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## **PROJECT PROFILE**

### **1.0 BASIC INFORMATION**

#### **1.1 Project Title**

Agreement No. CE74/99 & Supplementary Agreement No.1  
10 Year Extended Landslip Preventive Measures Project, Phase 2, Package A – Lantau Island, Investigation, Design and Supervision of Landslip Preventive Works on Government Slopes

#### **1.2 Purpose and nature of the project**

The study features under the captioned project were formed during the construction of South Lantau Road before 1956. Due to a large number of landslide incidents on South Lantau Island, stabilisation works to the slopes on Lantau Island are considered necessary to reduce risk to life and economic loss. It is intended to undertake these works as part of the Government's on-going Landslip Preventive Measures (LPM) programme.

Initially, a group of 20 slopes have been identified which are located along South Lantau Road on Lantau Island between Mui Wo and Pui O. These 20 features have been included in this first batch of slope improvement works on Lantau Island under Agreement No. CE 74/99. These 20 substandard features will be upgraded to make them safe and at the same time undertake landscaping works to increase their aesthetic value. Later on 4 additional features were included in the project as a supplementary agreement. Therefore a total of 24 features are included in the project. Most of these features have experienced previous landslide incidents and a series of slope failures along the road between 1993 and 1999 has caused concern for the safety of South Lantau Road users. Other slopes on Lantau Island are scheduled for similar upgrading in the coming years.

The 24 features earmarked for upgrade comprise cut slopes and fill slopes and the broad scope of works required includes minor earthworks for facilitating landscape works, soil nailing, rock slope stabilisation measures (RSSM), drainage improvement and landscaping works.

#### **1.3 Name of Project Proponent**

Geotechnical Engineering Office (GEO)/ Design Division  
Civil Engineering Department (CED)  
The Government of the Hong Kong Special Administrative Region.

#### **1.4 Location and scale of project and history of the site**

The project as a whole involves investigation, design and upgrading works for the 24 substandard features, distributed along South Lantau Road between Mui Wo and Pui O on Lantau Island. Among them, 12 features fall within Lantau South and Lantau North Country Parks. A general location plan, No. LPM 7499/PP01, provided in Attachment 1, shows the location of all 24 slopes, respective individual feature numbers and broad extent of the works, with the 12 features within the country parks highlighted.

The designated sites were originally natural vegetated terrain and the cut and fill slopes

were only formed during the construction of the South Lantau Road prior to 1956. The bare slopes then formed were subsequently shotcreted, it is understood as a result of slope failures in the area.

### **1.5 Number and types of designated projects to be covered by the project profile**

In accordance with category Q.1 of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), twelve of the proposed slope work boundaries fall within the boundary of Lantau South and Lantau North Country Parks and as such shall be regarded as a Designated Project. Therefore, an Environmental Permit under the EIA Ordinance must be obtained prior to the commencement of construction of these features. The designated features are as shown below:

#### Lantau South Country Park

10SW-C/C119  
10SW-C/C118  
10SW-C/C116  
10SW-C/C117  
10SW-C/C20  
10SW-C/C209  
10SW-C/C21  
10SW-C/C193  
10SW-C/C199  
10SW-C/C198  
10SW-C/C165

#### Lantau North Country Park

10SW-C/C187

All these features are covered by this project profile.

### **1.6 Name and telephone number of contact person(s)**

## 2.0 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

### 2.1 How will the project be planned and implemented

The Agreement was awarded to Halcrow China Ltd. (HCL) as an engineering consultant in April 2000. HCL is responsible for investigation and detailed design works, in addition to supervision of the construction works for each of the study features. The proposed slope works for the features will be implemented under Works Contract (No. GE/2001/06).

