



Project Profile for
Roadside Slope Improvement Works
along Ma On Shan Tsuen Road within Ma On Shan Country Park

Prepared for:

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Date:

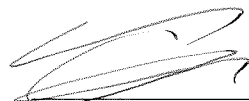
December 2009

Project Number:

SHKMOSRWEI00

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Roadside Slope Improvement Works
along Ma On Shan Tsuen Road within Ma On Shan Country Park

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1.0 BASIC INFORMATION

1.1 Project Title

Roadside Slope Improvement Works for Ma On Shan Tsuen Road within Ma On Shan Country Park (hereafter refers as the Project).

1.2 Purpose and Nature of the Project

The Project is to carry out roadside slope improvement works within Ma On Shan Country Park to facilitate the improvement works of the Ma On Shan Tsuen Road to meet relevant safety standards.

1.3 Name of the Project Proponent

Yorky Ltd.

1.4 Location and Scale of the Project and its History

Ma On Shan Tsuen Road is the only access road connecting Ma On Shan Tsuen and its vicinity, such as the Ma On Shan Country Park picnic area. The Ma On Shan Tsuen Road is a rural road and it is located outside the Ma On Shan Country Park.

In year 2006, there was an incident of natural terrain landslide occurred on the hillside along the Ma On Shan Tsuen Road. The deposited landslide debris blocked this only access road and largely affected the accessibility of residents in Ma On Shan Tsuen. It was therefore considered that the roadside slope improvement works should be carried out on the uphill side of the road (i.e. within the Country Park) to prevent potential landslide along the concerned road section.

The Project is to carry out roadside slope improvement works within Ma On Shan Country Park (MOS CP). The location of the Project is shown in **Figure 1**. It involves an area of about 0.57 ha. The major scope of works comprises:

- (i) Soil nailing works to stabilize the hillside (about 0.49ha);
- (ii) Construction of retaining wall to stabilize the hillside (about 0.08ha); and
- (iii) Minor roadside touch-up works close to the Ma On Shan CP picnic area.

There would also be minor slope landscaping works for the Project. Operational phase of the Project would be limited to routine inspection and maintenance of the slope. **Figure 1** presents the area where the proposed works will be conducted. The area where the retaining wall is applied will be formed as part of the upgraded Ma On Shan Tsuen Road.

Since the Project is sited within the MOS CP, the Country Park Board was consulted. The Project was discussed at a meeting of the Country Park Board meeting in April 2007 for the consent of Country and Marine Parks Authority (CMPA) to the project. As an outcome, the CMPA has no objection in principle to the project and a copy of the letter is contained in **Annex I**.

In addition, the Project and other upgrading works for Ma On Shan Tsuen Road, has gone through gazetting process under Roads (Works, Use and Compensation) Ordinance Cap 370 in January 2009. The upgraded Ma On Shan Tsuen Road will facilitate an approved residential development to be undertaken further inland of the existing Ma On Sha Tsuen Road near the abandoned original Ma On Shan Tsuen. There is no public objection to the Ma On Shan Tsuen Road upgrading works.

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

In accordance with category of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), the Project which involves earthworks within Ma On Shan Country Park is classified as a designated project (Category Q1).

2.0 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Proponent, Engineer and Contractor

Yorky Ltd is the project proponent. Maunsell Consultants Asia Limited is commissioned by project proponent as the engineering consultant. The proposed works will be implemented by the contractor(s) to be appointed by the Project Proponent at a later stage.

2.2 Programme of the Project

The tentative construction programme for the Project is about 12 months starting from 2nd / 3rd quarter of 2010.

2.3 Construction Methodology

As mentioned in Section 1.4, the Project involves three types of construction works and they are described in below sections.

2.3.1 Slope Works - Installation of Soil Nails

About 0.49 ha of slope will be improved with the installation of soil nails. Typical section of the slope improvement works with soil nailing is shown in **Annex II**. The method for installing soil-nails in the slope is described in the following subsections. In general, the spacing of the soil nails is flexible and the location of the soil nails will be adjusted onsite to avoid existing trees.

2.3.1.1 Preparation Work

- All utilities undertakers shall be consulted if there are any existing utilities laid within the working area.
- Existing trees shall be identified and protected.
- Particular traffic arrangement during the period of soil nail works shall be discussed. The public use of the access to MOS CP should be maintained during the works period. If road closure is required, the Police Department and other concerned government departments should be consulted for consent.
- Erect steel scaffolding work platform and shift drilling rig to soil nail location. Working platform shall be erected in accordance with the safety requirement and checked by competent person prior to usage.

2.3.1.2 Drilling and Installation of Soil Nails

- The setting out of soil nails shall be marked on slope surface and verified prior to drilling. The orientation of soil nails shall be fixed by survey instrument. Inclination of the proposed soil nails (approximate size: 0.8m x 0.8m) shall be controlled by dip angle meter prior to drilling. The spacing of soil nails is flexible and the location of the soil nails will be adjusted to avoid existing trees.
- Use pneumatic type drilling rig with air flush to drill holes with diameter as specified.

- Drilling record shall be submitted to the Engineer within 2 days after drilling.
- The depth and cleanliness of the drill holes shall be checked prior to installation of soil nails.
- Each drill hole shall not be left unsupported for more than 3 days.
- Soil nails with PVC centralizers approved by the Engineer shall be installed at 1500mm spacing along the length of reinforcement to ensure a minimum specified grout cover to all faces.
- During the installation process, no jacking or hammering of soil nail bars shall be carried out.

2.3.1.3 Grouting of Soil Nails

- Six 100mm test cubes shall be made from each sample of grout taken to determine crushing strength at 7 and 28 days.
- The grout mix shall be prepared in batches by weight of water and cement in proportion of 36kg:100kg.
- Flow cone test, bleeding test and cube strength test shall be carried out prior to grouting. Bleeding of grout mixture shall not exceed 2%.
- Cement grout shall be injected through grout tube by grout pump starting from the bottom of a drill hole until injected grout mix emerged from the drill hole.

2.3.1.4 Construction of Soil Nail Head

- Soil nail head shall be reinforced with nuts and OSM plates approved by the Engineer in accordance with the Standard Drawing.
- No welding of reinforcement is allowed.
- Soil nail head with reinforcement shall be protected by sprayed concrete in 1:3 mix.

2.3.2 Construction of Retaining Wall

The works for constructing the retaining wall would involve the cutting of a slope that is 220m long by 3 to 4m wide. The slope area involved is about 0.08 ha. The location of this slope area is also shown in **Figure 1**. Mini-pile will be used for the construction of the retaining wall. Road alignment at the section will be adjusted to line up with the retaining wall. Afterwards, the retaining wall will be landscaped. Typical section of the retaining wall is shown in **Annex II**. The indicative sequences of construction of the retaining wall are described as follows:

1. Steel casing will be driven into the ground with the underground soil being excavated as the casing advances;
2. Steel H-pile will be placed after the casing reaches the specified founding level;
3. The steel casing will be extracted while the void between the casing and the H-pile will be grouted;

4. Pile construction will be repeated along the alignment of the proposed retaining wall at suitable spacing;
5. The ground in front of the constructed piles will be excavated, followed by the construction of vertical skin wall between the constructed piles until the road alignment level is reached;
6. The retaining wall surfaces will be landscaped and treated with finishes.

The construction of retaining wall at this slope area is considered as the best option for the purpose of achieving balance between engineering design, the minimization of disturbances on the MOS CP, as well as the disturbances on the village houses outside the MOS CP. The justification for constructing the retaining wall is given in **Section A8.3** and **Section A8.5** in **Annex VIII**.

2.3.3 Minor Touch-up Works at the Edge of MOS Country Park Picnic Area

Minor touch-up work on the slope at MOS CP Picnic Area will be carried out in order to tie in the slope crest level and the road level. This touch-up work is minor in nature and would be carried out in stages such that the access to the MOS CP Management Centre could be maintained at all times. Since the scope of the touch-up works involve only minor soil filling/cutting works to adjust the vertical alignment between the slope crest level and the road level as shown in the sectional drawing in **Annex II**, the trees on the slope will be retained. Detailed slope profile of minor touch-up work will be finalized during the detailed design of Ma On Shan Tsuen Road upgrading works.

2.3.4 Proposed Construction Method to be Adopted

The project proponent plans to apply more environmentally friendly construction method so as to minimize the potential disturbance upon the MOS CP. The following table is a comparison between the proposed method to be applied for this Project and the conventional method.

Table 1 Proposed Construction Method vs. Conventional Method

	Current Method	Conventional Method
Construction Method	Soil nailing and retaining structure	Conventional cut and fill
Affected Area	~ 0.57 ha slope area (of which 0.49 ha is soil nailing)	~ 0.73 ha slope area
Impact to Trees	Tree clearance only required at the area with retaining structure, i.e. ~0.08 ha.	Clearance of tree will be required, i.e. ~ 0.73 ha.

2.3.5 Construction Phase Equipment List

The equipment listed in the following table will be employed during construction phase. The construction will include grouting works while it will be carried out manually onsite with concrete pump and hence no concrete lorry mixer will be required. In order to minimize noise nuisance during the Project construction period, quiet type Powered Mechanical Equipment (PME) has been proposed to be used and the number of construction equipment is kept to a minimum. Due to operation need to maintain the function of the road, the Project will be carried out in a phased manner, and the construction of retaining wall and soil

nailing would not be carried out at the same time. The works will be conducted during daytime. In case there is a need for night-time work, a construction noise permit will have to be applied under the Noise Control Ordinance, and relevant government departments including AFCD and EPD should be consulted.

Table 2 Proposed Powered Mechanical Equipment List for the Slope Improvement Works

Powered Mechanical Equipment	ID Code	Qty
Piling and Excavation for Construction of Retaining Wall		
Piling, diaphragm wall, hydraulic extractor	CNP 163	1
Crane lorry	BS C7-101	1
Power generator	CNP 103	1
Excavator	BS C8-15	1
Concrete Pump	CNP 054	1
Backfilling for Construction of Retaining Wall		
Dump truck	BS C9-39	1
Excavator	BS C8-15	1
Paving Works for Construction of Retaining Wall		
Dump truck	BS C9-39	1
Power generator	CNP 103	1
Pump	CNP 283	1
Drilling and Installation of Soil Nail		
Drill	CNP 064	1
Generator	CNP 103	1
Compressor	CNP 002	1
Grouting of Soil Nail		
Compressor	CNP 002	1
Generator	CNP 103	1
Concrete pump	CNP 054	1
Construction of Soil Nail Head		
Compressor	CNP 002	1
Generator	CNP 103	1
Concrete pump	CNP 054	1

2.3.6 Interactions with Other Projects in the Area

The Project needs to interface with other upgrading works on Ma On Shan Tsuen Road (which are outside the MOS CP). In order to minimise the disturbance to be caused to the users of the Ma On Shan Tsuen Road, the Project and the Ma On Shan Tsuen Road upgrading works will be carried out in phases. An environmental assessment on the Ma On Shan Tsuen Road upgrading works was approved by Town Planning Board in 2005. The proposed work is part of the submission for the approved residential development scheme further inland of the existing Ma On Shan Tsuen Road near the abandoned Ma On Shan Tsuen. The findings adopted and updated from the above-mentioned environmental assessment are shown in **Annex VIII** for reference.

3.0 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Major Elements of the Environment and Land Use near the Project

3.1.1 Ecology

All plant species recorded along Ma On Shan Tsuen Road, except the species of *Rhododendron simsii* and *Diospyros vaccinioides*, are relatively common and widespread in Hong Kong. The plant species can be referred to Page A8-9 to A8-12 in *Appendix A8-1*. MOS CP lies adjacent to the uphill side of the Road. The portion lying within the project area mainly consists of small cut slopes formed during the past road construction works. The habitat maps in **Figure 2** and **Figure 3** show the distributions of the plant species of conservation importance within the Ma On Shan Country Park.

There are two freshwater streams running across a further inland section of the existing Ma On Shan Tsuen Road (see **Figure 3** for the location of the streams).

3.1.2 Noise

Ma On Shan Tsuen Road is a local access road with very low traffic flow and is not expected to be a major noise polluting source.

3.1.3 Air Quality

Ma On Shan Tsuen Road is a local access road with very low traffic flow and is not expected to be a major air polluting source.

3.1.4 Water Quality

There is no identified watercourse passing through or in vicinity to the concerned section of Ma On Shan Tsuen Road, except for freshwater streams running across a bridge at further inland of Ma On Shan Tsuen Road. The streams are more than 400m from the Project site, thus it is unlikely to be impacted by the proposed works. The locations of the freshwater streams are shown in **Figure 3**. On the other hand, as consulted with the Water Supplies Department (WSD), part of the Project area (the minor touch-up works area) which falls within the MOS CP picnic area is located within the WSD Water Gathering Grounds.

3.1.5 Landscape & Visual

In terms of landscape aspects, major elements are the existing vegetation on slopes along Ma On Shan Tsuen Road. The meandering Ma On Shan Tsuen Road with mix natural vegetation and occasional shotcrete and chunan on slopes on both sides of the Road defines the major landscape character of the area. It is fundamentally a space of semi-natural hillside setting but with human disturbance due to squatters, temporary shelters and workshops at the roadside.

In terms of visual aspects, mountains in the area offer a green backdrop for those high-rise residential developments from shore of Tolo Harbour. MOS CP, Ma On Shan Country Trail and MacLehose Trail serve as a recreational spot of naturalistic setting.

3.2 Sensitive Receivers in Existing Condition and Proposed Plan

The Project is located along roadside slope of existing Ma On Shan Tsuen Road. The major land uses surrounding Ma On Shan Tsuen Road is hillside with uphill to the north-east and downhill to the south-west. Few village houses are located to the south-west side of the Ma On Shan Tsuen Road; while Heng On Estate is located to its northern end with more than 300m from the Project area. There are country park visitors and morning walkers who use the Ma On Shan Tsuen Road to access the MOS CP recreational site.

3.2.1 Ecology

All plant species recorded in the vicinity of the Project works area, except the species of *Rhododendron simsii* and *Diospyros vaccinioides*, are relatively common and widespread in Hong Kong. MOS CP lies adjacent to the uphill side of the Road, and this portion mainly consists of small cut slopes formed during the past road construction works.

The following table summarizes the dominated plant species recorded in different habitats within the Project area.

Table 3 Summary of the Dominated Plant Species Recorded in the Project Area

Slope Works Areas	Dominated Habitats	Dominated Plant Species
Uphill, northern section of Ma On Shan Tsuen Road	Shrubland	<i>Dicranopteris pedata</i> , <i>Rhaphiolepis indica</i> , <i>Zanthoxylum Avicenna</i> , <i>Gordonia axillaries</i> , <i>Wedelia trilobata</i> , <i>Bidens pilosa</i> , <i>Mischanthus sp.</i> , <i>Ligustrum sinense</i>
Uphill, southern section of Ma On Shan Tsuen Road	Plantation	<i>Acacia confusa</i>

General observations of wildlife at the Project area were made. Animals recorded are limited to common and widespread species. The recorded species can be referred to in *Appendix A4-1* (Page A4-11 to A4-18).

3.2.2 Streamcourse

There are freshwater streams running across the bridge at upper end of Ma On Shan Tsuen Road (see **Figure 3** for the location of the freshwater streams). Since the streams are at the inland location with more than 400 meter away from the Project area, the stream will unlikely be impacted by the proposed works of this Project.

3.2.3 Noise

Village houses downhill of Ma On Shan Tsuen Road and the Heng On Estate are the nearest sensitive uses in relation to the construction of the Project. As mentioned in Section 1, there will be approved residential development further inland of the Ma On Shan Tsuen; however, the development will not be operated before the completion of this Project. Thus, the said development is not considered to be a sensitive receiver during the Project

construction phase. **Figure 4** shows the locations of the representative sensitive receivers to the works areas of the proposed slope improvement works under this Project. For the minor roadside touch-up works, the visitors to the MOS CP picnic area are the potential noise sensitive receiver.

Table 4 Representative Noise Sensitive Receivers

NSR	Location	Shortest Distance from the works area (m)	Use
1	Heng On Estate	360	High-rise Residential Development
2	Village house downhill of the Ma On Shan Tsuen Road	22	1 storey high village house

3.2.4 Air Quality

The sensitive receivers associated with air quality are the same as those described above for noise issue. In addition, the pavilion at the MOS CP picnic area, which is about 27 m from the minor touch-up works location, can also be considered as an ASR.

3.2.5 Visual and Landscape

Existing sensitive receivers are mostly visitors, hikers and morning walkers to MOS CP and two hiking trails and also the residents of various high-rise developments at the city centre of Ma On Shan such as Heng On Estate and Yiu On Estate. It should be noted that most of the visitors to MOS CP for barbecue on weekends travel through Ma On Shan Tsuen Road by vehicles. Due to the topography and distance, a relatively small population of hikers and morning walkers will travel up the hill through the Ma On Shan Tsuen Road by foot.

However, in order to maintain accessibility to the MOS CP barbecue site by travelers, a 2.5m wide footpath will be provided under the proposed Project works.

There are also squatters of houses, temporary shelters, workshops and storage sheds along Ma On Shan Tsuen Road, but the affected population size is rather small. Photos of different vantage points along Ma On Shan Tsuen Road are presented in **Annex III**. It is expected that the sensitivity of these receivers do not change after the completion of the works.

Residents of the proposed private residential development in various lots in DD191, Ma On Shan located further inland of Ma On Shan Tsuen will be a planned receiver and its location is shown in **Annex III**. There will be not more than 180 houses within the development, but it is expected that most of these residents will travel by vehicles. The slope improvement shall complete before the occupation of this new development, and thus impact to this receiver will be limited to the operation phase when slope maintenance is required.

4.0 POSSIBLE IMPACT ON THE ENVIRONMENT

4.1 Construction Phase

4.1.1 Ecological Impact

An ecological study was conducted to collect information to establish ecological characters of the work sites and its surrounding area by both literature review and field surveys. Field surveys were conducted in October 2004, March 2005, July 2005, September 2007, and August – November 2008, covering habitat, vegetation, mammal, bird, herpetofauna, dragonfly and butterfly. The findings of the ecological study for the Project area are enclosed in **Annex IV**.

Flora - Slope Improvement Works Area

Potential direct impacts of the construction of the Project would be minor in terms of the size and scale. Approximately 0.57 ha of disturbed shrubland habitats along the existing road within the MOS CP will be affected. For about 80% area of the affected habitats, only soil nail works will be involved; the remaining work will involve the construction of landscaped retaining walls.

For the slope area where soil nailing applies, all trees will be retained in order to minimize the potential disturbance as shown in **Figure 5**.

For the slope area applying retaining walls, it is predicted that only 47 trees within the MOS CP will be directly affected. Landscape treatment such as provision of climber, use of natural rocks or artificial rocks will be proposed to veneer the future retaining structure as shown in **Figure 6**. **Table 5** below shows the species and abundance of the directly affected trees due to the proposed slope improvement works.

Table 5 Tree Species and abundance affected due to the Slope Works – Landscaped Retaining Structure

Tree Species	Subtotal
<i>Schefflera heptaphylla</i> (鴨腳木)	21
<i>Mallotus paniculatus</i> (白楸)	4
<i>Itea chinensis</i> (鼠刺)	3
<i>Pinus massoniana</i> (馬尾松)	3
<i>Rhus succedanea</i> (野漆樹)	3
<i>Sterculia lanceolata</i> (假蘋婆)	3
<i>Bridelia tomentosa</i> (土蜜樹)	2
<i>Scolopia saeva</i> (廣東刺柃)	2
<i>Celtis sinensis</i> (朴樹)	1
<i>Cinnamomum camphora</i> (樟樹)	1
<i>Eurya macartneyi</i> (黑矜)	1
<i>Macaranga tanarius</i> (血桐)	1
<i>Rhus hypoleuca</i> (白背漆)	1
<i>Zanthoxylum avicennae</i> (簕欖花椒)	1
Total	47

For the affected trees, all of them are common species, relatively small in size, and of limited conservancy or amenity value. 26 out of the 47 trees have been identified to be suitable for transplantation, such as the slope areas with soil nail. New trees with heavy standard size are also proposed to be planted as part of the landscape measures. The plan showing the planting areas for these new and transplanted trees are shown in **Figure 7**.

The compensatory planting ratio for the Project area will be not less than 1:1. In addition, *Rhododendron* species will be planted to enhance the greenery as well as ecological value along the roadside of the future upgraded Ma On Shan Tsuen Road.

Apart from trees, all other plants species recorded in the slope improvement area were relatively common and widespread in Hong Kong. The identified species of conservation importance, namely *Diospyros vaccinioides* and *Rhododendron simsii* located within the Project area will be retained in-situ. Impact will be avoided by fine-tuning the location of soil-nails when conducting the slope stabilization works.

The ecological value of the main habitat types of the Project works area was evaluated as follows:

Table 6 Ecological Value of Shrubland and Plantation Habitat of the Project Works Area

Criteria	Shrubland	Plantation
<i>Naturalness</i>	Habitat is secondary in nature and maintained by hill fires	Habitat supports numerous exotic species and is quite disturbed
<i>Size</i>	Large	Small
<i>Diversity</i>	Moderate	Low
<i>Rarity</i>	Two locally common species of conservation importance (<i>Diospyros vaccinioides</i> and <i>Rhododendron simsii</i>) *	No significant record
<i>Recreatability</i>	Moderate	High
<i>Fragmentation</i>	Not fragmented	Not fragmented
<i>Ecological linkage</i>	Partially falls within the MOS CP	Within the MOS CP
<i>Potential Value</i>	Moderate	Low to Moderate
<i>Nursery ground</i>	No significant records	No significant records
<i>Age</i>	N/A	N/A
<i>Abundance/Richness of Wildlife</i>	Low-Moderate	Low
Ecological value	Low to Moderate	Low

Remark: * The location of common species of conservation importance is shown in Figures 2 and 3.

In general, areas adjacent to the uphill side of slope improvement area largely consisted of small cut slopes which were formed during the construction of the existing Ma On Shan Tsuen Road. Some areas of the slopes were shotcreted or covered in chunan, which supported very little vegetation. Habitats above and in between the cut slopes were

dominated by Hong Kong hillsides characterizes shrubland, such as the commonly recorded *Dicranopteris pedata*, *Rhaphiolepis indica*, *Zanthoxylum*, *Avicenna* and *Gordonia axillaries*. Typical plants of disturbed habitats (e.g. *Wedelia trilobata*, *Bidens pilosa*, *Mischanthus* sp.) along with common shrubland species (e.g. *Rhaphiolepis indica*, *Ligustrum sinense*) and occasional trees (e.g. *Schefflera heptaphylla*) were found to be dominated plants species at the slope area.

Flora - Minor Touch-up Works Area

At the uphill section next to the minor touch-up works area, there was a small plantation area covering with exotic *Acacia confusa* between the existing Ma On Shan Tsuen road and the BBQ site of the Ma On Shan Country Park. Since the proposed touch-up works would be minor in nature and with limited extent, this habitat would not be directly impacted by the proposed works and is considered in low ecological value. In addition, there would be no trees in this area. Potential impacts to this habitat were therefore not considered further in this report. The layout and sectional drawings showing the plantation and the minor touch-up works are shown in **Figure 3** and **Annex II**.

Fauna

In order to collect further ecological data of fauna species for this project, a fauna survey focusing on the terrestrial fauna was conducted between August and November 2008 covering both wet and dry seasons. According to this survey, the fauna species recorded at the Project area were mainly species common in Hong Kong. There were only several uncommon species, but no rare species or species of special conservation importance recorded close to the area. The uncommon species are listed in **Table 7** below and their locations are shown in **Annex IV**. It is expected that these uncommon species will unlikely be affected by the Project works.

Table 7 Summary of Uncommon Fauna Recorded in the Ecological Surveys

Taxon	Common Name
Reptile	Slender Forest Skink
Bird	Japanese Bush Warbler
Bird	Black-naped Monarch
Bird	Collared Crow
Butterfly	Formosan Swift
Butterfly	Painted Jezebel
Butterfly	Silver Streak Blue
Butterfly	White-edged Blue Baron

Summary

The report for the terrestrial fauna survey is attached in *Appendix A4-1 of Annex IV*.

The evaluation of ecological impact during the construction phase is summarised in **Table 8** as follow.

Table 8 Summary of the Ecological Impact during Construction Phase

Criteria	Remarks
Habitat quality	No impact on the habitat of conservation importance
Species	May affect some common species only
Size/Abundance	Small area of habitat and limited number of vegetation to be affected
Duration	Short and temporary
Magnitude	Minor
Reversibility	Moderate-High

Given the above findings of the ecological study and the recent fauna survey, plantation to be affected by the Project works belongs to common type, which is classified as having low to moderate ecological value. Compensatory planning will be provided at the affected areas after the construction period, which is further discussed in Section 5. Two locally common species of conservation importance were identified within the Project area, which are proposed to be retained in-situ. Therefore, no adverse ecological impact would be expected.

4.1.2 Fugitive Dust Impact

No major site formation works or excavation works will be carried out for the Project. In order to minimise the disturbance to the existing hill side areas, soil-nailing and retaining walls are utilized as appropriate instead of cut and fill slopes with retaining walls (Table 1 refers).

Given the small amount of spoil to be generated during the construction phase and that the proposed works area is close to an existing road, construction of haul roads or installation of conveyor system will not be required. Since there are no major open excavation works, it is anticipated that the dust emission from the proposed works areas would be relatively insignificant.

The nearest air sensitive receiver is a village house about 22m away from the Project area (**Figure 4** refers). It is expected that with standard dust suppression measures, potential dust nuisance to the adjacent sensitive receivers will be acceptable and insignificant, and any temporary impacts to the MOS CP visitors and morning walkers using the Ma On Shan Tsuen Road will also be minimized. Proposed preventive measures are further discussed in Section 5.

Upon completion of the slope improvement works, there will not be any air quality polluting sources due to the Project and hence there is no dust emission problem during the operational phase.

4.1.3 Construction Noise Impact

Construction noise impact due to the use of powered mechanical equipment is limited because of the small works area and implementation of proper control measures, such as 1) proper scheduling of the equipment, 2) the selection of silenced mechanical powered equipment and 3) the adoption of noise protective measures such as movable temporary noise barriers. The powered mechanical equipment as listed in **Table 2** will not be operated all the time in the whole construction period, and therefore the estimated noise impact can

be reduced due to the practical on-time operating of the equipment. Due to the limited areas for the slope improvement works and the limited areas of Ma On Shan Tsuen Road, only one construction task would be carried out at any one time. In addition, the slope improvement works would be carried out in phases, for example, the construction of retaining structure and the soil nailing works will not be carried out concurrently.

The sound pressure level of each construction task was calculated, depending on the number of equipment and distance from the noise sensitive receivers. For a worst case scenario for each task of the works, the equipment is assumed to be located at the closest distances to the noise sensitive receivers. The noise levels at the noise sensitive receivers were then predicted by adding up the sound pressure levels of all concurrent construction tasks with appropriate corrections applied. According to the assessment results in **Table 10** in Section 5.1.2 and **Annex V**, the representative noise sensitive receivers are unlikely subject to unacceptable temporary construction noise impact.

