

Agreement No. CE 67/2001

**Agreement No. CE 67/2001
Design and Construction Assignment for
Landslide Mitigation Works
Against Natural Terrain Hazards in
Tung Wan and Sha Tin Heights**

**Landscape and Visual Mitigation Proposal
for Natural Terrain Hazard Mitigation Works at Tung Wan**

Deliverable No. TWSH08BF

**Agreement No. CE 67/2001
Design and Construction Assignment for
Landslide Mitigation Works
Against Natural Terrain Hazards in
Tung Wan and Sha Tin Heights**

**Landscape and Visual Mitigation Proposal for
Natural Terrain Hazard Mitigation Works at Tung Wan**

CONTENTS

- 1 INTRODUCTION
- 2 PROPOSED LANDSCAPE AND VISUAL MITIGATION WORKS
 - 2.1 Soil Nail Heads at Existing Slope
 - 2.2 Sprayed Concrete at Existing Landslip Scars
 - 2.3 Concrete Check Dam
 - 2.4 Boulder Fence
 - 2.5 Maintenance Access

3 CONCLUSIONS

LIST OF FIGURE

APPENDICES

- | | |
|------------|--|
| APPENDIX A | EXTRACTS OF ENVIRONMENT PERMIT NO. EP-164/2003 FROM EPD |
| APPENDIX B | EXTRACTS OF WORKING CONDITIONS WITHIN COUNTRY PARK FROM AFCD |
| APPENDIX C | RECESSED SOIL NAIL HEAD |
| APPENDIX D | PLANTER HOLE FOR SPRAYED CONCRETE SLOPE |
| APPENDIX E | STONE FACING TO CONCRETE SURFACES |
| APPENDIX F | LAYOUT PLAN, SECTIONS AND DETAILS OF BOULDER FENCE |
| APPENDIX G | TREE SURVEY REPORT |
| APPENDIX H | METHOD STATEMENT FOR PROTECTION OF EXISTING TREES |
| APPENDIX I | LAYOUT PLAN & SCHEDULE OF LANDSCAPING WORKS |

1 INTRODUCTION

- 1.1 The title of this Project is “Landslide Mitigation Works Against Natural Terrain Hazards in Tung Wan and Shatin Heights – Design and Construction, Tung Wan Landslide Mitigation Works”. Maunsell Geotechnical Services Ltd. was appointed by Planning Division of Geotechnical Engineering Office (GEO), Civil Engineering and Development Department under Agreement No. CE67/2001 (GE) in February 2002 to carry out design and supervision of the construction of natural terrain hazard mitigation works at two natural terrains in Tung Wan and Sha Tin Heights.
- 1.2 In respect of the natural terrain hazard mitigation works at Tung Wan are located within the Lantau South Country Park, in accordance with Category Q.1(a) of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), the mitigation works is regarded as a Designated Project. A Project Profile was submitted in January 2003 to Environmental Protection Department (EPD) and an Environmental Permit (No. EP-164/2003) under EIAO for the mitigation works was obtained in April 2003 (Appendix A refers).
- 1.3 Apart from the Project Profile, a report to the Country and Marine Parks Authority of Agricultural, Fisheries and Conservation Department (AFCD) was submitted in April 2003 for the consent application to implement the construction of natural terrain hazard mitigation works. The consent with working conditions inside the Country Park was obtained in May 2003 (Appendix B refers).
- 1.4 The natural terrain hazard mitigation works at Tung Wan consisted of soil nails, raking drains, boulder fence, concrete check dam and maintenance access. The construction of the landslide mitigation works commenced on 15th October 2003 under Contract No. GE/2003/12. The Contractor was Messer. Geotech Engineering Ltd.
- 1.5 As stipulated in the Environmental Permit, a landscape and visual mitigation proposal was required to be submitted to the Director of Environmental Protection of EPD at least 4 weeks before the commencement of the landscape and visual mitigation works. This report presents the proposed landscape and visual mitigation works for the following items, which are considered as the sources of impacts to the existing landscape.
 - i. Soil nail heads at existing slope;
 - ii. Sprayed concrete at existing landslip scars;
 - iii. Concrete check dam;
 - iv. Boulder fence; and
 - v. Maintenance access.
- 1.6 According to the current site progress, it is anticipated that the proposed landscape and visual mitigation works will commence in November 2004.

2. PROPOSED LANDSCAPE AND VISUAL MITIGATION WORKS

The sources of impacts to the existing landscape are mainly the existence of the soil nail heads at existing slope, sprayed concrete at landslip scars, concrete check dam, boulder fence and maintenance access after the completion of the works. In order to mitigate these visual and landscape impacts, the following mitigation works are proposed.

2.1 Soil Nail Heads at Existing Slope

A total of 229 nos. of soil nails have been installed in a 3m x 3m grid pattern at the west of the site to stabilize the limited source area. The soil nail heads of recessed type embedded entirely into soil with hydroseeding are used to reduce the visual impact on the surrounding. The entire soil nail area will also be hydroseeded and covered with erosion control mat in green. Native shrubs species, *Melastoma candidum*, *Rhodomyrtus tomentosa*, *Psychortia rubra* and *Raphiolepis indica*, will be planted at spacing of 1m c/c over the soil nailed area to blend in with the adjacent shrubby area. Details of recessed soil nail head and layout plan of landscaping works are presented in Appendix C and I respectively.