A sequence of the proposed slope works, generally comprising 5 activities, is presented below:

<b><u>Activity</u></b>	<b><u>Details</u></b>
(1) Minor earthworks	- trimming back of slope to improve gradient for landscaping works and disposal of excavated material; and/or - removal of existing shotcreted areas.
(2) Soil nailing for soil slopes	- formation of holes into slope by drilling, installation of steel bars and grouting.
(3) Rock Slope Stabilisation Measures (RSSM) (rock slopes only)	- rock scaling, removal of unstable boulders, installation of rock dowels and bolts, and rock mesh.
(4) Drainage improvement	- construction of concrete drainage channels on the slopes and provision of subsoil drains.
(5) Landscaping works	- grassing, trees and shrub planting.

A summary of which of these activities are relevant to each of the 12 designated features is presented in Table 1 below:

**Table 1: Proposed Works for Each Designated Feature**

Feature No.	Proposed works
10SW-C/C119	<ul style="list-style-type: none"> <li>◆ slope trimming and removal of shotcrete covers</li> <li>◆ drainage improvement</li> <li>◆ landscaping works</li> </ul>
10SW-C/C118 10SW-C/C209 10SW-C/C187 10SW-C/C199 10SW-C/C198 10SW-C/C165	<ul style="list-style-type: none"> <li>◆ slope trimming and removal of shotcrete covers</li> <li>◆ soil nailing for soil slopes</li> <li>◆ drainage improvement</li> <li>◆ landscaping works</li> </ul>
10SW-C/C116 10SW-C/C117 10SW-C/C20	<ul style="list-style-type: none"> <li>◆ removal of shotcrete covers</li> <li>◆ soil nailing for soil slopes</li> <li>◆ drainage improvement</li> <li>◆ landscaping work</li> </ul>
10SW-C/C21 10SW-C/C193	<ul style="list-style-type: none"> <li>◆ rock slope stabilisation measures (RSSM)</li> <li>◆ for the soil sections at either end:                             <ul style="list-style-type: none"> <li>- slope trimming and removal of shotcrete covers</li> <li>- soil nailing for soil slopes</li> <li>- drainage improvement</li> <li>- landscaping works</li> </ul> </li> </ul>

Details of the proposed works for each of the designated features are presented in Attachment 2 and summarised in the Table 2 below:

**Table 2: Details of Each Designated Feature**

Feature No.	Height (m)	Length along slope toe (m)		Slope angle		Existing covers	
		Soil portion	Rock portion	Soil portion	Rock portion	Soil portion	Rock portion
10SW-C/C119	4	42	N/A	58°	N/A	Shotcrete	N/A
10SW-C/C118	7	28	N/A	58°	N/A	Shotcrete	N/A
10SW-C/C117	10	38	N/A	58°	N/A	Shotcrete	N/A
10SW-C/C116	37	20	N/A	45° to 65°	N/A	Shotcrete	N/A
10SW-C/C20	17	50	N/A	60°	N/A	Shotcrete	N/A
10SW-C/C209	19	62	N/A	60°	N/A	Shotcrete	N/A
10SW-C/C21	11	50	150	60°	75° to 90°	Shotcrete	Exposed
10SW-C/C193	15	70	125	60°	75° to 90°	Shotcrete	Exposed
10SW-C/C187	15	130	50	35° to 60°	60°	Shotcrete	Exposed
10SW-C/C199	13	70	N/A	60°	N/A	Shotcrete	N/A
10SW-C/C198	24	90	N/A	40° to 55°	N/A	Shotcrete	N/A
10SW-C/C165	13	145	N/A	60°	N/A	Shotcrete	N/A

## 2.2 What is the project time table

The Works Contract (No. GE/2001/06) for the 24 features is scheduled for tendering in July 2001 and will commence in October 2001 for a duration of 24 months and a tentative

works programme for the project as a whole provided in Attachment 3. The whole construction works for Works Contract (GE/2001/06) will be divided into 6 sections each comprising between 3 and 6 slopes, as shown in Attachment 4. The anticipated duration of each package of works is about 3 to 4 months. Each package of works will commence in sequence when the preceding package is completed, as indicated in the programme in Attachment 4.