4.1.4 Surface Run Off Impact

Water quality impacts may arise due to site effluent including site surface runoff and potential washouts, fuel contaminated fluids and improper site housekeeping, especially during the rainy season. As consulted with the WSD, part of the Project area (the minor touch-up works area) close to the MOS CP picnic area is located within the WSD's Water Gathering Grounds. However, with the proposed water quality control measures discussed in Section 5, it is expected that the potential water quality impact will be minimised and is expected not to be significant. Nevertheless, relevant conditions for working within Water Gathering Grounds required by WSD will be complied with during the construction phase of the Project. The relevant conditions are attached in **Annex IX**. As consulted with WSD, approval will be obtained from them prior to the commencement of works within the Water Gathering Grounds.

4.1.5 Waste Management

The construction activities to be carried out for the Project would generate a variety of wastes that can be classified into distinct categories as follows:

- Construction and demolition (C&D) materials;
- General refuse;
- Chemical waste.

Construction and demolition (C&D) materials will be generated from site clearance, soil nailing and construction of retaining structures. They would mainly comprise soil, however due to the small scale of the Project, the amount of C&D materials is expected to be small. The C&D materials generated will be reused for backfilling in the Project throughout the construction whenever engineering possible, and the surplus C&D materials with an estimated amount of 2,000m³ would require disposal at the designated public fill reception facility. Given that a trip-ticket system is established for the disposal of the C&D materials, and that good site practices are adhered to, adverse environmental impacts and nuisance would not be anticipated.

Insignificant amount of general refuse comprising food scraps, waste paper, empty containers, etc would be expected from the construction workforce. These refuse would be

properly managed to avoid release of the general refuse to the surrounding environment. They would be effectively collected and stored to avoid creating odour nuisance or pest and vermin problem, and disposed of only at approved disposal facilities. With the implementation of good waste management practice at site, adverse environmental impacts would be not anticipated from the storage, handling and transportation of the general refuse.

Insignificant amount of construction chemical waste (e.g. oil and lubricant) is expected from the maintenance and servicing of construction plant and equipment. Chemical wastes arising during the construction of the Project, if not handled and disposed of properly, may pose potential hazards such as toxic effects to workers, adverse impacts on water quality from spills and fire hazards. As such, the chemical wastes should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Spent chemicals should be collected by a licensed collector for disposal at the Chemical Waste Treatment Facility or licensed facility in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

4.1.6 Cultural Heritage Impact

It has been checked with the Antiques and Monuments Office that the slope improvement works areas do not fall within the sites of any cultural heritage. Thus, no cultural heritage impact is expected.

4.1.7 Landscape and Visual Impact

Landscape impacts during construction phase will be moderate but temporary. The slope works will induce an immediate loss of greenery. For areas where slopes will be cut and replaced with retaining wall, the landform will be altered. The forecasted landscape impacts for the works within project area are quantified as follows:

- No. of existing trees to be transplanted within the site = 26
- No. of existing trees to be felled = 21
- No. of compensatory trees = with ratio not less than 1:1 in terms of quality and quantity to compensate for the 21 nos. of felled trees, i.e. the total numbers and the aggregated girth size of compensatory trees would not be less than that of the trees to be felled.
- Area of existing Ma On Shan Country Park to be closed = No

The loss of vegetation and the construction works will temporarily create visually incompatible sight of exposed soil, hoarding and machinery. Impact to visitors, morning walkers and hikers to MOS CP and users of squatters along Ma On Shan Tsuen is expected to be moderate, as the population of these users is small with medium sensitivity to the existing disturbed semi-natural roadside setting from a landscape and visual point of view.

At a further scale, the Project will disturb surface vegetation and will require the erection of scaffolding and working platforms, affecting the green hilly landform enjoyed by the residents of various high-rise developments at the city centre of Ma On Shan. The sensitivity of these residents would be medium due to the permanent direct view to the Project area, while the impact is expected to be moderate because the extent of the slope works is relatively small compared with the scale of the entire hill masses. The works is also at a moderate distance (approx. 300m) from these high-rises.

To maintain function of the road, construction of the Project and other upgrading works of the road will be phased so that the works will be divided into a number of segments. Construction works and reinstatement in each segment shall be completed before starting the work on the next segment. The total construction time of the Ma On Shan Tsuen Road upgrading works is expected last for 36 – 48 months, which is twice as long as what it would normally take. However, this will keep the possible environmental impacts to a minimal level and minimize the cumulative impact. This coordinated work program would help to maintain an acceptable environment for sensitive receivers, especially visitors, morning walkers and hikers to MOS CP, Ma On Shan Country Trail and Maclehose Trail, during the construction period.

4.2 Operational Phase Impact

4.2.1 Noise, Air Quality and Water Quality

The operational phase of the Project would be limited to routine maintenance of the improved slopes along Ma On Shan Tsuen Road, no adverse noise, air and water quality impacts, as well as impacts on the WSD Water Gathering Grounds are expected from the routine maintenance activities during the operation phase.

For the works area of constructing the retaining wall, it will form part of the upgraded Ma On Shan Tsuen Road. The upgraded Ma On Shan Tsuen Road is the local rural road mainly utilized by the visitors to the MOS CP and the residents of scatter village houses along the Ma On Shan Tsuen Road, such as villagers of the Ma On Shan Tsuen and the residents of the approved low-rise and low density residential development, hence the traffic flow would be very limited. No increase in traffic flow would be expected from either the Project works or the upgrading works. It is anticipated that there would be no adverse traffic noise or vehicular emission impact during the operational phase of the Project.

4.2.2 Ecological Impact

No direct ecological impacts to habitats are expected during the operational phase.

4.2.3 Landscape and Visual Impact

Landscape and visual impacts during operation will be slightly adverse at commencement of operation phase to insubstantial or even beneficial after the mitigation measure of replanting disturbed slopes have established. Cut-slopes and slopes with soil nails will be reinstated with woodland mix comprised of native trees and shrubs to match the existing condition. Rhododendrons, as advised by local community groups to be used as a thematic type of plants, will be added to accentuate the existing natural occurrence of Rhododendrons along the roadside of Ma On Shan Tsuen Road. Roadside tree planting of native species with both aesthetic and ecological values will also be planted to provide immediate greening effect. All these new plants will be more than the number required to compensate for the loss of existing greenery due to the proposed works. Locally altered landform at the proposed retaining wall will be appropriately mitigated by planting and a careful choice of materials and climbers for retaining walls. The original semi-natural setting shall be fully restored by the proposed vegetation.

The forecasted landscape impacts after reinstatement/mitigated are quantified as follows:

- Area of existing slope wildgrass and shrubs within country park permanently loss (due to provision of pavement) = 0
- Area of existing slope wildgrass and shrubs within country park permanently loss (due to provision of standardized road surface) = 0.05ha

Table 9 summarizes the potential visual impact during the construction and operational phase of the Project.

Table 9 Summary of the Visual Impact During Construction and Operational Phase of the Project

	LR/ LC/ VSR	Nature	View Distance	Population	Sensitivity	Visual Impact (Construction)	Visual Impact (Operation)
LR	Existing mixed vegetation on slopes with occasional shotcrete and chunan	Vegetation	-	-	Moderate	Moderate	Slight
LR	Hilly Landform	Landform	-	-	Moderate	Moderate	Slight
LC	Disturbed semi-natural hilly setting	-	-	-	Moderate	Moderate	Slight
VSR	Visitors to Country Park (those for weekend family barbecue)	Traveling (by vehicle)	Close	Small to Large (seasonal)	Medium	Moderate	Slight
VSR	Hikers to Country Park & MacLehose Trail	Traveling (on foot)	Close	Small to Medium (seasonal)	Medium	Moderate	Slight
VSR	Morning Walkers to Country Park & MacLehose Trail	Traveling (on foot)	Close	Medium	Medium	Moderate	Slight
VSR	Residents of highrises in the city centres of Ma On Shan	Residential	Far (min. 300m)	Large	Medium	Moderate	Slight
VSR	Users of squatters along Ma On Shan Tsuen Road	Squatter/ Industrial	Close	Small	Medium	Moderate	Insubstantial
VSR	Residents of the proposed private development in various lots in DD191	Traveling (on vehicle) (planned)	Close	Medium	Medium	None	Slight

5.0 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED

5.1 Protection Measures to Minimise Environmental Impacts

No significant environmental impact is envisaged during the operational phase of the Project. The remaining paragraphs of this section will focus on pollution control and mitigation measures proposed for construction phase and post-construction works.

In addition to these measures, standard good site practice measures including safety measures to visitors for works within country park as listed in **Annex VI** will also need to be implemented by the Contractor(s) of this Project throughout the works where appropriate.

5.1.1 Fugitive Dust Control Measures

Any works that involve the handling of dusty materials are regulated under the Air Pollution Control (Construction Dust) Regulation and it is a requirement for the contractor to observe and implement. In accordance with the requirements of the regulation, sufficient dust control/ mitigation measures such as covering and watering of dusty materials shall be implemented by the contractor to ensure full protection of the nearby air sensitive receivers (ASRs)

For the country park visitors and morning walkers who use the Ma On Shan Tsuen Road on foot, they will also be subject to the potential fugitive dust impact from the construction works. All the above-mentioned dust mitigation measures will be implemented by the contractor to minimize the dust impact upon these country park visitors and morning walkers. In addition, hoarding will also be erected along the works areas acting as dust screen for the country park visitors and morning walkers. The dust control measures will be incorporated into the construction contract of the proposed road and slope works so that the potential environmental nuisance can be kept to minimum.

For the offsite temporary stockpile, it is proposed that the stockpile could be covered by waterproof materials (e.g. impervious sheet) or placed in an area sheltered on the top and three sides to minimise the potential dust nuisance, where practical. If the stockpile area is to be maintained for a longer period of time, it is recommended to compact the stockpile, and implementing turfing, hydroseeding or vegetation planting on the stockpile to minimise the potential dust nuisance due to the stockpile, where necessary and practical.

5.1.2 Construction Noise Management

The commonly adopted noise control measures including the use of quiet equipment, proper schedule of the power equipment at the limited works area and the use of movable noise barriers will be implemented in the construction phase as a standard provision. The movable barriers will be located close to the stationary plants such as generators and compressors and within about 5m for mobile equipment such as excavator, so that the line of sight to the major noise sources would be blocked by the movable barriers when viewed from the noise sensitive receivers.

Moreover, the above noise control measures also apply to mitigate the temporary construction noise impact to the country park visitors and morning walkers who use the Ma On Shan Tsuen Road on foot. Hoarding will also be erected along the works areas serving as another noise barrier for the country park visitors and morning walkers. With this construction noise management, the village houses downhill of the Ma On Shan Tsuen Road as well as the country park visitors and morning walkers are unlikely to subject to unacceptable temporary construction noise impact. The assessment results are shown in **Table 10** below and in **Annex V**. The typical section and design of the proposed movable noise barriers is also shown in **Annex V**.

Table 10 Predicted Construction Noise Level at Representative NSRs

NSR	Construction Activities	Distance from the Works Areas (m)	Predicted Noise Level, dB(A)	Criteria of Noise Level, dB(A)
1	Construction of Retaining Wall			
	Piling and Excavation Works	680	48	75
	Backfilling	680	44	75
	Paving Works	680	42	75
	Soil Nailing			
	Drilling and Installation of Soil Nail	360	50	75
	Grouting of Soil Nail	360	54	75
	Construction of Soil Nail Head	360	54	75
2	Construction of Retaining Wall			
	Piling and Excavation Works	22	68	75
	Backfilling	22	64	75
	Paving Works	22	61	75
	Soil Nailing			
	Drilling and Installation of Soil Nail	66	54	75
	Grouting of Soil Nail	66	59	75
	Construction of Soil Nail Head	66	59	75

5.1.3 Water Quality Control Measures

The contractor for this project will be required to fully comply with the Water Pollution Control Ordinance (WPCO) and its relevant regulations. The guidelines for handling and disposal of construction site discharges as detailed in EPD's Professional Persons Environmental Consultative Committee Practice Note (ProPECC PN) 1/94 "Construction Site Drainage" should be followed. The contractor should be responsible for the design, construction, operation and maintenance of all the identified mitigation measures and practices specified in this ProPECC Note.

In general, the contractor should ensure that all runoff arising from the works areas are properly treated, e.g. by the use of sedimentation tank or silt trap, up to the discharge standards as stipulated by the technical memorandum made under WPCO. In addition, in order to further minimise the potential construction water quality impacts to any nearby areas, it is recommended to lay a series of sand bag along the sides of the works area

boundary to prevent seepage of potential surface run-off from the works area, where practical.

Due to the site constraint, some construction and demolition (C&D) materials would be temporarily stockpiled alongside Ma On Shan Tsuen Road. At least three sides of these stockpiled materials will be properly enclosed or to be covered by waterproof materials to avoid washing away due to surface runoff. The C&D materials will be carried by the workers from the works area to the stockpile area, site haul road and conveyor system are not required.

Since part of the Project area (the minor roadside touch-up works area) close to the MOS CP picnic area is located within the WSD Water Gathering Grounds, relevant conditions for working within Water Gathering Grounds required by WSD should be observed by the contractor. The relevant conditions are attached in **Annex IX**. As consulted with WSD, approval will be obtained from them prior to the commencement of works within the Water Gathering Grounds.

5.1.4 Waste Management

The excavated C&D materials will be temporary stockpiled offsite at roadside of Ma On Shan Tsuen Road due to the site constraint. The temporary stockpile locations will be carefully located to avoid the run-off from stockpile areas from entering the nearby drains and habitats. The stockpile locations shall also be close to the works areas to minimize the distance for transporting the excavated C&D materials to the stockpile locations. The C&D materials will be reused for backfilling onsite wherever engineering possible. The contractor is also required to maximize the reuse of the materials in other projects if practicable. Only surplus materials should be transported to public filling areas or landfills for disposal. Disposal of the C&D materials will be monitored through the trip-ticket system following the guideline stipulated by the Environmental, Transport and Works Bureau Technical Circular (Works) (ETWB TCW) No. 31/2004 to prevent any illegal dumping. Given the limited amount of materials to be removed, the burden on the public filling facilities is considered insignificant.

For the temporary stockpiled C&D materials, at least three sides will be properly enclosed or to be covered by waterproof material to avoid wind erosion and washing away due to surface runoff. Limited construction-related chemical wastes and general wastes are expected due to relatively small scale of the project and limited number of construction equipment. With the implementation of good waste management practice at site and by observing the relevant regulations, adverse environmental impacts would be not anticipated from the storage, handling and transportation of these wastes.

5.1.5 Ecological Mitigation Measures

The proposed works have been under continuous engineering design review in order to minimize the footprint of the slope improvement works affecting the MOS CP. The currently proposed scheme is considered to be the scenario having the least environmental impact, in terms of habitat and landscape and slope protection.

It is recommended that the affected trees of good form and condition would be directly transplanted within the MOS CP and along Ma On Shan Tsuen Road. For trees which cannot be transplanted directly due to the low survival rate after transplantation, compensatory planting will be made by using the native species with flowers and fruits attractive to the wildlife. The tree planting plan showing the locations for the compensatory planting is shown in **Figure 7**. A compensatory ratio of not less than 1:1 for the estimated 21 no. of trees to be felled will be achieved. In addition, woodland mix planting of native trees and shrubs will also be provided on slope areas that would be affected by the proposed soil nailing works.

Landscape planting proposal is also described in the section 5.1.7 below.

Special care would be made to individual plant species of conservation importance, e.g. *Diospyros vaccinioides* and *Rhodeodendron simsii* located within the Project area will be retained in-situ, and the location of soil-nails will be fine-tuned as far as practicable when conducting the slope stabilization works to avoid impacts on them. It is to ensure minimal damage on the identified individuals during the construction phase and all individuals could be retained in-situ. Location of the plants would be considered during the detailed design stage in order to ensure the impacts resulting from the slope works would be minimized. If any unavoidable impacts are caused to the species of conservation importance, transplantation of any affected individuals will be considered as the last resort as far as practicable.

5.1.6 Landscape and Visual Impact

During the construction phase, all existing trees to be retained onsite shall be properly protected before the works start. Contractor's access to designated 'no-intrusion zone' should be prohibited. The Contractor shall exercise the greatest care to avoid any damage to the retained trees and shall comply with the requirements of Preservation and Protection of Existing Trees under Section 26 Preservation and Protection of Trees of the General Specification for Civil Engineering Works 2006 Edition, published by the Government of the HKSAR.

To reduce soil erosion and to lessen the visual impact of the loss of vegetation on slopes to be soil-nailed, exposed soil will be temporarily covered with erosion control matt of a subtle color during the construction.

Any disturbed slope shall be reinstated with hydroseeding and matching woodland mix planting, as shown in **Figure 5**. The transplantation and the compensatory planting plan is based on the proposal that has been presented and accepted by the Town Planning Board and Country and Marine Parks Authority, as enclosed in **Annex VII**. The landscape planting proposal for the project area is described in the following section.

Landscape treatment such as provision of climber, use of natural rocks or artificial rocks will be proposed to veneer the future retaining structure as shown in **Figure 6**.

Owing to a comprehensive landscape treatment together with perimeter planting, the visual impact of the proposed works will be effectively minimized.

5.1.7 Compensatory Planting / Landscape Proposal

No existing trees on the slope area to be soil nailed will be affected, but 21 common trees of relatively small size at the proposed retaining structure works area will be felled. Heavy standard trees in native species, will be planted at designated locations to compensate the felled trees. The compensatory ratio will not be less than 1:1 in terms of quality and quantity, i.e. the total numbers and the aggregated girth size of compensatory trees should not be less than that of the trees to be felled.

Existing shrubs on slopes will be directly or indirectly disturbed or damaged during the construction. However, woodland mix planting of trees and shrubs in native species will be provided. The rest of the area will also be reinstated by hydroseeding.

Table 11 below shows the species of the proposed vegetation under the landscape proposal.

Table 11 Proposed Vegetation Species under the Landscape Planting Proposal

Compensation Location	Vegetation Species	Size
Slope improvement Area	Proposed Woodland Mix	
	<i>Celtis sinensis</i>	"Whips"
	<i>Cinnamomum camphora</i>	"Whips"
	<i>Rhus succedanea</i>	"Whips"
	<i>Schefflera heptaphylla</i>	"Whips"
	<i>Gordonia axillaris</i>	Min. 800mm(H) x 600mm(W)
	<i>Melastoma sanguineum</i>	Min. 800mm(H) x 600mm(W)
	<i>Rhaphiolepis indica</i>	Min. 800mm(H) x 600mm(W)
	Proposed Compensatory Trees	
	<i>Sapium sebiferum</i>	Girth: 0.30m – 0.35m Height: 4.5m – 5.0m
	<i>Schefflera heptaphylla</i>	
	<i>Sterculia lanceolata</i>	

A plan showing the tree planting locations for the Project area is shown in **Figure 7**. A detailed landscape plan together with planting schedule and implementation programme will be made available when detailed design of the Project is finalized.

Owing to a comprehensive landscape treatment together with perimeter planting, the landscape and visual impacts of the project would be effectively minimized.

5.1.8 Safety to MOS CP Visitors

Regarding safety to the country park visitors during the construction of the Project, the contractor will be required to comply with the safety fence, lighting, signing and guarding specifications in accordance with the current statutory requirement and standard guidelines. A safe access in accordance with the statutory requirement will be maintained for the country park visitors and morning walkers during the construction of the Project. Moreover, site safety supervision plan will be submitted to the Buildings Department for approval before the commencement of works. Technically Competent Persons (TCPs) will supervise

the site safety during the construction stage. Regarding the construction noise and dust impacts to the country park visitors and morning walkers, the impacts to them would be temporary only. Nevertheless, the Contractor would implement the construction dust and noise control measures as detailed in Section 5.1.1 and 5.1.2 above to minimize the impacts to the country park visitors and morning walkers.

5.1.9 Use of previously Approved EIA Reports

No previous approved EIA reports were used in this Project.

6.0 CONCLUSION

The proposed slope improvement works within Ma On Shan Country Park is to facilitate the Ma On Shan Tsuen Road to meet relevant road safety standards. The proposed footprint of the slope improvement works affecting the MOS CP has been greatly minimized through continuous engineering design review. The currently proposed scheme is considered to be the scenario having the least environmental impact in terms of habitat, landscape and slope protection, as well as disturbances on the existing village houses in the vicinity of the Project area. Based on the current scheme, the Project will only affect a small area of low to moderate ecological value habitats (mostly shrubland). The Country and Marine Parks Authority has no objection in principle for the proposed improvement works.

Given the limited size of affected area, together with the comprehensive landscaping measures as part of the Project, the project is unlikely to be adverse. In fact, the proposed measures will help enhance the greenery as well as ecological value along the road.

In conclusion, the Project is not regarded as major works which would result in adverse environmental impacts as defined in the EIAO-TM. Therefore, the application for the permission to proceed directly to apply for an Environmental Permit for this Project is justifiable.

Figures

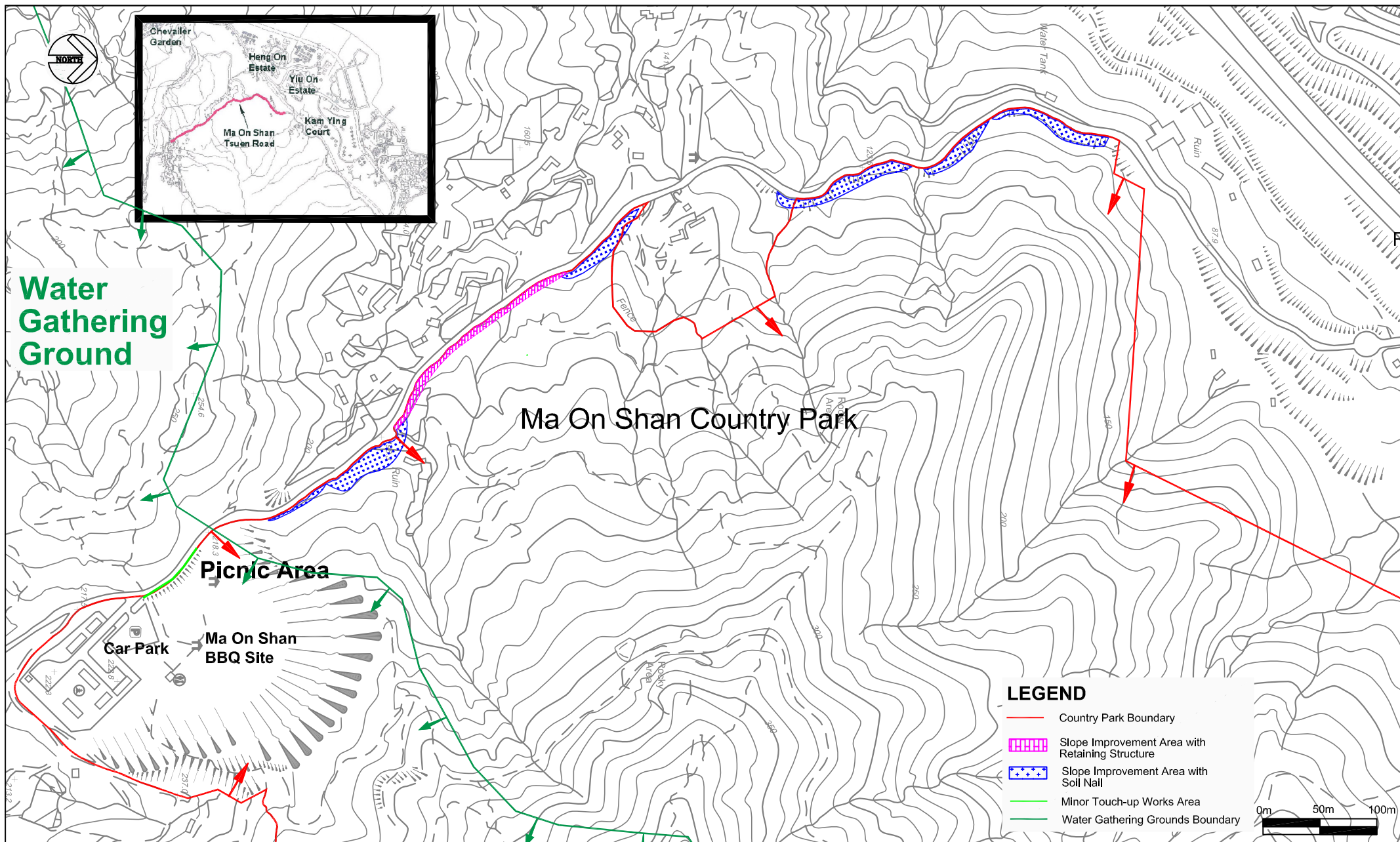


Figure: 1	ENVIRON
Title: Project Location Plan	Drawn by: SLam
Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park	Checked by: TC
	Rev.: 1.3
	Date: July 2009

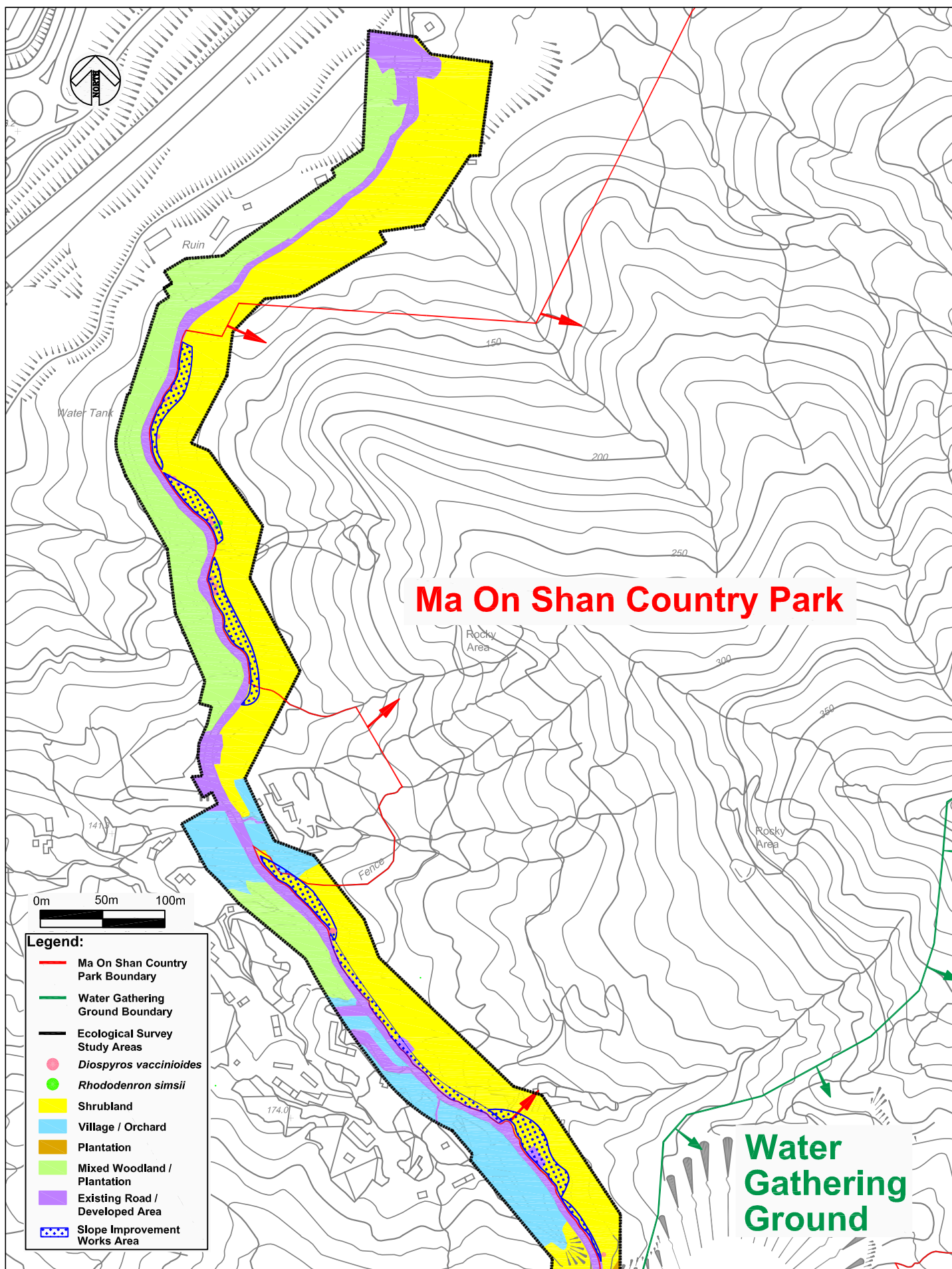


Figure: 2

Title: Habitat Map of Plant Species Distributions within Ma On Shan Country Park - Northern Half of the Ecological Survey Study Area

