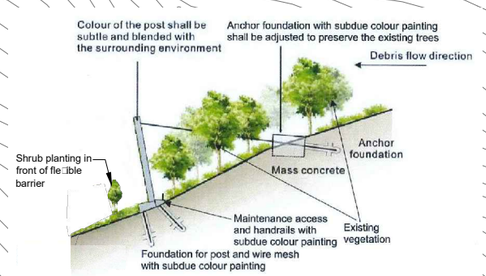
CONSERVATION AREA
自然保育區

RAZOR HILL
鷓鴣山

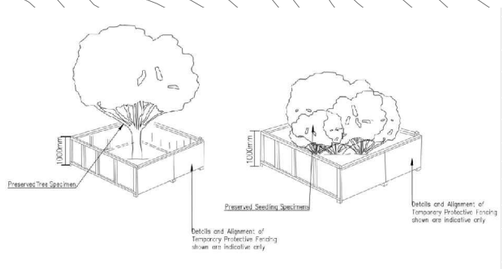
MO1 MO2 MO3 MO4 MC1 MC2 MC3 MC4 MC5 MC6 MC7a MC7b MC7c MC8 MC□

Legend :

- Boundary of Study Area
- Conservation Area
- E□isting Ephemeral Drainage Line
- Proposed Fle□ible Barrier
- Post of Fle□ible Barrier
- Works Area
- Hydroseeding With Shrub Planting
- H — Hoarding With Decorative Panels
- Shrub Planting In Front Of Fle□ible Barrier



Landscape Treatment Works for Flexible Barrier



Temporary Protective Fencing for the Protected Species

Proposed Landscape Mitigation Measures

Construction Phase

- MC1: Retain all trees and plant species of conservation importance
- MC2: Adjust alignment/location of design
- □MC3: Tree protection □ones for common tree species
- MC4: Protection □ones to plant species of conservation importance
- MC5: Bridging over e□tensive tree roots by steel maintenance access/staircase
- □MC6: Establish temporary scaffolding and working platforms to further reduce impacts to trees
- MC7a: Temporary access for manual delivery of e□uipment and bridge over ephemeral drainage line
- MC7b: Orange net with min. 1.5m clearance from ephemeral drainage line
- MC7c: Anchor locations should avoid drilling at ephemeral drainage line
- MC8: Hoarding with decorative panels at temporary storage area and works boundary (H)
- MC□: Planting with subse□uent maintenance of native seedling trees before commencement of soil nailing works as compensatory measure (tentative planting area)

Operational Phase

- MO1: Subdued colour paint to posts of ( ) fle□ible barrier
- MO2: Hydroseeding with shrub planting ( ) in soil nailing areas
- MO3: Shrub planting in front of fle□ible barrier ( ) for screening purpose
- □MO4: Look after landscape work under Establishment/Maintenance Period

□MC3, MC6 and MO4 are generali□ed mitigation measures with no indicative location provided for clarity

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme, 2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Ha□ard Study for
Study Area 11NE-B/SA3 - Ra□or Hill, Clear Water Bay Road

Landscape Mitigation Plan

FUGRO (HONG KONG) LTD

Scale :	1 : 1000		
Drawn by : HON	Date : JUN-2017	Checked :	Approved :
Job No. : 120141	Figure No : 10		

PLATES

CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-BSA3\120141-PLATE_1 (P05) (11NE-BSA3-EPD).dwgPLOTTED BY : JOEW, 05 Dec,2017 - 11:34am

Compiled by :

Drawn by :

Checked by :

844000 E

844200 E

N

822800 N

822600 N

822400 N

Clear Water Bay Road

AIR HOUSE

Clear Water Bay Road

CONSERVATION
AREA
自然保育區

Study Area No. 11NE-B/SA3

RAZOR HILL
鷓鴣山

Legend :

Study Area

N

Location of the
Designated Project

Kowloon

Hong Kong Island

Key Plan Scale 1 : 25000

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme,
2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Study for
Study Area 11NE-B/SA3 - Razon Hill at Clear Water Bay Road

Overview of The Surrounding Environment of The Designated Project

FUGRO (HONG KONG) LTD

Scale :	1 : 2000 / AS SHOWN		
Drawn by : HON	Date : FEB-2016	Checked :	Approved :
Job No. : 120141	Plate No : 1		

Checked by :

Drawn by :

Compiled by :

844000 E

844200 E

N

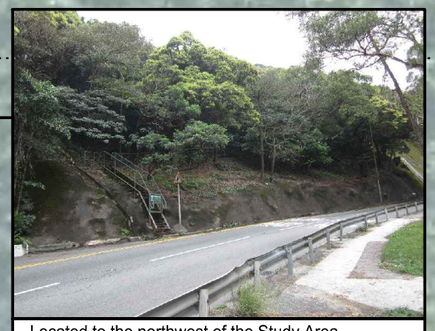
Clear Water Bay Road

Clear Water Bay Road

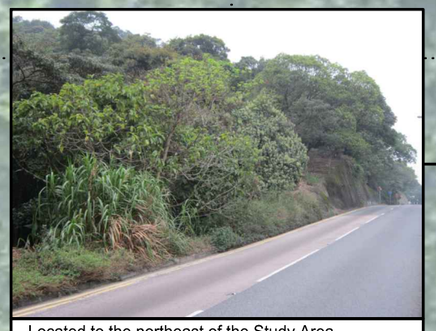
AIR HOUSE

Study Area No. 11NE-B/SA3

822600 N



Located to the northwest of the Study Area
(Looking Southwest)



Located to the northeast of the Study Area
(Looking West)

Legend :

- Study Area
- The Works Area
- Proposed Soil Nail
- Proposed Hydroseeding with Biodegradable Erosion Control Mat and Wire Mesh
- Proposed Flexible Barrier (to be designed, supplied and installed by the contractor)

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme,
2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

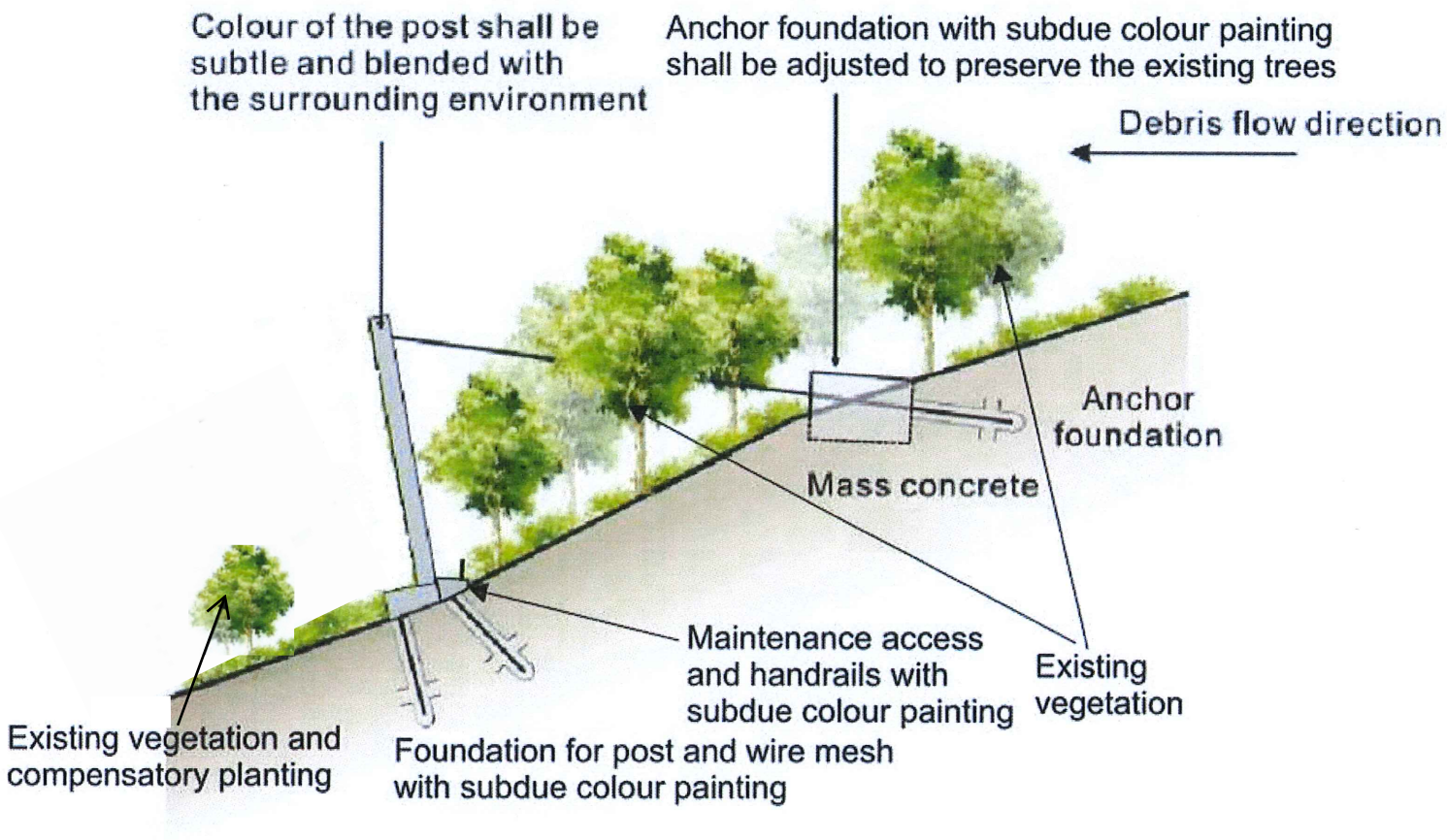
Natural Terrain Hazard Study for
Study Area 11NE-B/SA3 - Razon Hill at Clear Water Bay Road

Approximate Location of the Proposed Works and Views Around the Works Area

FUGRO (HONG KONG) LTD

Scale :	1 : 1000		
Drawn by : HON	Date : JAN-2017	Checked :	Approved :
Job No. : 120141	Plate No : 1A		

CAD. FILE NO. : X:\Working\120141_CE26-2011\EPD\11NE-BSA3\120141-PLATE_1A (P04) (11NE-BSA3-EPD).dwg PLOTTED BY : poew, 05 Jan 2017 - 2:08pm



Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Schematic Diagram of Landscape Treatment Works for Flexible Barrier**	FUGRO (HONG KONG) LTD Scale : Not to Scale Drawn By Date : Jul 2015 Checked: Approved: Job No. 120141 Plate No. : 2

General View of the Flexible Barrier

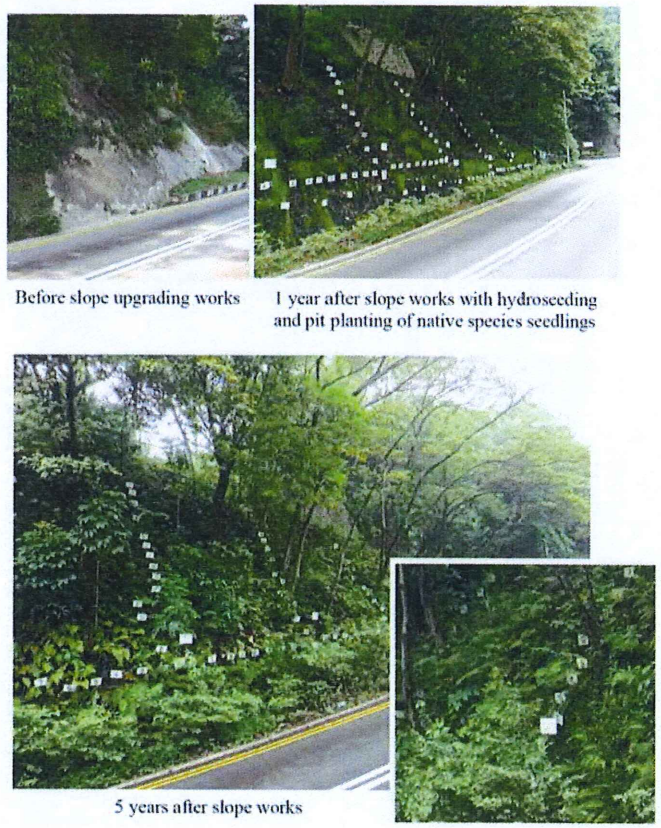


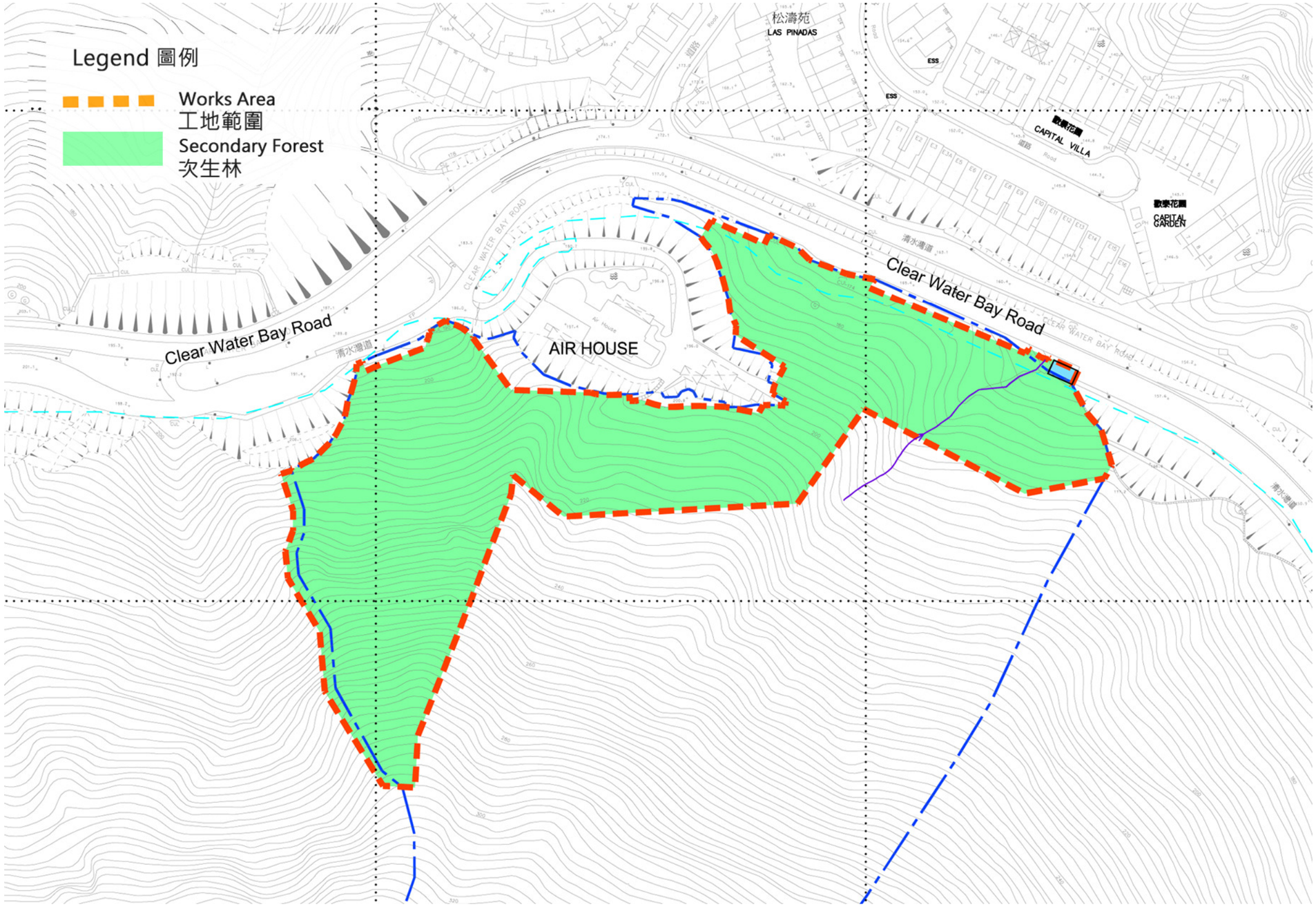
Illustration of successful establishment of native plant species and natural dispersal of vegetation over time along Clear Water Bay Road

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Illustration of Mitigation Measures**	FUGRO (HONG KONG) LTD Scale : Not to Scale Drawn By Date : Jul 2015 Checked: Approved: Job No. 120141 Plate No. : 3

Protective wrapping around tree trunks
(Source: GEO Publication No. 1/2011)

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Illustration of Protective Wrapping around Tree Trunks**	FUGRO (HONG KONG) LTD Scale : Not to Scale Drawn By Date : Jul 2015 Checked: Approved: Job No. 120141 Plate No. : 4

Habitat map of Proposed Works Area No. 11NE-B/SA3, green represents secondary forest.



Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of Habitats**	FUGRO (HONG KONG) LTD Scale 1:2000/ AS SHOWN Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 5.1

Checked by :

Drawn by :

Compiled by :

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844000 E

844200 E

822600 N

Clear Water Bay Road

CLEAR WATER BAY ROAD

AIR HOUSE

EXISTING GRAVE

C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24

Works Area A

Works Area B

Works Area C

Temporary Storage Area

8 individuals of Cibotium barometz (金毛狗)

5 individuals of Cibotium barometz (金毛狗)

>50 individuals of Cibotium barometz (金毛狗)

>50 individuals of Cibotium barometz (金毛狗)

Study Area No. 11NE-B/SA3

RAZOR HILL
鷓鴣山

CONSERVATION AREA
自然保育區

N

Legend :

- Boundary of Study Area
- Conservation Area
- Existing Ephemeral Drainage Line
- Works Area
- Temporary Storage Area
- Proposed Flexible Barrier with Concrete/Steel Maintenance Staircase with Handrailing
- Proposed Soil Nail and Hydroseeding with Biodegradable Erosion Control Mat and Wire Mesh
- Proposed Concrete/Steel Maintenance Staircase with Handrailing

Species of Conservation Importance Location

- Pavetta hongkongensis (香港大沙葉)
- Cibotium barometz (金毛狗)
- Aquilaria sinensis (土沉香)
- Ania hongkongensis (香港安蘭)
- Gnetum luofuense (羅浮買麻藤)

Remark: 1) *Location of proposed works may be further adjusted during construction to suit the actual site condition and to avoid affecting existing trees.

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme, 2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Study for
Study Area 11NE-B/SA3 - Razor Hill, Clear Water Bay Road

Representative Photographs of Habitats (Locations of Plant Species of Conservation Importance Indicated)

FUGRO (HONG KONG) LTD

Scale :			
1 : 1000			
Drawn by : HQN	Date : JAN-2018	Checked :	Approved :
Job No. : 120141	Plate No : 5.2		

844000 E

844200 E

822600 N

Clear Water Bay Road

CLEAR WATER BAY ROAD

AIR HOUSE

EXISTING GRAVE

Works Area A

Works Area B

Works Area C

Temporary Storage Area

8 individuals of Cibotium barometz (金毛狗)

5 individuals of Cibotium barometz (金毛狗)

>50 individuals of Cibotium barometz (金毛狗)

>50 individuals of Cibotium barometz (金毛狗)

Study Area No. 11NE-B/SA3

RAZOR HILL 鷓鴣山

CONSERVATION AREA 自然保育區

C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13 C14 C15 C16 C17 C18 C20 C21 C22 C23 C24

Legend :

- Boundary of Study Area
- Conservation Area
- Existing Ephemeral Drainage Line
- Works Area
- Temporary Storage Area
- Proposed Flexible Barrier with Concrete/Steel Maintenance Staircase with Handrailing
- Proposed Soil Nail and Hydroseeding with Biodegradable Erosion Control Mat and Wire Mesh
- Proposed Concrete/Steel Maintenance Staircase with Handrailing

Species of Conservation Importance Location

- Pavetta hongkongensis (香港大沙葉)
- Cibotium barometz (金毛狗)
- Aquilaria sinensis (土沉香)
- Ania hongkongensis (香港安蘭)
- Gnetum luofuense (羅浮買麻藤)

Remark: 1) *Location of proposed works may be further adjusted during construction to suit the actual site condition and to avoid affecting existing trees.

Job Title

Agreement No. CE26/2011 (GE)

Landslip Prevention and Mitigation Programme, 2011, Package H,
Landslip Prevention and Mitigation Works,
- Investigation, Design and Construction

Drawing Title

Natural Terrain Hazard Study for
Study Area 11NE-B/SA3 - Razor Hill, Clear Water Bay Road

Representative Photographs of Habitats
(Locations of Plant Species of Conservation Importance and Surveyed Trees Indicated)

FUGRO (HONG KONG) LTD

Scale : 1 : 1000

Drawn by : HON | Date : JAN-2018 | Checked : | Approved :

Job No. : 120141 | Plate No : 5.2A

Checked by :
Drawn by :
Compiled by :

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The ephemeral drainage line was found dry even in wet season. The natural section is full of rocks and stones. Very slow flow of shallow water was observed at the end point at a culvert passing through Clear Water Bay Road.

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of Habitats**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 5.3

Four plant species of conservation found during the ecological survey, namely *Aquilaria sinensis* (土沉香; left), *Pavetta hongkongensis* (香港大沙葉; middle), *Ania hongkongensis* (香港安蘭; top right) and *Cibotium barometz* (金毛狗; bottom right).

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of Habitats**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 5.4

Landscape Resources (LR) of the Proposed Works Area and the surrounding environment. LR1 Hillside Woodland (top left); LR2 Rural Development Area (top right); LR3 Major Transportation Corridor (bottom left) and LR4 Ephemeral Drainage Line (bottom right)

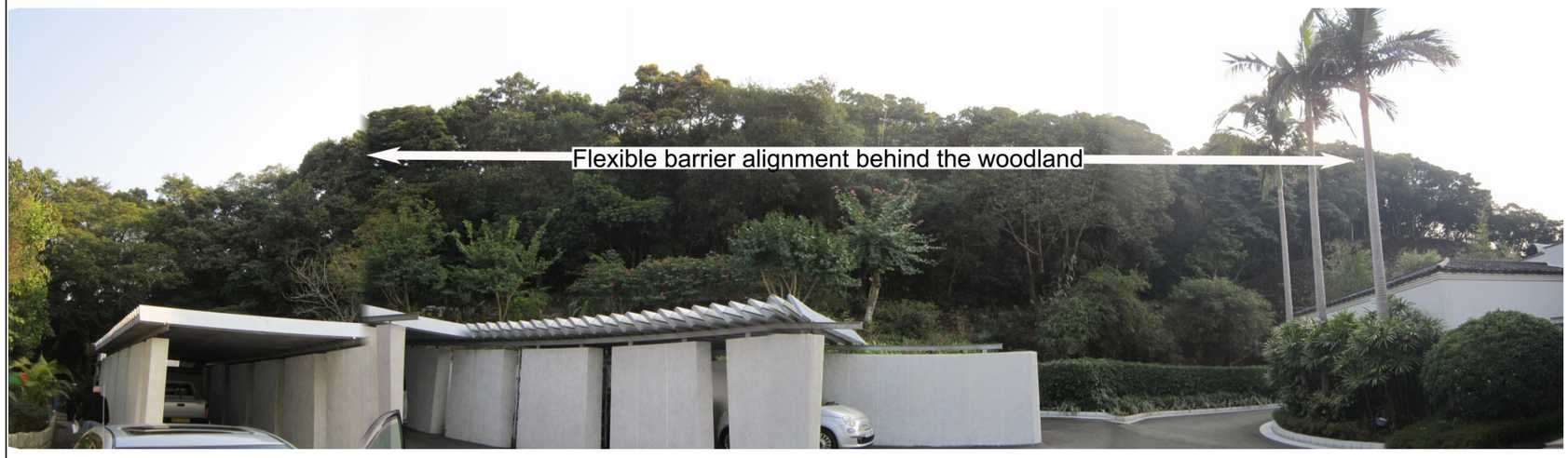
Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of LRs and LCAs**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 6.1

Landscape Character Areas (LCA) of the Proposed Works Area and the surrounding environment. LCA1 Natural Hillside Landscape of Razor Hill and woodland in vicinity. LCA2 Urban Fringe Village Landscape of the Air House, Villas of Ta Ku Ling San Tsuen and, LCA3 Transportation Corridor Landscape including Clear Water Bay Road and roads connecting the Air House and Ta Ku Ling San Tsuen.

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of LRs and LCAs**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 6.2

Vantage points (VP) from various Visually Sensitive Receivers (VSR). VSR1: The residents of the Air House (VP1–VP2), The corresponding VPs are marked on the map in Figure 8.

VP1 (left): South facing upslope view from the Air House. The two proposed flexible barriers at this location are unlikely to be visible by VSR1 as the existing layer of mature trees will be retained and act as a natural screen of the flexible barriers. VP2 (right): West looking view of VP1. The proposed flexible barriers are located behind the tree layers on the man-made slope.

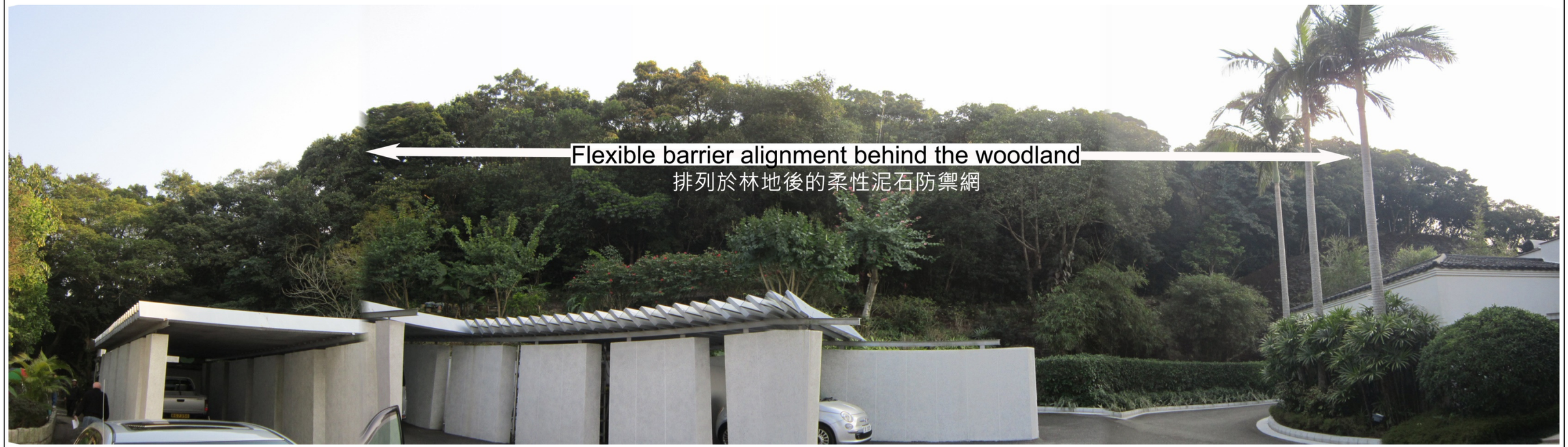


VSR2: The residents of the Villas (VP3–VP8). The corresponding VPs are marked on the map in Figure 8.

VP3 (left): Green screen erected by Las Pinadas at Block E16 further reduces visual impact of the proposed flexible barrier works at the opposite hillside wihtin the woodland.

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of VSRs and VP**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 7.1

Flexible barriers would likely be non-visible at the Air House under long term mitigated situation.



Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Photomontage of Year10**	FUGRO (HONG KONG) LTD Scale 1:2000/ AS SHOWN Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 7.1A

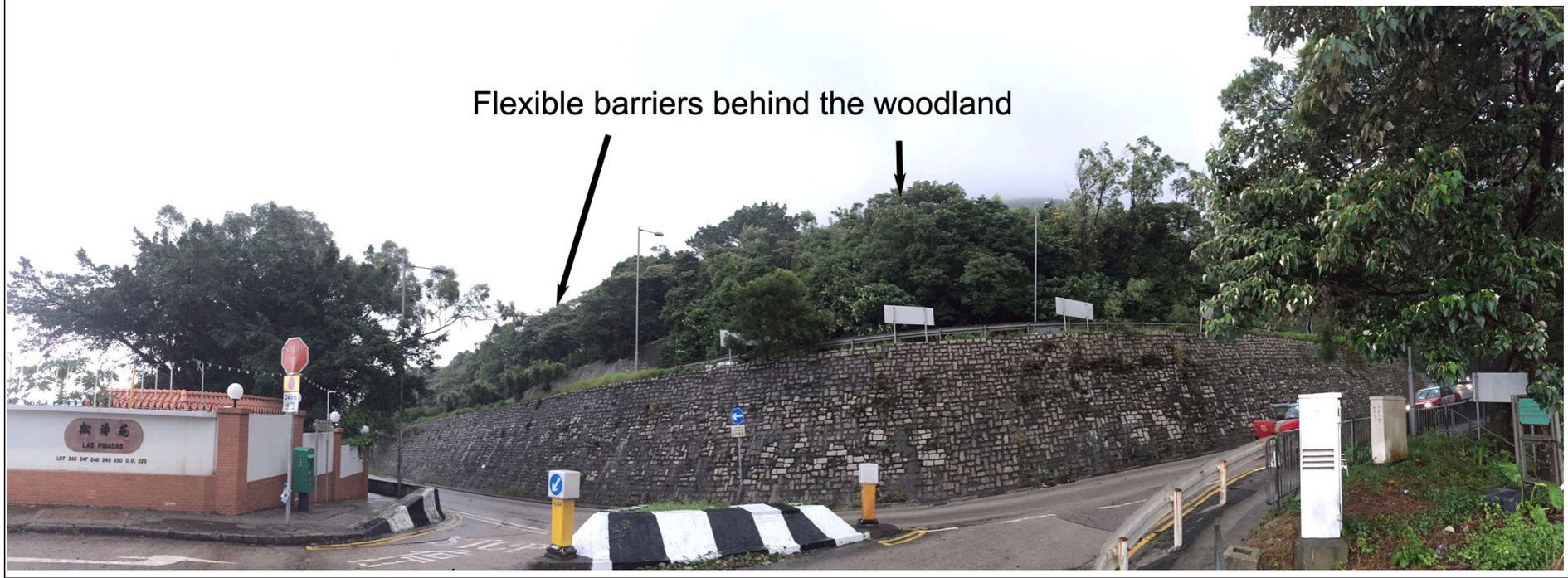
VP4 (left): This is the view from the pedestrian road facing the proposed flexible barrier alignment. The Villas blocks settled downslope after a tree layer behind this viewpoint should hardly receive any visual impact to the proposed works (right).

VP5 (left): VSR3 coming from the west of the Clear Water Bay Road are at a lower elevation of the Proposed Works Area below the masonry wall. The white wall built at the boundary of Las Pinadas would hinder much of the view to the Proposed Works Area within the hillside woodland. Note that the block with orange roof is not a residental house but a guard room at the entrance of the village. Residential blocks are further down slope behind the wall (right).

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of VSRs and VP**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 7.2

VP6 (left): Viewpoint just outside the entrance of Las Pinadas. VP7 (right): Viewpoint outside Block 1 & 2 of the Green Villa. Note that some view of the Proposed Works Area in the hillside woodland is blocked by the large tree growing inside Las Pinadas behind the gate. The flexible barrier indicated by the right arrow in both photos are further behind the Air House, which is invisible from these VPs.

VP8: View at the road junction between Clear Water Bay Road and the Ta Ku Ling San Tsuen. The flexible barrier indicated by the right arrow in the photo is further behind the Air House, which is invisible from this VP.



Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of VSRs and VP**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 7.3

VSR3: Travellers along Clear Water Bay Road (VP9–VP12). The corresponding VPs are marked on the map in Figure 8.

VP9: Dense vegetation of the man-made slope at the lower elevation to the Air House, the building itself provide screening effect for the flexible barrier behind, making VSR3 coming from the east of Clear Water Bay Road receive slight visual impact significance.

VP10: View point opposite to the entrance of the Air House. The flexible barrier indicated by the left arrow in the photo is further behind the Air House, which is invisible from this VP.

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of VSRs and VP**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 7.4

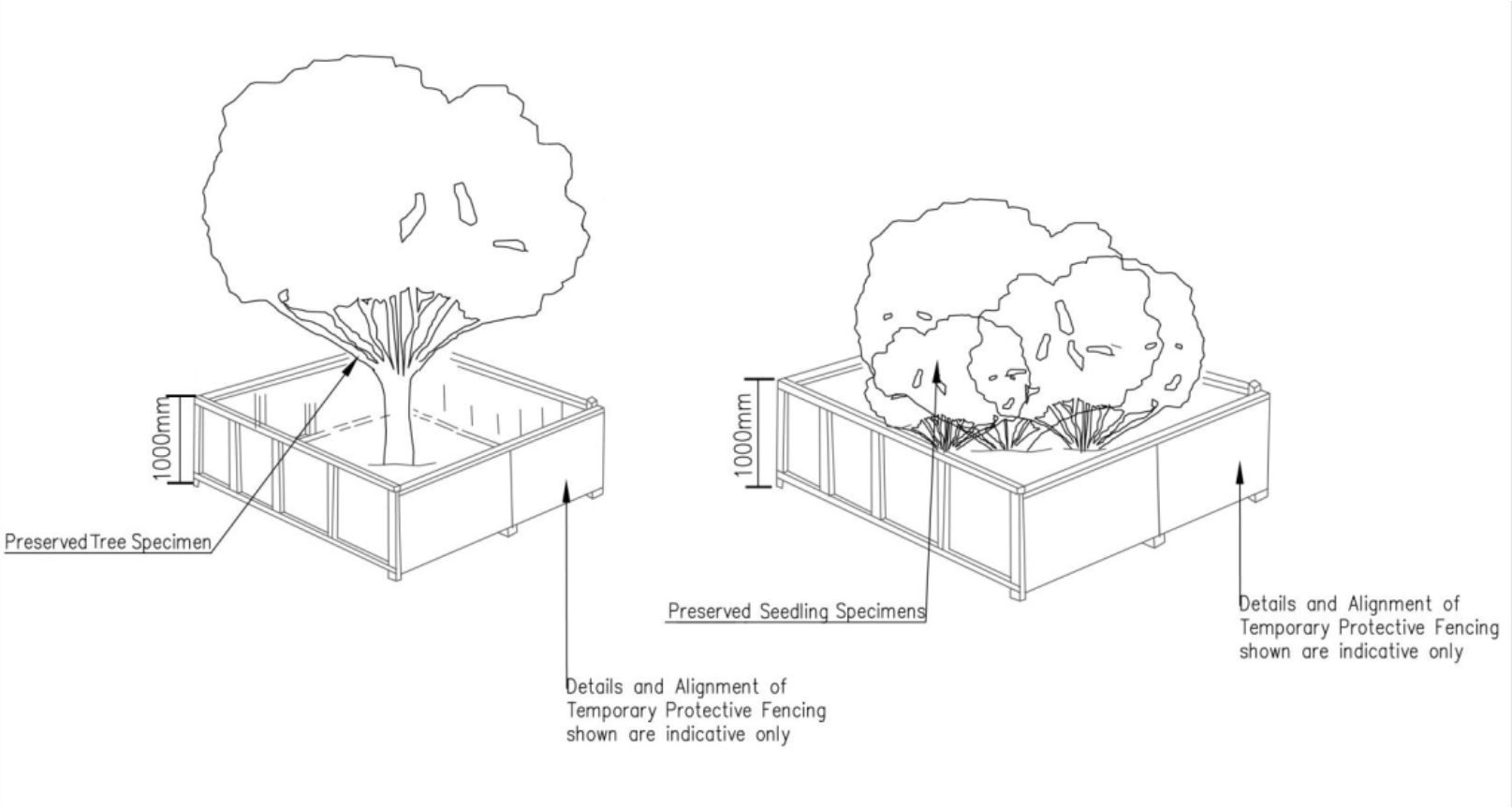
VP11: Dense vegetation of the man-made slope feature adjacent to the Air House provide screening effect for the flexible barrier behind, making VSR3 receive slight visual impact significance.

VP12: Viewpoint opposite to the man-made slope feature shown in VP11. Note the layer of trees between two lanes further block the view to the hillside woodland.

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of VSRs and VP**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No : 7.5

The grave site found within the Proposed Works Area.

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Representative Photographs of VSRs and VP**	FUGRO (HONG KONG) LTD Scale Drawn By Date : Jul 2015 Checked : Approved: Job No. 120141 Plate No :7.6



Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Illustration of Temporary Protective Fencing for the Protected Species**	FUGRO (HONG KONG) LTD Scale N.T.S. Drawn By Date : Feb 2016 Checked: Approved: Job No. 120141 Plate No : 8

APPENDICES

Appendix A

Proposed Natural Hazard Mitigation Design

Job Title

Agreement No. GE/26/2011 (GE)

Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction

Drawing Title

Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road
Previous Examples of Flexible Barrier for Natural Terrain Hazard Mitigation Works

FUGRO (HONG KONG) LTD

Scale : Not to Scale

Drawn By Date : Jul 2015 Checked:

Approved:

Job No. 120141 Figure No. : A1

Close-up View of Flexible Barrier and Supporting Post

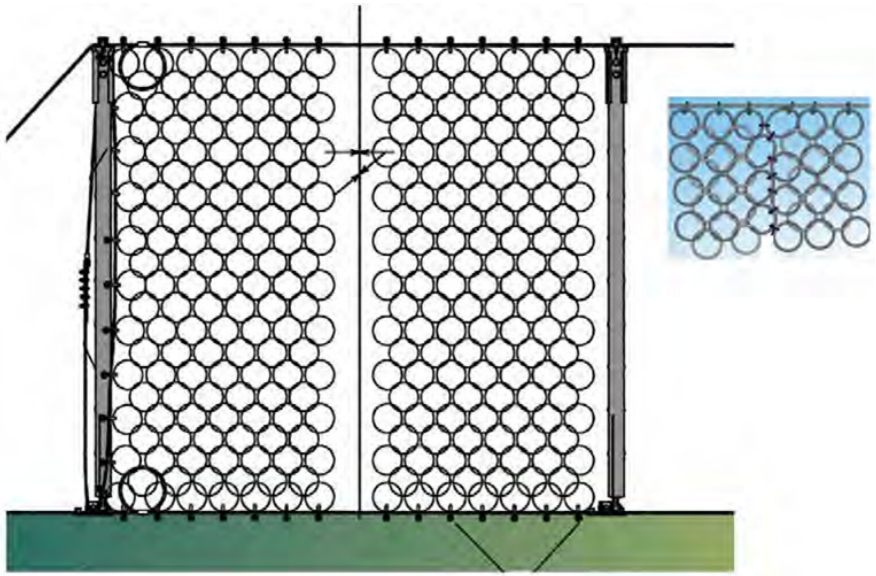
Details of Flexible Barrier

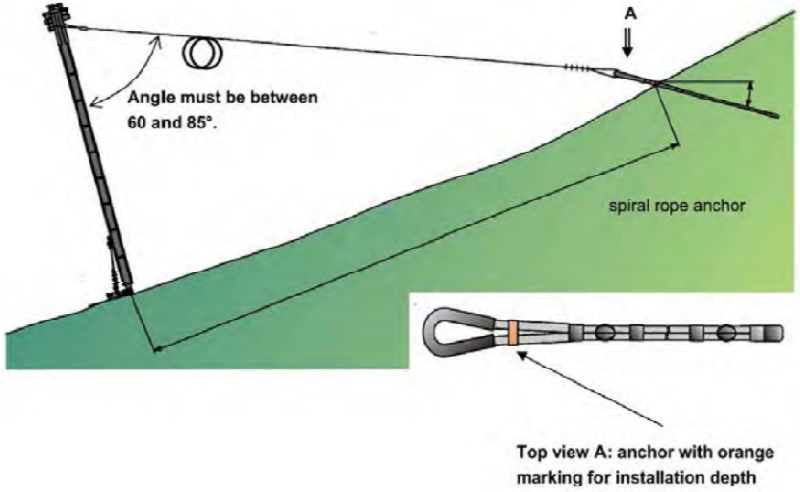
Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Previous Examples of Flexible Barrier for Natural Terrain Hazard Mitigation Works**	FUGRO (HONG KONG) LTD Scale : Not to Scale Drawn By Date : Jul 2015 Checked: Approved: Job No. 120141 Figure No. : A2

View of Flexible Barriers and access with painted handrails

View of Flexible Barriers above Tung Chung Road

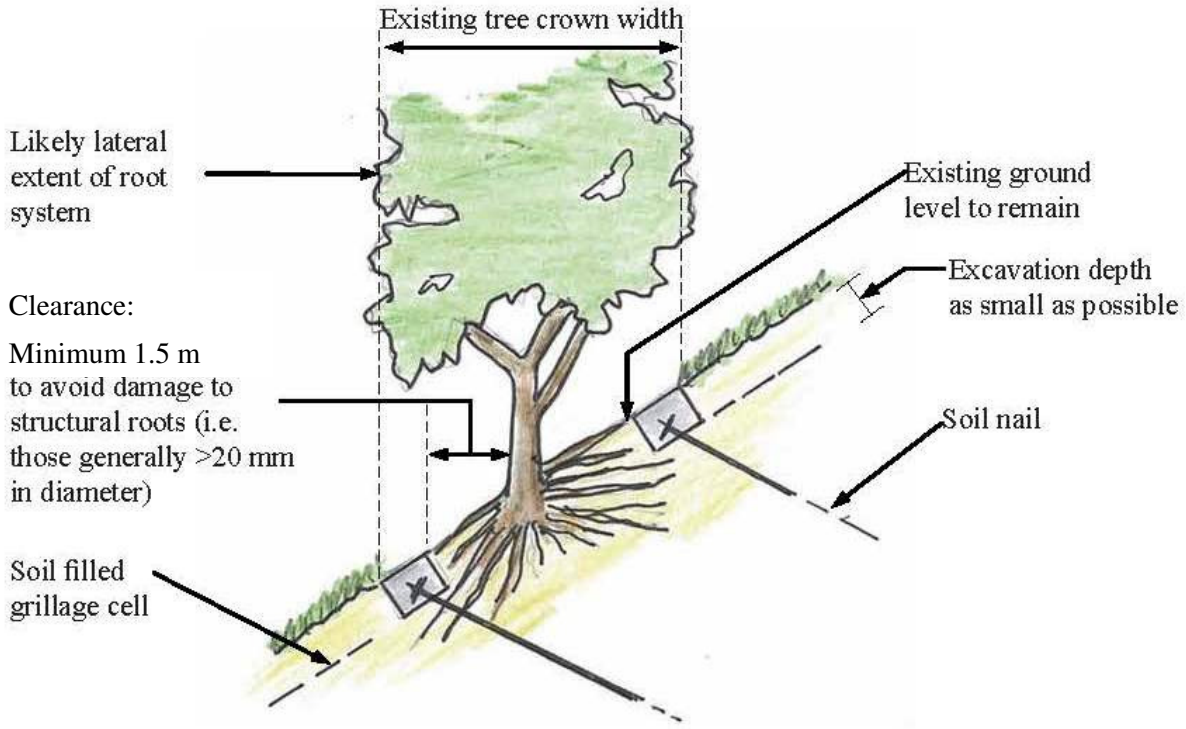
Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Previous Examples of Flexible Barrier for Natural Terrain Hazard Mitigation Works**	FUGRO (HONG KONG) LTD Scale : Not to Scale Drawn By Date : Jul 2015 Checked: Approved: Job No. 120141 Figure No. : A3





Installation of Flexible Barrier

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Example of the Installation of a Flexible Barrier**	FUGRO (HONG KONG) LTD Scale : Not to Scale Drawn By Date : Jul 2015 Checked: Approved: Job No. 120141 Figure No. : A4



Installation of Soil Nail in Vicinity of Existing Tree Roots

(Extracted from GEO Publication No. 1/2011)

Job Title Agreement No. GE/26/2011 (GE) Landslip Prevention and Mitigation Programme, 2011, Package H, Landslip Prevention and Mitigation Works, - Investigation, Design and Construction	Drawing Title **Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road** **Example of Installation of Soil Nails**	FUGRO (HONG KONG) LTD Scale : Not to Scale Drawn By Date : Jul 2015 Checked: Approved: Job No. 120141 Figure No. : A5

Appendix B

Tentative Construction Programme

Tentative Construction Programme of Proposed Hazard Mitigation Works at Study Area 11NE-B/SA3, Razor Hill, Clear Water Bay Road

Works Area A

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22
1	Site preparation																						
3	Construction of flexible barriers and provision of maintenance access / staircases																						
4	Landscaping works																						

Works Area B

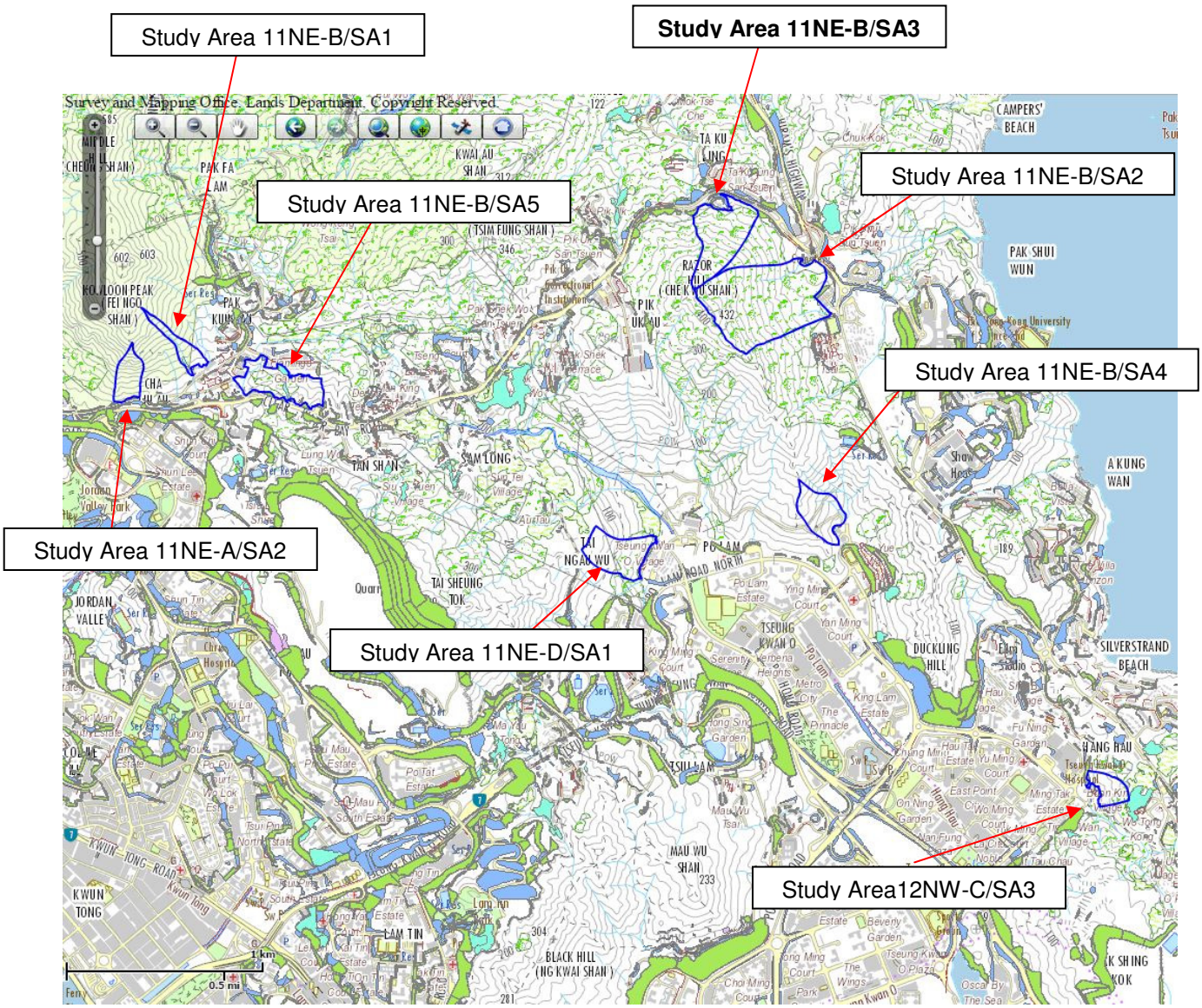
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22
1	Site preparation																						
2	Installation of soil nails																						
3	Construction of flexible barriers and provision of maintenance access / staircases																						
4	Landscaping works																						

Works Area C

		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22
1	Site preparation																						
2	Installation of soil nails																						
4	Landscaping works																						

Appendix C

Location of the Study Area 11NE-B/SA3 and Other Concurrent Natural Terrain Hazard Mitigation Works in the Vicinity



Source: http://hkss.cedd.gov.hk/hkss/chi/sis_map.aspx

Appendix D

Ecological Survey data

List of Plant Species Recorded in the Works Area 11NE-B/SA3.