The approximate construction periods for each activity is as follows:

<u>Activity</u>	<u>Anticipated Duration</u>
(1) Minor earthworks including slope trimming and shotcrete removal	1 – 1.5 months
(2) Soil nailing	1 – 1.5 months
(3) RSSM	1 – 1.5 months
(4) Drainage improvement	1 month
(5) Landscaping works	0.5 – 1 month

### **2.3 Are there any interactions with broader programme requirements or other projects that shall be considered.**

As shown in the programmes in Attachments 3 and 4, the 12 designated features are integrated into the overall programme for the upgrading works as a whole. It can be seen that in some locations, there is the potential for construction works for two features in the same vicinity to be on-going at the same time. In the cases of 10SW – C/C119 and 10SW – C/C118, 10SW – C/C116 and 10SW – C/C117 and 10SW – C/C20 and 10SW – C/C209, the slopes will be undertaken with one set of equipment and are thus no cumulative impacts are predicted. However, in two locations, there is the potential for cumulative impacts as work on two features could be on-going concurrently. In one of these locations, one of the features is designated and one is not located within a country park. In the other areas, the features are designated. Thus, the areas where cumulative impacts could occur are:

- ◆ 10SW – C/C21 (Stage 2) (designated ) and 10SW – C/FR32 (non-designated); and
- ◆ 10SW – C/C20 & 10SW – C/C209 (designated) and 10SW – C/C193 (Stage 2) (designated).

Any cumulative effects associated with the works on these features on-going concurrently in the same area are addressed in this Project Profile.

There are no interactions with other projects on-going during the same period which need to be considered.

### 3.0 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

#### 3.1 Outline existing and planned sensitive receivers and sensitive parts of the natural environment which might be affected by the proposed project

##### Noise

South Lantau Road is a major road on Lantau Island providing access to the both rural and residential areas in South Lantau Island and access to the link between north and south. 13 residential buildings have been identified within 200m of the proposed slope maintenance works and the sensitive facades of these properties mostly face towards the proposed construction works. The locations of the key noise sensitive receivers (NSRs) are shown on Attachment 5a and 5b and their distances to the closest slopes are presented in Table 3 below.

**Table 3: Identified Sensitive Receivers**

Sensitive Receiver Reference	Closest Slope Reference	Distance from the Closest Feature (m)
SR1	10SW-C/C209	196
SR2		173
SR3		131
SR4	10SW-C/C193	109
SR5		96
SR6		91
SR7	10SW-C/C189	123
SR8		90
SR9	10SW-C/C199	169
SR10		173
SR11	10SW-C/C165	98
SR12		106
SR13		100

Thus, there are no fixed sensitive receivers within 205m of the remaining 7 slopes. However, visitors to the country parks will also be sensitive to noise and these could be affected by works on all designated slope features.

The major noise source in this area is the road traffic from the existing South Lantau Road. The traffic noise would be expected to be higher during the weekend and on holidays due to the influx of visitors to this area.

##### Air Quality

Air quality sensitive receivers are the same as for noise above. South Lantau Road is the key source of air pollution in the area but with the level of traffic expected to be relatively low in Hong Kong terms due to the permit system which operates in South Lantau Island. No other source of air pollution has been identified. There is no specific air quality data for this area, but baseline levels, for Total Suspended Particulates (TSP) and Respirable Suspended Particulates (RSP), extracted from Guidelines on Assessing the “TOTAL” Air Quality Impacts, classify Lantau Island into the rural/new development category and the



estimated TSP and RSP levels are expected to be  $87 \text{ :g m}^{-3}$  and  $51 \text{ :g m}^{-3}$  respectively. These are well within 24-hour average AQOs for TSP ( $260 \text{ :g m}^{-3}$ ) and RSP ( $180 \text{ :g m}^{-3}$ ). Thus, the overall background air quality is considered to be fair and the background dust level at Lantau Island is relatively low. However, it is expected that the actual TSP and RSP levels of the sites will be higher due to the close proximity of South Lantau Road and the possible increase of traffic flow on weekends.

### **Ecology**

The 12 designated slopes have been subject to landslide incidences and all twelve slopes have partially lost their natural vegetation and are now covered by shotcreted surfaces.