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.4

Date: Jul 2009

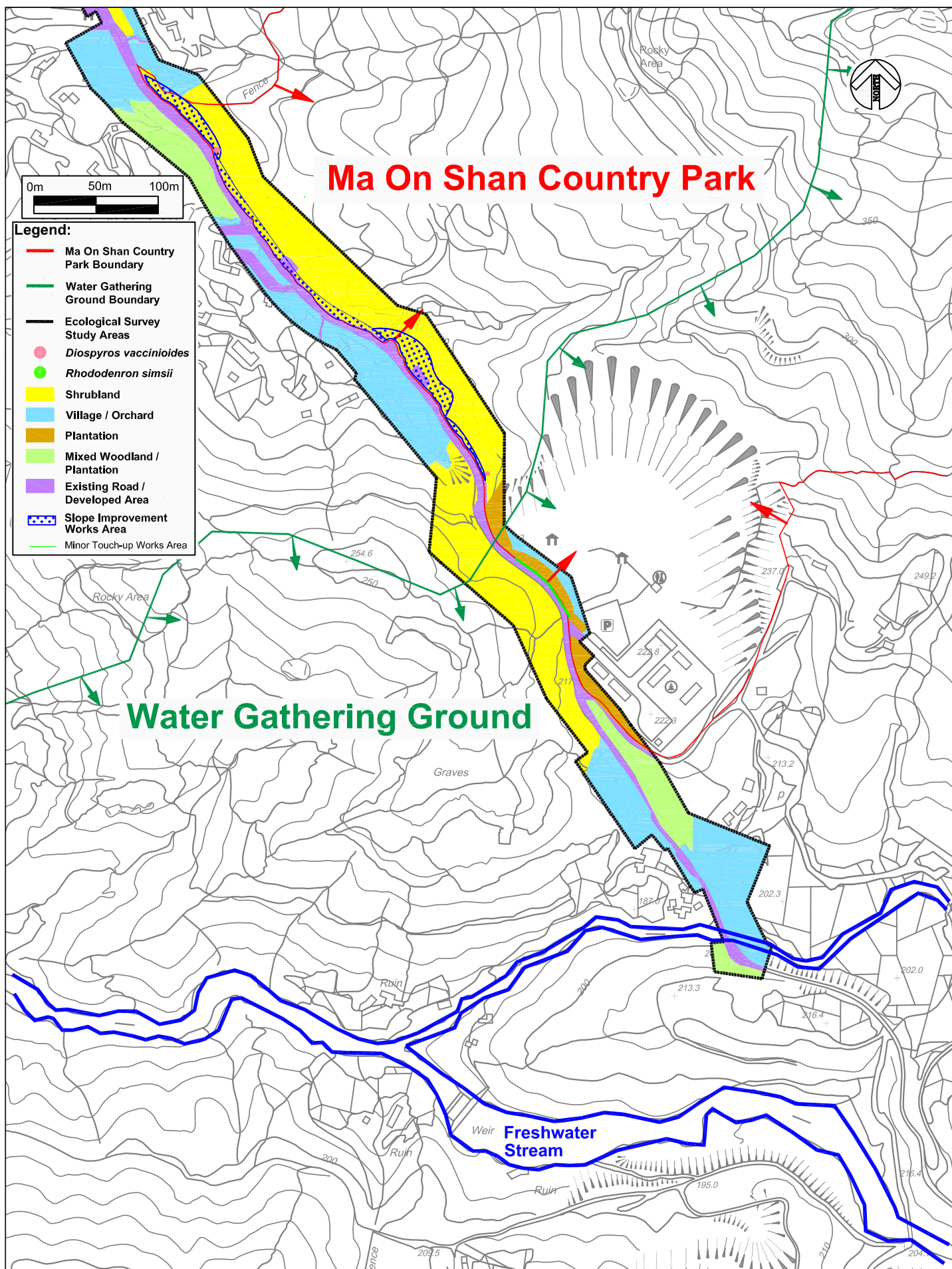


Figure: 3

Title: Habitat Map of Plant Species Distributions within Ma On Shan Country Park - Southern Half of the Ecological Survey Study Area

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.4

Date: Jul 2009

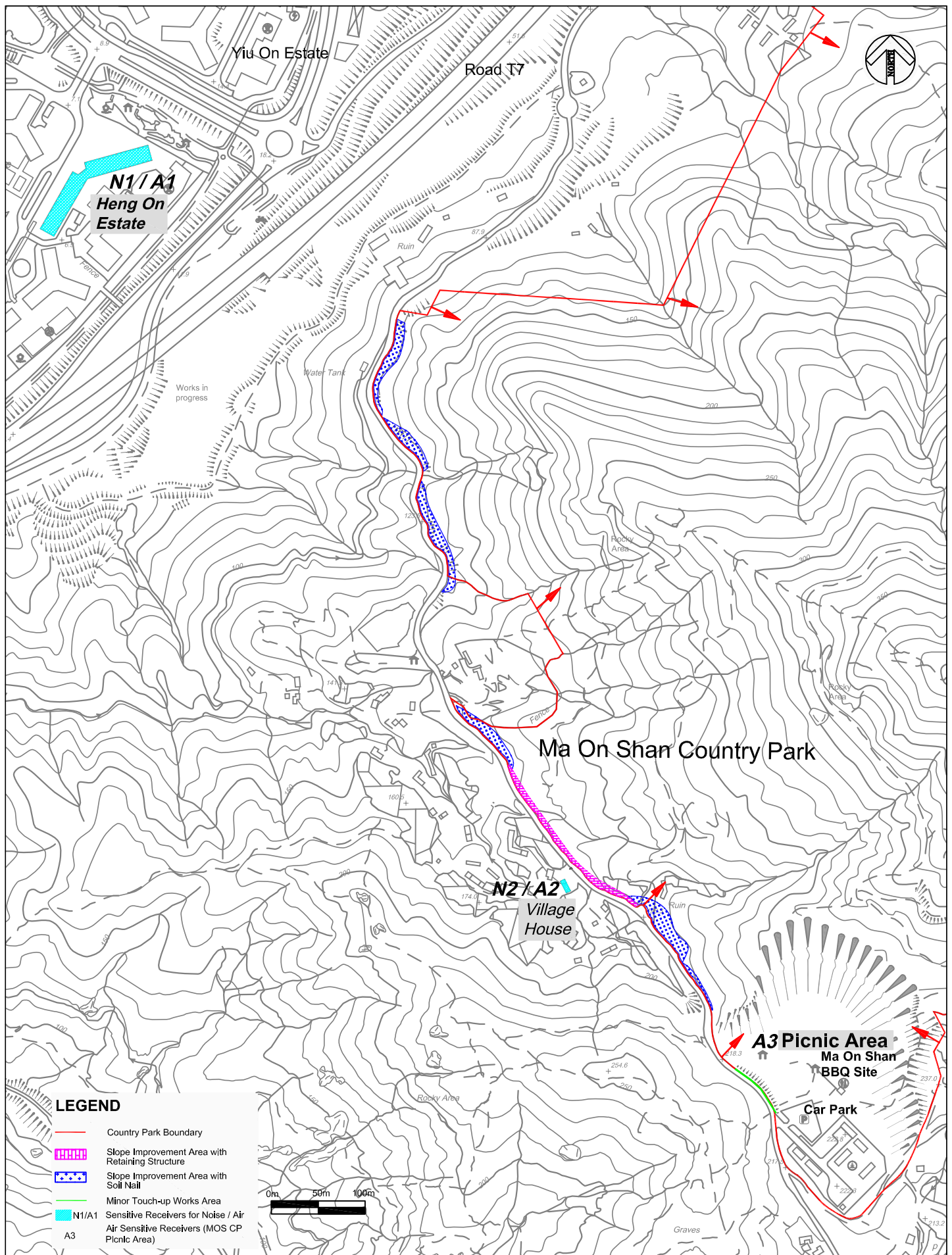


Figure: 4

Title: Locations of Representative Noise and Air Quality Sensitive Receivers

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.4

Date: July 2009

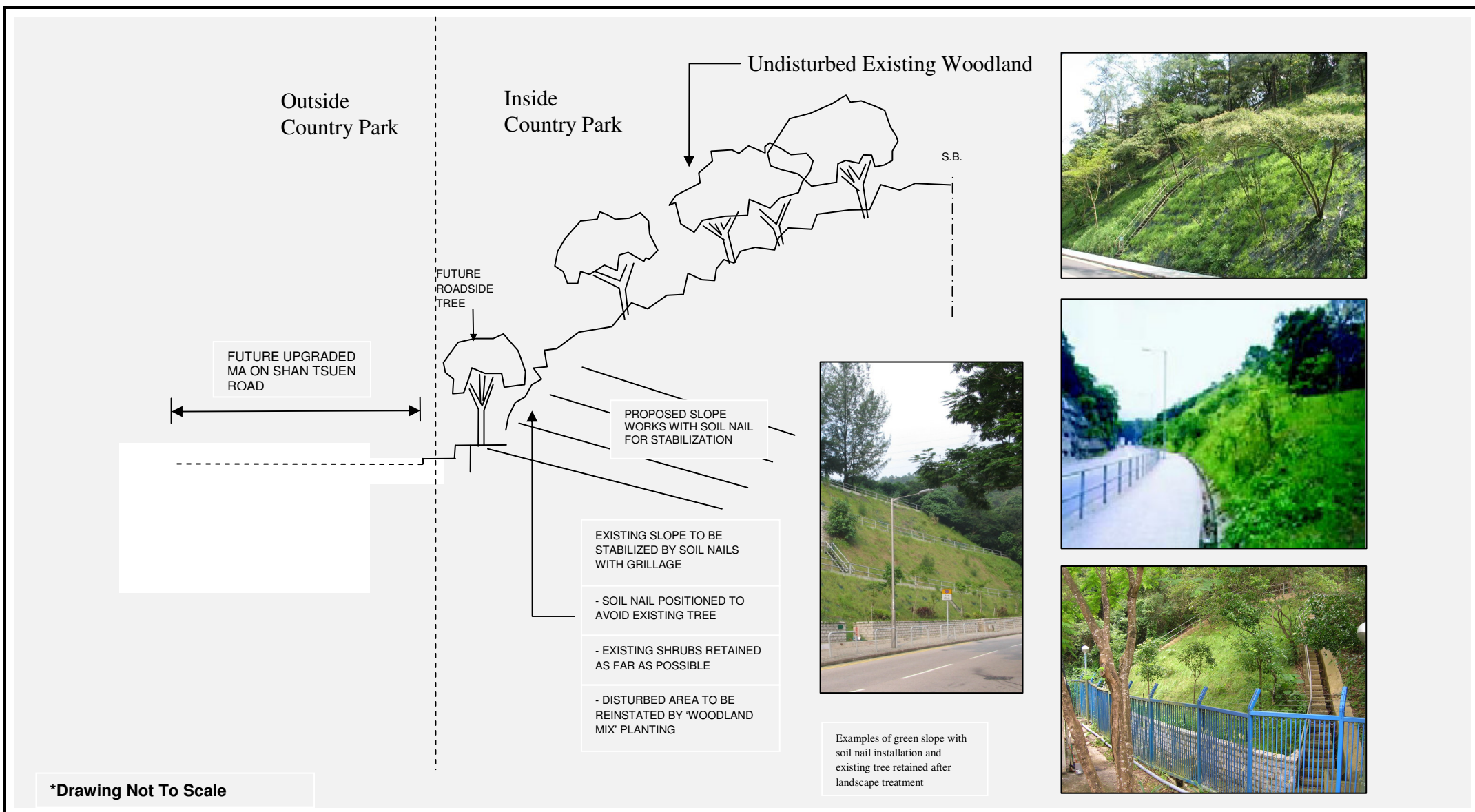


Figure: 5

Title: Indicative Plan on Landscapes and Visual Enhancement Measures (1)

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

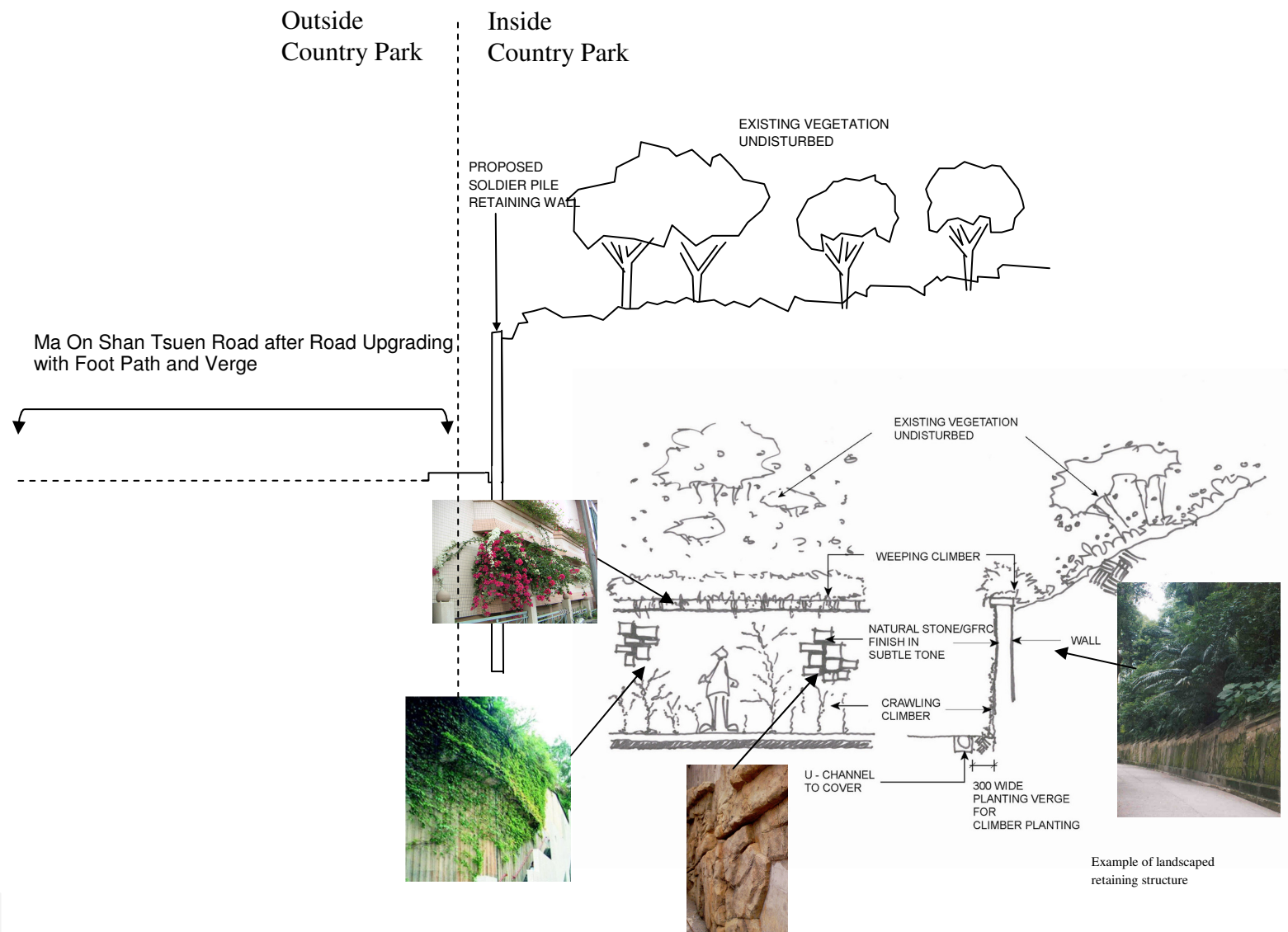
ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.6

Date: Dec 2009



*Drawing Not To Scale

Figure: 6

Title: Indicative Plan on Landscapes and Visual Enhancement Measures (2)

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.6

Date: Dec 2009

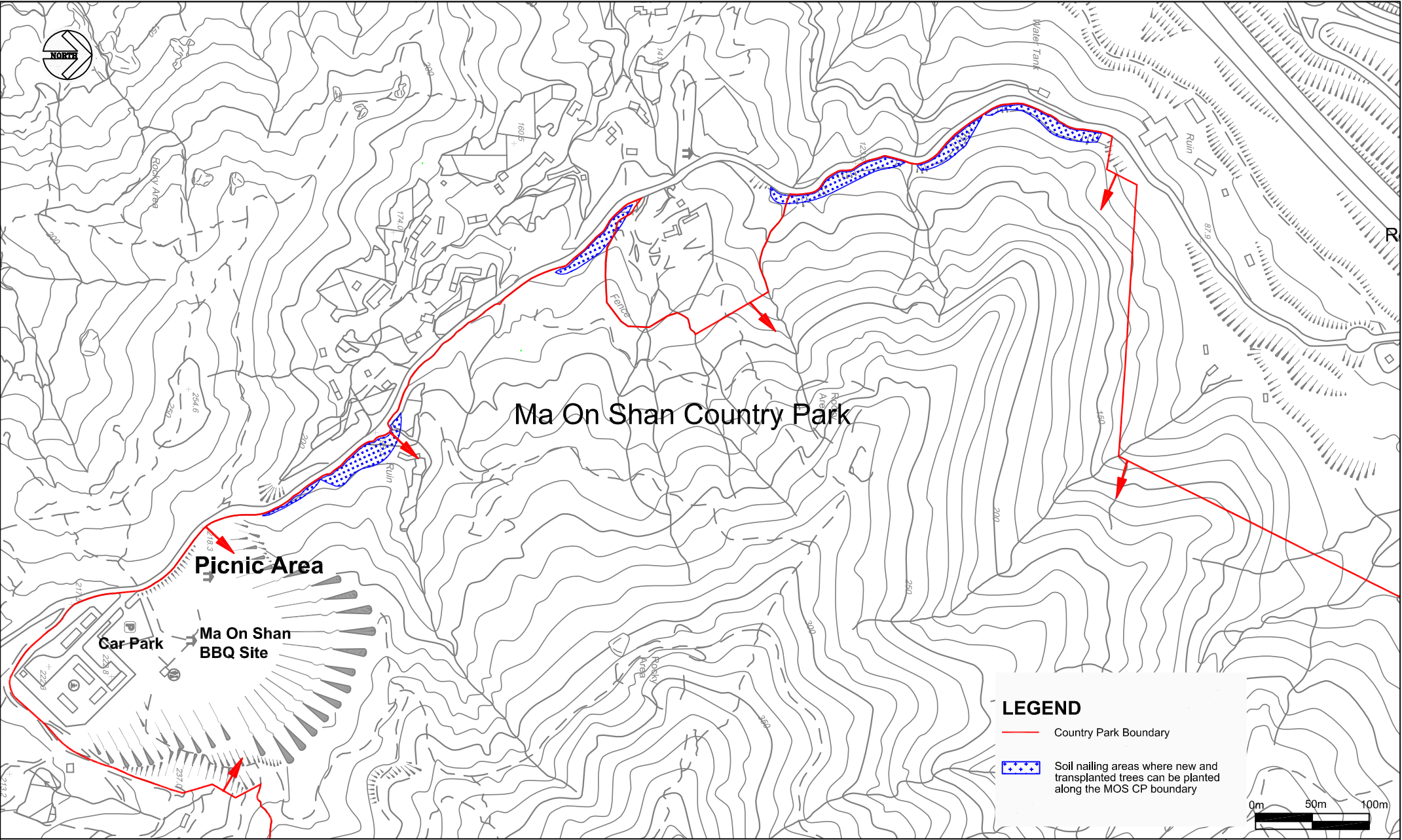


Figure: 7	ENVIRON	
	Drawn by:	SLam
	Checked by:	TC
	Rev.:	1.3
Title: Compensatory Planting Locations for the Project Area		Date: July 2009
Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park		

Annex I:
Letter Issued by the Country Parks Committee
dated 31 May 2007

香港政府漁農自然護理署
郊野公園及海岸公園管理局
九龍長沙灣道 303 號
長沙灣政府合署 8 樓



RECEIVED 01 JUN 2007
Country & Marine Parks Authority
Agriculture, Fisheries & Conservation
Department

307

8/F., Cheung Sha Wan Government Offices
303 Cheung Sha Wan Road
Kowloon, Hong Kong.

本署檔號 Our Ref: AF CPA 01/19/0

來函檔號 Your Ref:

電話 Tel. No.: 2150 6697

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圖文傳真 FAX NO.: 3101 0304

File to: (1) TNG MOSPLE100/0			
(2)			
Circulate to:			

Mr Tony CHENG
Consultant
CH2M HILL Hong Kong Ltd.,
Suite 1801, Harcourt House
39 Gloucester Road
Wanchai, Hong Kong

31 May 2007

Dear Mr Cheng,

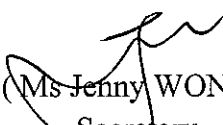
**Country and Marine Parks Board
35th Meeting of Country Parks Committee**

Thank you for attending the 35th Meeting of Country Parks Committee (Committee) on 19 April 2007 to brief members on the proposed improvement works for Ma On Shan Tsuen Road within Ma On Shan Country Park.

After deliberation, the Committee raised no objection in principle to the proposal on the ground that it would improve safety and facilitate better accessibility to the area. The project proponent, however, should implement adequate mitigation measures to ensure that impacts to the surrounding environment and country park users were kept to the minimum during the construction period. As Ma On Shan Tsuen Road had many curves, the project proponent should also ensure that adequate safety measures were in place to ensure safety of country parks users and morning walkers during the construction period. The developer should also improve the infrastructures along the road to facilitate better and safer use of the road. The need of maintaining a 2.5m wide footpath along the whole alignment of the road should also be re-assessed.

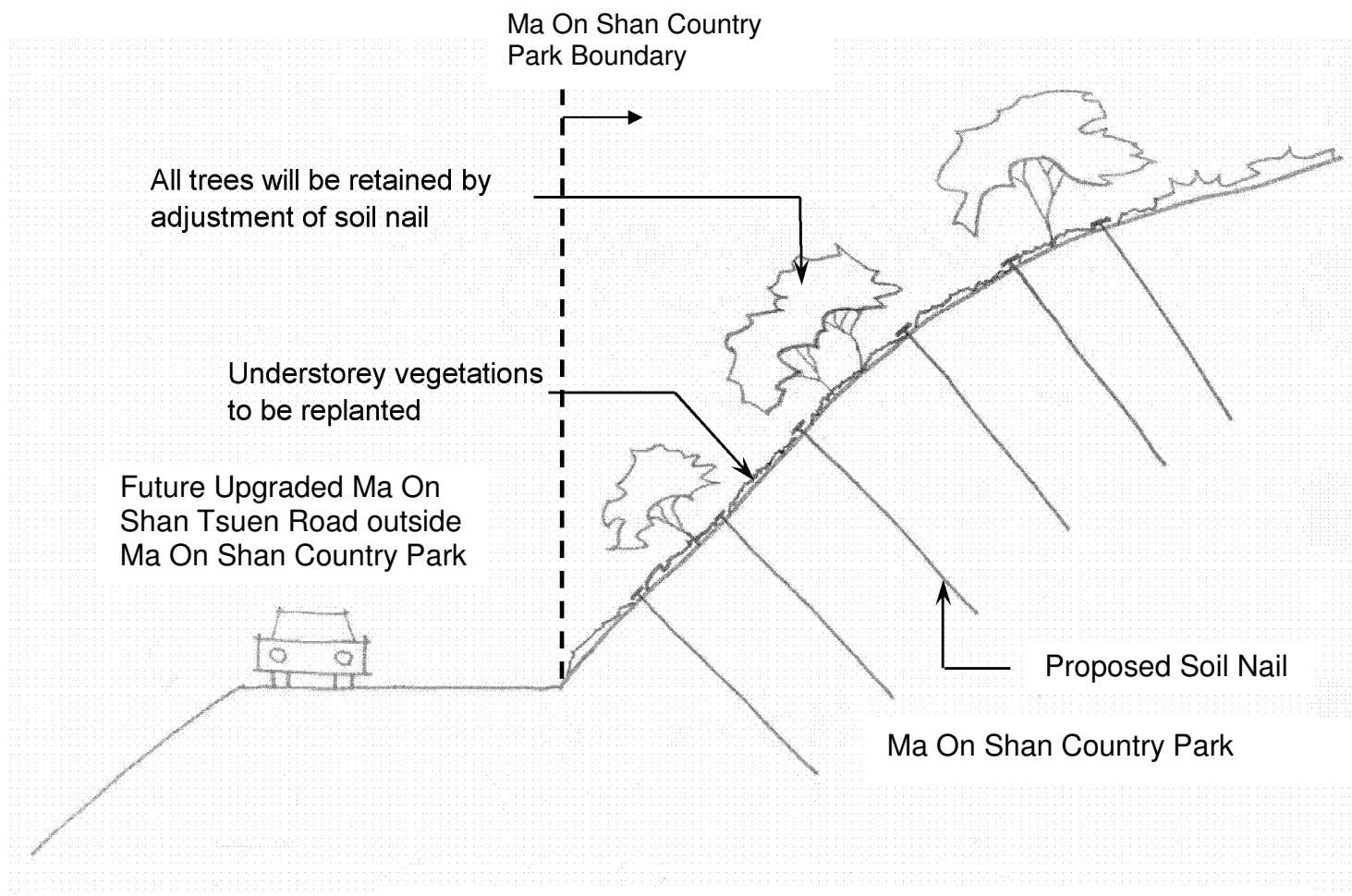
Please also note that despite the Committee's no objection-in-principle to the project, formal consent of the Country and Marine Parks Authority is required before commencement of the works. In this connection, you should provide Agriculture, Fisheries & Conservation Department with the detailed plans of the finalized project for the consideration of the Country and Marine Parks Authority when they are available.