Species name[1]	Chinese name	Growth form	Status	Relative abundance[2]
Machilus chekiangensis	浙江潤楠	Tree	Very common	+++
Psychotria asiatica	山大刀	Shrub/Tree	Very common	+++
Cyclosorus parasiticus	華南毛蕨	Fern	Very common	+++
Sarcandra glabra	草珊瑚	Shrub	Very common	+++
Dendrotrophe frutescens	寄生藤	Climber	Very common	+++
Symplocos glauca	羊舌樹	Tree	Common	+++
Cibotium barometz	金毛狗	Herb	Very common	++
Schefflera heptaphylla	鵝掌柴	Tree	Very common	++
Ardisia quinquegona	羅傘樹	Tree	Very common	++
Blechnum orientale	烏毛蕨	Fern	Very common	++
Adiantum flabellulatum	扇葉鐵線蕨	Fern	Very common	++
Lygodium japonicum	海金沙	Fern	Very common	++
Psychotria serpens	蔓九節	Climber	Very common	++
Syzygium levinei	山蒲桃	Tree	Common	++
Glochidion eriocarpum	毛果算盤子	Shrub	Very common	++
Dicranopteris pedata	芒萁	Fern	Very common	++
Hedyotis acutangula	方骨草	Herb	Very common	++
Zanthoxylum avicennae	簕欓花椒	Tree	Common	++
Celastrus monospermus	獨子藤	Climber	Common	++
Lophatherum gracile	淡竹葉	Herb	Very common	++
Rhodomyrtus tomentosa	崗稔	Shrub	Very common	++
Cinnamomum parthenoxylon	黃樟	Tree	Common	++
Eurya nitida	細齒葉柃	Shrub/Tree	Very common	++
Ardisia crenata	朱砂根	Shrub	Common	++
Cinnamomum camphora	樟	Tree	Common	++
Miscanthus sinensis	芒	Herb	Very common	++
Pueraria lobata var. montana	葛麻姆	Climber	Common	++
Selaginella doederleinii	深綠卷柏	Fern	Common	++
Melodinus suaveolens	山橙	Climber	Common	++
Rubus reflexus	蛇泡簕	Climber	Very common	+
Jasminum lanceolarium	清香藤	Climber	Very common	+
Meliosma rigida	筆羅子	Tree	Common	+
Gnetum luofuense	羅浮買麻藤	Climber	Very common	+
Tetracera asiatica	錫葉藤	Climber	Very common	+
Uvaria macrophylla	紫玉盤	Shrub/Climber	Common	+
Mallotus paniculatus	白楸	Tree	Very common	+
Melastoma candidum	野牡丹	Shurb	Common	+
Melicope pteleifolia	三椏苦	Tree	Common	+

Species name[1]	Chinese name	Growth form	Status	Relative abundance[2]
Breynia fruticosa	黑面神	Shrub	Very common	+
Diospyros eriantha	烏柿	Tree	Very common	+
Diospyros morrisiana	羅浮柿	Tree	Very common	+
Elaeocarpus chinensis	華杜英	Tree	Common	+
Ficus fistulosa	水同木	Tree	Common	+
Ficus hirta	粗葉榕	Shrub	Common	+
Ilex asprella	梅葉冬青	Shrub	Very common	+
Pittosporum glabratum	光葉海桐	Shrub	Very common	+
Aidia canthioides	香楠	Tree	Very common	+
Archidendron lucidum	亮葉猴耳環	Tree	Common	+
Acronychia pedunculata	山油柑	Tree	Very common	+
Alyxia sinensis	念珠藤	Climber	Common	+
Elaeocarpus sylvestris	山杜英	Tree	Very common	+
Ficus variolosa	變葉榕	Shrub/Tree	Very common	+
Pericampylus glaucus	細圓藤	Climber	Restricted	+
Smilax corbularia	筐條菝葜	Climber	Common	+
Smilax lanceifolia	暗色菝葜	Climber	Common	+
Syzygium buxifolium	赤楠	Shrub	Common	+
Zanthoxylum nitidum	兩面針	Climber	Very common	+
Ilex viridis	綠冬青	Shrub	Common	+
Ania hongkongensis	香港安蘭	Herb	Very common	+
Millettia speciosa	美麗崖豆藤	Climber	Common	+
Dalbergia benthamii	兩廣黃檀	Climber	Common	+
Aquilaria sinensis	土沉香	Tree	Common	+
Liriope spicata	山麥冬	Herb	Common	+
Scolopia saeva	廣東刺柊	Tree	Common	+
Bauhinia championii	龍鬚藤	Climber	Common	+
Byttneria aspera	刺果藤	Climber	Very common	+
Callicarpa kochiana	枇杷葉紫珠	Shrub	Common	+
Cayratia corniculata	角花烏蘞莓	Climber	Very common	+
Turpinia montana	山香圓	Tree	Common	+
Desmos chinensis	假鷹爪	Shrub	Common	+
Pavetta hongkongensis	香港大沙葉	Shrub/Tree	Common	+
Ilex pubescens	毛冬青	Shrub	Very common	+
Tylophora ovata	娃兒藤	Climber	Common	+
Zanthoxylum scandens	花椒簕	Climber	Common	+
Mussaenda pubescens	玉葉金花	Climber	Very common	+
Alchornea trewioides	紅背山麻桿	Shrub	Common	+
Bidens pilosa var. radiata	白花鬼針草	Herb	Very common	+
Cratoxylum cochinchinense	黃牛木	Shrub/Tree	Very common	+

Species name[1]	Chinese name	Growth form	Status	Relative abundance[2]
Daemonorops margaritae	真白藤	Climber	Very common	+
Daphniphyllum oldhamii	虎皮楠	Tree	Common	+
Diplospora dubia	狗骨柴	Shrub/Tree	Common	+
Embelia laeta	酸藤子	Climber	Very common	+
Embelia ribes	白花酸藤子	Climber	Common	+
Ficus variegata var. chlorocarpa	青果榕	Tree	Common	+
Gahnia tristis	黑莎草	Herb	Very common	+
Garcinia oblongifolia	黃牙果	Tree	Very common	+
Glochidion wrightii	白背算盤子	Shrub	Very common	+
Graphistemma pictum	天星藤	Climber	Common	+
Litsea rotundifolia	豺皮樟	Shrub	Very common	+
Lonicera macrantha	大花忍冬	Climber	Common	+
Machilus pauhoi	刨花潤楠	Tree	Common	+
Pteris vittata	蜈蚣草	Fern	Very common	+
Rourea microphylla	小葉紅葉藤	Climber	Common	+
Scleria ciliaris	緣毛珍珠茅	Herb	Very common	+
Strophanthus divaricatus	羊角拗	Climber	Common	+
Wikstroemia nutans	細軸荛花	Shrub	Common	+
Pteris dispar	刺齒半邊旗	Fern	Common	+
Endospermum chinense	黃桐	Tree	Restricted	+
Symplocos cochinchinensis var. *laurina*	黃牛奶樹	Tree	Common	+
Helicia cochinchinensis	越南山龍眼	Tree	Restricted	+
Millettia dielsiana	香花崖豆藤	Climber	Very common	+
Taxillus chinensis	廣寄生	Parasite	Common	+
Rourea minor	牛栓藤	Climber	Common	+
Tetrastigma hemsleyanum	三葉青	Climber	Restricted	+
Elaeagnus loureirii	羅氏胡頹子	Climber	Common	+
Actinidia latifolia	闊葉獼猴桃	Climber	Restricted	+
Bischofia javanica	秋楓	Tree	Common	+
Broussonetia kaempferi var. australis	藤構	Climber	Restricted	+

Note[1]: Species highlighted in yellow represents plant species of conservation importance species with conservation concern.
Note[2]: Relative abundance: ++++ = Abundant; +++ = Common; +++ = Uncommon; + = Scare.

List of all individuals of *Aquilaria sinensis* (土沉香), *Pavetta hongkongensis* (香港大沙葉), *Ania hongkongensis* (香港安蘭) and *Gnetum luofuense* (羅浮買麻藤) recorded in the Proposed Works Area 11NE-B/SA3.

Species name	Chinese name	Tag No.	Height (m)	Crown (m)	DBH (mm)(2)	Re-sprout(1)	Health(3)	Form(4)	Remarks(5)
Aquilaria sinensis	土沉香	C01	4	1.5	80	No	Good	Fair	
Aquilaria sinensis	土沉香	C02	2.5	1	200	Yes	Poor	Poor	Topped
Aquilaria sinensis	土沉香	C04	1.5	Nil	110	Yes	Poor	Poor	Topped
Aquilaria sinensis	土沉香	C05	1.7	1	30	No	Fair	Fair	
Aquilaria sinensis	土沉香	C06	3	1.5	30	No	Good	Good	
Aquilaria sinensis	土沉香	C07	2.5	1	25	No	Good	Good	
Aquilaria sinensis	土沉香	C08	0.5	Nil	Nil	No	Good	Good	Seedling
Aquilaria sinensis	土沉香	C09	1.5	Nil	Nil	No	Good	Good	Sapling
Aquilaria sinensis	土沉香	C10	3	2	30	No	Good	Good	
Aquilaria sinensis	土沉香	C11	3	1.5	30	No	Good	Good	
Aquilaria sinensis	土沉香	C12	4	2	30	No	Good	Good	
Aquilaria sinensis	土沉香	C13	3	1.5	30	No	Good	Good	
Aquilaria sinensis	土沉香	C14	3.5	2	55	No	Fair	Poor	
Aquilaria sinensis	土沉香	C15	2.5	1.5	20	No	Good	Good	
Aquilaria sinensis	土沉香	C16	1.5	Nil	200	Yes	Poor	Poor	Topped
Aquilaria sinensis	土沉香	C17	1.5	Nil	15	No	Good	Good	Sapling
Aquilaria sinensis	土沉香	C18	2	0.8	10	No	Good	Good	
Aquilaria sinensis	土沉香	C19	1.2	Nil	100	Yes	Poor	Poor	Topped/Harvested
Aquilaria sinensis	土沉香	C20	4	0.5	50	No	Good	Good	
Pavetta hongkongensis	香港大沙葉	C21	1.7	Nil	10	No	Good	Good	
Pavetta hongkongensis	香港大沙葉	C22	0.5	Nil	Nil	No	Good	Good	Seedling
Ania hongkongensis	香港安蘭	C23	0.2	N/A	N/A	No	Fair	Fair	

Gnetum luofuense	羅浮買麻藤	C24	3	1	N/A	No	Fair	Fair

Notes:
(1) Presence of re-sprout was generally resulted from heavy trunk damage, e.g. topping, from illegal logging activities.
(2) DBH (diameter at breast height) were measured for each sizeable individual. Base diameter of the main stem was measured instead if the trunk was seriously damaged. No DBH could be obtained from seedlings or saplings.
(3) Foliage condition, presence of epicormic and root condition were considered for determining the healthiness of plants (Matheny and Clark, 1994).
(4) Form of tree taper, overall tree performance and structure were considered for determining the tree and crown form of each individual plant (Matheny and Clark, 1994).
(5) All observations and remarks of tree condition were made between January and July 2015.

Bird species and abundance recorded during the ecological surveys in the Proposed Works Area 11NE-B/SA3.

Species name	Common name	Chinese name	Abundance
Hemixos castanonotus	Chestnut Bulbul	栗背短腳鵯	4
Parus cinereus	Cinereous Tit	蒼背山雀	1
Orthotomus sutorius	Common Tailorbird	長尾縫葉鶯	2
Aethopyga christinae	Fork-tailed Sunbird	叉尾太陽鳥	3
Turdus hortulorum	Grey-backed Thrush	灰背鶇	7
Zosterops japonicus	Japanese White-eye	暗綠繡眼鳥	24
Pycnonotus jocosus	Red-whiskered Bulbul	紅耳鵯	2
Stachyridopsis ruficeps	Rufous-capped Babbler	紅頭穗鶥	2
Phylloscopus inornatus	Yellow-browed Warbler	黃眉柳鶯	2
Spilornis cheela	Crested Serpent Eagle	蛇鵰	1

Appendix D1

Percentage of Trees in DBH Range Groups, Tree Schedule and Tree Group of Common Tree Species found within Works Area A, B and C

Tree Group of Common Tree Species in % of DBH Range for all Works Areas A, B and C

DBH Range with approx. percentage		Range of Height	Range of Tree Crown Spread
< 0.3m	80%	0.6 - 8m	1 - 6m
0.3 - 0.75m	19.7%	3 - 11m	2 - 8.5m
>0.75m	0.3%	9 - 16m	7 - 10m