2.2 Sprayed Concrete at Existing Landslip Scars

There are two existing landslip scars covered with sprayed concrete at the west and north of the site respectively. Since the profiles of the landslip scars are steep and unfavourable for vegetation growth, the existing deteriorated sprayed concrete will be stripped off and replaced by a new layer of sprayed concrete. Planter holes will be installed at spacing of 1.5m c/c on the sprayed concrete with native creeper plant, *Ficus pumila*, planted inside so as to provide screening to the sprayed concrete. The newly formed sprayed concrete will also be painted with Pantone 462U, BS10B25 to blend in with the surroundings. Details of planter hole for sprayed concrete slope are presented in Appendix D.

2.3 Concrete Check Dam

In order to mitigate the visual and landscape impacts on the surround natural setting due to the existence of the concrete check dam, the external surface of the check dam will be paved with granite stone in random pattern. In addition, native creeper plant, *Ficus pumila*, and buffer planting of trees consisting of native trees such as *Litsea glutinosa*, *Mallotus paniculatus* and *Sapium sebiferum* are proposed to be planted over the area surrounding the check dam to screen and blend in with the natural surroundings. Details of granite stone facing to the exposed concrete surfaces and layout of creepers and buffer trees are presented in Appendix E and I respectively.

2.4 Boulder Fence

As stipulated in the special conditions of the working consent in Lantau South Country Park by the Director of AFCD, the posts supporting the boulder fence should be painted with Pantone 462U, BS10B25 to reduce the visual impact to the surrounding. Moreover, the proposed amenity / screening planting of native trees which consist of *Litsea glutinosa*, *Mallotus paniculatus* and *Sapium sebiferum* along the maintenance access will screen the boulder fence to further reduce the impacts. Layout plan, sections and typical details of proposed boulder fence are presented in Appendix F.

2.5 Maintenance Access

The 2.5m wide maintenance access is constructed to link up Lantau Trail and the check dam for future maintenance purpose. The alignment of the maintenance access is designed to minimize the extent of excavation and to avoid any felling of mature trees on site. In addition, amenity / screening planting of native trees such as *Litsea glutinosa*, *Mallotus paniculatus* and *Sapium sebiferum* will be provided along both sides of the maintenance access to screen and blend in with the natural surroundings. The schedule of the amenity / screening planting along the access is presented in Appendix I.

Tree survey was conducted to identify the condition of existing trees within the proposed works area. The tree survey report is enclosed in Appendix G. All existing trees are proposed to be left intact and preserved. Method statement of protection of existing trees during construction stage is enclosed in Appendix H.

Drawing No. 51802/TUN/1101^B showing the layout plan and schedule of landscape works is enclosed in Appendix I.

3. CONCLUSIONS

- 3.1 As stipulated in the Environmental Permit, a landscape and visual mitigation proposal for the constructed natural terrain hazard mitigation works within the Lantau South Country Park in Tung Wan was required to be submitted to the Director of Environmental Protection at least 4 weeks before the commencement of landscape and visual mitigation works.
- 3.2 The sources of landscape and visual impacts to the surrounding are mainly the existence of the soil nail heads, sprayed concrete at existing landslip scars, concrete check dam, boulder fence and maintenance access after the completion of the works.
- 3.2 The proposed landscape and visual mitigation works is scheduled to commence in November 2004 and consist of the following elements:
- i. Soil nail heads of recessed type covering with hydroseeding are proposed to reduce the visual impact on the surrounding. The hydroseeded slope surface will then be covered with erosion control mat in green. Native shrubs species at 1m spacing will be planted over the entire soil nailed area to blend in with the adjacent shrubby area.
 - ii. Planter holes with native creepers planted inside are proposed to be installed at spacing 1.5m c/c to provide screening to the sprayed concrete of the existing landslip scars. The sprayed concrete will also be painted with Pantone 462U, BS10B25 to blend in with the surroundings.
 - iii. Granite stone facing is proposed to be paved on the external surface of the check dam in random pattern. In addition, native creepers and buffer planting of native trees are proposed to be planted over the area surrounding the check dam to screen and blend in with the natural surroundings.
 - iv. The posts supporting the boulder fence will be painted with Pantone 462U, BS10B25 to reduce the visual impact to the surrounding as required by AFCD. Moreover, amenity / screening planting of native trees are proposed along the maintenance access to screen the boulder fence.
 - v. The alignment of the maintenance access is designed to minimize the extent of excavation and to avoid felling of mature trees. In addition, amenity / screening planting will be provided along both sides of the maintenance access to further reduce the visual and landscape impacts to the surrounding.
- 3.3 All existing trees will be left intact and preserved, due care will be exercised during construction.
- 3.4 With the implementation of the above mitigation works, it is anticipated that the landscape and visual impacts resulting from the completed natural terrain hazard mitigation works are minor and acceptable.

LIST OF FIGURES

Figure
No.

1.1 Project Site Location Plan

APPENDIX A

EXTRACTS OF ENVIRONMENT PERMIT NO. EP-164/2003 FROM EPD

APPENDIX B

EXTRACTS OF WORKING CONDITIONS WITHIN COUNTRY PARK FROM AFCD

APPENDIX C

RECESSED SOIL NAIL HEAD

APPENDIX D

PLANTER HOLE FOR SPRAYED CONCRETE SLOPE

APPENDIX E

STONE FACING TO CONCRETE SURFACES

APPENDIX F

LAYOUT PLAN, SECTIONS AND DETAILS OF BOULDER FENCE

APPENDIX G
TREE SURVEY REPORT

APPENDIX H

METHOD STATEMENT FOR PROTECTION OF EXISTING TREES

APPENDIX I

LAYOUT PLAN & SCHEDULE OF LANDSCAPING WORKS (DRG. NO. 51802/TUN/1011^B)