Yours sincerely,


(Ms Jenny WONG)
Secretary
Country Parks Committee

c.c. Prof. CHAU Kwai-cheong, Chairman of the Country and Marine Parks Board
Prof. Nora TAM Fung-ye, Chairman of the Country Parks Committee
File Ref.: AF GR CPDA MOS/27/2002

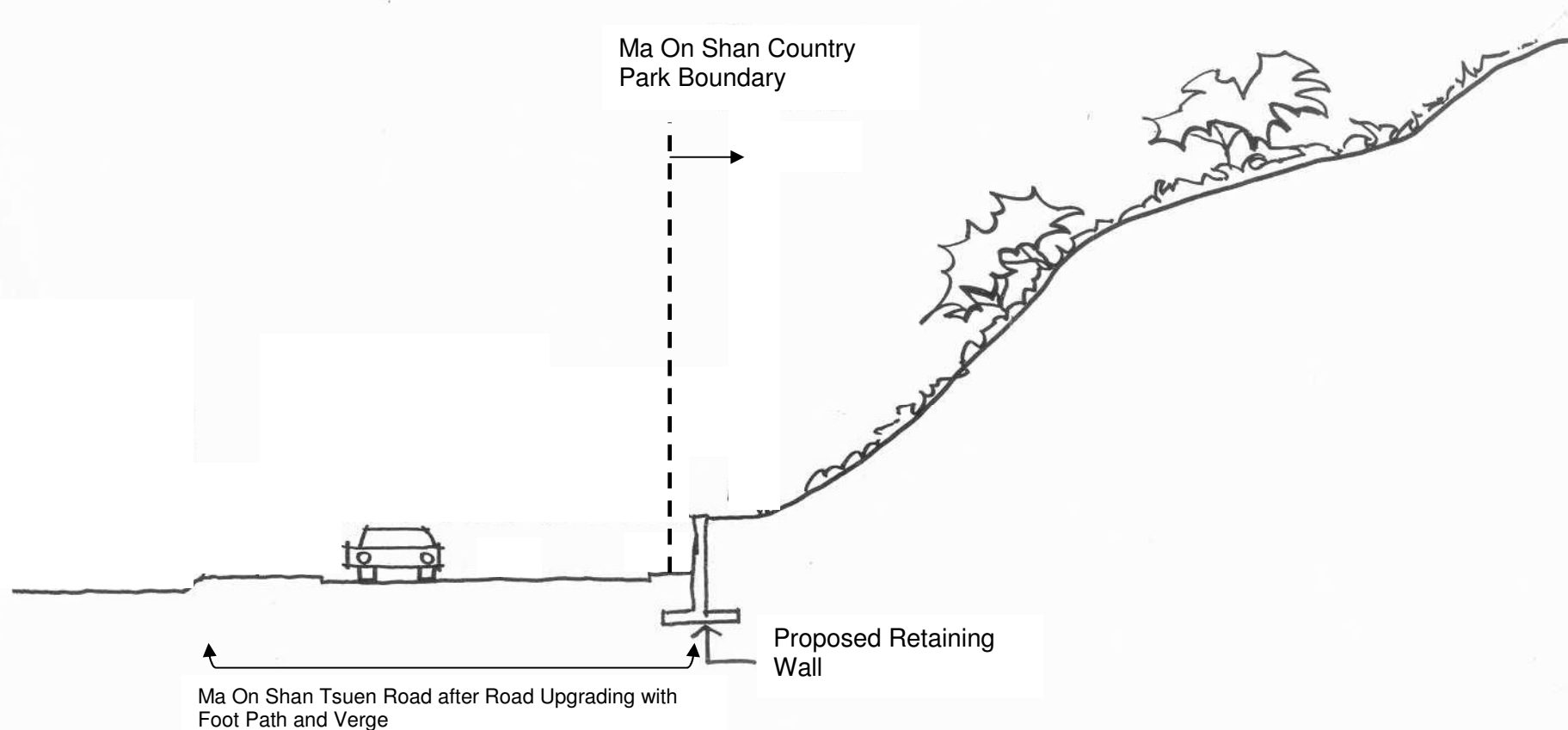
Annex II:
Typical Sections of the Slope Improvement
Works with
1) Soil Nailing
2) Retaining Wall
3) Minor Touch-up Works
within MOS CP



Typical Section for Slope Improvement Works with Soil Nailing

*Drawing Not To Scale

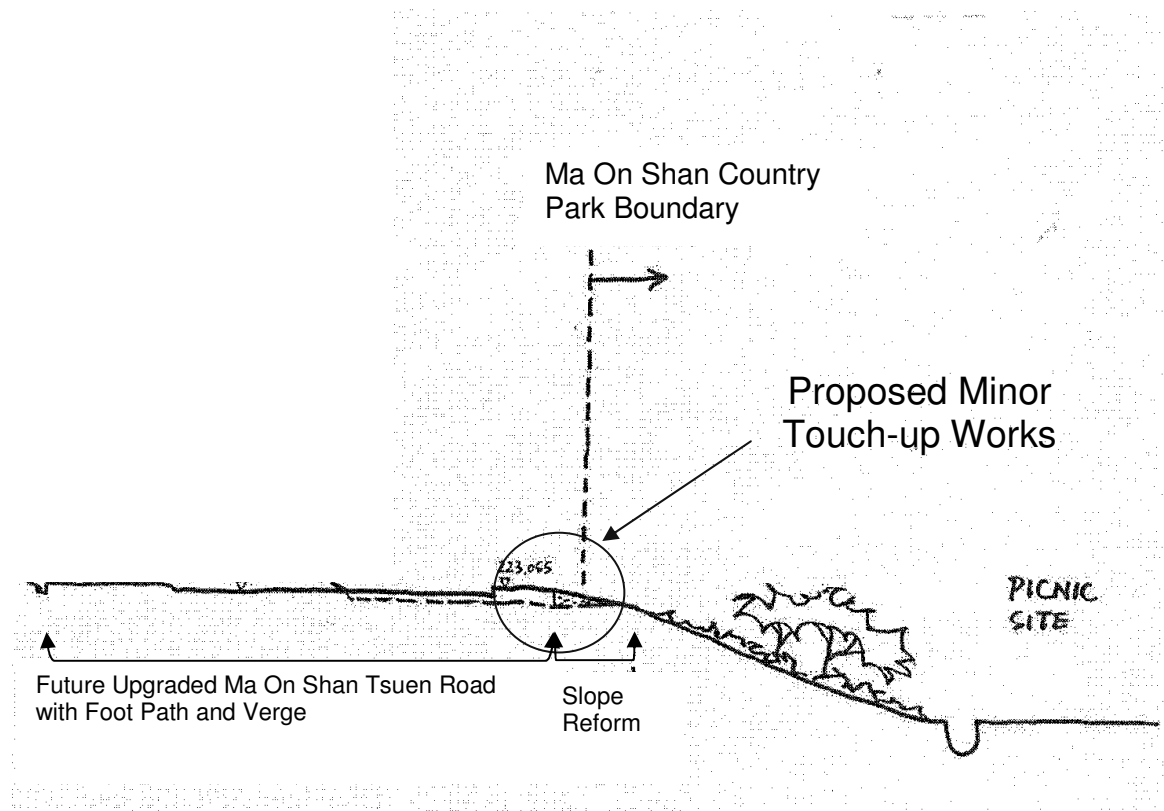
Annex II		ENVIRON	
Title:	Typical Sections of the Slope Improvement Works with Soil Nailing and Retaining Wall Structure – Sheet 1 of 3	Drawn by: SLam	
		Checked by: TC	
Project:	Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park	Rev.: 1.6	
		Date: Dec 2009	



Typical Section for Slope Improvement Works with Retaining Wall Structure

*Drawing Not To Scale

Annex II		ENVIRON	
Title:	Typical Sections of the Slope Improvement Works with Soil Nailing and Retaining Wall Structure – Sheet 2 of 3	Drawn by: SLam	
		Checked by: TC	
Project:	Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park	Rev.: 1.5	
		Date: Sep 2009	

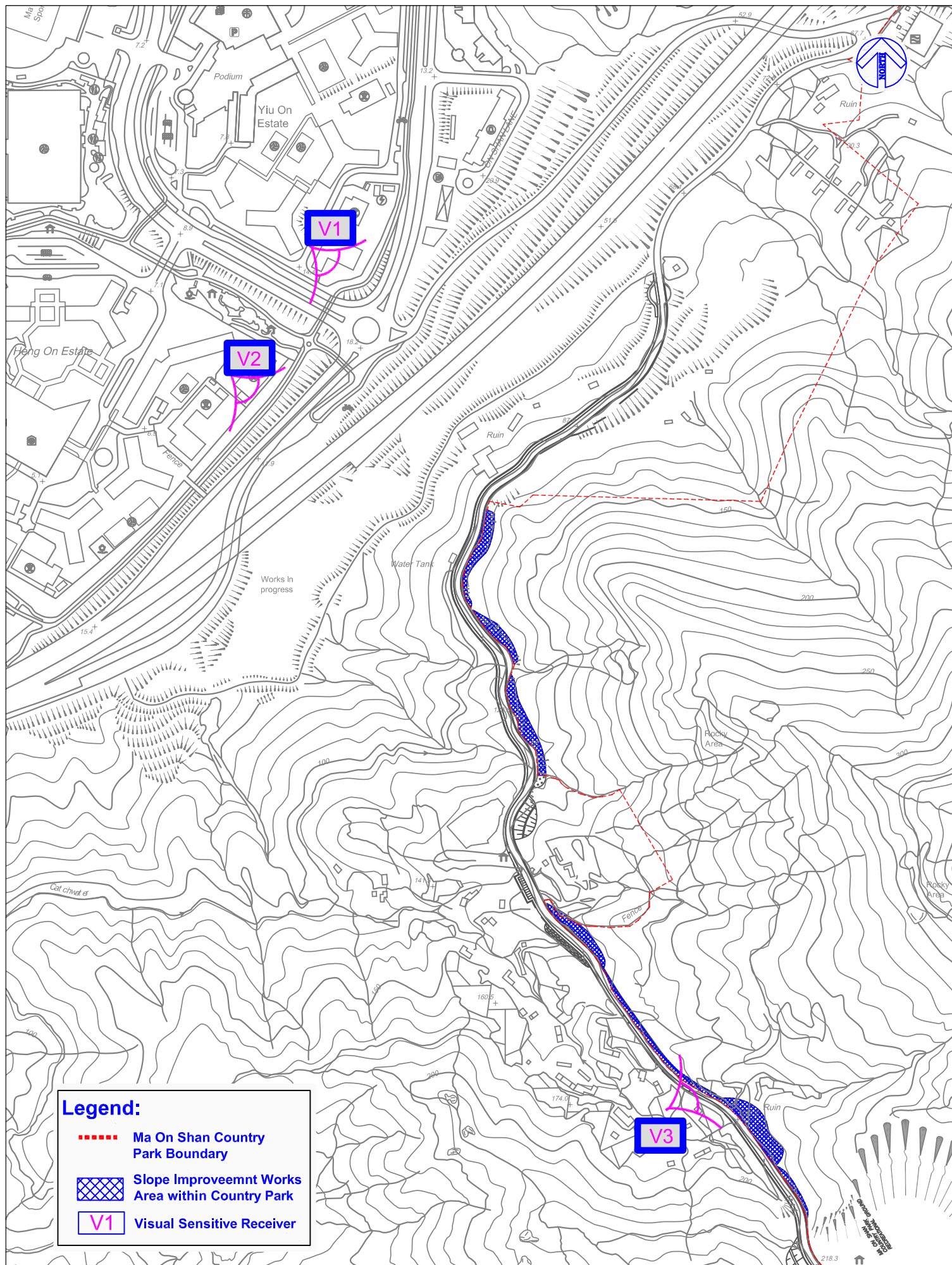


Typical Section for Minor Touch-up Work at Ma On Shan Country Park Boundary

*Drawing Not To Scale

Annex II		ENVIRON	
Title:	Typical Sections of the Slope Improvement Works with Soil Nailing and Retaining Wall Structure – Sheet 3 of 3	Drawn by: SLam	
		Checked by: TC	
Project:	Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park	Rev.: 1.5	
		Date: Sep 2009	

Annex III:
**Locations and Photos of Existing Landscape and Visual Sensitive
Receivers along Ma On Shan Tsuen Road**



Annex: III

Title: Locations of Visual Sensitive Receivers

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

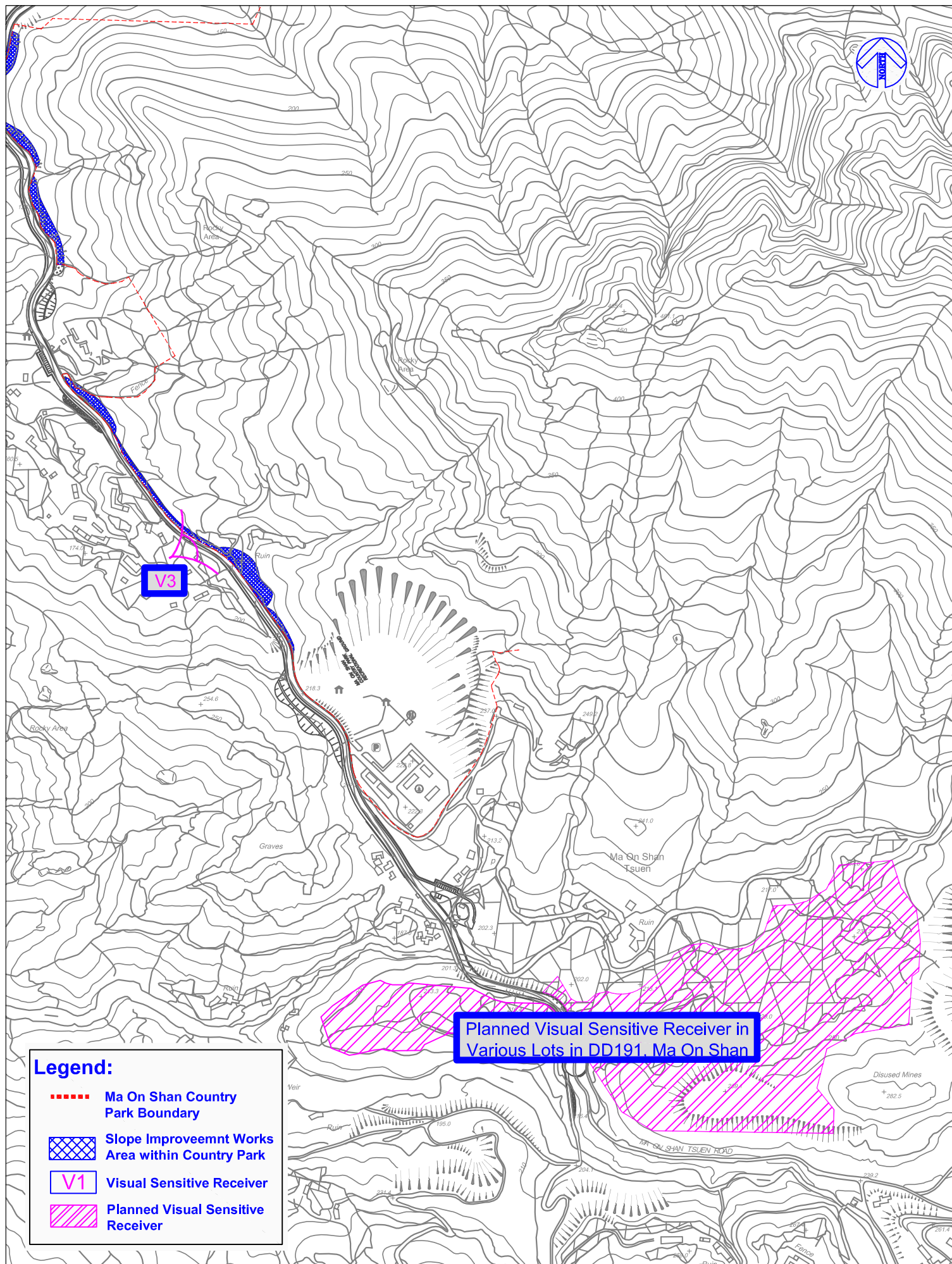
ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.3

Date: July 2009



Annex: III

Title: Locations of Visual Sensitive Receivers

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

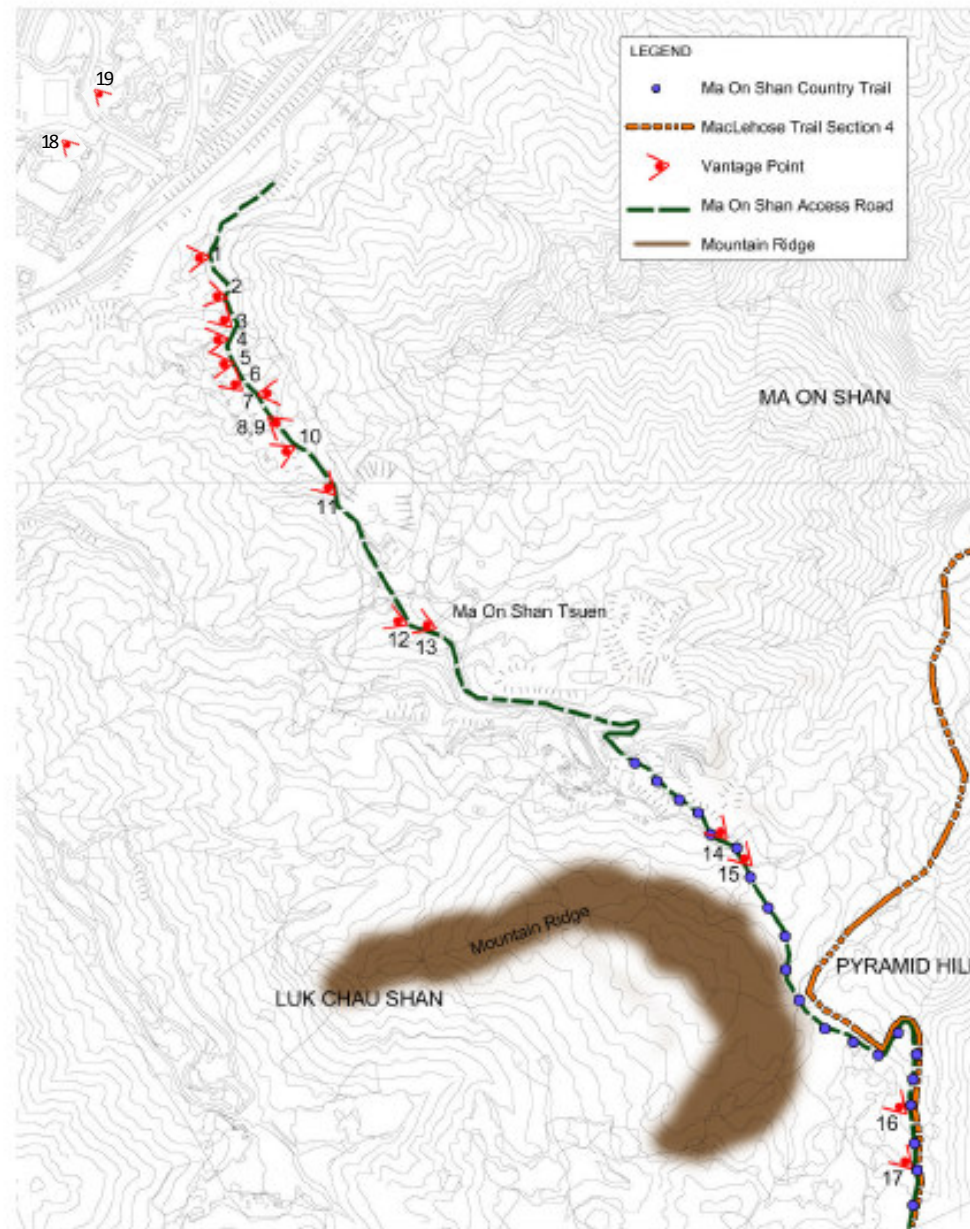
Drawn by: SLam

Checked by: TC

Rev.: 1.2

Date: July 2009

1D) Key Plan of Ma On Shan Access Road, Country Trail and MacLehose Trail Section 4



1E) Site Photos of Landscape and Visual Aspect

Vantage Point 1

Ma On Shan Access Road going uphill

Works area could be screened by existing vegetation.



Vantage Point 2

Ma On Shan Access Road going downhill

Works area could be screened by existing vegetation.



Vantage Point 3

Ma On Shan Access Road going uphill

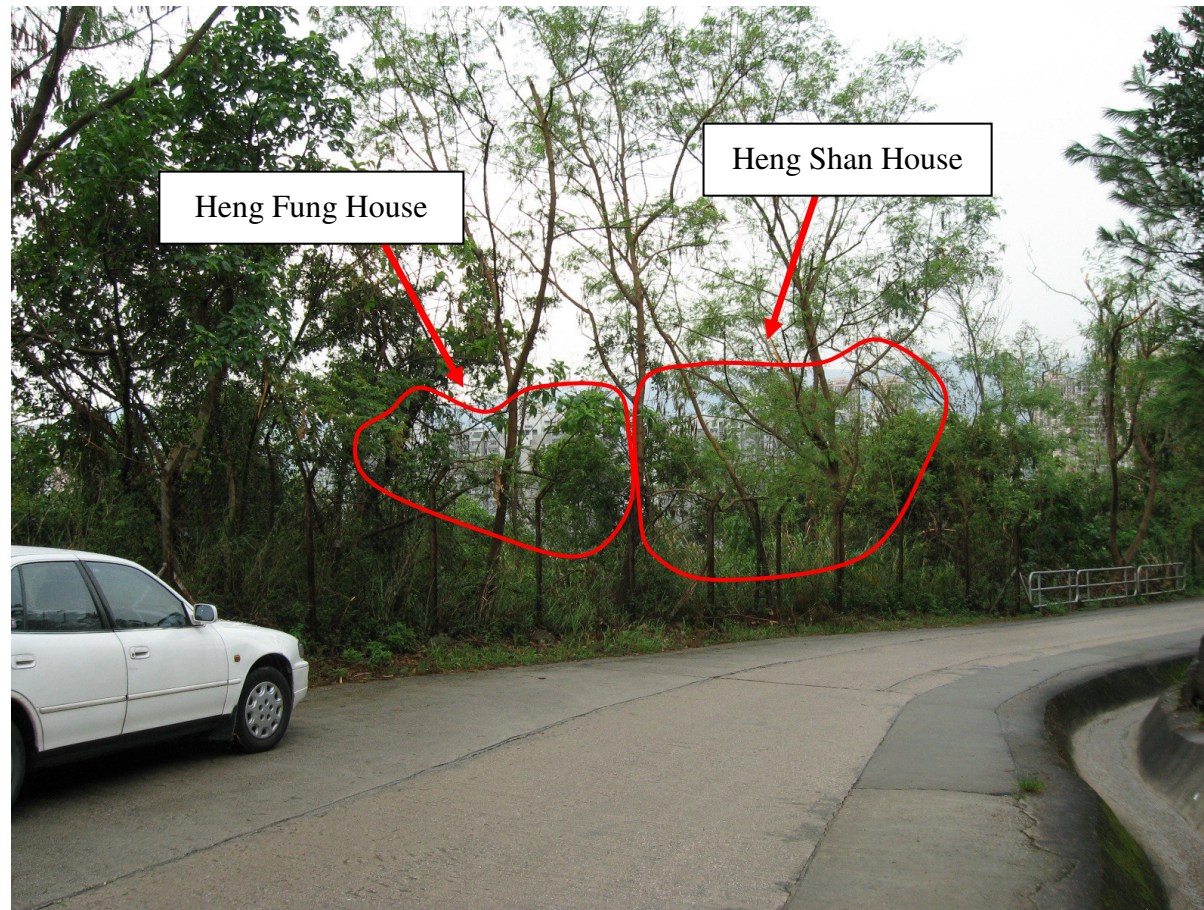
View from the location of proposed slope improvement works towards Shatin Hoi.



Vantage Point 4

Ma On Shan Access Road going downhill

View from Rooftop of Heng On Estate could be blocked by existing vegetation



Vantage Point 5

Ma On Shan Access Road going uphill

Ma On Shan Pavilion



Vantage Point 6

Ma On Shan Access Road going downhill

Workshop on the left hand side of the access road.



Vantage Point 7

Ma On Shan Access Road going uphill

Squatters along Ma On Shan Access Road



Vantage Point 8

Ma On Shan Access Road going uphill

Dense layers of trees on both sides of the access road.



Vantage Point 9

Ma On Shan Access Road going uphill

Bus stop near Ma On Shan Access Road



Vantage Point 10
Ma On Shan Access Road going uphill



Vantage Point 11

Ma On Shan Access Road going downhill

Dense layers of trees are found on both sides of the access road.



Vantage Point 12

Ma On Shan Country Trail going uphill from Subject Areas

Squatters along Ma On Shan Tsuen Road



Vantage Point 13
Ma On Shan Country Trail going uphill from Subject Areas



Vantage Point 14

Ma On Shan Country Trail going uphill from Subject Areas



Vantage Point 15

Ma On Shan Country Trail going uphill from Subject Areas

Level difference between Ma On Shan Tsuen and Ma On Shan Country Trail



Vantage Point 16

Ma On Shan Country Trail going uphill from Subject Areas towards Ngong Ping



Vantage Point 17

Ma On Shan Country Trail going uphill from Subject Areas towards Ngong Ping



Vantage Point 18

From Heng On Estate Towards Subject Area



Vantage Point 19

From Yiu On Estate Towards Subject Area



Annex IV: **Ecological Study for the Project**

A4.1 Ecological Impact Assessment

A4.1.1 Introduction and Background

Ma On Shan Tsuen Road is the existing access road leading to the Ma On Shan Country Park Management Centre, Recreational Ground and the nearby villages. Its uphill side lies adjacent to the Ma On Shan Country Park Boundary. It was a sub-standard road and posed potential danger at times to pedestrian and traffic alike. A proposed gazette plan from this section of road, subsequent to an approved planning application of a proposed development at various lots in DD 191, was submitted to the government in 2003 and received no in principle objection from the governmental departments in 2004. The gazettal process had been held up pending approval of a Section 16 application by the Town Planning Board primarily on an amendment to the visitor center to be operated by the proponent. As a result of the application, the Board requested a detail ecological review of the proposed development, including the impact due to the upgrading of Ma On Shan Tsuen Road as updated information for consideration.