Tree Schedule within Works Area A

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
#153	0.11	6.00	3.00
#154	0.30	11.00	7.00
#155	0.22	8.00	5.00
#156	0.19	5.00	5.00
#157	0.13	6.00	4.00
#158	0.32	8.00	7.00
#159	0.13	5.00	5.00
#160	0.16	7.00	4.00
#161	0.33	7.00	5.00
#162	0.16	6.00	4.00
#168	0.29	8.00	5.00
#169	0.13	5.00	4.00
#207	0.32	8.00	5.00
#208	0.29	8.00	5.00
#209	0.32	8.00	5.00
#221	0.38	8.00	7.00
T1	0.25	8.00	6.00
T2	0.27	8.00	4.00
T3	0.26	7.50	6.00
T4	0.19	7.00	4.00
T5	0.18	7.00	4.00
T6	0.24	8.00	6.00
T7	0.18	7.00	4.00
T8	0.27	8.00	6.00
T9	0.24	8.00	5.00
T10	0.37	11.00	7.00
T11	0.15	6.00	4.00
T12	0.28	8.00	6.00
T13	0.27	8.00	6.00
T14	0.19	8.00	6.00
T15	0.13	5.00	2.00
T16	0.12	5.00	2.00
T17	0.12	7.00	4.00
T18	0.12	6.00	4.00
T19	0.23	8.00	3.00
T20	0.27	6.00	4.00
T21	0.17	7.00	4.00
T22	0.24	7.00	5.00
T23	0.35	8.00	6.00
T24	0.37	9.00	7.00
T25	0.14	6.00	4.00
T26	0.37	8.00	4.00
T27	0.25	6.00	4.00
T28	0.37	11.00	8.50
T29	0.25	8.00	5.00
T30	0.17	7.00	4.00
T32	0.21	8.00	6.00
T34	0.29	8.00	6.00
T36	0.19	6.00	4.00
T38	0.19	7.00	5.00
T40	0.12	3.00	1.00
T41	0.14	7.00	4.00
T51	0.24	7.00	4.00
T52	0.23	5.00	3.00
T53	0.25	7.00	3.00
T54	0.15	6.00	3.00
T55	0.11	7.00	4.00
T57	0.17	8.00	5.00
T60	0.17	7.00	5.00
T62	0.12	8.00	2.00
T63	0.24	7.00	5.00
T64	0.32	11.00	7.00
T66	0.12	3.00	5.00
T67	0.12	3.00	4.00
T68	0.35	5.00	5.00
T69	0.15	4.00	4.00
T70	0.13	5.00	6.00
T71	0.14	6.00	5.00
T72	0.21	6.00	5.00
T73	0.23	6.00	6.00
T74	0.27	7.00	4.00
T75	0.25	6.00	6.00
T76	0.40	9.00	7.00
T77	0.30	3.00	2.00
T78	0.50	8.00	5.00
T79	0.45	8.00	7.00
T80	0.45	9.00	3.00
T81	0.13	7.00	4.00
T82	0.10	6.00	4.00
T83	0.10	6.00	4.00
T84	0.20	6.00	3.00
T85	0.19	7.00	3.00
T86	0.11	6.00	4.00
T87	0.28	7.00	5.00
T88	0.15	6.00	5.00
T89	0.24	8.00	5.00
T90	0.13	7.00	2.00
T91	0.17	8.00	3.00
T92	0.16	6.00	3.00
T93	0.15	6.00	3.00
T94	0.18	7.00	4.00
T95	0.15	6.00	4.00
T96	0.40	10.00	5.00
T97	0.13	6.00	4.00
T98	0.37	10.00	6.00
T99	0.70	7.00	7.00
T101	0.18	6.00	4.00
T102	0.60	11.00	8.50
T103	0.25	7.00	3.00
T105	0.18	8.00	5.00
T107	0.20	7.00	4.00
T109	0.15	5.00	5.00
T112	0.20	6.00	3.00
T114	0.22	7.00	4.00
T115	0.39	6.00	4.00
T116	0.38	8.00	4.00
T117	0.25	7.00	5.00
T118	0.20	7.00	3.00
T119	0.39	7.00	6.00
T121	0.30	7.00	5.00
T122	0.19	6.00	4.00
T159	0.17	7.00	4.00
T161	0.10	6.00	3.00
T163	0.10	6.00	3.00
T165	0.17	7.00	2.00
T167	0.11	6.00	4.00
T168	0.15	7.00	3.00
T170	0.12	7.00	3.00
T171	0.10	7.00	2.00
T172	0.12	7.00	2.00
T174	0.11	7.00	2.00
T176	0.11	6.00	2.00
T177	0.10	7.00	2.00
T178	0.12	7.00	3.00
T179	0.10	7.00	3.00
T180	0.15	6.00	4.00
T181	0.11	7.00	3.00
T182	0.12	7.00	3.00
T183	0.20	6.00	4.00
T184	0.26	7.00	5.00
T185	0.22	7.00	4.00
T186	0.13	5.00	5.00
T187	0.18	8.00	3.00
T188	0.10	6.00	4.00
T189	0.13	7.00	4.00
T190	0.14	8.00	3.00
T191	0.18	6.00	4.00
T192	0.13	8.00	4.00
T193	0.16	6.00	2.00
T194	0.16	4.00	3.00
T195	0.16	6.00	3.00
T196	0.18	6.00	4.00
T197	0.10	4.00	3.00
T234	0.17	6.00	4.00
T235	0.23	6.00	5.00
T236	0.19	5.00	6.00
T237	0.20	5.00	4.00
T238	0.17	4.00	3.00
T239	0.17	6.00	4.00
T240	0.17	5.00	3.00
T241	0.18	5.00	3.00
T242	0.24	6.00	6.00
T243	0.23	8.00	6.00
T244	0.24	8.00	4.00
T245	0.13	4.00	5.00
T246	0.17	6.00	6.00
T247	0.27	7.00	6.00
T248	0.13	5.00	3.00
T249	0.20	6.00	6.00
T250	0.17	5.00	4.00
T251	0.20	6.00	5.00
T252	0.40	7.00	6.00
T253	0.25	7.50	4.00
T254	0.30	11.00	6.00
T255	0.40	9.00	4.00
T256	0.35	6.00	4.00
T257	0.35	7.00	4.00
T258	0.27	5.00	5.00
T259	0.50	11.00	8.00
T260	0.20	6.00	4.00
T261	0.13	5.00	4.00
T262	0.11	4.00	4.00
T364	0.27	5.00	3.00
T365	0.35	7.00	4.00
T366	0.35	6.00	6.00
T367	0.30	6.00	5.00
T368	0.30	7.00	5.00
T369	0.20	6.00	4.00
T373	0.21	7.00	5.00
T374	0.29	8.00	6.00
T375	0.25	7.00	5.00
T376	0.25	7.00	5.00
T377	0.17	8.00	5.00
T378	0.20	6.00	4.00
T379	0.18	6.00	4.00
T380	0.24	8.00	6.00
T381	0.25	6.00	4.00
T382	0.14	7.00	5.00
T383	0.40	7.00	5.00
T384	0.20	7.00	5.00
T385	0.20	6.00	5.00
T386	0.25	6.00	3.00
T387	0.21	8.00	5.00
T388	0.15	4.00	3.00
T389	0.22	6.00	4.00
T397	0.11	5.00	3.00
T398	0.21	5.00	4.00
T399	0.18	7.00	4.00
T400	0.12	6.00	3.00
T401	0.30	8.00	5.00
T402	0.27	7.00	5.00
T403	0.17	7.00	5.00
T404	0.28	8.00	5.00
T405	0.21	7.00	5.00
T406	0.25	7.00	6.00
T407	0.33	9.00	7.00
T408	0.29	7.00	5.00
T409	0.20	7.00	3.00
T410	0.40	9.00	7.00
T411	0.20	7.00	4.00
T412	0.39	7.00	5.00
T413	0.30	7.00	5.00
T414	0.13	7.00	3.00
T415	0.13	6.00	6.00
T416	0.13	6.00	3.00
T417	0.90	9.00	7.00
T418	0.21	6.00	4.00
T419	0.20	7.00	6.00
T420	0.22	7.00	6.00
T421	0.20	7.00	6.00
T422	0.60	4.00	3.00
T423	0.18	4.00	5.00
T424	0.14	5.00	3.00
T426	0.20	7.00	5.00
T427	0.15	6.00	4.00
T428	0.29	6.00	6.00
T429	0.45	10.50	7.00
T430	0.27	8.00	6.00
T431	0.28	7.00	6.00
T432	0.25	7.00	4.00
T433	0.25	7.00	4.00
T434	0.37	9.00	7.00
T435	0.28	8.00	5.00
T436	0.20	6.00	3.00
T437	0.30	7.00	4.00
T438	0.16	7.00	4.00
T439	0.18	7.00	3.00
T440	0.20	7.00	4.00
T441	0.60	10.00	7.00
T442	0.30	7.00	7.00
T444	0.13	5.00	4.00
T446	1.00	9.00	8.00
T447	0.21	8.00	4.00
T448	0.50	8.00	6.00
T449	0.50	11.00	6.00
T450	0.20	7.00	5.00
T451	0.35	9.00	6.00
T452	0.35	8.00	6.00
T453	0.30	4.00	4.00
T454	0.37	8.00	5.00
T455	0.34	8.00	4.00
T456	0.35	8.00	5.00
T457	0.18	7.00	4.00
T458	0.14	6.00	3.00
T459	0.17	5.00	5.00
T460	0.20	7.00	5.00
T461	0.20	6.00	4.00
T464	0.22	5.00	4.00
T465	0.13	6.00	5.00
T466	0.13	5.00	5.00
T467	0.18	6.00	5.00
T477	0.40	7.00	4.00
T479	0.36	5.00	4.00
T480	0.15	4.00	3.00
T481	0.20	5.00	3.00
T485	0.18	4.00	3.00
T814	0.15	7.00	3.00
T815	0.16	8.00	4.00
T816	0.20	8.00	3.00
T817	0.18	5.00	3.00
T824	0.17	5.00	4.00
T825	0.20	5.00	5.00
T826	0.17	5.00	4.00
T827	0.50	5.00	5.00
T828	0.50	9.00	7.00
T829	0.20	8.00	6.00
T830	0.15	7.00	4.00
T831	0.20	5.00	5.00
T833	0.17	6.00	5.00
T834	0.18	6.00	6.00

Tree Schedule within Works Area A

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T835	0.21	6.00	5.00
T836	0.23	6.00	6.00
T837	0.23	6.00	5.00
T838	0.18	6.00	5.00
T839	0.16	6.00	5.00
T840	0.19	6.00	5.00
T841	0.21	7.00	5.00
T844	0.26	8.00	6.00
T846	0.44	4.00	4.00
T847	0.15	7.00	4.00
T848	0.46	7.00	3.00
T849	0.53	7.00	2.00
T850	0.35	7.00	5.00
T851	0.38	6.00	3.00
T852	0.37	6.00	3.00
T853	0.39	6.00	6.00
T854	0.24	5.00	5.00
T855	0.25	5.00	6.00
T856	0.29	5.00	5.00
T857	0.28	5.00	5.00
T866	0.17	5.00	5.50
T876	0.46	8.00	5.00
T877	0.53	7.00	5.00
T878	0.35	8.00	5.00
T879	0.38	8.00	5.00
T880	0.37	5.00	5.00
T881	0.39	5.00	4.00
T882	0.24	7.00	4.00
T883	0.25	8.00	6.00
T884	0.29	7.00	4.00
T885	0.28	8.00	4.00
T886	0.21	6.00	4.00
T887	0.22	5.00	3.00
T888	0.13	6.00	2.00
T889	0.35	8.00	5.00
T890	0.16	7.00	3.00
T891	0.13	8.00	3.00
T892	0.14	8.00	4.00
T893	0.21	5.00	2.00
T894	0.24	5.00	4.00
T896	0.23	8.00	3.00
T897	0.25	6.00	3.00

Approximate number of trees within Works Area A
= 322

Tree Group of Common Tree Species found within Works Area A

Species Name	Chinese Name	Approx. Percentage Range
Machilus chekiangensis	浙江潤楠	40 - 45%
Symplocos glauca	羊舌樹	
Schefflera heptaphylla	鵝掌柴	
Ardisia quinquegona	羅傘樹	
Syzygium levinei	山蒲桃	
Zanthoxylum avicennae	簕欓花椒	35 - 40%
Cinnamomum parthenoxylon	黃樟	
Cinnamomum camphora	樟	
Diospyros eriantha	烏柿	
Mallotus paniculatus	白楸	
Acronychia pedunculata	山油柑	
Garcinia oblongifolia	黃牙果	
Meliosma rigida	筆羅子	15 - 20%
Melicope pteleifolia	三桠苦	
Diospyros morrisiana	羅浮柿	
Elaeocarpus chinensis	華杜英	
Archidendron lucidum	亮葉猴耳環	
Elaeocarpus sylvestris	山杜英	
Scolopia saeva	廣東刺柊	
Daphniphyllum oldhamii	虎皮楠	
Ficus variegata var. chlorocarpa	青果榕	
Machilus pauhoi	刨花潤楠	
Bischofia javanica	秋楓	
Endospermum chinense	黃桐	1 - 5%
Symplocos cochinchinensis var. *laurina*	黃牛奶樹	
Helicia cochinchinensis	越南山龍眼	
Turpinia montana	山香圓	

Remark:
The approximate percentage range of tree species is based on tree group inspection.

Tree Group of Common Tree Species in % of DBH Range within Works Area A

DBH Range with approx. percentage		Range of Height	Range of Tree Crown Spread
< 0.3m	76.5%	3 - 8m	1 - 6m
0.3 - 0.75m	23%	3 - 11m	2 - 8.5m
>0.75m	0.5%	9m	7 - 8m