A mixture of young woodland and tall scrub habitats surround the margins of these slopes. The majority of the habitats present are characterised by some stands of mature trees and tall shrubs with the presence of sparse saplings and a fair number of vines and ferns. Common native tree species present include *Machilius* sp., *Celtis* sp., *Cinnamomum* sp. which are combined with some planted species such as *Acacia*, *Albiz* species. Shrub species comprise of *Rahapiolepis indica*, *Microscos paniculata*, *Melastoma spp*, *Psychotria rubra* and *Litsea rotunda*. Dominant fern species recorded include *Dicranopteris linearis* and *Dalbargin hancei*.

Habitats at the top of features 10SW-C/C118, 10SW-C/C119, 10SW-C/C187, 10SW-C/C165, 10SW-C/C209, 10SW-C/C198, 10SW-C/C199 and the soil portions of 10SW-C/C193 and 10SW-C/C21 are composed mainly of woodland and scrubland with relatively dense and diverse native vegetation. The overall species diversity is considered to be medium. However, notable signs of human disturbance were recorded at the margin of the features 10SW-C/C198, 10SW-C/C199 and 10SW-C/C165. For instance, branches have been broken or tilted, some scrubland understorey has been partially cleared and trees have been felled and these were likely to be the result of slope maintenance works. Although these habitats support quite a wide range of plant diversity, frequent disturbance has reduced the ecological values of most of the sites. For other features 10SW-C/C116, 10SW-C/C117, 10SW-C/C20, tall shrubland are present and they are not densely vegetated. A list of species recorded for each feature is provided in Attachments 6a and 6b. In all these cases no rare or protected flora was detected. In view of the high level of disturbance and commonness of species found, these marginal habitats are considered to be of low ecological importance.

Features 10SW-C/C193 and 10SW-C/C21 comprise largely rock slopes which are relatively natural in appearance. The orchid species, *Spiranthes sinensis*, was noted on the rock face of these two slopes. Groups of two to three individuals were noted at different locations within the boundary of the two designated slopes. The approximate locations of the observed specimens are shown in Attachments 7a and 7b.

Although all wild orchids are protected under the Forestry Regulation, this species is commonly distributed in grassland and boggy areas in Hong Kong (Siu, 2000). It is distributed from Japan, China and down through SE Asia to northern Australia. Apart from the orchid, no other protected species was recorded. Other common species like *Dicranopteris linearis*, *Eriocanlon wallichian*, *Scutella indica*, *Tectaria subtriphylia*, *Dalbargin hancei*, *Melastoma spp.*, together with some saplings of *Schefflera Octphylla* and *Rhus succedance* were observed on these rocky slopes. A list of species recorded for

each feature is provided in Attachments 6a and 6b.

While no rare species were recorded on the large rocky slopes, natural rock habitats are uncommon in terms of the dominant grassland, scrubland and woodland complexes found across Hong Kong. The protected orchid species is of note but not in itself rare. Species diversity is not high given the large expanse of rock and the limited availability of niches available for plants. The habitat is not of a great age as it was created during the construction of the South Lantau Road. It can therefore be recreated. The ecological value of this rock habitat is therefore considered to be low-medium mainly due to the presence of the orchids and the unusual nature of the habitat.

The EIA Study of Lantau North-South Road Link between Tai Ho Wan and Mui Wo Investigation Assignment (2000) indicated that the Nam Shan area is likely to support a range of rare or protected wildlife such as barking deer, flowerpecker species, grey thrush, (*Turdus cardis*), tristram's bunting (*Emberiza tristrami*), white thrush (*Zoothera dauma*) and chestnut bulbul (*Hemixos castanonotus*). However, wildlife are less likely to inhabit in these marginal shrubland and woodland habitats due to the high level of disturbance and proximity of the road. Only common bird species are anticipated to be present in these areas.

### **Water Quality**

A few stream courses exist in the Nam Shan area. The majority of the streams are steep in the upland reaches and remain natural and unpolluted due to the lack of human habitation and pollution sources. In addition, the aquatic ecology in these streams are expected to be of high conservation values. However, there is no direct interface with any of these streams.