A Report titled Revised Ecological Impact Assessment for Ma On Shan Tsuen Road Upgrading Works has been submitted in September 2005 as an attachment for supporting the Planning Application No. A/MOS/65.

According to the firstly submitted tree survey report for the road upgrading works in 2000, it identified at that time 349 trees adjacent to Ma On Shan Tsuen Road with 219 of these trees in direct conflict with the works including 32 trees inside the country park. Recently, an updated tree survey covering the entire proposed gazette road works boundary was conducted in 2005 for the purpose of this planning application, with more than 4000 trees over a trunk girth of 0.3m identified. Initial review of trees directly affected by the necessary slope works and associated road alignment works based on the original proposal identified the amount of affected number of 2300 trees with about 110 of them within the country park was considered excessive. The increase in the number of trees affected comparing with findings in 2000 was attributed to continual tree growth which made them large enough to be defined as a 'tree', rather than any increase in scale of the road upgrading works. In fact, the scale of works has been greatly reduced comparing to the previously approved road upgrading scheme, and the number of tree needed to be fell have been minimized wherever possible.

In order to minimize the potential ecological impact, an extensive due diligence exercise was conducted to redesign the slope improvement works by using soil-nails and soldier-pile walls and slightly adjusted the road alignment to minimize the number of trees directly affected by the works. Through the adoption of these environmental optimal alternative options, the number of affected trees has been reduced to 47 trees within the country park. The current design of the proposed works could thus be considered as the optimum option.

Based on the preliminary design, this report reviews and assesses the potential ecological impacts of the proposed slope improvement works on Ma On Shan Tsuen Road leading to the Ma On Shan Country Park Management Centre, recreational ground and the nearby villages. The report provides a review and description of the existing baseline ecological conditions of vegetation communities and habitats at the immediate surrounding areas of the Ma On Shan Tsuen road. It identifies and evaluates the possible direct and indirect ecological impacts of the proposed slope improvement works. Where feasible, mitigation measures are recommended to reduce or eliminate any negative impacts associated with the proposed works.

A4.2 Legislation, Policies, Plans, Standards and Criteria

Annexes 8 and 16 of the Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO) have been used as general guidelines for this assessment. Other relevant environmental legislations, guidelines and references include:

- Hong Kong Planning Standards and Guidelines (HKPSG) Chapter 10,;
- Forests and Countryside Ordinance (Cap. 96) and its subsidiary legislation (the Forestry Regulation);
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586),;
- Wild Animals Protection Ordinance (Cap. 170),;

This section also makes reference to the following international conventions where appropriate:

- Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- IUCN Red Data Book; and
- The PRC National Protection List of Important Wild Animals.

A4.3 Approach and Methodology

A4.3.1 Past Records and Literature Review

Preliminary ecological surveys of habitats and vegetation along the existing Ma On Shan Tsuen road were first undertaken between 1994 and 1995. Additional surveys were continued to be undertaken in Sep 1997 (refer to approved Application A/MOS/34, March 1999), October 2004, March and July 2005 to collect and update the baseline condition of the Project area.

The information was presented and summarized in a Report titled Revised Ecological Impact Assessment for the Access Road Upgrading Works has been submitted in Sep 2005 as an attachment for supporting the Planning Application No. A/MOS/65.

Past records revealed that no species protected under local legislation or international conventions were recorded within the Project area. The vegetation along Ma On Shan Tsuen Road was dominated by common and widespread plant species, with the trees *Schefflera octophylla* (*heptaphylla*), *Acacia confusa*, *Mallotus paniculatus*, *Machilus thunbergii*, *Leucaena leucocephala* and *Sterculia lanceolata* being particularly common.

A4.3.2 Baseline Field Surveys

In order to confirm the validity and update the existing baseline ecological information of the Project area, additional vegetation and habitat surveys were conducted in July 2006, August 2008 and September 2008 for the Project area. All survey techniques employed in this study were in accordance with the EIAO Guidance Note No. 10/2004 entitled "Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys".

The Project area was surveyed on foot. In addition, the distribution of habitats along Ma On Shan Tsuen Road was also recorded and as shown in **Figure A4-1** and **Figure A4-2**. General habitat type and level of human disturbance of the Project area, as well as vegetation type have been examined. Habitats were mapped based on government aerial photos (2000, 2001, 2003 and 2004) and field ground truthing.

In order to protect these flora and fauna species, no sample was collected. All species were identified in-situ. Nomenclature and conservation status of plant species followed Xing et al. (2000) and Hong Kong Herbarium (2005).

A4.3.3 Description of the Baseline Ecology Context of the Project Area

Results of the present study reveal that the description and evaluation documented in the previous planning application documents are still valid. No substantial changes to vegetation and habitats at the Project area were observed during the survey conducted in July 2006.

All plant species recorded within the Project area were relatively common and widespread in Hong Kong. However, two plant species of conservation importance, the shrubs *Diospyros vaccinioides* and *Rhodeodendron simsii* were recorded at several locations within the Project area. Their locations were marked in **Figure A4-1** and **Figure A4-2**. *Diospyros vaccinioides* was common and virtually ubiquitous in areas of natural or semi-natural shrubland/woodland in Hong Kong. Although locally common, *D. vaccinioides* was listed as critically endangered in the IUCN Red Data List (IUCN, 2003). *Rhododendron simsii* is very common in Hong Kong (Xing et al. 2000), but is listed under Cap. 96 and therefore protected by Hong Kong Legislation.

In general, areas adjacent to the uphill side of the Project area largely consisted of small cut slopes which were formed during the original road construction. Some areas of the slopes were shotcreted or covered in chunan, which supported very little vegetation. Habitats above and in between the cut slopes were dominated by Hong Kong hillsides characterizes shrubland, such as the commonly recorded *Dicranopteris pedata*, *Rhaphiolepis indica*, *Zanthoxylum Avicenna* and *Gordonia axillaries*. Typical plants of disturbed habitats (e.g. *Wedelia trilobata*, *Bidens pilosa*, *Mischanthus* sp.) along with common shrubland species (e.g. *Rhaphiolepis indica*, *Ligustrum sinense*) and occasional trees (e.g. *Schefflera heptaphylla*) were found to be dominated plants species at the slope area.

There was a small plantation area covering with exotic *Acacia confusa* between the existing Ma On Shan Tsuen road and the BBQ site of the Ma On Shan Country Park. This habitat would not be directly impacted by the proposed works and was considered in low ecological value. Potential impacts to this habitat were therefore not considered further in this report.

As was the case with all previous ecological surveys of Ma On Shan Tsuen Road, these recent scoping surveys conducted for this report focused on habitats and vegetation. Only general observations of wildlife at the Project area were made, with the animals recorded limited to common and widespread species. In order to collect further ecological data of fauna species for this project, a fauna survey focusing on the terrestrial fauna at the Project area was conducted between August and November 2008 covering both wet and dry seasons. According to this survey, the fauna species recorded at the Project area were mainly species common in Hong Kong. There were only several uncommon species, but no rare species or species of special conservation importance recorded close to the Project area. For other common fauna species recorded, they were found at the Project area and also generally recorded in all habitats along the Ma On Shan Tsuen Road. Due to the disturbed nature and relatively low ecological value of fauna habitats recorded, it was unlikely that the Project area provided an important resource for wildlife communities and faunal species of conservation importance. The report for the terrestrial fauna survey is attached in **Appendix A4-1**. The locations where the uncommon fauna species were recorded are shown in **Figure A4-3**.

A4.4 Ecological Value of the Project Area

Based on the information presented above, ecological value of the main habitat type found in the Project area is evaluated following the criteria set in Table 1 of the TM-EIAO Annex 8. The results of evaluation are listed in the table below.

Table 1 Ecological Value of Shrubland Habitat in the Project Area

Criteria	Ecological Value
Naturalness	Habitat is secondary in nature and maintained by hill fires
Size	Large
Diversity	Moderate

Criteria	Ecological Value
Rarity	Two locally very common plant species of conservation importance (<i>Diospyros vaccinioides</i> and <i>Rhododendron simii</i>) recorded from shrubland habitat
Dominated Plant Species	<i>Dicranopteris pedata</i> , <i>Rhaphiolepis indica</i> , <i>Zanthoxylum Avicenna</i> , <i>Gordonia axillaries</i> , <i>Wedelia trilobata</i> , <i>Bidens pilosa</i> , <i>Mischanthus sp.</i> , <i>Ligustrum sinense</i>
Re-creatability	Moderate
Fragmentation	The habitat is not fragmented
Ecological Linkage	Habitat falls partially within Ma On Shan Country Park
Potential Value	Moderate
Nursery/Breeding Ground	No significant records
Age	n/a
Abundance/Richness of Wildlife	Low-Moderate
Overall Value	Low-Moderate

Table 2 Ecological Value of Plantation Habitat in the Project Area

Criteria	Ecological Value
Naturalness	Low
Size	Small
Diversity	Low
Rarity	No significant records
Dominated Plant Species	Acacia confusa
Re-creatability	High
Fragmentation	The habitat is not fragmented
Ecological Linkage	Habitat falls within the MOS CP
Potential Value	Low
Nursery/Breeding Ground	No significant records
Age	n/a
Abundance/Richness of Wildlife	Low
Overall Value	Low

A4.5 Identification and Evaluation of Impacts

A4.5.1 Construction Phase

It is estimated that approximately 0.57 ha of shrubland habitat would be temporarily affected due to soil nailing of the slope improvement works. These impacts are considered minor in scale, as trees and larger shrubs on these slopes would be retained during the construction phase, and it is expected that habitats on the slopes would re-establish following the completion of works.

Several individuals of the plant species of conservation importance *D. vaccinioides* and *R. simsii* were recorded to be located on slopes that would be stabilized through soil-nailing of the slope improvement works. The location of the soil-nails will be 'fine-tuned' as far as practicable to avoid the locations where the *D. vaccinioides* and *R. simsii* were situated, and therefore no direct impacts to these plant species of conservation importance are expected.

Potential indirect impacts during the construction phase would include disturbance impacts to wildlife in areas adjacent to the site resulting from noise-generating construction activities and potential impacts to vegetation due to dust deposition. These impacts are generally considered minor in scale as the affected habitats would be not of high ecological value, and the impacts can be effectively controlled through implementation of standard good site practice (discussed in Section A4.6.4 below).

Some of the slope improvement works would be close to or entering into the ecological sensitive Ma On Shan Country Park boundary. However, works within Ma On Shan Country Park would be largely restricted to the soil-nailing of slopes to be conducted under due diligence engineering design and soil nailing locations selection above Ma On Shan Tsuen Road to improve slope stability under minimal ecological disturbance. As described above, soil-nailing works were expected to have only minor and temporary ecological impacts. In total, only 47 trees within the Country Park would be directly impacted by the proposed slope improvement works, all of which were common species, relatively small in size, and of limited conservation/amenity value. *Appendix A4-2* shows the list of tree species affected by the proposed works. Overall, impacts to the Country Park due to Ma On Shan Tsuen Road upgrading are considered minor in scale.

A4.5.2 Operation Phase

No direct ecological impacts to habitats within the Project area are expected during the operation phase.

Indirect impact during the operation phase would be limited to disturbance caused by vehicular and human traffic along Ma On Shan Tsuen Road. As the existing road was already used by considerable number of private cars, taxis, buses, coaches and hikers, any additional traffic on the road would unlikely to cause any substantial increase in disturbance over the current situation.

A4.6 Mitigation Measures

A4.6.1 Revision of Construction Method

The proposed slope improvement and associated alignment works have undergone several revisions in order to reduce the footprint of Ma On Shan Tsuen Road and minimize tree-felling. These revisions included replacing proposed cut and fill slopes with retaining walls, and utilising soil-nailing and other techniques in the slope improvement works to allow existing trees/vegetation to be retained instead of slope re-profiling, which would involve complete removal of all trees and vegetation and habitat loss. With these measures in place, the footprint of proposed slope improvement work has been substantially reduced (0.57 ha only). It is predicted that only 47 trees within the MOS CP would be directly affected by the Project.

A4.6.2 Trees Protection and Compensatory Planting

Mature trees within the Project area would be retained where possible. Measures would be implemented to protect retained trees from injury during the construction phase (e.g. providing fencing/hoarding around tree trunks to prevent damage to the bark). During the construction phase, all existing trees to be retained onsite shall be properly protected before the works start. Contractor's access to designated 'no-intrusion zone' should be prohibited. The Contractor shall exercise the greatest care to avoid any damage to the retained trees and shall comply with the requirements of Preservation and Protection of Existing Trees under Section 26 Preservation and Protection of Trees of the General Specification for Civil Engineering Works 2006 Edition, published by the Government of the HKSAR.

Of the 47 trees directly affected by the Project (see *Appendix A4-2* in **Annex IV** for the list of tree species), it is recommended that 26 trees of good form and condition would be transplanted. Any unavoidable felling of trees would be compensated through extensive tree planting. It was proposed that standard and heavy standard trees would be planted at designated locations to compensate for the expected felling of 21 trees. Additionally, slopes affected by soil nailing would be provided with woodland mix planting of trees and shrubs in native species. Compensatory planting would make use of native species with flowers/fruit attractive to wildlife, as shown in the landscape planting proposal in **Annex VII**.

A4.6.3 Protection of Species of Conservation Interest

It was expected that individuals of plant species of conservation importance recorded within the Project area could be retained in-situ. To provide an adequate level of protection for these plants, detailed surveys of the precise location of each plant should be conducted prior to the commencement of construction phase of the project. Other individuals of rare/protected plant species, if any, that could occur in the works area should also be located during these surveys. The locations of these plants would be paid caution during the detailed design stage to ensure the impacts resulting from the slope works were minimized. Additionally, the location of these plants should be taken into account during landscaping works to ensure compensatory planting of trees and other vegetation would not affect these

species. It was also recommended to carrying out ecological monitoring programme throughout the construction phase to monitor the condition of the concerned individual plants of conservation importance.

Although no direct impacts to plant species of conservation importance were expected under the current preliminary scheme, in case any unavoidable impact was identified in the detailed design stage, transplantation of the affected individuals should be considered as the last resort.

A4.6.4 Good Site Practice

Standard good site practice measures would be implemented throughout the construction phase. The measures should include:

- Placement of equipment or stockpile in designed works areas and access routes selected on existing disturbed land to minimise disturbance to natural habitats and vegetation, particularly mature trees.
- Construction activities should be restricted to work areas that should be clearly demarcated. The work areas should be reinstated after completion of the works.
- Waste skips should be provided to collect general refuse and construction wastes. The wastes should be disposed of timely and properly off-site.
- Use of dust suppression measures (e.g. regular watering to reduce dust emissions from exposed site surfaces and unpaved road, particularly during dry weather) to minimise dust deposition on vegetation adjacent to works areas.
- General drainage arrangements should include sediment and oil traps to collect and control construction site run-off.
- Open burning on works sites is illegal, and should be strictly prohibited.

A4.7 Residual Ecological Impact

With the implementation of the proposed mitigation measures, residual ecological impacts would be limited to the loss of approximately 0.08ha of shrubland habitats that would fall within the Project area for the construction of retaining structures. Given the small area and low ecological value of the affected habitats, residual impacts are considered minor in scale and ecologically acceptable.

A4.8 Summary

The existing Ma On Shan Tsuen Road leading to the Ma On Shan Country Park Management Centre, Recreational Ground and the nearby villages was sub-standard and posed potential danger at times to vehicles and pedestrian. It would require slope improvement and associated alignment works along Ma On Shan Tsuen Road to ensure minimum safety standard could be met. The proposed slope improvement works would cause direct impacts to habitats close to the existing road. However, habitats recorded

within the Project area generally supported a low diversity of common and widespread plant species, and were not considered of particular ecological value.

Measures were recommended to implement to mitigate the identified ecological impacts. These would include the protection and transplantation of plant species of conservation interest and trees potentially affected by the proposed works, and compensatory tree planting. The total number and aggregated size of compensatory trees would equal or exceed that of any trees felled. Overall, it was expected that no insurmountable ecological impacts would result from the proposed slope improvement works.

A4.9 References

1. AFCD (2002) Checklist of Hong Kong Plants 7th Edition 407p
2. AFCD (2004) Ma On Shan Country Park.
http://parks.afcd.gov.hk/newparks/eng/country/cps/cp_mos.htm
3. Hong Kong Herbarium (2005): <http://www.hkherbarium.net/Herbarium/>
4. IUCN (2003). 2003 IUCN Red List of Threatened Species: www.redlist.org
5. Xing, F. Sai-chit, N. & Chau, L, (2000) Gymnosperms and Angiosperms of Hong Kong. Memoirs of the Hong Kong Natural History Society 23: 21-136

Annex IV:
Appendix A4-1:
Terrestrial Fauna Survey for the
Project

Introduction

To collect ecological data for establishing the ecological baseline and facilitating the assessment of potential ecological impacts from the Project, a four-month terrestrial fauna survey was performed between August and November 2008.

Methodology

Monthly surveys were conducted between August and November 2008, covering both wet and dry seasons. The surveys were also scheduled to cover both the morning and the evening time periods.

The diversity and abundance of terrestrial fauna including mammals, herpetofauna, birds, butterflies and odonates were surveyed for the Project area along Ma On Shan Tsuen Road.

During the survey, traces, tracks and scats of mammals were searched and recorded. Reptiles and amphibians surveys were supplemented by active searching, with particular attention given to potential shelters sites and hiding places such as litters and watercourses. Frogs and toads were also surveyed by auditory besides visual detection. As most of the amphibian species are more active after dusk, two of the surveys were conducted during evening.

Transect count method was used to survey the avifauna. The transect covered the full length of the proposed Ma On Shan Tsuen Road alignment.

Dragonflies and butterflies were surveyed following the same transect used for bird surveys. Dragonflies and butterflies were identified with the aid of binoculars, and when necessary, a telescopic hand net would be used to capture specimens for identification in the hand. Attentions were paid to potential habitats including wet areas (e.g. drains) and flowering vegetation.

All fauna encountered were identified to species level as far as possible. The species were recorded and their abundance were reported. Lists of the fauna species recorded with abundance and conservation status were provided. For species with conservation importance, sighting locations were also shown on the map.

Survey results

A total of 4 individuals from 2 species of reptiles, 197 individuals from 25 species of birds, 248 individuals from 42 species of butterflies, and 354 individuals from 14 species of odonates were recorded during the surveys. No mammals or amphibians were found during the survey. **Table 1** below summarizes the survey results.

Table 1 **Number of fauna individuals recorded in the four-month survey**

Taxa	2008				Total
	Aug	Sep	Oct	Nov	
Reptiles	2	1	1	0	4
Birds	22	33	67	75	197
Butterflies	76	33	67	72	248
Dragonflies	32	229	68	25	354

The terrestrial fauna survey results (August, September, October and November 2008) were shown below.

Reptile

Scientific name	Chinese Name	Common Name	Status*	Abundance			
				2008/8/30	2008/9/17	2008/10/26	2008/11/15
<i>Scincella modesta</i>	寧波滑蜥	Slender Forest Skink	Scattered distributed	1	1	0	0
<i>Scincella reevesii</i>	南滑蜥	Reeves' Smooth Skink	Widely distributed	1	0	1	0
Sub-total number				2	1	1	0
Total number				4			

*Karsen *et al.* 1998. "Hong Kong Amphibians and Reptiles" Second Edition. Provisional Urban Council, Hong Kong.

Bird

Uncommon species are bolded.

Scientific name	Chinese Name	Common Name	Status*	Abundance			
				2008/8/30	2008/9/17	2008/10/26	2008/11/15
<i>Streptopelia chinensis</i>	珠頸斑鳩	Spotted Dove	Abundant	0	4	1	0
<i>Eudynamys scolopacea</i>	噪鵲	Common Koel	Abundant	0	2	0	0
<i>Apus affinis</i>	小白腰雨燕	Little Swift	Common	2	0	0	0
<i>Motacilla flava</i>	黃鵲	Yellow Wagtail	Common	0	0	0	2
<i>Motacilla alba</i>	白鵲	White Wagtail	Common	1	1	2	0
<i>Pycnonotus jocosus</i>	紅耳鵲	Red-whiskered Bulbul	Abundant	6	11	19	37
<i>Pycnonotus sinensis</i>	白頭鵲	Chinese Bulbul	Abundant	6	2	17	11
<i>Lanius schach</i>	棕背伯勞	Long-tailed Shrike	Common	1	1	0	0
<i>Copsychus saularis</i>	鵲	Magpie Robin	Abundant	0	1	2	0
<i>Myophonus caeruleus</i>	紫嘯鵲	Blue Whistling Thrush	Widespread and common	1	1	3	1
<i>Garrulax perspicillatus</i>	黑臉噪(眉鳥)	Masked Laughingthrush	Abundant	0	0	1	0
<i>Garrulax chinensis</i>	黑喉噪(眉鳥)	Black-throated Laughingthrush	Common	0	1	0	0
<i>Garrulax canorus</i>	畫眉	Hwamei	Common and widespread	0	0	0	1

Scientific name	Chinese Name	Common Name	Status*	Abundance			
				2008/8/30	2008/9/17	2008/10/26	2008/11/15
<i>Cettia diphone</i>	日本樹鶯	Japanese Bush Warbler	Uncommon to common	0	0	0	1
<i>Prinia flaviventris</i>	灰頭鷦鶯	Yellow-bellied Prinia	Widespread and abundant	0	1	0	0
<i>Orthotomus sutorius</i>	火尾縫葉鶯	Common Tailorbird	Widespread and abundant	1	1	0	1
<i>Phylloscopus inornatus</i>	黃眉柳鶯	Yellow-browed Warbler	Common	0	0	0	3
<i>Muscicapa dauurica</i>	北灰鷓	Asian Brown Flycatcher	Common	0	0	2	0
<i>Hypothymis azurea</i>	黑枕王鷓	Black-naped Monarch	Uncommon	0	0	0	1
<i>Parus major</i>	大山雀	Great Tit	Widespread and abundant	1	0	4	1
<i>Aethopyga christinae</i>	叉尾太陽鳥	Fork-tailed Sunbird	Common	2	1	0	3
<i>Dicaeum</i> sp.	啄花鳥屬	Scarlet-backed Flowerpecker	Common	1	0	3	1
<i>Zosterops japonicus</i>	暗綠繡眼鳥	Japanese White-eye	Abundant	0	3	12	12
<i>Urocissa erythrorhyncha</i>	紅嘴藍鵲	Blue Magpie	Common	0	2	1	0
<i>Corvus torquatus</i>	白頸鴉	Collared Crow	Uncommon	0	1	0	0
Sub-total number				22	33	67	75
Total number				197			

* Carey *et al.* 2000. "The Avifauna of Hong Kong", Hong Kong Bird Watching Society, Hong Kong.

Butterfly

Uncommon species are bolded.

Scientific name	Chinese Name	Common Name	Status*	Abundance			
				2008/8/30	2008/9/17	2008/10/26	2008/11/15
<i>Astictopterus jama chinensis</i>	脛翅弄蝶	Forest Hopper	Common	2	0	0	0
<i>Potanthus confucius</i>	黃室弄蝶屬	Chinese Dart	Common	0	1	0	0
<i>Borbo cinnara</i>	杉弄蝶	Formosan Swift	Uncommon	0	1	0	0
<i>Polytremis lubricans lubricans</i>	黃紋孔弄蝶	Contiguous Swift	Common	2	1	0	0
<i>Graphium agamemon</i>	統帥青鳳蝶	Tailed Jay	Very common	0	0	1	0
<i>Graphium sarpedon sarpedon</i>	青鳳蝶	Common Bluebottle	Very common	1	0	3	0
<i>Chilasa clytia clytia</i>	斑鳳蝶	Common Mine	Common	0	0	2	0
<i>Papilio helenus helenus</i>	玉斑鳳蝶	Red Helen	Very common	1	1	4	0
<i>Papilio polytes polytes</i>	玉帶鳳蝶	Common Mormon	Common	5	2	4	1
<i>Papilio memnon agenor</i>	美鳳蝶	Great Mormon	Common	9	3	8	1
<i>Papilio protenor protenor</i>	藍鳳蝶	Spangle	Very common	3	0	0	0
<i>Papilio paris paris</i>	巴黎翠鳳蝶	Paris Peacock	Very common	2	1	0	0
<i>Delias hyparete hierte</i>	優越斑粉蝶	Painted Jezebel	Uncommon	1	0	0	0
<i>Pieris canidia canidia</i>	東方菜粉蝶	Indian Cabbage White	Very common	0	0	0	2
<i>Hebomoia glaucippe glaucippe</i>	鶴頂粉蝶	Great Orange Tip	Common	1	0	0	0
<i>Eurema blanda</i>	槩黃粉蝶	Three-spot Grass Yellow	Very common	0	0	1	0
<i>Eurema hecabe hecabe</i>	寬邊黃粉蝶	Common Grass Yellow	Very common	2	1	1	3
<i>Iraota timoleon timoleon</i>	鐵木萊異灰蝶	Silver Streak Blue	Uncommon	1	0	0	0
<i>Heliophorus epicles</i>	斜斑彩灰蝶	Purple Sapphire	Common	0	0	3	3
<i>Jamides bochus bochus</i>	雅灰蝶	Dark Cerulean	Common	0	0	0	4
<i>Lampides boeticus</i>	亮灰蝶	Long-tailed Blue	Very common	0	0	1	4
<i>Zizeeria maha serica</i>	酢醬灰蝶	Pale Grass Blue	Very common	10	4	3	2

Scientific name	Chinese Name	Common Name	Status*	Abundance			
				2008/8/30	2008/9/17	2008/10/26	2008/11/15
<i>Abisara echerius echerius</i>	蛇目褐蛱蝶	Plum Judy	Very common	0	7	16	33
<i>Lethe confusa confusa</i>	白帶黛眼蝶	Banded Tree Brown	Very common	5	1	0	0
<i>Elymnias hypermnestra hainana</i>	翠袖鋸眼蝶	Common Palmfly	Common	0	2	1	0
<i>Mycalesis mineus mineus</i>	小眉眼蝶	Dark-brand Bush Brown	Very common	1	2	9	7
<i>Mycalesis zonata</i>	平頂眉眼蝶	South China Bush Brown	Common	1	0	0	0
<i>Ypthima baldus baldus</i>	矚眼蝶	Common Five-ring	Very common	8	1	8	2
<i>Cupha erymanthis erymanthis</i>	黃襟蛱蝶	Rustic	Very common	2	1	0	0
<i>Kaniska canace canace</i>	琉璃蛱蝶	Blue Admiral	Common	0	0	0	1
<i>Symbrenthia lilaea lunica</i>	散紋盛蛱蝶	Common Jester	Common	1	0	0	0
<i>Hypolimnas bolina kezia</i>	幻紫斑蛱蝶	Great Egg-fly	Common	8	0	0	0
<i>Neptis hylas hylas</i>	中環蛱蝶	Common Sailer	Very common	1	0	2	0
<i>Neptis clinia susruta</i>	珂環蛱蝶	Southern Sullied Sailer	Common	1	0	0	0
<i>Euthalia phemius seitzii</i>	尖翅翠蛱蝶	White-edged Blue Baron	Uncommon	0	0	0	1
<i>Cyrestis thyodamas chinensis</i>	網絲蛱蝶	Common Mapwing	Common	1	0	0	0
<i>Parantica aglea melanoides</i>	絹斑蝶	Glassy Tiger	Very common	1	0	0	3
<i>Ideopsis similis similis</i>	擬旖斑蝶	Ceylon Blue Glassy Tiger	Very common	2	2	0	0
<i>Tirumala limniace limniace</i>	青斑蝶	Blue Tiger	Common	2	0	0	0
<i>Danaus genutia genutia</i>	虎斑蝶	Common Tiger	Very common	2	2	0	1
<i>Euploea midamus midamus</i>	藍點紫斑蝶	Blue-spotted Crow	Very common	0	0	0	3
<i>Euploea core amymone</i>	幻紫斑蝶	Common Indian Crow	Very common	0	0	0	1
Sub-total number				76	33	67	72
Total number				248			

* 饒戈, 2004. 香港觀蝶圖鑑觀蝶地圖. 野外動向, 香港. (In Chinese).