Tree Schedule within Works Area B

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
#7	0.41	8.00	7.00
#8	0.25	7.00	6.00
#9	0.16	7.00	5.00
#10	0.16	5.00	4.00
#11	0.13	6.00	3.00
#12	0.19	6.00	5.00
#13	0.32	8.00	7.00
#145	0.32	9.00	8.00
#146	0.96	13.00	9.00
#147	0.14	7.00	5.00
#148	0.19	8.00	5.00
#149	0.29	7.00	6.00
#150	0.19	6.00	4.00
#151	0.29	8.00	5.00
#152	0.13	5.00	3.00
#206	0.14	5.00	5.00
T152	0.17	3.00	4.00
T154	0.23	8.00	6.00
T158	0.23	7.50	5.00
T160	0.23	7.00	4.00
T162	0.39	11.00	4.00
T164	0.23	5.50	3.00
T166	0.13	8.00	4.00
T169	0.24	7.00	5.00
T263	0.32	8.00	6.00
T265	0.15	8.00	5.00
T266	0.80	16.00	10.00
T267	0.15	5.00	2.00
T268	0.37	7.00	5.00
T269	0.18	6.00	4.00
T270	0.27	6.00	5.00
T271	0.35	8.00	6.00
T272	0.23	7.00	3.00
T273	0.28	8.00	5.00
T274	0.30	7.00	5.00
T275	0.31	8.00	6.00
T276	0.25	6.00	5.00
T277	0.23	6.00	6.00
T278	0.35	5.00	5.00
T279	0.23	5.00	6.00
T280	0.15	7.50	4.00
T281	0.23	7.50	5.00
T282	0.32	11.00	7.00
T283	0.12	7.00	4.00
T284	0.15	7.00	4.00
T285	0.17	3.00	2.00
T286	0.11	4.00	3.00
T287	0.15	5.00	4.00
T288	0.48	11.00	7.00
T289	0.10	4.00	3.00
T290	0.32	9.00	7.00
T291	0.17	6.00	4.00
T292	0.17	7.00	4.00
T293	0.18	6.00	4.00
T294	0.27	8.00	6.00
T295	0.39	11.00	8.00
T296	0.25	8.00	6.00
T297	0.28	8.00	5.50
T298	0.30	9.00	7.00
T299	0.29	8.00	6.00
T300	0.15	7.00	4.00
T301	0.18	8.00	6.00
T302	0.27	8.00	6.00
T303	0.30	10.50	8.00
T304	0.32	11.00	7.00
T305	0.19	7.00	5.00
T306	0.35	11.00	8.50
T307	0.11	4.00	3.00
T308	0.15	7.00	4.00
T309	0.17	7.00	5.00
T310	0.12	6.00	3.00
T311	0.18	8.00	5.00
T312	0.11	7.00	4.00
T313	0.25	8.00	6.00
T314	0.24	7.00	5.00
T315	0.25	6.00	3.00
T316	0.21	7.00	5.00
T317	0.18	7.00	5.00
T318	0.27	8.00	6.00
T319	0.18	7.00	4.00
T320	0.11	4.00	3.00
T321	0.23	7.50	5.00
T322	0.23	8.00	5.00
T323	0.32	9.00	7.00
T324	0.40	8.00	5.00
T325	0.50	9.00	6.00
T327	0.29	6.50	4.00
T328	0.17	8.00	4.00
T329	0.30	10.00	5.00
T330	0.40	10.00	7.00
T331	0.32	11.00	8.50
T333	0.29	7.00	5.00
T334	0.11	7.00	4.00
T335	0.18	8.00	5.00
T347	0.27	8.00	6.00
T348	0.17	7.00	5.00
T349	0.15	8.00	6.00
T350	0.19	7.00	4.00
T351	0.50	8.00	3.00
T352	0.13	7.00	5.00
T353	0.15	6.00	3.00
T354	0.27	7.00	4.00
T356	0.19	7.00	4.00
T357	0.17	8.00	5.00
T358	0.16	8.00	5.00
T359	0.25	7.00	5.00
T360	0.30	6.00	5.00
T361	0.38	9.00	5.00
T362	0.25	6.50	5.00
T363	0.30	9.00	5.00
T486	0.20	6.00	3.00
T487	0.18	7.00	4.00
T488	0.35	7.00	3.00
T490	0.18	5.00	4.00
T491	0.15	5.00	3.00
T492	0.35	5.00	4.00
T493	0.25	8.00	5.00
T494	0.40	8.00	6.00
T499	0.15	5.00	3.00
T500	0.15	6.00	3.00
T501	0.20	5.00	4.00
T502	0.18	6.00	2.00
T503	0.11	5.00	5.00
T504	0.27	8.00	5.00
T506	0.21	7.00	5.00
T508	0.25	8.00	6.00
T509	0.17	6.00	4.00
T512	0.24	6.00	5.00
T513	0.20	8.00	6.00
T601	0.31	5.00	3.00
T602	0.21	6.00	4.00
T613	0.19	7.00	5.00
T614	0.21	7.00	4.00
T615	0.21	4.00	6.00
T616	0.22	6.00	4.00
T617	0.26	5.00	6.00
T618	0.25	5.00	4.00
T619	0.21	7.00	6.00
T620	0.20	8.00	6.00
T628	0.18	6.00	3.00
T629	0.22	8.00	3.00
T630	0.19	8.00	6.00
T631	0.32	8.00	2.00
T635	0.14	5.00	4.00
T636	0.18	4.00	6.00
T637	0.19	6.00	6.00
T638	0.21	6.00	4.00
T639	0.27	6.00	6.00
T640	0.26	4.00	4.00
T641	0.21	5.00	2.00
T642	0.21	5.00	3.00
T661	0.22	5.00	5.00
T662	0.30	6.00	5.00
T663	0.31	5.00	6.00
T664	0.32	5.00	7.00
T665	0.33	5.00	8.00
T666	0.21	6.00	4.00
T667	0.21	5.00	5.00
T668	0.19	6.00	6.00
T669	0.14	7.00	5.00
T670	0.18	8.00	4.00
T671	0.19	8.00	5.00
T672	0.21	8.00	6.00
T673	0.27	8.00	5.00
T674	0.26	7.00	6.00
T675	0.21	7.00	6.00
T676	0.23	3.00	5.00
T677	0.18	4.00	6.00
T678	0.16	5.00	4.00
T679	0.19	4.00	6.00
T680	0.21	3.00	5.00
T681	0.21	5.00	6.00
T682	0.22	6.00	5.00
T683	0.26	4.00	6.00
T684	0.24	7.00	6.00
T685	0.19	3.00	5.00
T686	0.15	5.00	5.50
T687	0.17	4.00	5.00
T688	0.18	5.00	5.00
T689	0.21	5.00	5.00
T690	0.22	6.00	6.00
T691	0.23	4.00	6.00
T692	0.18	4.00	6.00
T693	0.16	6.00	6.00
T694	0.16	7.00	6.00
T695	0.16	7.00	6.00
T697	0.29	5.00	6.00
T698	0.22	5.00	6.00
T699	0.26	5.00	4.00
T700	0.15	8.00	6.00
T701	0.17	8.00	5.00
T702	0.19	8.00	6.00
T703	0.26	7.00	5.00
T704	0.33	6.00	8.00
T705	0.36	8.00	5.00
T706	0.38	5.00	6.00
T707	0.43	6.00	3.00
T708	0.29	5.00	5.00
T709	0.30	6.00	3.00
T710	0.24	5.00	6.00
T711	0.15	8.00	3.00
T712	0.16	7.00	6.00
T713	0.20	7.00	3.00
T714	0.18	6.00	6.00
T715	0.12	8.00	3.00
T716	0.27	6.00	5.00
T717	0.22	7.00	3.00
T718	0.21	6.00	3.00
T719	0.23	7.00	6.00
T720	0.25	8.00	4.00
T721	0.17	5.00	5.00
T722	0.20	5.00	5.00
T723	0.17	5.00	5.00
T724	0.50	5.00	5.00
T725	0.50	6.00	5.00
T726	0.20	4.00	5.00
T727	0.15	5.00	6.00
T728	0.35	6.00	5.00
T729	0.30	6.00	5.00
T730	0.37	5.00	4.00
T731	0.34	5.00	4.00
T732	0.49	5.00	5.00
T733	0.27	6.00	4.00
T734	0.17	5.00	4.00
T735	0.15	6.00	3.00
T736	0.20	5.00	5.00
T737	0.50	5.00	7.00
T738	0.13	5.00	6.00
T739	0.15	7.00	5.00
T740	0.27	4.00	5.50
T741	0.25	5.00	6.00
T742	0.23	6.00	5.00
T743	0.35	6.00	7.00
T744	0.23	5.00	5.00
T745	0.15	5.00	6.00
T746	0.23	5.00	6.00
T747	0.32	6.00	5.00
T748	0.12	5.00	6.00
T749	0.14	6.00	6.00
T750	0.14	5.00	4.00
T751	0.20	5.00	5.00
T752	0.12	5.00	6.00
T753	0.75	4.00	6.00
T754	0.23	5.00	6.00
T755	0.21	6.00	5.00
T756	0.12	6.00	6.00
T757	0.10	5.00	6.00
T758	0.25	5.00	5.50
T759	0.20	5.00	6.00
T760	0.39	6.00	8.00
T761	0.14	5.00	6.00
T762	0.30	6.00	7.00
T763	0.19	5.00	4.00
T765	0.50	5.00	4.00
T766	0.27	6.00	5.00
T767	0.29	7.00	4.00
T768	0.17	6.00	5.00
T769	0.21	7.00	4.00
T770	0.15	7.00	5.00
T771	0.20	8.00	3.00
T772	0.17	7.50	5.00
T773	0.24	7.00	3.00
T774	0.12	6.00	5.00
T775	0.24	5.00	6.00
T776	0.32	7.00	5.00
T777	0.10	7.00	6.00
T778	0.12	7.00	5.00
T779	0.13	4.00	5.00
T780	0.35	6.00	5.00
T781	0.16	8.00	5.00
T782	0.13	4.00	5.00
T783	0.14	4.00	4.00
T784	0.21	5.00	4.00
T785	0.24	6.00	6.00
T786	0.21	6.00	4.00
T787	0.23	7.00	4.00
T788	0.25	8.00	4.00
T789	0.17	6.00	3.00
T790	0.20	5.00	2.00
T791	0.17	6.00	5.00
T792	0.21	8.00	3.00
T793	0.21	7.00	3.00
T794	0.20	8.00	4.00
T795	0.15	8.00	2.00
T796	0.35	5.00	4.00
T797	0.30	5.00	3.00
T798	0.37	7.00	3.00
T799	0.34	8.00	3.00
T800	0.49	8.00	4.00
T801	0.27	5.00	3.00
T802	0.17	4.00	3.00
T803	0.15	5.00	4.00
T804	0.20	5.00	3.00
T895	0.21	7.00	3.00
T898	0.17	6.00	4.00
T899	0.20	7.00	4.00
T900	0.19	8.00	5.00
T901	0.22	6.00	6.00
T902	0.43	5.00	7.00
T903	0.35	6.00	5.00
T904	0.34	8.00	6.00
T905	0.11	5.00	6.00
T906	0.19	6.00	4.00
T907	0.18	6.00	5.00
T908	0.17	6.00	3.00
T909	0.27	6.00	4.00
T910	0.29	8.00	5.00
T911	0.28	7.00	4.00
T912	0.36	4.00	5.00
T913	0.34	5.00	3.00
T1001	0.10	0.60	3.00
T1002	0.25	8.00	6.00
T1003	0.19	5.50	5.00
T1004	0.20	7.50	4.50
T1005	0.26	7.50	5.50
T1006	0.13	7.00	4.50
T1007	0.11	4.50	3.00
T1008	0.20	6.00	5.00
T1009	0.13	6.00	4.50
T1010	0.10	6.50	3.00
T1011	0.12	7.00	4.50
T1012	0.14	6.50	4.00
T1013	0.10	5.50	3.00
T1014	0.11	6.00	3.00
T1015	0.10	4.00	3.00
T1016	0.10	6.50	3.00
T1017	0.10	6.00	3.00
T1018	0.38	7.50	5.50
T1019	0.39	9.00	7.50
T1020	0.10	4.00	3.00
T1021	0.15	7.50	4.00
T1022	0.14	6.00	4.00
T1023	0.12	5.50	3.50
T1024	0.22	7.00	5.50
T1025	0.13	5.00	3.00
T1026	0.18	6.50	3.50
T1027	0.18	7.00	4.50
T1028	0.22	3.00	1.50
T1029	0.16	6.50	5.00
T1031	0.20	8.00	6.00
T1034	0.13	6.00	4.00
T1036	0.21	8.00	6.00

Tree Schedule within Works Area B

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1037	0.11	6.00	4.00
T1038	0.10	4.50	2.50
T1042	0.25	8.00	6.00
T1043	0.10	4.50	3.50
T1044	0.10	3.50	3.00
T1045	0.20	5.00	3.00
T1046	0.55	8.50	7.00
T1047	0.23	5.00	3.00
T1049	0.25	7.50	4.50
T1054	0.13	4.50	3.00
T1056	0.20	7.00	4.00
T1058	0.25	7.00	4.50
T1059	0.30	7.50	6.00
T1060	0.24	8.00	6.00
T1061	0.10	7.00	4.00
T1062	0.12	6.50	4.50
T1063	0.35	8.50	5.50
T1064	0.27	7.50	6.00
T1065	0.10	5.00	4.00
T1066	0.28	7.50	6.00
T1067	0.18	6.50	5.00
T1068	0.16	6.50	4.00
T1069	0.18	5.00	4.00
T1070	0.35	8.50	7.50
T1072	0.10	5.00	3.00
T1073	0.20	7.00	5.00
T1074	0.26	7.00	4.50
T1075	0.10	6.50	4.00
T1076	0.10	4.50	3.00
T1077	0.13	5.00	4.00
T1078	0.13	6.50	4.00
T1079	0.10	4.00	3.00
T1080	0.30	6.00	4.00
T1081	0.12	6.00	4.00
T1082	0.10	4.50	2.50
T1083	0.10	5.00	3.00
T1084	0.40	9.50	5.50
T1085	0.11	5.00	3.00
T1086	0.32	7.50	5.00
T1087	0.19	7.50	4.50
T1088	0.30	8.00	6.00
T1089	0.12	6.00	5.50
T1090	0.13	4.50	3.50
T1091	0.13	5.00	4.00
T1092	0.20	8.00	6.00
T1093	0.28	8.00	6.00
T1094	0.24	8.00	6.00
T1095	0.30	8.00	5.00
T1096	0.35	8.00	6.00
T1097	0.13	6.50	3.50
T1098	0.12	4.45	2.50
T1099	0.15	7.00	5.00
T1101	0.26	7.00	4.00
T1107	0.19	7.50	5.00
T1110	0.11	3.50	2.50
T1130	0.24	7.00	4.50
T1133	0.11	4.50	3.00

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1137	0.14	7.00	4.50
T1139	0.12	6.00	4.00
T1142	0.30	8.00	4.50
T1143	0.25	7.50	5.00
T1443	0.14	7.00	5.00
T1448	0.50	11.00	8.50
T1545	0.12	4.00	4.00
T1546	0.25	5.00	5.00
T1547	0.10	3.00	2.00
T1548	0.10	3.00	2.00
T1549	0.10	3.00	3.00
T1550	0.35	8.50	6.00
T1551	0.11	6.00	5.00
T1552	0.26	6.00	3.00
T1553	0.10	7.50	5.00
T1554	0.10	7.50	5.00
T1555	0.26	8.00	6.00
T1556	0.10	6.50	4.00
T1557	0.22	8.00	6.00
T1558	0.20	7.00	4.00
T1559	0.10	5.50	4.00
T1560	0.15	6.00	6.00
T1561	0.30	8.00	5.50
T1562	0.20	5.00	4.00
T1563	0.18	7.00	5.00
T1564	0.22	5.00	4.00
T1565	0.10	6.00	5.00
T1566	0.14	6.00	5.00
T1567	0.11	8.00	5.00
T1568	0.14	8.00	6.00
T1569	0.12	6.00	4.00
T1570	0.25	7.00	5.00
T1571	0.22	7.00	5.00
T1572	0.40	8.00	6.00
T1573	0.25	8.00	6.00
T1574	0.30	8.00	4.00
T1575	0.10	7.00	5.00
T1576	0.14	6.00	4.00
T1577	0.18	8.00	6.00
T1578	0.20	7.00	6.00
T1579	0.30	7.00	6.00
T1580	0.18	6.00	6.00
T1581	0.20	7.00	5.00
T1582	0.12	5.00	5.00
T1583	0.18	6.00	5.00
T1584	0.40	11.00	8.00
T1585	0.18	8.00	6.00
T1586	0.20	8.00	6.00
T1587	0.18	7.00	5.00
T1588	0.17	6.00	4.50
T1589	0.15	6.00	5.00
T1590	0.18	6.00	6.00
T1591	0.70	6.00	4.00
T1592	0.23	7.00	5.00
T1593	0.25	7.00	4.00
T1594	0.20	7.50	5.00
T1595	0.23	7.50	4.00

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1596	0.18	5.00	3.00
T1597	0.20	5.00	4.00
T1598	0.30	5.00	4.00

Approximate number of trees within Works Area B = 459

Tree Group of Common Tree Species found within Works Area B

Species Name	Chinese Name	Approx. Percentage Range
Machilus chekiangensis	浙江潤楠	45 - 50%
Symplocos glauca	羊舌樹	
Schefflera heptaphylla	鵝掌柴	
Ardisia quinquegona	羅傘樹	
Syzygium levinei	山蒲桃	
Zanthoxylum avicennae	簕欓花椒	35 - 40%
Cinnamomum parthenoxylon	黃樟	
Cinnamomum camphora	樟	
Diospyros eriantha	烏柿	
Mallotus paniculatus	白楸	
Acronychia pedunculata	山油柑	
Garcinia oblongifolia	黃牙果	
Meliosma rigida	筆羅子	10 - 15%
Melicope pteleifolia	三桠苦	
Diospyros morrisiana	羅浮柿	
Elaeocarpus chinensis	華杜英	
Archidendron lucidum	亮葉猴耳環	
Elaeocarpus sylvestris	山杜英	
Scolopia saeva	廣東刺柊	
Daphniphyllum oldhamii	虎皮楠	
Ficus variegata var. chlorocarpa	青果榕	
Machilus pauhoi	刨花潤楠	
Bischofia javanica	秋楓	
Symplocos cochinchinensis var. *laurina*	黃牛奶樹	1 - 5%
Ficus fistulosa	水同木	
Aidia canthioides	香楠	
Turpinia montana	山香圓	

Remark:
The approximate percentage range of tree species is based on tree group inspection.