### **Landscape and Visual**

The Mui Wo Outline Zoning Plan (OZP) (Plan No.S/I-MWF/3) notes that this section of South Lantau Road traverses through the South Lantau Country Park and adjoining areas of Green Belt. South Lantau Island has been identified in the Draft Recommended Strategy of the South West New Territories Development Strategy Review as a tourist / recreation area with emphasis on natural landscape resources. The planning intention for South Lantau Island is to limit both the resident population and vehicular traffic.

South Lantau Road is both a key tourist and commuting route, serving as the principal access from the ferry at Mui Wo to the residential and recreational (beach and hillside) areas along South Lantau, and via Tung Chung Road to Tung Chung and the Hong Kong International Airport.

The undulating natural landscape setting, the winding alignment of the road and the nature natural scrub / woodland vegetation and the large Acacia trees all give the road corridor a special character. The section of South Lantau Road where the slopes are located comprises an area of steeply sloping, naturally vegetated hillside, partly within the area of the South Lantau Country Park.

Within the road corridor, there are a large number of mature Acacia confusa trees lining the northern side, which overhang and enclose the carriageway. These were planted for

ornamental purposes and to shade the road some 25 – 30 years ago, and now give the road a distinctive character.

The road was formed by cutting into the natural hill slopes, and as a result it is now lined (largely on the southern side) by a series of steep cut slope features, ranging from 4 metres to 37 metres in height and from 20 to 145 metres in length. As most of the slope features have been altered by landslides or maintenance works during the last thirty years, the quality of the vegetation on existing slope faces is not generally high. Hard surface covers installed to control surface erosion have effectively prohibited the establishment of new vegetation and surface vegetation consists largely of small trees in poor condition.

By contrast, the vegetation on the undisturbed slopes immediately around the slope features is typically well developed dense tall scrub or secondary woodland consisting of a diverse range of native tree and shrub species.

The original profile was varied and undulating with many small ephemeral stream courses forming depressions and valleys, with outcrops of rock occasional being exposed. The road follows a sinuous alignment through the landscape which adds to its character. The topography of the slope features tends to be more uniform and planar, following the geometry of the road.

Visually, the road is largely enclosed by the natural topography and the overhanging vegetation. Views from the pedestrian and vehicular traffic within the road corridor tend to be limited to the road and adjacent slopes and vegetation with only occasional longer view along the line or out into neighbouring valley areas. Key visually sensitive receptors include daily commuters to the ferry at Mui Wo and tourists / recreational passengers on buses.

## **4.0 POSSIBLE IMPACTS ON THE ENVIRONMENT**

### **4.1 Outline any processes involved, including process flow diagrams, site plans, storage requirements and information on emissions and discharges**

Twelve slopes fall within the boundary of the Lantau South and North Country Parks and they are located along the South Lantau Road between Mui Wo and Pui O on Lantau Island. A general location plan of each individual feature is presented in Attachment 1.

As described in Section 2.1, the works on these designated slopes will generally comprise five key activities:

- 1) minor earthworks;
- 2) soil nailing;
- 3) rock slope stabilisation measures (RSSM);
- 4) drainage improvement works; and
- 5) landscaping works.

All these activities have the potential for environmental impacts. All activities could lead to noise impacts as mechanical equipment will be used in all cases. Dust could be generated during the majority of construction activities including earth works (slope trimming and shotcrete removal), soil nailing and particularly during rock drilling, while drainage and landscape works are unlikely to give rise to significant amounts of dust. Ecologically, there could be disturbance to wildlife during the works and there will be removal of existing vegetation during slope trimming. Waste will be generated largely during the excavation works and this will need to be handled and transported off site. Water quality impacts are not predicted as a result of site runoff entering streams as there is no interface with any water courses.