Odonate

Uncommon species are bolded.

Scientific name	Chinese Name	Common Name	Status*	Abundance			
				2008/8/30	2008/9/17	2008/10/26	2008/11/15
<i>Brachydiplax chalybea</i>	藍額疏脈蜻	Blue Dasher	Common	0	0	1	0
<i>Coeliccia cyanomelas</i>	黃紋長腹蟴	Blue Forest Damselfly	Abundant and widespread	0	1	0	0
<i>Copera marginipes</i>	黃狹扇蟴	Yellow Featherlegs	Abundant and widespread	1	8	10	1
<i>Euphaea decorata</i>	方帶幽蟴	Black-banded Gossamerwing	Abundant and widespread	5	5	0	0
<i>Orthetrum chrysis</i>	華麗灰蜻	Red-faced Skimmer	Common and widespread	0	0	1	0
<i>Orthetrum glaucum</i>	黑尾灰蜻	Common Blue Skimmer	Abundant and widespread	17	8	22	14
<i>Orthetrum triangulare</i>	鼎異色灰蜻	Lesser Blue Skimmer	Common, widespread	1	3	1	0
<i>Pantala flavescens</i>	黃蜻	Wandering Glider	Abundant and widespread	6	193	20	8
<i>Rhinocypha perforata</i>	三斑鼻蟴	Common Blue Jewel	Abundant and widespread	2	9	6	1
<i>Tamea virginia</i>	華斜痣蜻	Saddlebag Glider	Common	0	0	3	0
<i>Trithemis aurora</i>	曉褐蜻	Crimson Dropwing	Abundant and widespread	0	2	1	1
<i>Trithemis festiva</i>	慶褐蜻	Indigo Dropwing	Abundant and widespread	0	0	1	0
<i>Urothemis signata signata</i>	赤斑曲鈎脈蜻	Scarlet Basker	Common	0	0	1	0
<i>Zygonyx iris insignis</i>	彩虹蜻	Emerald Cascader	Abundant and widespread	0	0	1	0
Sub-total number				32	229	68	25
Total number				354			

* Wilson et al. 2004. "Field Guide to the Dragonflies of Hong Kong", Second Edition. Agriculture, Fisheries and Conservation Department, Hong Kong.

Discussions

The majority of the survey transect is a paved road. It goes through shrubby and woody areas habitats, with scattered engineering slopes and residential buildings along the road.

The diversity and abundance of both reptiles and birds were low, while butterflies and odonates were of moderate diversity and abundance.

It should be noted that the dragonfly individual number was higher than other fauna groups. This was partly attributed by the record of 193 individuals of Wandering Glider in the Sep 08 survey.

There is no rare species among the recorded fauna, but 8 species are uncommon or scattered distributed in Hong Kong (see **Table 2** below for details and **Figure A4-3** for their locations), and thus considered as potentially of conservation concern.

Table 2 Uncommon Species recorded during the fauna survey

Scientific name		Common Name	Status
Reptile			
<i>Scincella modesta</i>	寧波滑蜥	Slender Forest Skink	Scattered distributed
Bird			
<i>Cettia diphone</i>	日本樹鶯	Japanese Bush Warbler	Uncommon to common
<i>Hypothymis azurea</i>	黑枕王鶇	Black-naped Monarch	Uncommon
<i>Corvus torquatus</i>	白頸鴉	Collared Crow	Uncommon
Butterfly			
<i>Borbo cinnara</i>	杉弄蝶	Formosan Swift	Uncommon
<i>Delias hyparete hierte</i>	優越斑粉蝶	Painted Jezebel	Uncommon
<i>Iraota timoleon timoleon</i>	鐵木菜異灰蝶	Silver Streak Blue	Uncommon
<i>Euthalia phemius seitzii</i>	尖翅翠蛺蝶	White-edged Blue Baron	Uncommon

Conclusion

In general, the fauna species recorded for the Project area along Ma On Shan Tsuen Road were mainly species common in Hong Kong. There were only several uncommon species, but no rare species or species of special conservation importance recorded in the area.

Annex IV:
Appendix A4-2:
Lists of Tree Species Affected by the
Proposed Works

Lists of Tree Species Affected by the Proposed Works

Tree Species	To be Transplanted	To be Felled	Total
<i>Schefflera heptaphylla</i>	15	6	21
<i>Mallotus paniculatus</i>	1	3	4
<i>Itea chinensis</i>	0	3	3
<i>Pinus massoniana</i>	1	2	3
<i>Rhus succedanea</i>	0	3	3
<i>Sterculia lanceolata</i>	1	2	3
<i>Bridelia tomentosa</i>	0	2	2
<i>Scolopia saeva</i>	2	0	2
<i>Celtis sinensis</i>	1	0	1
<i>Cinnamomum camphora</i>	1	0	1
<i>Eurya macartneyi</i>	1	0	1
<i>Macaranga tanarius</i>	1	0	1
<i>Rhus hypoleuca</i>	1	0	1
<i>Zanthoxylum avicennae</i>	1	0	1
Total	26	21	47

Annex IV:
Figures of Annex IV

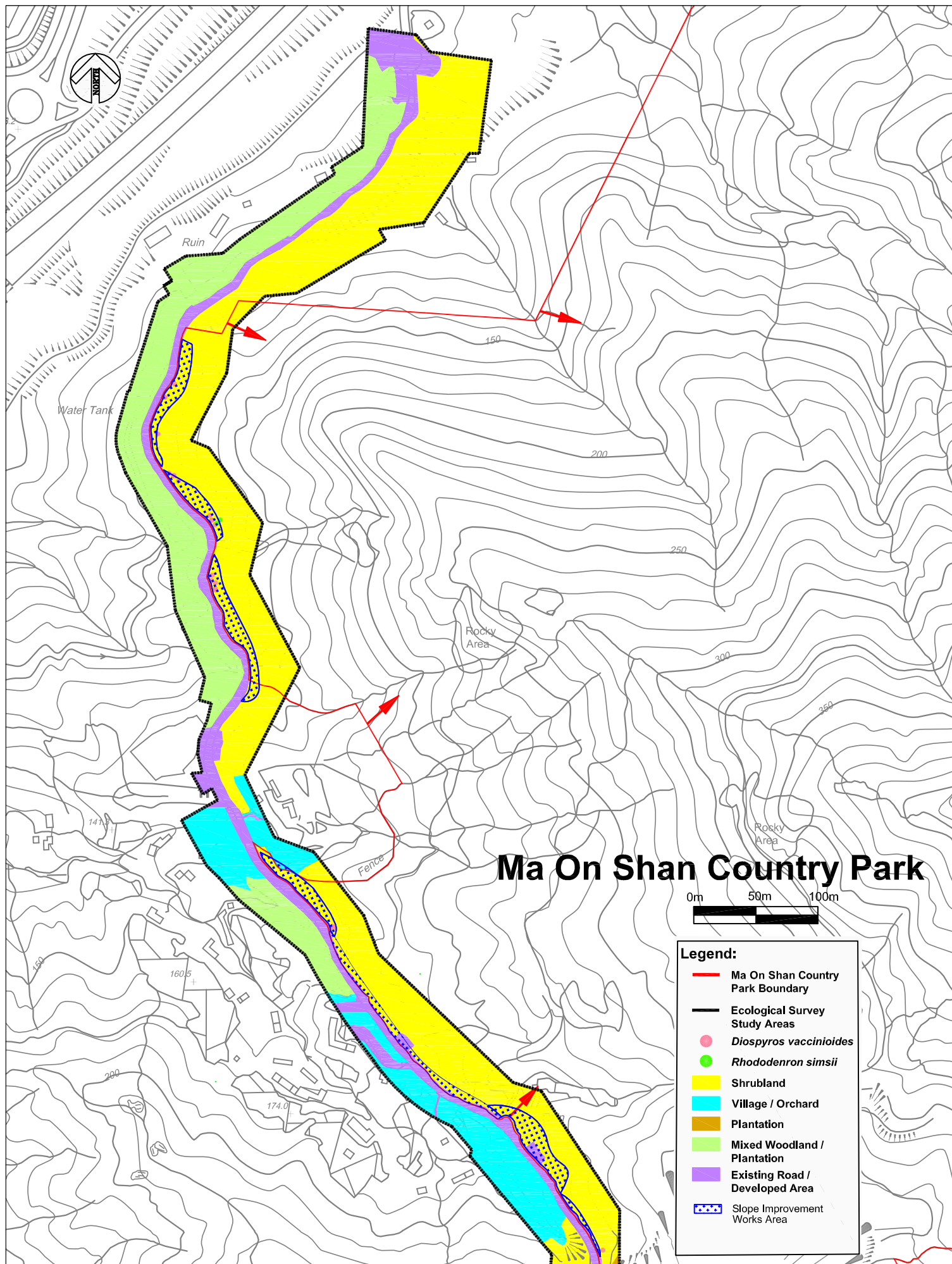


Figure: A4-1

Title: Habitat Map of Plant Species Distributions within Ma On Shan Country Park - Northern Half of the Ecological Survey Study Area

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.3

Date: July 2009

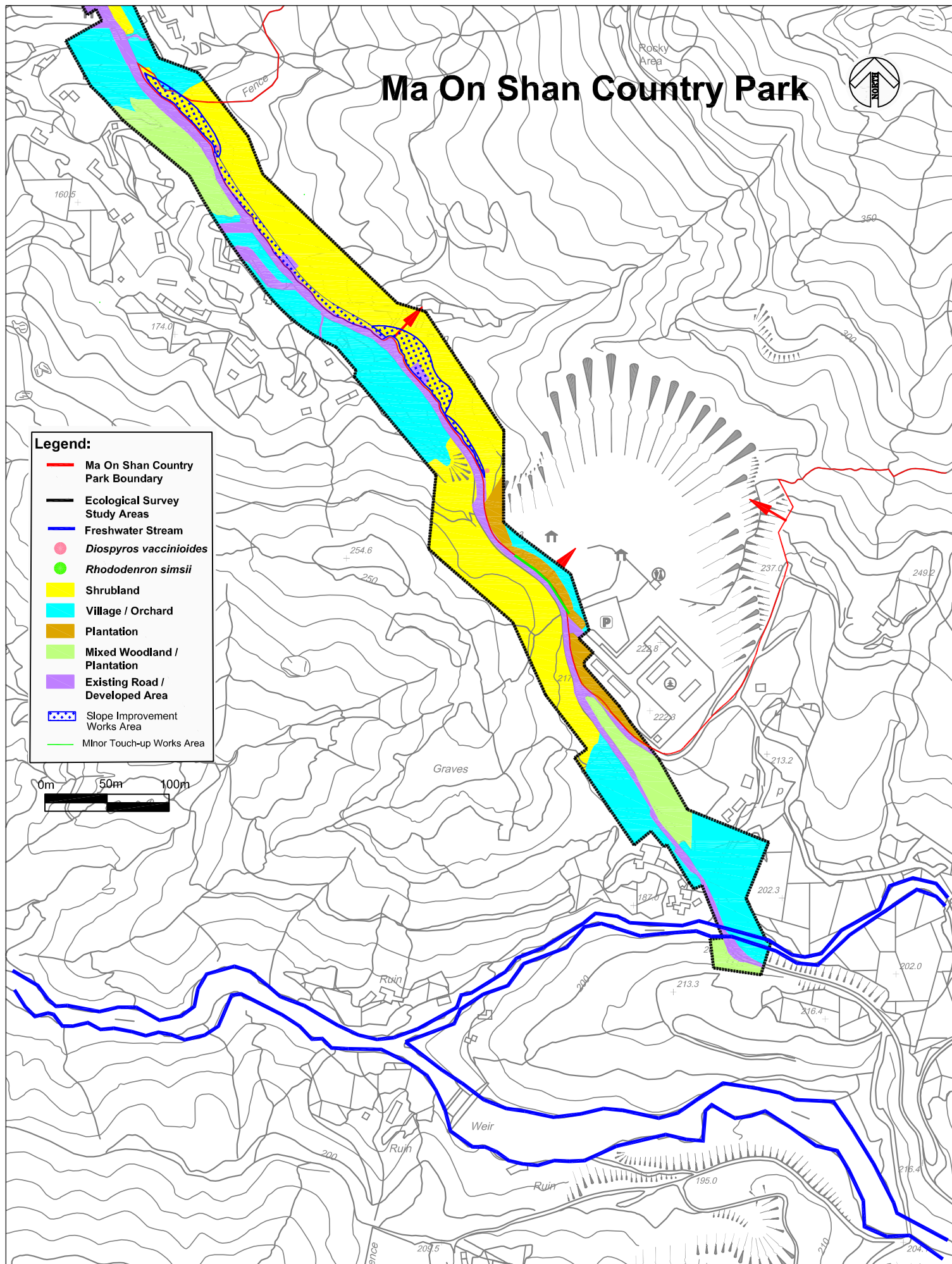


Figure: A4-2

Title: Habitat Map of Plant Species Distributions within Ma On Shan Country Park - Southern Half of the Ecological Survey Study Area

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.3

Date: July 2009

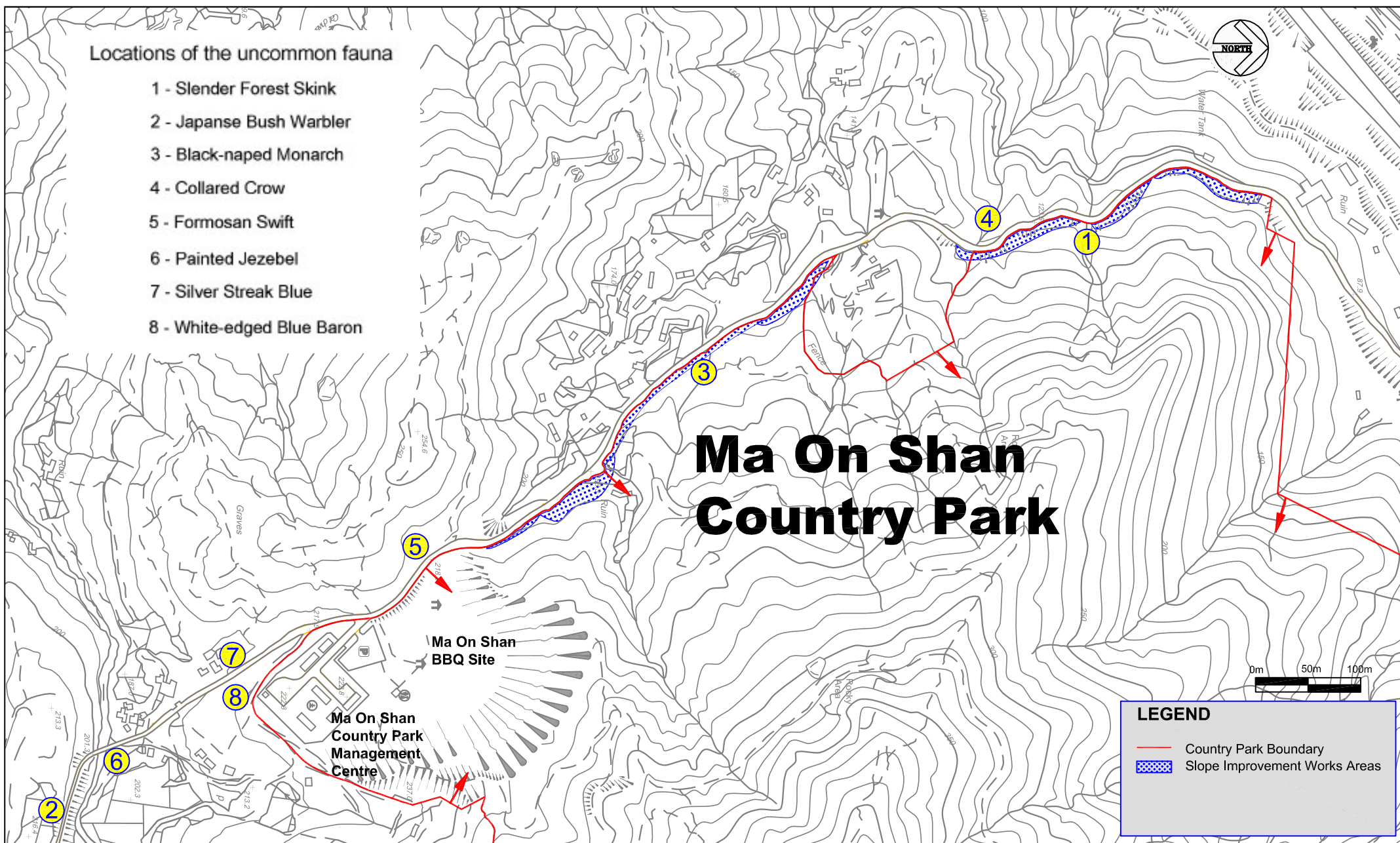


Figure: A4-3

Title: Locations of Uncommon Fauna Recorded in the Fauna Survey

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

Drawn by: SLam

Checked by: TC

Rev.: 1.1

Date: July 2009

Annex V: **Calculations of Construction Noise Impacts**

Sound Power Levels of the Powered Mechanical Equipment Employed in the Slope Improvement Works

Powered Mechanical Equipment	ID Code	Qty.	SWL dB(A)	Utilisation	Total SWL dB(A)
Piling and Excavation for Construction of Retaining Wall					
Piling, diaphragm wall, hydraulic extractor	CNP 163	1	90	80%	89
Crane lorry	BS C7-101	1	94	80%	93
Power generator	CNP 103	1	95	100%	95
Excavator	BS C8-15	1	103	90%	103
Concrete Pump	CNP 054	1	109	90%	109
				Sub-total	110
Backfilling for Construction of Retaining Wall					
Dump truck	BS C9-39	1	103	90%	103
Excavator	BS C8-15	1	103	100%	103
				Sub-total	106
Paving Works for Construction of Retaining Wall					
Dump truck	BS C9-39	1	103	90%	103
Power generator	CNP 103	1	95	100%	95
Pump	CNP 283	1	85	100%	85
				Sub-total	103
Drilling and Installation of Soil Nail					
Drill	CNP 064	1	103	90%	103
Generator	CNP 103	1	95	100%	95
Compressor	CNP 002	1	102	100%	102
				Sub-total	106
Grouting of Soil Nail					
Compressor	CNP 002	1	100	100%	100
Generator	CNP 103	1	102	100%	102
Concrete pump	CNP 054	1	109	100%	109
				Sub-total	110
Construction of Soil Nail Head					
Compressor	CNP 002	1	100	100%	100
Generator	CNP 103	1	102	100%	102
Concrete pump	CNP 054	1	109	100%	109
				Sub-total	110

Predicted Construction Noise Levels at the Selected NSRs for the Slope Improvement Works

NSR	Distance (m)	Activities	SWL dB(A)	Distance Correction dB(A)	Façade Correction dB(A)	Barrier Correction dB(A)	Predicted Noise Level dB(A)
1	Construction of Retaining wall						
	680	Piling and Excavation	110	-65	3	0	48
		Backfilling	106	-65	3	0	44
		Paving Works	103	-65	3	0	42
	Soil Nailing						
	360	Drilling and Installation of Soil Nail	106	-59	3	0	50
		Grounting of Soil Nail	110	-59	3	0	54
		Construction of Soil Nail Head	110	-59	3	0	54
2	Construction of Retaining wall						
	22	Piling and Excavation	110	-35	3	-10	68
		Backfilling	106	-35	3	-10	64
		Paving Works	103	-35	3	-10	61
	Soil Nailing						
	66	Drilling and Installation of Soil Nail	106	-44	3	-10	54
		Grounting of Soil Nail	110	-44	3	-10	59
		Construction of Soil Nail Head	110	-44	3	-10	59

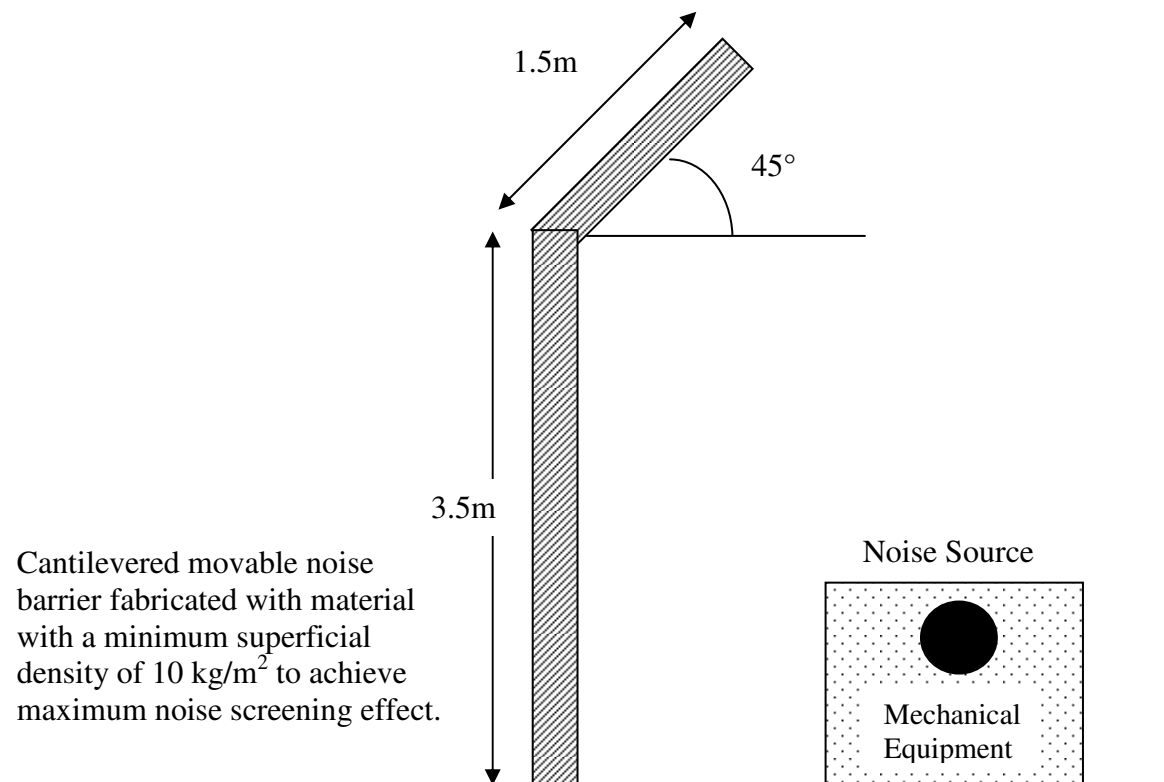


Figure: Annex V	<u>ENVIRON</u>
Title: Typical Section of Movable Noise Barrier	Drawn by: SLam
	Checked by: TC
Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park	Rev.: 1.2
	Date: July 2009

Annex VI:
**Standard Good Site Practice Measures to
Minimise Impact within Country Park**

Standard Good Site Practice Measures to Minimize Impact within Country Park

- The proposed project sites in the proximity of the surrounding habitats should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props, to prevent adverse impacts on these areas. Other protective measures should also be taken to ensure that no pollution or siltation occurs to the water gathering grounds of the works sites;
- Temporary access to the work sites should be carefully planned and located to minimize disturbance caused to the surrounding habitats;
- Temporary sewage system should be installed to collect wastewater and prevent it from entering the surrounding habitats;
- Proper locations well away from the surrounding habitats for temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction debris and spoil should be identified before commencement of the works;
- Stockpiling of construction materials, if necessary, should be properly covered and located away from the surrounding habitats;
- Construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into the surrounding habitats by rain;
- Contractors should adhere to a strict 'clean site' policy, with all construction waste transported to predetermined sites for safe disposal. Under no circumstances should there be any disposal of waste oil or other materials on site;
- Construction effluent, site runoff and sewage should be properly collected and/or treated. Wastewater from a construction site should be managed with the following approach in descending order:
 - (i) minimization of wastewater generation;
 - (ii) reuse and recycle; and
 - (iii) treatment.
- Proper locations for discharge outlets of wastewater treatment facilities should be identified;
- Adequate lateral support may need to be erected in order to prevent soil/mud from slipping into the surrounding habitats, but without unduly impeding the flow of the stream during heavy rain;
- Vehicles and other plant should be carefully maintained and properly used to minimize the chance for accidental spillage;
- Any spillages that do occur should be quickly identified and appropriately cleaned up before they can contaminate stream or groundwater;
- Supervisory staff should be assigned to station on site to closely supervise and monitor the works;
- Earth bunding of all areas on which soils have been disturbed or from which vegetation has been cleared to ensure that runoff will not move soils off-site;
- Erection of temporary geotextile silt fences around earth moving works to trap any sediments being washed away and prevent them from entering surrounding areas;
- Installation of silt traps at points where drainage from the site enters temporary sewage system;
- Covering of any exposed soil or other loose materials with tarpaulins to prevent erosion;

- Exposed soil to be covered as quickly as possible following formation works, then seeded and covered with a biodegradable geotextile blanket for erosion control purposes.
- The use of sturdy 1.8 metres protective fencing to be located at the edge of the canopy of tree proposed to be retained, if any, but not around the trunk;
- Prohibition of works beneath the tree canopy: this includes storage of materials, movement of construction vehicles and washing of equipment such as concrete mixers;
- Minimize disturbance to surrounding areas by careful selection of site entrance, storage area and works areas;
- Construction works should be restricted to works areas which are clearly defined;
- Areas that would be affected by the construction works should be well-defined and minimized;
- Avoid human inference to areas beyond the site boundary and areas proposed to be retained by providing temporary barricades;
- Works areas should be reinstated immediately after completion of the works;
- Waste and other garbage generated during the slope improvement works should be dumped properly;
- Carry out regular environmental audit to ensure that the proposed mitigation measures (e.g. site drainage and proper waste disposal) are effective;
- Uncontrolled fire should be strictly prohibited. Appropriate fire control measures should be provided in order to protect nearby habitats;
- The contractor shall be required to comply with the safety fence, lighting, signing and guarding specifications in accordance with the current statutory requirement and standard guidelines; and
- Site safety supervision plan shall be submitted to the Buildings Department for approval before the commencement of works. Technically Competent Persons (TCPs) shall supervise the site safety during the construction stage of the Project.