Tree Group of Common Tree Species in % of DBH Range within Works Area B

DBH Range with approx. percentage		Range of Height	Range of Tree Crown Spread
< 0.3m	80.0%	0.6 - 8m	1.5 - 6m
0.3 - 0.75m	19.5%	4 - 11m	2 - 8.5m
>0.75m	0.5%	13 - 16m	9 - 10m

Tree Schedule within Works Area C

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T443	0.37	9.00	5.00
T445	0.20	8.00	5.00
T462	0.20	6.00	4.00
T463	0.40	8.00	6.00
T482	0.17	5.00	3.00
T609	0.22	7.00	6.00
T610	0.23	6.00	6.00
T611	0.18	5.00	5.00
T621	0.19	7.00	4.00
T622	0.17	4.00	6.00
T623	0.18	5.00	4.00
T624	0.22	6.00	2.00
T625	0.31	6.00	2.00
T626	0.20	6.00	2.00
T627	0.16	6.00	6.00
T632	0.28	8.00	6.00
T633	0.21	7.00	4.00
T634	0.19	7.00	6.00
T643	0.21	5.00	2.00
T644	0.41	6.00	6.00
T645	0.31	4.00	4.00
T646	0.38	5.00	6.00
T647	0.29	6.00	4.00
T648	0.26	6.00	6.00
T649	0.24	5.00	6.00
T650	0.22	5.00	6.00
T651	0.22	5.00	6.00
T652	0.24	6.00	4.00
T653	0.24	5.00	2.00
T654	0.26	6.00	2.00
T655	0.29	5.00	2.00
T656	0.27	5.00	4.00
T657	0.24	5.00	5.00
T658	0.24	7.00	4.00
T659	0.55	8.00	5.00
T660	0.44	4.00	4.00
T696	0.17	7.00	4.00
T1048	0.12	7.00	4.00
T1100	0.25	7.00	5.00
T1102	0.12	7.00	4.50
T1103	0.12	6.50	4.00
T1104	0.18	6.50	4.50
T1105	0.10	4.00	2.50
T1106	0.30	10.00	7.00
T1108	0.10	8.00	6.00
T1109	0.14	8.00	5.00
T1111	0.10	5.00	4.00
T1112	0.17	7.00	4.50
T1113	0.22	6.50	4.50
T1114	0.24	8.00	6.00
T1115	0.14	5.50	4.00
T1116	0.37	11.00	7.00
T1117	0.10	4.00	2.50
T1118	0.40	10.00	8.00
T1120	0.10	3.00	3.50
T1123	0.10	4.00	3.00
T1124	0.13	6.00	4.00

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1125	0.12	5.50	3.50
T1126	0.25	7.50	5.00
T1129	0.13	6.00	4.00
T1131	0.12	8.00	4.50
T1132	0.13	6.00	5.00
T1140	0.13	5.00	3.50
T1144	0.22	7.00	5.00
T1145	0.40	10.50	7.50
T1146	0.35	11.00	8.50
T1147	0.30	8.00	6.50
T1148	0.30	7.50	6.00
T1163	0.17	7.00	4.00
T1164	0.17	5.50	4.00
T1165	0.12	7.50	5.00
T1166	0.10	4.00	3.00
T1167	0.10	5.00	3.00
T1168	0.15	8.00	4.00
T1169	0.12	5.00	3.00
T1170	0.20	8.00	6.00
T1171	0.14	5.00	4.00
T1172	0.20	8.00	6.00
T1173	0.14	8.00	6.00
T1174	0.24	6.50	5.00
T1175	0.20	7.50	5.00
T1176	0.12	7.50	4.00
T1177	0.17	6.50	5.00
T1178	0.20	8.00	6.00
T1179	0.28	8.00	6.00
T1181	0.18	5.00	4.00
T1183	0.25	6.50	5.00
T1186	0.14	7.50	5.00
T1187	0.15	7.00	5.00
T1189	0.14	7.00	4.00
T1192	0.20	5.00	5.00
T1194	0.20	7.00	5.00
T1196	0.23	8.00	6.00
T1198	0.22	6.00	4.00
T1200	0.22	8.00	6.00
T1203	0.11	4.00	3.00
T1204	0.10	6.00	5.00
T1205	0.12	6.00	3.00
T1206	0.18	7.50	5.00
T1207	0.14	8.00	3.50
T1208	0.18	5.00	4.00
T1209	0.18	7.00	5.00
T1210	0.20	5.00	4.00
T1211	0.16	6.50	5.00
T1212	0.20	5.00	6.00
T1214	0.10	5.00	2.50
T1215	0.18	6.00	5.00
T1216	0.12	6.00	3.00
T1217	0.10	5.00	3.00
T1219	0.12	7.00	3.50
T1220	0.18	6.00	4.50
T1222	0.18	5.00	5.50
T1223	0.15	7.50	6.00
T1226	0.22	8.00	4.00

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1228	0.25	6.50	5.00
T1229	0.12	7.00	5.00
T1231	0.20	6.50	5.00
T1232	0.11	5.00	3.50
T1233	0.21	6.50	4.00
T1234	0.23	7.50	5.00
T1235	0.25	7.50	5.00
T1236	0.16	7.00	4.50
T1237	0.15	6.00	3.50
T1238	0.10	5.00	4.00
T1240	0.35	8.50	6.00
T1241	0.17	7.00	4.00
T1242	0.23	8.00	4.50
T1243	0.20	7.00	4.00
T1244	0.20	8.00	5.00
T1245	0.18	8.00	4.50
T1246	0.15	6.00	4.00
T1247	0.20	7.00	5.00
T1248	0.15	6.50	4.00
T1249	0.40	8.50	6.50
T1250	0.24	6.50	4.00
T1251	0.11	5.00	3.50
T1252	0.13	7.00	3.50
T1253	0.13	6.00	3.00
T1254	0.13	6.50	3.50
T1255	0.28	7.50	6.00
T1256	0.30	8.50	6.00
T1257	0.13	7.00	3.50
T1258	0.14	6.00	4.00
T1259	0.13	6.00	4.00
T1260	0.12	5.00	3.00
T1261	0.27	7.00	4.50
T1262	0.12	6.00	3.50
T1263	0.11	5.00	3.00
T1264	0.12	7.00	3.50
T1265	0.11	5.00	3.00
T1266	0.10	6.50	3.00
T1267	0.13	6.00	3.50
T1268	0.18	7.00	4.00
T1269	0.17	7.50	5.00
T1270	0.13	6.50	3.50
T1271	0.11	5.50	3.00
T1272	0.43	8.50	7.00
T1273	0.40	8.00	5.50
T1274	0.16	7.50	4.50
T1275	0.17	5.50	3.50
T1276	0.17	6.00	4.00
T1277	0.15	7.00	3.50
T1278	0.40	7.00	5.50
T1279	0.22	7.50	4.00
T1280	0.55	10.50	7.00
T1281	0.45	11.00	7.50
T1282	0.16	6.00	4.00
T1283	0.17	6.50	4.00
T1284	0.12	5.00	3.50
T1285	0.36	8.00	5.50
T1286	0.14	6.00	4.50

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1287	0.12	5.00	3.00
T1288	0.15	7.50	4.00
T1289	0.14	7.00	3.00
T1290	0.17	6.00	4.50
T1291	0.17	6.00	4.00
T1292	0.21	7.50	4.00
T1293	0.15	5.00	4.00
T1294	0.55	10.50	7.50
T1295	0.27	6.50	5.50
T1296	0.20	6.00	4.00
T1297	0.40	11.00	8.00
T1298	0.22	7.50	4.00
T1299	0.12	4.50	3.00
T1300	0.43	10.00	6.50
T1301	0.22	6.00	4.50
T1302	0.37	8.50	5.00
T1303	0.14	5.00	3.50
T1304	0.12	5.50	3.50
T1305	0.26	6.50	5.00
T1306	0.29	8.00	6.00
T1307	0.21	8.00	4.50
T1308	0.39	11.00	7.00
T1309	0.30	8.50	5.00
T1310	0.16	7.00	4.00
T1311	0.14	8.00	4.50
T1312	0.13	6.00	3.50
T1313	0.13	6.00	3.50
T1314	0.15	6.00	3.50
T1315	0.13	6.00	3.00
T1316	0.13	5.50	3.00
T1317	0.14	7.00	3.50
T1318	0.15	8.00	5.00
T1319	0.27	8.00	5.50
T1320	0.11	6.50	4.00
T1321	0.16	5.00	4.50
T1322	0.13	5.50	4.50
T1323	0.23	5.50	4.50
T1324	0.17	7.00	5.00
T1325	0.11	6.00	3.00
T1326	0.39	8.50	6.00
T1327	0.11	6.00	3.00
T1328	0.14	6.00	4.00
T1329	0.25	7.00	4.50
T1330	0.11	4.50	3.50
T1331	0.13	6.50	4.00
T1332	0.11	5.00	3.50
T1333	0.17	6.50	4.50
T1334	0.16	7.00	4.50
T1335	0.22	7.50	4.00
T1336	0.37	11.00	7.00
T1337	0.13	5.00	4.00
T1338	0.20	6.50	4.00
T1339	0.20	8.00	5.00
T1340	0.14	6.00	3.00
T1341	0.19	7.50	5.00
T1342	0.10	5.00	4.00
T1343	0.30	9.00	6.50

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1344	0.14	7.50	4.00
T1345	0.15	7.00	3.50
T1346	0.13	6.50	3.50
T1347	0.13	6.50	3.50
T1348	0.14	6.50	3.50
T1349	0.13	6.50	3.40
T1350	0.13	7.50	3.00
T1351	0.11	6.50	4.00
T1352	0.11	6.00	4.00
T1353	0.14	6.00	4.00
T1354	0.16	6.50	5.50
T1355	0.16	6.00	3.50
T1356	0.23	7.50	5.00
T1357	0.17	6.00	4.50
T1358	0.15	7.50	3.50
T1359	0.14	6.50	4.00
T1360	0.12	6.00	3.00
T1361	0.11	6.50	3.50
T1362	0.23	8.00	6.00
T1363	0.12	5.00	3.00
T1364	0.14	6.00	4.00
T1365	0.11	5.00	3.50
T1366	0.14	6.50	3.50
T1367	0.16	5.50	4.00
T1368	0.14	6.00	4.00
T1369	0.12	5.00	3.00
T1370	0.12	5.00	3.00
T1371	0.10	5.00	3.00
T1372	0.13	5.00	4.00
T1373	0.12	5.50	3.50
T1374	0.10	6.00	4.00
T1375	0.23	7.50	4.50
T1376	0.22	6.50	4.50
T1377	0.11	6.00	4.00
T1378	0.14	6.50	4.50
T1379	0.17	7.00	4.50
T1380	0.40	10.00	7.00
T1381	0.33	9.00	6.50
T1382	0.22	8.00	6.00
T1383	0.19	7.00	4.50
T1384	0.14	6.50	3.50
T1385	0.15	6.00	5.00
T1386	0.13	7.00	3.50
T1387	0.14	7.50	5.00
T1388	0.14	5.00	4.00
T1389	0.11	6.00	3.50
T1390	0.14	7.00	3.50
T1391	0.18	7.00	4.00
T1392	0.13	6.50	4.00
T1393	0.18	6.50	3.50
T1394	0.12	7.00	3.50
T1395	0.16	8.00	4.00
T1396	0.10	6.00	3.00
T1397	0.18	8.00	4.50
T1398	0.11	6.00	4.00
T1399	0.10	6.00	3.00
T1400	0.19	7.50	5.00

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1401	0.11	6.00	3.00
T1402	0.10	6.00	3.00
T1403	0.14	7.00	5.50
T1404	0.15	6.50	4.00
T1405	0.12	7.00	3.50
T1406	0.18	7.50	6.00
T1407	0.11	6.50	3.50
T1408	0.20	6.00	5.00
T1409	0.19	6.00	5.00
T1410	0.10	5.00	6.00
T1411	0.42	9.00	8.00
T1412	0.45	9.50	6.00
T1413	0.35	8.50	8.00
T1416	0.25	8.00	6.00
T1417	0.18	5.00	5.00
T1418	0.13	7.00	4.00
T1419	0.15	5.00	3.00
T1420	0.18	5.00	4.00
T1421	0.21	8.00	6.00
T1422	0.15	5.00	5.00
T1423	0.13	6.50	5.00
T1424	0.10	6.00	4.00
T1425	0.22	7.00	5.00
T1426	0.20	8.00	5.00
T1427	0.14	7.00	4.00
T1428	0.12	7.00	4.00
T1429	0.23	7.50	5.00
T1430	0.40	10.00	8.00
T1431	0.10	5.00	4.00
T1432	0.12	6.00	4.00
T1433	0.15	8.00	5.00
T1434	0.35	9.00	8.00
T1435	0.25	7.00	6.00
T1436	0.12	8.00	4.00
T1437	0.25	8.00	6.00
T1438	0.15	7.00	6.00
T1439	0.50	6.00	7.00
T1440	0.15	6.50	4.00
T1441	0.22	7.00	5.00
T1442	0.15	6.00	4.00
T1445	0.17	4.00	4.00
T1446	0.14	6.00	4.50
T1447	0.14	5.00	3.00
T1449	0.25	7.50	5.00
T1450	0.28	8.00	6.00
T1451	0.30	10.00	7.00
T1452	0.30	7.00	5.00
T1453	0.25	8.00	6.00
T1454	0.40	11.00	8.00
T1455	0.20	6.00	5.00
T1456	0.28	7.50	6.00
T1457	0.28	7.00	6.00
T1458	0.20	7.00	6.00
T1459	0.32	7.00	4.00
T1460	0.18	7.00	6.00
T1461	0.15	7.00	4.00
T1462	0.20	6.00	4.00

Tree Schedule within Works Area C

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1463	0.23	6.00	5.00
T1464	0.22	7.00	6.00
T1465	0.18	5.00	4.00
T1466	0.17	7.00	4.00
T1467	0.20	7.00	6.00
T1468	0.30	8.00	7.00
T1469	0.50	10.00	7.00
T1470	0.35	10.00	6.00
T1471	0.25	7.00	5.00
T1472	0.25	6.00	6.00
T1473	0.23	8.00	6.00
T1474	0.60	9.00	7.00
T1475	0.15	8.00	5.00
T1476	0.20	7.00	5.00
T1477	0.12	1.50	4.00
T1478	0.35	6.00	7.00
T1479	0.40	8.00	7.00
T1480	0.50	9.00	7.00
T1481	0.40	8.00	5.00
T1482	0.18	7.00	5.00
T1483	0.28	8.00	6.00
T1484	0.10	5.00	5.00
T1485	0.35	7.00	6.00
T1486	0.28	7.00	5.00
T1487	0.25	8.00	6.00
T1488	0.30	7.00	4.00
T1489	0.23	6.50	4.00
T1490	0.24	6.00	5.00
T1494	0.35	7.00	7.00
T1495	0.40	10.00	7.00
T1496	0.23	8.00	4.00
T1497	0.40	9.00	6.00
T1498	0.10	4.00	4.00
T1499	0.23	7.00	6.00
T1501	0.18	5.00	5.50
T1504	0.10	5.00	4.00
T1507	0.35	7.50	5.00
T1510	0.20	7.00	4.50
T1512	0.28	7.50	5.00
T1515	0.20	5.00	6.00
T1517	0.15	6.00	4.00
T1521	0.25	6.50	6.00
T1522	0.16	7.00	5.00
T1523	0.10	5.50	3.00
T1524	0.30	8.00	5.00
T1525	0.18	7.50	5.00
T1528	0.25	7.50	6.00
T1530	0.12	5.00	4.00
T1531	0.10	4.00	4.00
T1532	0.25	6.00	5.00
T1538	0.30	8.00	4.00
T1599	0.20	7.00	4.00
T1600	0.12	5.00	4.50
T1601	0.40	6.00	5.00
T1602	0.22	7.00	5.00
T1603	0.18	5.00	4.00
T1604	0.40	7.00	6.00