### **4.2 Describe the environmental impacts or issues that arise during the construction, operation or decommissioning of the project, where applicable**

#### **4.2.1 Construction Phase**

##### **Noise**

Noise during the construction phase will be generated from powered mechanical equipment (PME) being used during various construction activities. Operations that may generate adverse noise impacts can be broadly divided into the following 5 stages:

- ◆ Activity 1 – Minor Earthworks: trimming back of slope to improve gradient for landscaping works and disposal of excavated material and/or removal of existing shotcreted areas;
- ◆ Activity 2 – Soil nailing for soil slopes: formation of holes into slope by drilling, installation of steel bars and grouting.
- ◆ Activity 3 – RSSM for Rock Slopes: rock scaling, removal of unstable boulders, installation of rock dowels and bolts, and rock mesh.
- ◆ Activity 4 – Drainage improvement: construction of concrete drainage channels on the slopes and provision of subsoil drains.

◆ Activity 5 - Landscaping works: grassing, trees and shrub planting.

The equipment which will be required for the construction operations during each of these stages is listed in Table 4 below:

**Table 4: Predicted Sound Power Levels for Each Construction Activities**

Construction Activity	Equipment	CNP Equipment Code*	Number of Equipment	Sound Power Level (SWL) in dB(A)*	Total SWL During Operation
Activity 1	Excavator (Backhoe)	CNP 081	1	112	115.0
	Lorry	CNP 141	1	112	
Activity 2	Rock Drill, crawler mounted (pneumatic)	CNP181	1	128	128.1
	Air Compressor	CNP001	1	100	
	Hoist, petrol	CNP123	1	104	
	Concrete Pump	CNP047	1	109	
	Concrete Mixer	CNP046	1	96	
Activity 3	Rock Drill, crawler mounted (pneumatic)	CNP181	1	128	128.1
	Air Compressor	CNP001	1	100	
	Hoist, petrol	CNP123	1	104	
	Concrete Pump	CNP047	1	109	
	Concrete Mixer	CNP046	1	96	
Activity 4	Concrete Pump	CNP047	1	109	109.2
	Concrete Mixer	CNP046	1	96	
Activity 5	Water Pump	CNP282	1	103	103.8
	Mixer	CNP046	1	96	

Note\*: Equipment codes and SWL are obtained from the Technical Memorandum on Noise from Construction Work Other than Percussive Piling

The construction noise at the designated NSRs has been assessed in accordance with the methodology specified in the *Technical Memorandum on Noise from Construction Work Other than Percussive Piling*. The details of the predicted unmitigated noise levels at the representative NSRs during the slope maintenance works is shown in Attachment 8A. Noise calculations have been based on the assumption that all the identified NSRs are 1 storey in height. In addition, the worst case scenario of the closest slope to the sensitive receiver has been assumed.

The results indicate that the noise levels during Activity 2 (soil nailing) of the

construction work at all identified sensitive receivers and during Activity 3 (rock stabilisation) at 3 NSRs will slightly exceed the daytime noise criteria of 75dB(A). Based upon these results, noise mitigation measures will be necessary to reduce the noise to acceptable levels during these activities. Visitors to the country parks will also be sensitive to noise but based upon their transient nature and the influence of the South Lantau Road in this location, impacts are not considered to be significant.

As highlighted above in Section 2.3, due to works on more than one feature on-going simultaneously, there is potential for cumulative noise impacts. This will occur for works on features 10SW-C/C193 (Stage 2) and 10SW-C/C209 & 10SW – C/C20 where each activity will be undertaken in parallel and features 10SW-C/C21 and 10SW-C/FR32, as shown in Attachment 4. It should be noted that slope maintenance work on feature 10SW-C/FR32 is not considered as designated and the impacts from this slope alone has therefore not been included in this Project Profile. Calculations have been undertaken to determine the cumulative effects of the worst case situation of two sets of equipment operating simultaneously. The predicted noise levels, without mitigation, are shown in Attachment 8B. The results indicate that there could be further exceedances and an increase in noise levels in some locations during the construction stages and mitigation measure are required.