Annex VII: **Landscape Planting Proposal for the Project**

Annex VII - Landscape Planting Proposal for the Project

Existing Slope to be Added with Soil Nails – Although no existing trees will be affected, existing shrubs on those slopes to be stabilized with soil nails will be disturbed or damaged during the construction. These slopes shall be reinstated with hydroseeding and woodland mix comprised of trees and shrubs, which will be spaced to avoid the soil nail heads.

Proposed Woodland Mix on Slope to be Soil Nailed			
Trees species	Size	Spacing	Qty.
<i>Celtis sinensis</i>	"Whips"	3000mm	25%
<i>Cinnamomum camphora</i>	"Whips"	3000mm	25%
<i>Rhus succedanea</i>	"Whips"	3000mm	25%
<i>Schefflera heptaphylla</i>	"Whips"	3000mm	25%
Total		Approx. 1400 nos.	

Proposed Woodland Mix on Slope to be Soil Nailed			
[' Continue]			
Shrubs species	Size	Spacing	Qty.
<i>Gordonia axillaries</i>	Min. 800mm (H) x 600mm (W)	1000mm	40%
<i>Melastoma sanguineum</i>	Min. 800mm (H) x 600mm (W)	1000mm	40%
<i>Rhaphiolepis indica</i>	Min. 800mm (H) x 600mm (W)	1000mm	20%

Existing Slope with Proposed Retaining Structure Works – 21 nos. of common trees at the proposed retaining structure works area would need to be felled. Heavy standard trees in native species will be planted at designated locations to compensate the felled trees. The compensatory ratio will not be less than 1:1 in terms of quality and quantity, that is, the total numbers and the aggregated girth size of the compensatory trees would not be less than that of the trees to be felled. The species and size of the proposed compensatory trees are as follows:

Proposed Compensatory Trees		
Trees species	Size (m)	Spacing
<i>Sapium sebiferum</i>	Girth: 0.30 – 0.35 Height: 4.5 – 5.0	3000mm – 3500mm
<i>Schefflera heptaphylla</i>	Girth: 0.30 – 0.35 Height: 4.5 – 5.0	3000mm – 3500mm
<i>Sterculia lanceolata</i>	Girth: 0.30 – 0.35 Height: 4.5 – 5.0	3000mm – 3500mm

Annex VIII:
**Overall Environmental Assessment for
Ma On Shan Tsuen Road Upgrading Works**

A8.1 Development on the Proposed Road Alignment

In considering the proposed alignment of the Ma On Shan Tsuen Road, one of the main consideration is minimizing the disturbance onto the nearby areas, including the MOS CP as this road is located just next to the MOS CP.

In the planning application for the “residential development with public recreational facilities and visitor centre” (case number A/MOS/21) approved in 1997, the proposal of the Ma On Shan Tsuen Road upgrading works has demonstrated that upgrading of the existing Ma On Shan Tsuen Road will have much less impacts on the environment than construction of a new access road. Therefore, the proposal on the upgrading works for the Ma On Shan Tsuen Road was firstly approved in 1997. It must be noted that in this approved planning application, it has been identified that slope improvement works would be required. However, it was not identified that there would be works within country park.

Subsequently, when developing the proposed Ma On Shan Tsuen Road upgrading works under the planning application (case number A/MOS/65) which was approved in December 2005, the project proponent proactively modified the proposed alignment in a further environmentally friendly aspect after considering the existing topographical condition, advice from existing Ma On Shan Tsuen villagers and the statutory highway requirement as well as minimizing the impact on the MOS CP.

A8.2 Existing Constraint

In general, the proposed road upgrading works are to be carried out along the western side of the road so as to minimize the potential impact on the MOS CP to the east. However, as shown in **Figure A8-2**, there are a number of existing village house lots and their ingress and egress located just immediate west of the road. In order to minimize the disturbance onto them as well as to follow the Transport Planning Design Manual (TPDM) standard as much as possible, some works on the existing slope along the eastern side of the road will be inevitably encroached into the boundary of the MOS CP which its boundary is immediate next to the Ma On Shan Tsuen Road. Therefore, this scheme has been understood to be the most preferable design scenario with balancing the disturbance on the MOS CP and that on the existing villagers.

A8.3 Use of retaining structure to minimize the disturbance

Disturbance on the MOS CP shall be minimized by selecting appropriate construction method. As the conventional cut and fill method will require disturbing large area and involving extensive felling of trees and excavation, soil nailing and construction of retaining structures are used where practicable. Construction of retaining structure can limit the disturbance area close to the structure only, so as to minimize the potential disturbance on the MOS CP.

According to a Rural & New Town Planning Committee (RNTPC) Paper for the further consideration of the planning application (case number A/MOS/65) in December 2005, the Agricultural, Fisheries and Conservation Department (AFCD) had been consulted on the planning application and agreed that there is no better alternatives than the currently proposed scheme in order to further minimize the impacts.

A8.4 Minor Touch-up works close to Ma On Shan Country Park Picnic

Area

The requirements stipulated in the Transport Planning Design Manual's (TPDM) are followed as far as possible, in particular on the safety issues, such as curvature, slight line restriction and gradient. Therefore, the road level of the proposed upgraded road may be higher or lower than that of its existing level.

For the road section close to the MOS CP picnic area, the future ground level of the proposed upgraded road is likely to be slightly higher or lower than about that of the slope immediate east of the road as well as the ingress and egress of the car park next to the MOS CP picnic area. It must be noted that this slope falls within the MOS Country Park Boundary. In order to minimize the potential impact upon the Country Park, minor resurfacing work of the slope has been proposed.

A8.5 Finalization of the Proposed Road Upgrading Alignment

Among the Ma On Shan Tsuen Road alignment works, the proposed improvement works for the road is to improve it to follow the existing requirement stipulated in the TPDM standard as much as possible; but the following information has also been considered during determining the proposed road alignment.

- 1) Area of existing structure or village houses to be affected;
- 2) Connection to the existing ingress or egress points to be affected; and
- 3) Minimization of the number of existing trees and landscape to be affected.

Moreover, in accordance with Table 3.4.11.1 of TPDM Volume 2, the minimum width of footpath in rural areas shall be 2 m to cater for very low pedestrian flow. Clause 3.4.11.7 further states that it is preferable to incorporate a 1.5 m wide verge to separate the footpath from the edge of carriageway. In view of the proposed street furniture (e.g. lighting poles) and possible tree planting along Ma On Shan Tsuen Road, a minimum provision of 0.5 m wide of verge is recommended for the sake of safety and amenity needs. It is not desirable to reduce the footpath width to below 2.5 m for the purpose of achieving balance between a proper road design and the disturbances on the MOS CP.

Table 1 at below shows the information of the proposed road upgrading works.

Table 1 Information of the Proposed Road Upgrading Works

Parameters	Upgraded Road
Width	Widened to be 6.75m with two way, two lane and to follow the safety requirement stipulated in TPDM <u>as much as possible</u>
Footpath	2.5m wide footpath along western side of the road only
Street Furniture	Provision of street lighting, road signs, drainage system and fire hydrant
Slope conditions	Safe and landscaped Slopes

A8.6 Construction Phase Equipment List

The following equipment will be employed for the road works based on the assumption that the Project will be carried out in a phased manner. This equipment list has been commented and agreed by the Project Proponent. The construction will be conducted during daytime. If night-time work is required, construction noise permit will be required, following the procedures as stipulated under the Noise Control Ordinance.

Table 2 Proposed Powered Mechanical Equipment List for the Road Upgrading Works

Powered Mechanical Equipment	ID Code	Qty
Road Excavation Works		
Excavator	BS C8-15	1
Crane lorry	BS C7-101	1
Power generator	CNP 103	1
Pump	CNP 283	1
Backfilling		
Dump truck	BS C9-39	1
Excavator	BS C8-15	1
Vibratory Roller	BS C3-115	1
Road Paving Works		
Dump truck	BS C9-39	1
Power generator	CNP 103	1
Pump	CNP 283	1
Concrete Truck Mixer	CNP 054	1
Road roller	BS C8-30	1

A8.8 Associated Environmental Impacts from the Ma On Shan Road Upgrading WorksConstruction Phase**A8.8.1 Ecological Impact**

Potential direct impacts during the construction phase would include the loss of small areas of habitat adjacent to the existing access road due to road upgrading. It is estimated that approximately 1.48ha of existing roadside habitat (comprising 0.37ha village orchard,

0.46ha plantation/ mixed woodland and 0.65ha shrubland) will be affected due to the road upgrading and the associated slope improvement works. A recent tree survey conducted for the Project indicated that a total of 184 number of plant species were recorded along Ma On Shan Tsuen Road. The details of the plant species were presented in *Appendix A8-1*. Of the approximately 4000 trees recorded within the gazette road works boundary, only 758 trees would be directly affected by the road upgrading and the associated slope improvement works with the additional roadwork of the provision of a roundabout for the proposed residential development at the south of Ma On Shan Tsuen. The below table shows the comparison of the number of affected trees from the recent survey with and without the additional roadwork.

Table 3 Comparison of Number of Affected Trees

Tree Transplanting and Felling	Quantity	
	Without additional roadwork	With additional roadwork
Number of existing trees to be transplanted	213	258
Number of existing trees to be felled	459	500
Total trees to be affected	672	758

Of the approximate 758 trees directly affected by the road works, it is recommended that 258 trees of good form and condition would be transplanted. Any unavoidable felling of trees would be compensated through extensive tree planting. It was proposed that 500 standard and heavy standard trees would be planted alongside the upgraded Ma On Shan Tsuen Road to compensate for the expected felling of 500 trees. Additionally, slopes affected by soil nailing would be planted with a mix of tree whips (approximately 3000 nos.) and shrubs. Compensatory planting would make use of native species with flowers/fruit attractive to wildlife.

The majority of affected trees are common species (e.g., *Sterculia lanceolata*, *Leucaena leucocephala*, *Macaranga tanarius*, *Mallotus paniculatus* and *Schefflera heptaphylla*) of small size (over 60% of the affected trees are less than 0.5m in firth, and only 6% are over 1m in girth) and fair health/ form only.

Several individuals of the plant species of conservation importance *D. vaccinioides* and *R. simsii* were recorded uphill of the existing access road alignment. Based on the preliminary layout of the proposed access road upgrading, individuals of these species are mostly located on slopes that would be stabilized through soil-nailing. The location of the soil-nails would be 'fine-tuned' as far as practicable to avoid *D. vaccinioides* and *R. simsii* plants, and therefore no direct impacts to these plant species of conservation importance are expected.

Potential indirect impacts during the construction phase of the road upgrading works would include disturbance impacts to wildlife in areas adjacent to the site resulting from noise-generating construction activities and potential impacts to vegetation due to dust deposition. These impacts are generally considered minor in scale as the affected habitats are not of high ecological value, and the impacts can be effectively controlled through implementation of standard good site practices.

The ecological impacts during the construction phase are therefore considered minimum in scale given the small area and relatively low ecological value of the habitats affected.

A8.8.2 Fugitive Dust Impact

Only minor concreting work is anticipated but no major site formation works or substantial excavation works will be carried out during the road upgrading works of the Project. Once the road upgrading works are completed, there will not be any air quality pollution sources and hence there is no air quality impact during the operational phase.

A8.8.3 Construction Noise Impact

Construction noise impact due to the use of powered mechanical equipment is limited because of the small works area and implementation of proper control measures, such as proper scheduling of the equipment, the selection of silenced mechanical powered equipment and adoption of noise protective measures. Precautionary control measure in terms of provision of movable noise barriers at the noise sources would be adopted so as to minimize the temporary construction noise impact to the village house along Ma On Shan Tsuen Road. Summary of construction noise impact assessment due to the Project is shown in **Table 4** below. Details of the calculation of the construction noise impact for the road upgrading works are shown in *Appendix A8-2*. According to the assessment results, the representative noise sensitive receivers are unlikely to subject to unacceptable temporary construction noise impact due to the road upgrading works.

Table 4 Predicted Construction Noise Level at Representative NSRs at various Construction Phases

NSR	Construction Activities	Distance from the Works Areas (m)	Predicted Noise Level, dB(A)	Criteria of Noise Level, dB(A)
1	Road Works			
	Road Excavation	356	48	75
	Backfilling	356	51	75
	Paving Works	356	50	75
2	Road Works			
	Road Excavation	19	63	75
	Backfilling	19	66	75
	Paving Works	19	65	75

A8.8.4 Surface Run Off Impact

The potential water quality impacts from surface run-off generated from the road upgrading works are expected to be insignificant with good site management practices implemented throughout the construction phase of the project.

A8.8.5 Waste Management

Construction and demolition (C&D) materials will be generated from the excavation works. General refuse, construction chemical waste (e.g. oil and lubricant) and C&D materials are expected and will be handled and disposed of in accordance with the Government

procedures. C&D materials will be reused for backfilling wherever engineering possible, and only surplus materials shall be disposed off-site.

A8.8.6 Cultural Heritage Impact

It has been checked with the Antiques and Monuments Office that the construction site does not fall within the sites of any cultural heritage. No cultural heritage impact is expected.

A8.8.7 Landscape and Visual Impact

Landscape and visual impacts during the construction phase would be moderate and temporary only. The temporary works areas for the road would only occupy the adjacent road areas and the immediate slope areas. There would only be a temporary loss of greenery, affecting the users from adjacent high-rises. Due to low transplantation rate of some species, some trees were proposed to be felled for the road works. However, with the comprehensive landscape treatment (e.g. transplanting) together with perimeter planting, the visual impact of the proposed works could be effectively minimized. The plan was presented and supported by the Town Planning Board in December 2005. In addition, the Country and Marine Parks Authority has no objection on the proposal in the meeting held at April 2007.

The figures (**Figure A8-3** and **Figure A8-4**) illustrate the landscape and visual mitigation plans and views of passers-by along the Ma On Shan Tsuen Road after completion of the proposed road upgrading works as described in the main text of this report. They reveal that there would be no visual impact to visitors of the MOS CP and that to the passers-by along the Road would be insignificant.

For the compensatory planting, approximate 500 nos. of new trees are proposed to be planted along the sides of the upgraded roads. Rhododendron species are proposed to enhance the greenery along the roadside of the upgraded roads. The landscape planting proposal for the road upgrading works is shown in *Appendix A8-3*.

Operational Phase Impact

A8.8.8 Ecological Impact

No direct ecological impacts to habitats are expected during the operation phase of the upgraded Ma On Shan Tsuen Road.

A8.8.9 Noise, Air Quality and Water Quality

The upgraded road would be a local rural road mainly utilized by the visitors to the MOS CP and the residents of scatter village houses along the Ma On Shan Tsuen Road, such as villagers of the Ma On Shan Tsuen and the residents of the approved low-rise and low density residential development, hence the traffic flow would be very limited. It is therefore unlikely to cause any increase in noise and air disturbance over the current situation.

No direct water quality impact is also expected due to its operation.

A8.8.10 Landscape and Visual Impact

Landscape and visual impacts during the operation phase of the upgraded road will be low. Although no existing trees at the slopes will be affected, some existing scrubs on those affected slopes will be disturbed or damaged during the construction. It is proposed those affected slopes shall be reinstated with hydroseeding and woodland mix comprised of trees and shrubs, which will be spaced to avoid the soil nail heads. The proposed landscape reinstatement has been presented and supported by the Town Planning Board.

Annex VIII:
Appendix A8-1:
Details of Plant Species Recorded along
Ma On Shan Tsuen Road

Appendix A8-1 – Plant Species Recorded Adjacent to the Existing Ma On Shan Tsuen Road (recorded between 2004 to 2008)

(Code for Abundance: ****=abundant; ***=frequent; **=occasional; *=scarce)

Plant Species	Growth Form	Status in Hong Kong	Relative Abundance
<i>Acacia confusa</i>	tree	exotic, common	****
<i>Acronychia pedunculata</i>	tree	common	*
<i>Adiantum flabellulatum</i>	herb	common	*
<i>Adiantum malesiamum</i>	herb	common	*
<i>Adinandra millettii</i>	shrub or small tree	common	*
<i>Alangium chinense</i>	shrub	common	*
<i>Alchornea trewioides</i>	shrub	common	*
<i>Alocasia macrorrhiza</i>	perennial herb	common	***
<i>Alpinia galanga</i>	herb	common	*
<i>Alyxia sinensis</i>	climber	common	*
<i>Antirhea chinensis</i>	tree	very common	**
<i>Aporosa dioca</i>	tree	common	**
<i>Aralia armata</i>	shrub	common	*
<i>Araucaria heterophylla</i>	tree	introduced, common	*
<i>Artocarpus heterophyllus</i>	tree	common	*
<i>Asparagus cochinchinensis</i>	climber	common	*
<i>Averrhoa carambola</i>	tree	introduced, common	*
<i>Bambusa</i> sp.	bamboo	common	**
<i>Baeckea frutescens</i>	herb	very common	**
<i>Bauhinia</i> spp.	tree	common	**
<i>Bauhinia blakeana</i>	tree	common	**
<i>Bauhinia glauca</i>	climber	common	*
<i>Bauhinia variegans</i>	tree	common	**
<i>Berchemia racemosa</i> (<i>Berchemia floribunda</i>)	climbing shrub	common	***
<i>Bidens pilosa</i>	herb	exotic, common	****
<i>Bischofia javanica</i>	tree	common	**
<i>Bechnum orientale</i>	herb	very common	*
<i>Blumea megacephala</i>	climber	common	*
<i>Bombax ceiba</i>	tree	common	*
<i>Borreria</i> spp.	herb	common	*
<i>Bougainvillea spectabilis</i>	climbing shrub	exotic, cultivated	*
<i>Breynia fruticosa</i>	shrub	very common	**
<i>Bridelia tomentosa</i>	tree	common	***
<i>Byttneria aspera</i>	woody climber	very common	**
<i>Calliandra haematocephala</i>	shrub	common	*
<i>Callicarpa</i> spp.	shrub	common	*
<i>Camellia japonica</i>	shrub	widely planted	**
<i>Carica papaya</i>	tree	exotic, common	*
<i>Carmona microphylla</i>	shrub	exotic, common	*
<i>Castanopsis fissa</i>	tree	common	*
<i>Catharanthus roseus</i>	herb	exotic, common	*
<i>Celastrus hindsii</i>	climber	very common	*
<i>Celtis senensis</i>	tree	very common	***
<i>Centotheca lappacea</i>	perennial herb	common	*
<i>Centella asiatica</i>	herb	very common	*
<i>Cinnamomum camphora</i>	tree	very common	*
<i>Citrus grandis</i>	tree	widely planted	*

Plant Species	Growth Form	Status in Hong Kong	Relative Abundance
<i>Clausena lansium</i>	tree	common	**
<i>Cleistocalyx operculata</i>	tree	common	*
<i>Clematis meyeniana</i>	climber	common	*
<i>Cocculus orbiculatus</i>	climber: vine	common	**
<i>Cratogeomys ligustrinum</i>	shrub	very common	**
<i>Cyclosorus parasiticus</i> (<i>Christella parasitica</i>)	herb	very common	**
<i>Dalbergia benthami</i>	climber: vine	common	**
<i>Dalbergia millettii</i>	vine	common	**
<i>Daphniphyllum calycinum</i>	shrub	common	*
<i>Delonix regia</i>	tree	exotic, common	*
<i>Dendranthema indicum</i>	herb	common	*
<i>Dendrotrophe frutescens</i>	herb	common	**
<i>Desmos chinensis</i>	woody climber	common	*
<i>Dianella ensifolia</i>	herb	very common	*
<i>Dicranopteris pedata</i> (<i>Dicranopteris dictotoma</i> ; <i>Dicranopteris linearis</i>)	climber	very common	***
<i>Dimocarpus longan</i> (<i>Euphoria longan</i>)	tree	common and widely planted, wild plant under State protection (category II)	***
<i>Diospyros vaccinioides</i>	shrub	very common, critically endangered under 2001 IUCN Red List Categories and Criteria (Version 3.1)	**
<i>Diploclisia glaucescens</i>	climber	common	**
<i>Elephantopus scaber</i>	herb	common	**
<i>Embelia laeta</i>	climber	very common	*
<i>Embelia ribes</i>	climber	common	**
<i>Emilia sonchifolia</i>	herb	exotic, common	*
<i>Eriobotrya japonica</i>	tree	cultivated	*
<i>Eucalyptus</i> spp.	tree	introduced, cultivated	**
<i>Eurya nitida</i>	shrub	common	**
<i>Ficus elastica</i>	tree	introduced, common	*
<i>Ficus fistulosa</i>	tree	common	*
<i>Ficus hirta</i>	shrub	common	**
<i>Ficus hispida</i>	tree	common	**
<i>Ficus microcarpa</i>	tree	common	*
<i>Ficus pumila</i>	climber	very common	*
<i>Ficus rumphii</i>	tree	common	*
<i>Ficus variegata</i>	shrub	common	*
<i>Ficus variolosa</i>	shrub	common	*
<i>Gardenia jasminoides</i>	shrub	common	*
<i>Glochidion lanceolarium</i>	shrub	common	*
<i>Glochidion wrightii</i>	shrub	common	*
<i>Gnetum lofuense</i>	vine	common	***
<i>Gordonia axillaris</i>	shrub	common	***
<i>Gymnema sylvestre</i>	climber	very common	*
<i>Hedychium coronarium</i>	shrub	common	*
<i>Hedyotis acutangula</i>	herb	very common	*
<i>Heterosmilax japonica</i> var. <i>gaudichaudiana</i>	climbing shrub	common	*
<i>Hibiscus rosa-sinensis</i>	shrub	exotic, common	*
<i>Hibiscus tiliaceus</i>	tree	common	*
<i>Ilex asprella</i>	shrub	very common	**

Plant Species	Growth Form	Status in Hong Kong	Relative Abundance
<i>Ipomoea cairica</i>	climber	exotic, common	**
<i>Itea chinensis</i>	shrub or small tree	common	***
<i>Lagerstroemia speciosa</i>	tree	common	*
<i>Lantana camara</i>	shrub	exotic, common	**
<i>Lemnaphyllum microphyllum</i>	herb	common	*
<i>Lepidosperma chinense</i>	herb	common	**
<i>Leucaena leucocephala</i>	tree	introduced, common	***
<i>Ligustrum sinense</i>	tree	common	****
<i>Liquidambar formosana</i>	tree	very common	*
<i>Liriope spicata</i>	herb	very common	*
<i>Litchi chinensis</i>	tree	restricted but widely planted, wild plant under State protection (category II)	*
<i>Litsea cubeba</i>	tree	common	*
<i>Litsea glutinosa</i>	shrub	very common	**
<i>Litsea rotundifolia</i>	shrub	very common	***
<i>Lophatherum gracile</i>	herb	common	*
<i>Lygodium japonicum</i>	climber	very common	**
<i>Macaranga tanarius</i>	tree	very common	***
<i>Machilus chekiangensis</i>	tree	common	*
<i>Machilus thunbergii</i>	tree	common	*
<i>Maesa perlaris</i>	climber: vine	common	**
<i>Mallotus paniculatus</i>	tree	very common	***
<i>Mangifera indica</i>	tree	introduced, common	*
<i>Melaleuca quinquenervia</i>	tree	exotic, common	*
<i>Melastoma sanguineum</i>	shrub	common	**
<i>Melia azedarach</i>	tree	introduced, common	*
<i>Merremia umbellata</i>	twining vine	common	*
<i>Microcos paniculatus</i>	tree	common	*
<i>Mikania micrantha</i>	climber	exotic, common	**
<i>Millettia</i> spp.	climber	common	**
<i>Millettia nitida</i>	climbing shrub	very common	*
<i>Miscanthus floridulus</i>	perennial herb	common	**
<i>Morinda umbrellata</i>	shrub	common	*
<i>Morus alba</i>	tree	introduced, common	*
<i>Murraya exotica</i>	shrub	exotic, common	*
<i>Musa paradisiacal</i>	shrub	exotic, common	**
<i>Mussaenda pubescens</i>	climber	very common	*
<i>Mussaenda erosa</i>	climbing shrub	common	*
<i>Oxalis corniculata</i>	herb	exotic, common	**
<i>Oxalis corymbosa</i>	herb	exotic, common	**
<i>Paederia scandens</i>	climber	very common	**
<i>Palhinhaea cernua</i> (<i>Lycopodium cernuum</i>)	creeping herb	very common	*
<i>Pandanus forceps</i>	shrub or small tree	common	*
<i>Pentaphylax euryoides</i>	tree	common	*
<i>Phyllanthus cochinchinensis</i>	shrub	very common	**
<i>Phyllanthus emblica</i>	shrub	very common	*
<i>Pinus massoniana</i>	tree	common	***
<i>Podocarpus macrophyllus</i>	shrub	fairly common	*
<i>Polygonum chinense</i>	herb	very common	**
<i>Prunus persica</i>	tree	common	*
<i>Prunus salicina</i>	tree	exotic, common	*

Plant Species	Growth Form	Status in Hong Kong	Relative Abundance
<i>Psidium guajava</i>	tree	common	*
<i>Psychotria serpens</i>	semi-woody climber	very common	*
<i>Pteris semipinnata</i>	herb	very common	*
<i>Pueraria phaseoloides</i>	climber	very common	*
<i>Pueraria lobata</i> var. <i>montana</i>	climber	common	*
<i>Rhaphiolepis indica</i>	shrub	common	****
<i>Rhaphidophora hongkongensis</i>	climbing shrub	common	*
<i>Rhododendron simsii</i>	shrub	very common, protected under Cap. 96	*
<i>Rhodomyrtus tomentosa</i>	shrub	very common	**
<i>Rhus succedanea</i>	tree	very common	***
<i>Roystonea regia</i>	tree	widely planted	*
<i>Rubus reflexus</i>	climber	very common	**
<i>Sageretia theezans</i>	shrub	very common	**
<i>Sapium discolor</i>	tree	very common	*
<i>Schefflera arboricola</i>	shrub	exotic, planted	*
<i>Schefflera heptaphylla</i> (<i>Schefflera octophylla</i>)	tree	very common	****
<i>Schima superba</i>	tree	common	*
<i>Scolopia saeva</i>	tree	common	*
<i>Sida</i> spp	herb	exotic, common	*
<i>Sinosideroxylon wightianum</i>	tree	common	*
<i>Smilax china</i>	climbing shrub	very common	**
<i>Smilax glabra</i>	climbing shrub	very common	*
<i>Smilax lanceifolia</i>	climbing shrub	common	*
<i>Solanum nigrum</i>	herb	exotic, common	*
<i>Solena amplexicaulis</i>	climber	very common	*
<i>Spathodea campanulata</i>	tree	exotic	*
<i>Stenoloma chusanum</i>	herb	common	**
<i>Sterculia lanceolata</i>	shrub	very common	***
<i>Symplocos lancifolia</i>	tree	common	**
<i>Syngonium podophyllum</i>	climber	exotic, common	*
<i>Syzygium jambos</i>	tree	introduced, common	*
<i>Tecoma capensis</i>	shrub	exotic	**
<i>Tetracera asiatica</i>	climber	very common	***
<i>Trema tomentosa</i>	shrub	common	**
<i>Tristania conferta</i> (<i>Lophostemon confertus</i>)	tree	exotic, common	**
<i>Turpinia montana</i>	tree	common	*
<i>Tylophora ovata</i>	woody vine	common	*
<i>Uvaria marcophylla</i>	vine	common	*
<i>Wedelia trilobata</i>	herb	introduced, common	****
<i>Zanthoxylum avicennae</i>	shrub	common	***
<i>Zanthoxylum scandens</i>	climbing shrub	common	*