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1605	0.10	4.00	4.00
T1606	0.15	5.50	5.00
T1607	0.16	6.00	3.00
T1608	0.24	6.00	5.00
T1609	0.12	4.00	4.00
T1610	0.30	8.00	5.00
T1611	0.20	7.00	5.00
T1612	0.10	6.00	5.00
T1613	0.16	6.00	5.00
T1614	0.30	9.00	6.00
T1615	0.30	7.00	5.50
T1616	0.25	7.00	5.00
T1617	0.30	8.00	7.00
T1618	0.20	7.00	5.00
T1619	0.20	8.00	5.00
T1620	0.15	6.00	4.00
T1621	0.15	5.00	3.00
T1622	0.12	5.00	4.00
T1623	0.28	4.00	4.00
T1624	0.30	6.00	5.00
T1625	0.18	8.00	4.00
T1626	0.25	8.00	6.00
T1627	0.40	10.00	6.00
T1628	0.20	8.00	5.00
T1629	0.30	8.00	8.00
T1630	0.15	7.50	4.00
T1631	0.18	8.00	6.00
T1632	0.50	9.00	6.00
T1633	0.18	8.00	6.00
T1634	0.20	5.00	4.00
T1635	0.14	4.00	5.00
T1636	0.18	5.00	4.00
T1637	0.15	7.00	5.00
T1638	0.15	6.50	4.00
T1639	0.18	5.00	4.00
T1640	0.15	7.00	5.00
T1641	0.15	6.50	4.00
T1642	0.20	7.00	5.00
T1643	0.12	1.50	4.00
T1644	0.35	6.00	7.00
T1645	0.40	8.00	7.00
T1646	0.50	9.00	7.00
T1647	0.40	8.00	5.00
T1648	0.18	7.00	5.00
T1649	0.28	8.00	6.00
T1651	0.35	7.00	6.00
T1652	0.28	7.00	5.00
T1653	0.25	8.00	6.00
T1654	0.30	7.00	4.00
T1655	0.23	6.50	4.00
T1656	0.24	6.00	5.00
T1657	0.30	10.00	7.00
T1658	0.25	6.00	5.00
T1659	0.20	8.00	5.00
T1660	0.35	7.00	7.00
T1661	0.40	10.00	7.00
T1662	0.23	8.00	4.00

Tree No.	DBH (m)	Height (m)	Tree Crown Spread (m)
T1663	0.40	9.00	6.00
T1664	0.14	6.00	4.00
T1665	0.18	8.00	6.00

Approximate number of trees within Works Area C = 459

Tree Group of Common Tree Species found within Works Area C

Species Name	Chinese Name	Approx. Percentage Range
Machilus chekiangensis	浙江潤楠	40 - 45%
Symplocos glauca	羊舌樹	
Schefflera heptaphylla	鵝掌柴	
Ardisia quinquegona	羅傘樹	
Syzygium levinei	山蒲桃	
Zanthoxylum avicennae	簕欓花椒	30 - 35%
Cinnamomum parthenoxylon	黃樟	
Cinnamomum camphora	樟	
Diospyros eriantha	烏柿	
Mallotus paniculatus	白楸	
Acronychia pedunculata	山油柑	
Garcinia oblongifolia	黃牙果	
Meliosma rigida	筆羅子	20 - 25%
Melicope pteleifolia	三桠苦	
Diospyros morrisiana	羅浮柿	
Elaeocarpus chinensis	華杜英	
Archidendron lucidum	亮葉猴耳環	
Elaeocarpus sylvestris	山杜英	
Scolopia saeva	廣東刺柊	
Daphniphyllum oldhamii	虎皮楠	
Ficus variegata var. chlorocarpa	青果榕	
Machilus pauhoi	刨花潤楠	
Bischofia javanica	秋楓	
Symplocos cochinchinensis var. *laurina*	黃牛奶樹	1 - 5%
Ficus fistulosa	水同木	
Aidia canthioides	香楠	
Turpinia montana	山香圓	

Remark:
The approximate percentage range of tree species is based on tree group inspection.

Tree Group of Common Tree Species in % of DBH Range within Works Area C

DBH Range with approx. percentage		Range of Height	Range of Tree Crown Spread
< 0.3m	82.5%	1.5 - 8m	2 - 6m
0.3 - 0.75m	17.5%	4 - 11m	2 - 8.5m
>0.75m	0%	N/A	N/A

Appendix E

Construction Noise Assessment

Unmitigated Scenario

Temporary Storage Area (TSA)

Works	ID code	SWL, dB(A)	No. of PME	Total SWL, dB(A)	% of time	% on time correction dB(A)	Screening dB(A)	Corrected SWL, dB(A)
2. Installation of soil nails								
Air compressor, air flow <10m^3/min	CNP 001	100	1	100	100%	0.0	-	100
Generator, super silenced, 70 dB(A) at 7m	CNP 103	95	1	95	100%	0.0	-	95
Concrete mixer (petrol)	CNP 046	96	1	96	80%	-1.0	-	95
Grout mixer	See note (1)	90	1	90	80%	-1.0	-	89
Grout pump	See note (1)	105	1	105	80%	-1.0	-	104
Shotcrete pump	See note (1)	109	1	109	80%	-1.0	-	108
							Total	**110.2**
3. Construction of flexible barriers and provision of maintenance access / staircase								
Air compressor, air flow <10m^3/min	CNP 001	100	1	100	100%	0.0	-	100
Generator, super silenced, 70 dB(A) at 7m	CNP 103	95	1	95	100%	0.0	-	95
Grout mixer	See note (1)	90	1	90	100%	-1.0	-	89
Grout pump	See note (1)	105	1	105	100%	-1.0	-	104
							Total	**105.9**

Works Area A, B and C

Works	ID code	SWL, dB(A)	No. of PME	Total SWL, dB(A)	% of time	% on time correction dB(A)	Screening dB(A)	Corrected SWL, dB(A)
1. Site preparation								
Breaker, hand-held, mass >10kg and <20kg	CNP 024	108	2	111	80%	-1.0	-	110
Dump truck, with grab, 5.5 tonnes < gross vehicle weight <38 tonnes	See note (1)	105	1	105	70%	-1.5	-	103.5
							Total	**110.9**
2. Installation of soil nails								
Drill rig, rotary type (diesel)	See note (1)	110	1	110	85%	-0.7	-	109.3
							Total	**109.3**
3. Construction of flexible barriers and provision of maintenance access / staircase								
Breaker, hand-held, mass >10kg and <20kg	CNP 024	108	2	111	80%	-1.0	-	107
Drill rig, rotary type (diesel)	See note (1)	110	1	110	85%	-0.7	-	109.3
							Total	**111.3**
4. Landscaping works								
Lorry, with crane, 5.5 tonnes < gross vehicle weight < 38 tonnes	See note (1)	105	1	105	70%	-1.5	-	103.5
							Total	**103.5**

Mitigated Scenario

Temporary Storage Area (TSA)

Works	ID code	SWL, dB(A)	No. of PME	Total SWL, dB(A)	% of time	% on time correction dB(A)	Screening dB(A)	Corrected SWL, dB(A)
2. 2. Installation of soil nails								
Air compressor, air flow <10m^3/min	CNP 001	100	1	100	100%	0.0	-10	90
Generator, super silenced, 70 dB(A) at 7m	CNP 103	95	1	95	100%	0.0	-10	85
Concrete mixer (petrol)	CNP 046	96	1	96	80%	-1.0	-10	85
Grout mixer	See note (1)	90	1	90	80%	-1.0	-10	79
Grout pump	See note (1)	105	1	105	100%	-1.0	-10	94
Shotcrete pump	See note (1)	109	1	109	100%	-1.0	-10	98
							Total	**100.2**
3. Construction of flexible barriers and provision of maintenance access / staircase								
Air compressor, air flow <10m^3/min	CNP 001	100	1	100	100%	0.0	-10	90
Generator, super silenced, 70 dB(A) at 7m	CNP 103	95	1	95	100%	0.0	-10	85
Grout mixer	See note (1)	90	1	90	80%	-1.0	-10	79
Grout pump	See note (1)	105	1	105	80%	-1.0	-10	94
							Total	**95.9**

Works Area A, B and C

Works	ID code	SWL, dB(A)	No. of PME	Total SWL, dB(A)	% of time	% on time correction dB(A)	Screening dB(A)	Corrected SWL, dB(A)
1. Site preparation								
Breaker, hand-held, mass >10kg and <20kg	CNP 024	108	2	111	80%	-1.0	-5	105
Dump truck, with grab, 5.5 tonnes < gross vehicle weight <38 tonnes	See note (1)	105	1	105	70%	-1.5	-5	98.5
							Total	**105.9**
2. Installation of soil nails								
Drill rig, rotary type (diesel)	See note (1)	110	1	110	85%	-0.7	-5*	104.3
							Total	**104.3**
3. Construction of flexible barriers and provision of maintenance access / staircase								
Breaker, hand-held, mass >10kg and <20kg	CNP 024	108	2	111	80%	-1.0	-5	105
Drill rig, rotary type (diesel)	See note (1)	110	1	110	85%	-0.7	-5	104.3
							Total	**107.7**
4. Landscaping works								
Lorry, with crane, 5.5 tonnes < gross vehicle weight < 38 tonnes	See note (1)	105	1	105	70%	-1.5	-5	98.5
							Total	**98.5**

*** Screening for installation of soil nails will be applied in Works Area B only.**

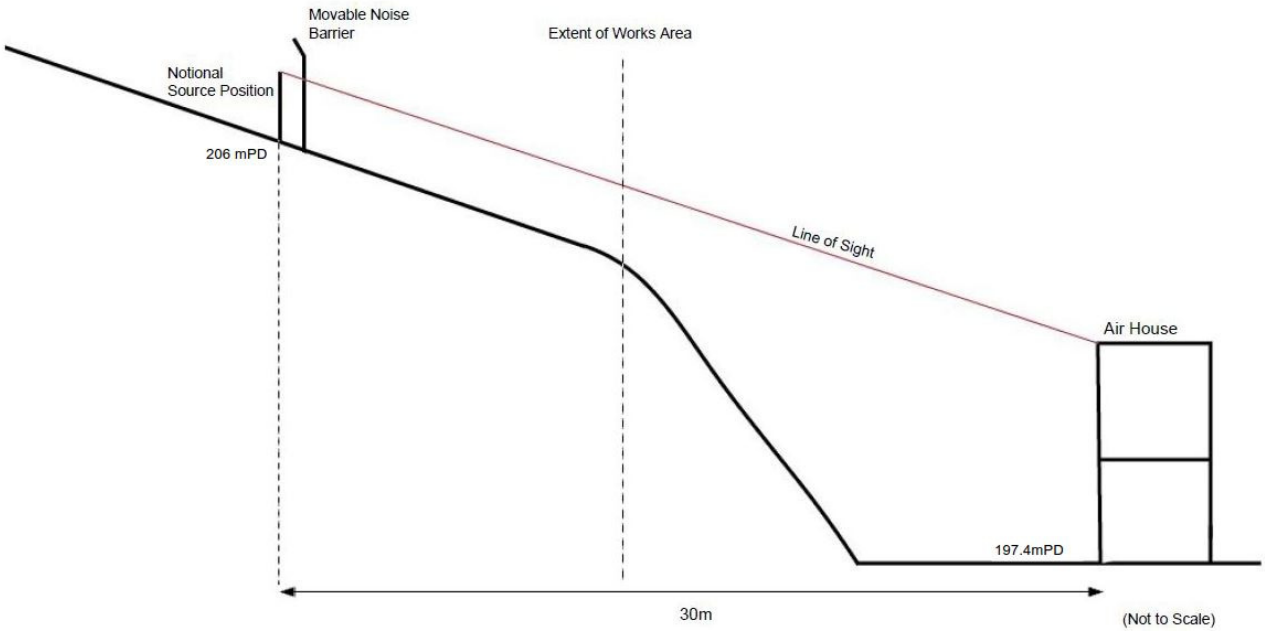
Note (1):
The Sound Power Levels (SWLs) of the PMEs presented are based on the "Technical Memorandum on Noise from Construction Work Other Than Percussive Piling" and EPD's guidance "Sound power levels of other commonly used PME" available at below website:
http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

Appendix F

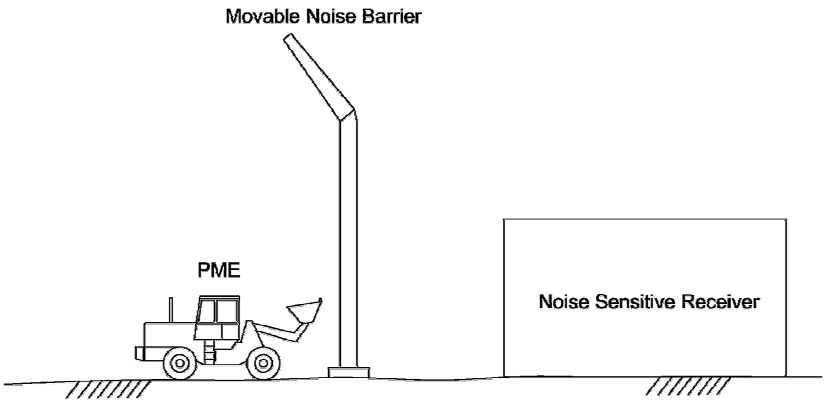
Noise Mitigation Measures

Cross Section of the Proposed Movable Noise Barrier

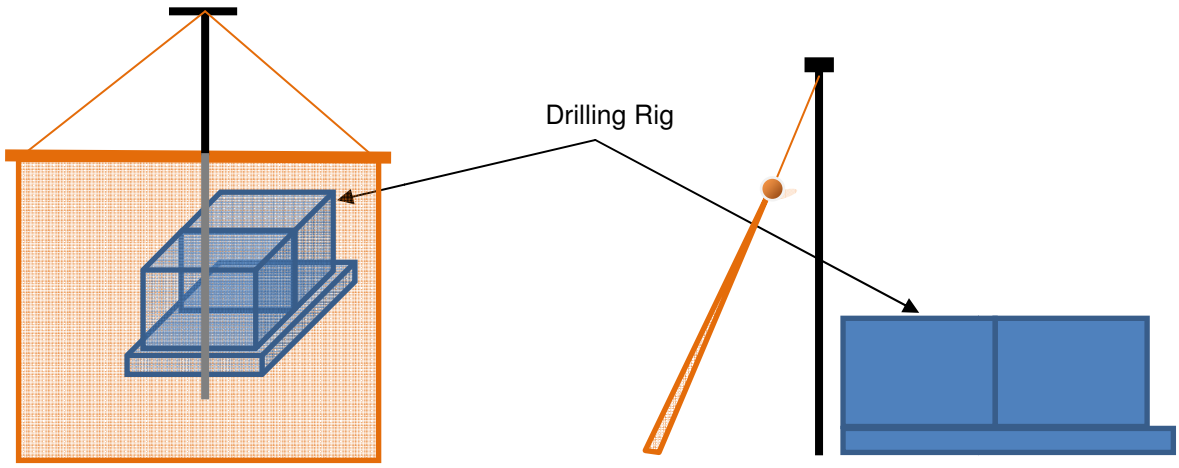
N3 – Air House



Proposed Movable Noise Barrier for PMEs



Proposed Movable Noise Barrier for Drilling Rig



Movable noise barrier

Front View

Movable noise barrier

Side View

Appendix G

Decorative Panels on Hoarding


安全斜坡
安枕無憂
Safe Slopes • Save Lives
安全斜坡
安枕無憂
Safe Slopes • Save Lives


斜坡齊保養
生命有保障
斜坡齊保養
生命有保障

Appendix H

Methodology for Installation of Soil Nails

Methodology for Installation of Soil Nails

The technique of soil nailing has been well-established for over 20 years in Hong Kong. This method has long been used under the Landslip Preventive Measures (LPM) Programme for the upgrading works to man-made features (including slopes and retaining walls). Due to the ease of mobilization of plant/equipment and construction, the soil nailing method has also been applied in the present Landslip Prevention and Mitigation (LPMit) Programme for mitigation works at natural hillsides in last decade.

The methodology of soil nailing works at natural hillsides and man-made features is generalized as below:

- General site review and determine tree protection zones
- Protection measures to existing trees
- Erection of scaffold, temporary access
- Setting out of soil nails and typical layout of temporary working platform
  (There is flexibility to adjust the location of soil nails to avoid affecting existing trees)
- Erection of temporary working platform
- Manual delivery of drilling machine to the temporary working platform
- Drilling for soil nails
- Installation of soil nails