Annex VIII:
Appendix A8-2:
Calculations of Construction Noise
Impacts for the Proposed Road
Upgrading Works

Sound Power Levels of the Powered Mechanical Equipment Employed in the Road Upgrading Works

Powered Mechanical Equipment	ID Code	Qty.	SWL dB(A)	Utilisation	Total SWL dB(A)
Road Excavation Works					
Excavator	BS C8-15	1	103	90%	103
Crane lorry	BS C7-101	1	94	80%	93
Power generator	CNP 103	1	95	90%	95
Pump	CNP 283	1	85	90%	85
				Sub-total	104
Road Backfilling					
Lorry	BS C9-39	1	103	80%	102
Excavator	BS C8-15	1	103	90%	103
Vibratory roller	BS C3-115	1	102	90%	102
				Sub-total	107
Road Paving Works					
Lorry	BS C9-39	1	103	80%	102
Power generator	CNP 103	1	95	100%	95
Pump	CNP 283	1	85	100%	85
Truck mixer	CNP 054	1	100	90%	100
Road roller	BS C8-30	1	101	90%	101
				Sub-total	106

Predicted Construction Noise Levels at the Selected NSRs for the Road Upgrading Works

NSR	Distance (m)	Activities	SWL dB(A)	Distance Correction dB(A)	Façade Correction dB(A)	Barrier Correction dB(A)	Predicted Noise Level dB(A)
1	Road Upgrading Works						
	356	Excavation Works	104	-59	3	0	48
		Backfilling	107	-59	3	0	51
		Paving Works	106	-59	3	0	50
2	Road Upgrading Works						
	19	Excavation Works	104	-34	3	-10	63
		Backfilling	107	-34	3	-10	66
		Paving Works	106	-34	3	-10	65

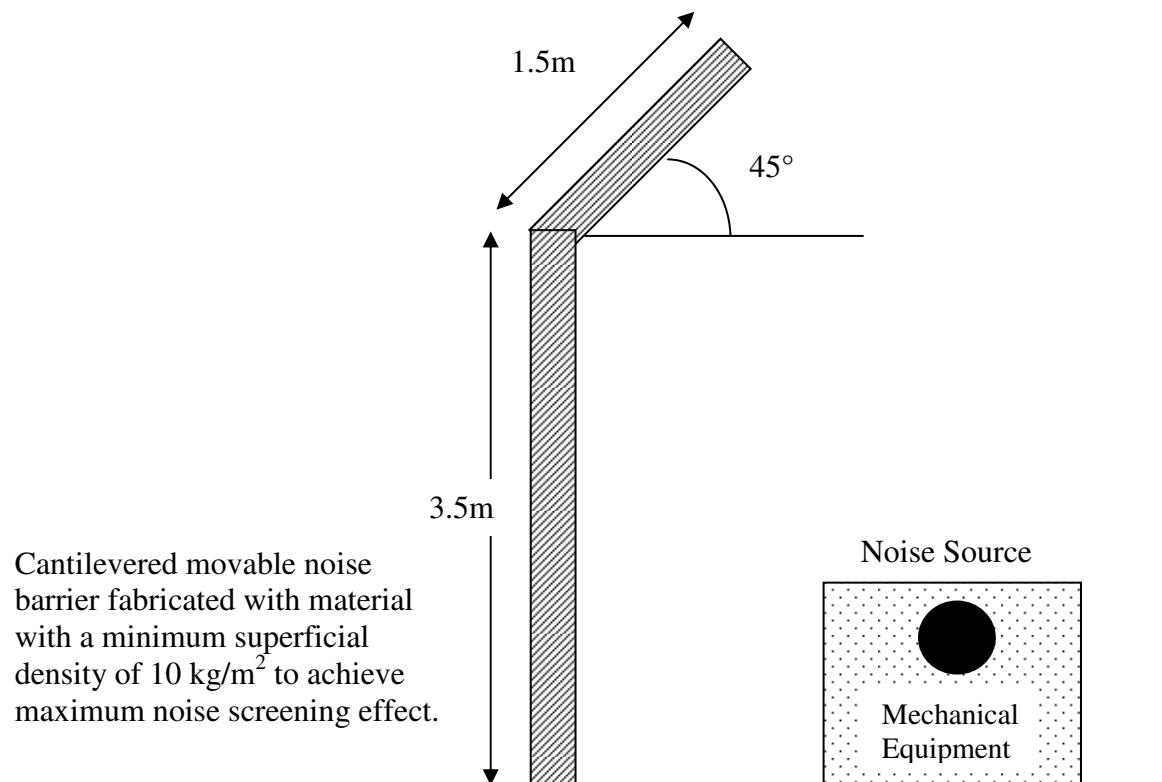


Figure: Appendix A8-2

ENVIRON

Title: Typical Section of Movable Noise Barrier

Drawn by: SLam

Checked by: TC

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

Rev.: 1.2

Date: July 2009

Annex VIII:
Appendix A8-3:
Landscape Planting Proposal for Road Upgrading
Works

Appendix A8-3 - Landscape Planting Proposal for Road Upgrading Works

Proposed Roadside Trees – A number of new trees are proposed along both sides of the upgraded Ma On Shan Tsuen Road. However, such trees will not be placed on areas with soldier-pile walls, which are intentionally proposed to retain and to minimize disturbance to existing vegetation as much as possible. While these trees shall have generally 4m spacing, they should also avoid conflicting with existing trees. Each tree will involve pit planting, which will only require digging up or disturbance to existing ground-level shrubs or wild grasses of an area approx. 1m x 1m.

Due to their proximity to the upgraded road and to ensure clearance of sightline, the trees shall be of small to medium size. They shall be of a native species that provide aesthetic value and ecological value to match the overall Ma On Shan Country Park neighborhood, as discussed with representatives from AFCD after S16 approval. Details of these trees are:

Proposed Roadside Trees					
Abb.	Tree species	Girth (m)	Height (m)	Spacing (m)	Qty.
CB	<i>Cinnamomum burmanii</i>	0.30 – 0.35	4.5 – 5.0	4.0	102
LF	<i>Liquidambar formosana</i>	0.30 – 0.35	4.5 – 5.0	4.0	96
SS	<i>Sapium sebiferum</i>	0.30 – 0.35	4.5 – 5.0	4.0	102
SH	<i>Schefflera heptaphylla</i>	0.30 – 0.35	4.5 – 5.0	4.0	100
SL	<i>Sterculia lanceolata</i>	0.30 – 0.35	4.5 – 5.0	4.0	100
				Total	500 nos.

Proposed Roadside Shrubs – *Rhododendron* species are proposed to enhance the greenery along the upgraded Ma On Shan Tsuen Road.

Proposed Roadside Shrubs				
Abb.	Species	Size	Spacing	Qty.
Rmu	<i>Rhododendron mucronatum</i>	Min. 800mm (H) x 600mm (W)	1000mm	15%
Rpu	<i>Rhododendron pulchrum</i> var. <i>phoeniceum</i>	Min. 800mm (H) x 600mm (W)	1000mm	15%
Rsi	<i>Rhododendron simsii</i>	Min. 800mm (H) x 600mm (W)	1000mm	70%

Annex VIII:
Figures of Annex VIII

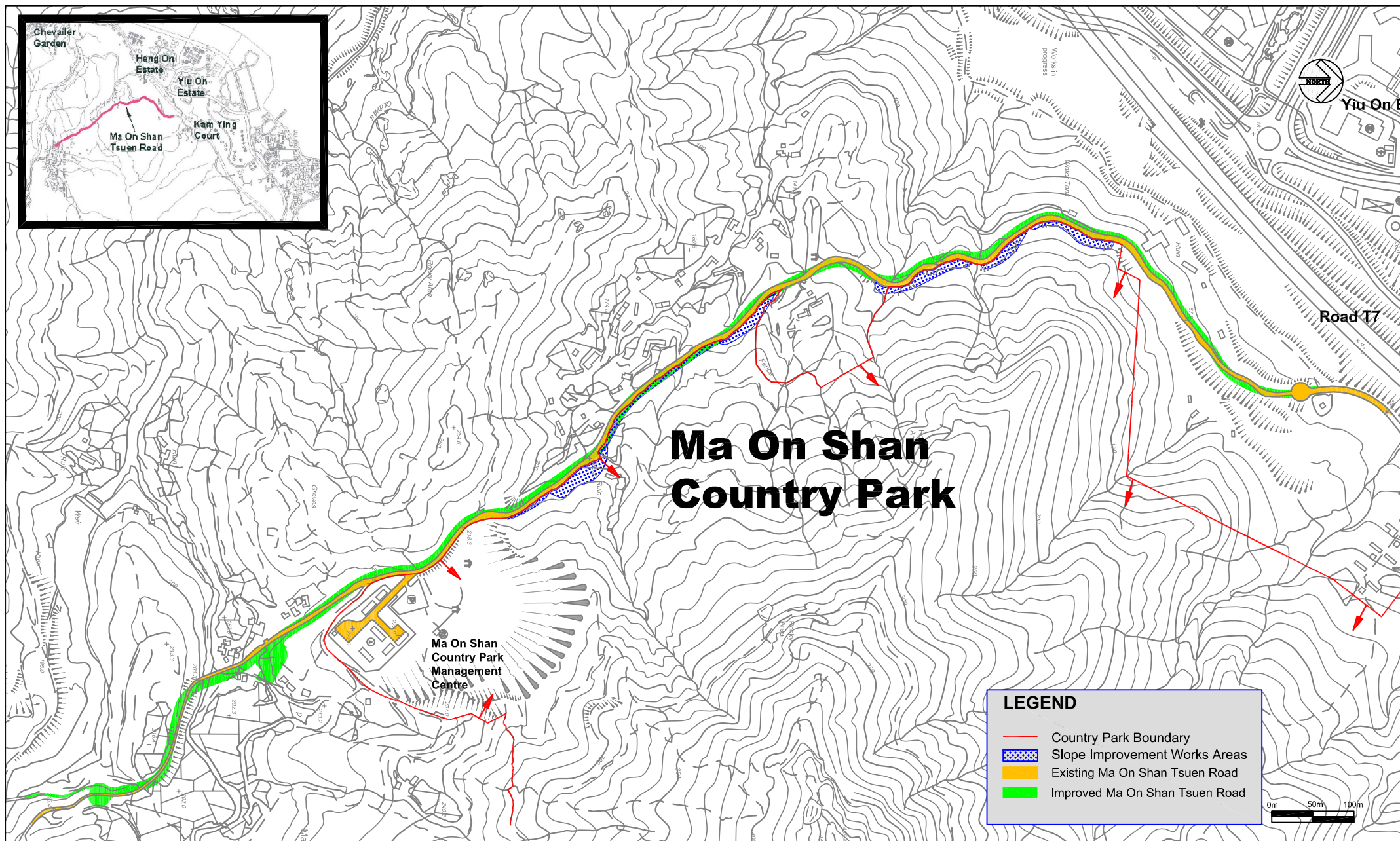


Figure: A8-1

Title: Extent of the Upgraded Ma On Shan Tsuen Road and the Associated Slope Improvement Works Areas

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

ENVIRON

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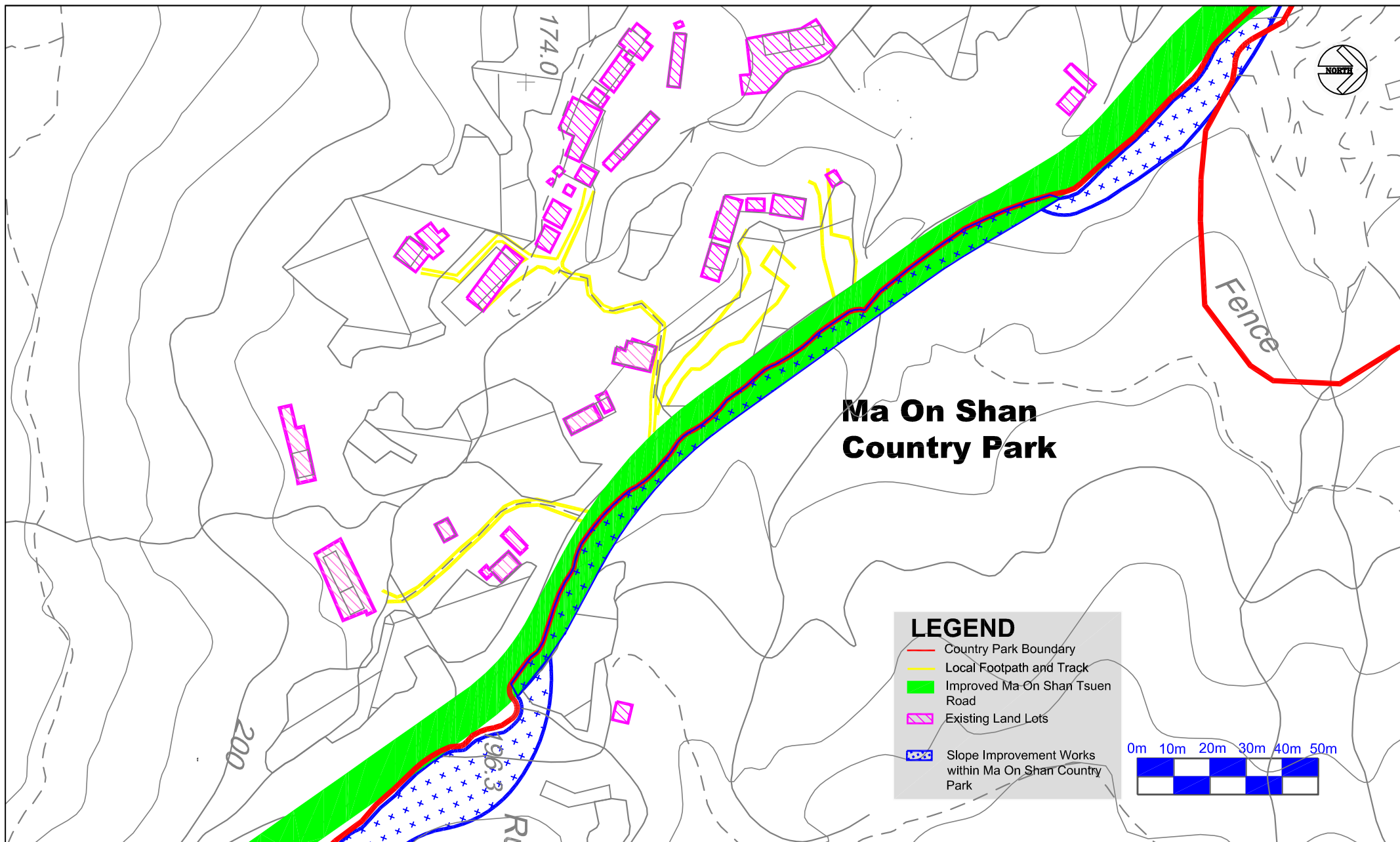
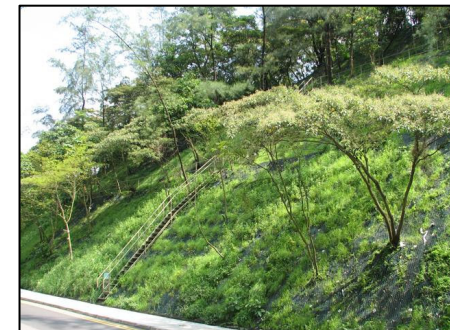
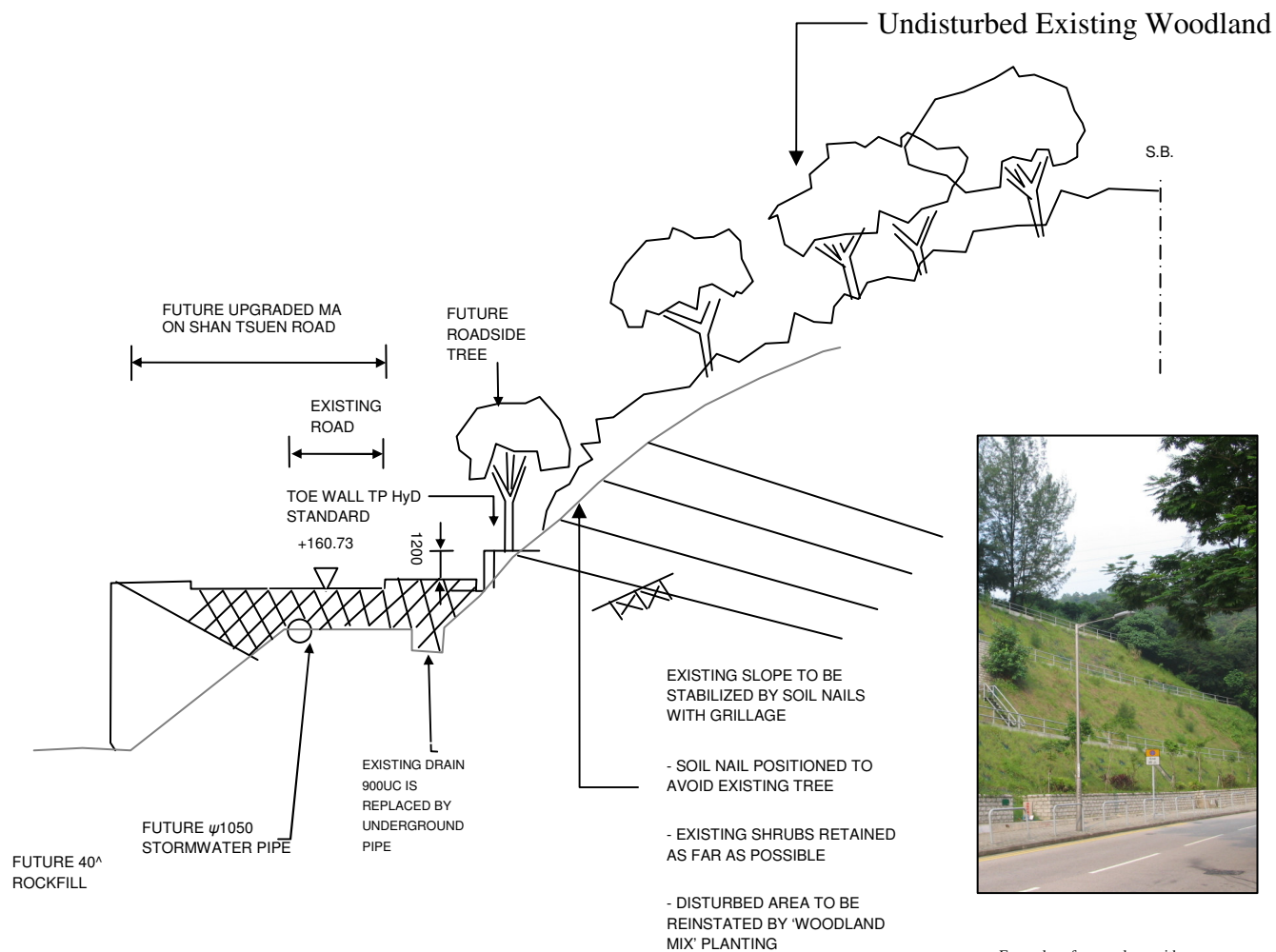


Figure: A8-2	ENVIRON
Title: Topographic Constraints on Road Upgrading Works	Drawn by: SLam
	Checked by: TC
Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park	Rev.: 1.3 Date: July 2009



Examples of green slope with soil nail installation and existing tree retained after landscape treatment

Figure: A8-3

Title: Indicative Plan on Landscapes and Visual Enhancement Measures (1)

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

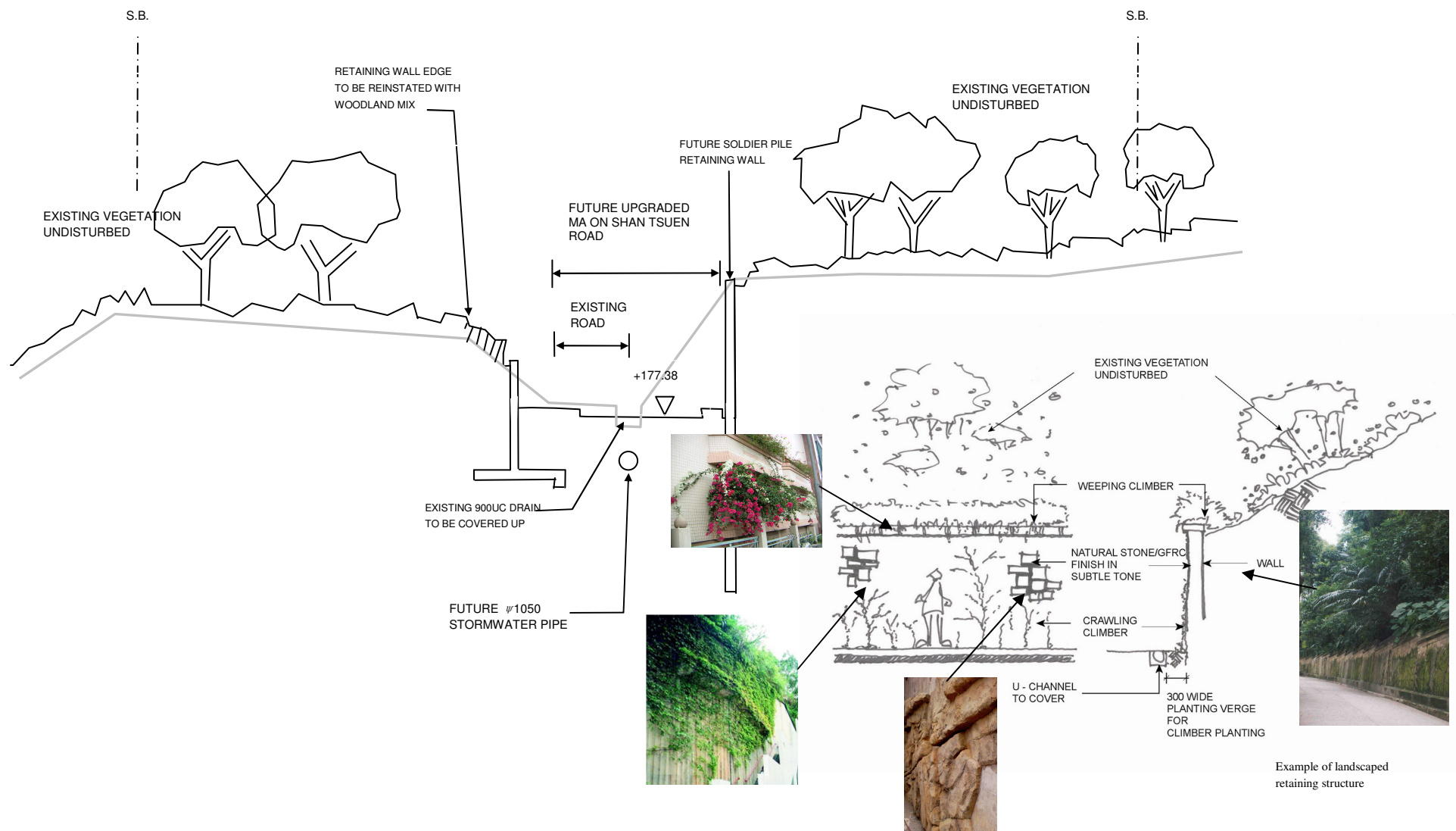
ENVIRON

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Rev.: 1.4

Date: July 2009



Example of landscaped retaining structure

Figure: A8-4

Title: Indicative Plan on Landscapes and Visual Enhancement Measures (2)

Project: Project Profile for Roadside Slope Improvement Works along Ma On Shan Tsuen Road within Ma On Shan Country Park

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Date: July 2009

Annex IX:
**Conditions for Working within Water Gathering
Grounds Required by WSD (for Minor Touch-up
Works Areas Only)**

Conditions for Working within Gathering Grounds

- (a) Adequate measures shall be taken to ensure that no pollution or siltation occurs to the gathering grounds.
- (b) No earth, building materials, fuel, oil or toxic materials and other materials, which may cause contamination to the gathering grounds, are allowed to be stockpiled or stored on site.
- (c) All surplus spoil shall be removed from gathering grounds as soon as possible.
- (d) Temporary drains with silt traps shall be constructed at the boundary of the site prior to the commencement of any earthworks.
- (e) Regular cleaning of the silt traps shall be carried out to ensure that they function properly at all time.
- (f) All excavated or filled surfaces which have the risk of erosion shall be protected from erosion at all time.
- (g) Facilities for washing the wheels of vehicles before leaving the site shall be provided.
- (h) Any construction plant, which causes pollution to the gathering grounds due to leakage of oil or fuel, shall be removed off site immediately.
- (i) Any soil contamination with fuel leaked from plant shall be removed off site and the voids arising from removal of contaminated soil shall be replaced by suitable material to the approval of the Director of Water Supplies.
- (j) Provision of temporary toilet facilities is to be subject to the approval of the Director of Water Supplies.
- (k) All waterworks access roads must be maintained unobstructed at all time.
- (l) Site formation plans shall be submitted to W.S.D. for approval prior to commencement of work.
- (m) No structure or temporary works shall be erected in the catchwaters without prior approval of W.S.D.
- (n) The Contractor shall be responsible for cleaning frequently any waterworks roads and associated drainage works of mud and debris.
- (o) The Contractor shall limit the gross weight of the vehicles imposed on the waterworks access to 5 tonnes and the axle load to 3 tonnes. He shall apply to W.S.D. with details of his vehicles for using the access.

- (p) The approval for using the access may be withdrawn on written notice to the Contractor by W.S.D. at their absolute discretion.
- (q) The Contractor shall recover immediately his vehicle which fell into the catchwater or stream bed or pay to Government on demand the cost of recovery that may be necessary through the occurrence of any incident caused by the Contractor.
- (r) The Contractor shall carry out repair or reinstatement works to the satisfaction of W.S.D. or pay to Government on demand the cost of repair and reinstatement to any waterworks installations that shall or may be necessary at any time as a result of damage caused by the Contractor or others under his charge.
- (s) The Contractor shall enter and remain on and use the access at his own risk and he shall indemnify the Government of Hong Kong from all claims, costs, damages and expense arising from the use of the access.
- (t) No excavation with depth more than 2m shall be permitted within 120m from the centerline of WSD water tunnels without the prior approval of WSD.