### **Air**

Earthworks and the drilling operations for soil nailing and particularly rock stabilisation could generate dust which could cause impacts, especially during the dry season. The stockpiling of excavated material or the material itself is expected to act as a source of dust. However, the Contractor will be required to comply with the Air Pollution Control (Construction Dust) Regulation in order to ensure that no adverse dust impact on the air sensitive receivers will result. However, while the duration of each of the dust generating activities will only be 1-1.5 months, it may be necessary to mitigate dust emissions during rock drilling operations to minimise any nuisance and deposition effects on the surrounding flora by ensuring that some water spraying is undertaken during the drilling operations. However, overall, in view of the short duration of work and the distance of air sensitive receivers to the sites, the air quality impacts on the sensitive receivers are not expected to be significant.

### **Ecology**

The proposed slope upgrading works that may generate ecological impacts are largely associated with the slope trimming works which will remove some existing vegetation including the loss of some tall shrubland and secondary woodland habitats. However, shotcrete removal, soil nailing and RSSM for rock slopes could also be a source of dust which could affect local flora and fauna. Noise generated for the duration of the works could also cause disturbance to wildlife.

A total of 9 of the designated slopes require some slope trimming and vegetation removal, with only features 10SW-C/C20, 10SW-C/C116 and 10SW-C/C117 not requiring these works. These 3 features are fully shotcreted and works will be confined to the removal of the shotcrete, soil nailing, drainage and landscape works. As such no habitat will be lost on these slopes. The extent of the relative trimming requirements for the remaining 9 slopes can be seen in Attachment 2 and the areas to be removed summarised in the

following Table 5:

**Table 5: Approximate Areas of Existing Vegetation Removal**

<b>Feature No.</b>	<b>Area of Vegetation to be Removed (m<sup>2</sup>)</b>
10SW-C/C119	100
10SW-C/C118	12
10SW-C/C209	134
10SW-C/C21	12
10SW-C/C193	400
10SW-C/C187	350
10SW-C/C199	55
10SW-C/C198	315
10SW-C/C165	510

In these cases, the dense vegetation at the top of the slopes will need to be removed. The removal of some vegetation in the form of trees will be unavoidable, but the mature trees to be felled will be replaced as part of the landscape proposal, which is discussed in more detail in the landscape section below. There will be a total of 193 trees to be felled across the designated features but a tree felling application and landscape proposal will be prepared to quantify the loss and propose mitigation measures prior to any works. In view of the small extent of slope works required, the woodland and tall shrubland habitats on the whole would not be adversely impacted. As these types of habitat are common throughout Hong Kong and the habitats are currently subject to frequent disturbance, the overall short-term ecological impacts of construction is considered to be minor. In addition, the habitat loss is considered to be insignificant when compare to the habitat available in the Lantau South and North Country Parks.

The rock portion of features 10SW-C/C21 and 10SW-C/C193 will only require Rock Slope Stabilization Measures to be carried out. As no cut back will be required for the rock portions of the slopes, very limited habitat loss and disturbances to the existing vegetation will be anticipated and due to the small scale of works required, impacts on these rocky slopes are expected to be minor. The main concern is the wild orchid stands which may experience disturbances or damage during the RSSM works. Although they are common in Hong Kong, particular care should be taken and mitigation measures as described below should be carried out. With the incorporation of the proposed mitigation measures, the disturbances or damages to the orchids can be kept to a minimum.

In view of the frequent human disturbances generated by the slope maintenance works and the South Lantau Road, no particularly rare wildlife is expected in this area. Also, as the works will be of only short duration and the area to be affected is situated within marginal habitats, only minor disturbance to common bird species and other wildlife is expected. In addition, the fauna is mobile and will have the large remainder of the country parks to go into in order to remove themselves from the noise source in the short term.

In terms of habitat loss, as the area of vegetation to be removed is considered marginal and already disturbed, no detectable impacts due to habitat loss are predicted.

### **Water Quality**

Earthworks and RSSM works could result in debris and suspended solids entering the stream courses. In addition, it is possible that run-off from the site may wash contaminants such as sediments, bituminous oils and diesel oil into the streams. In light of the existing water quality and aquatic ecology, impacts should be kept to a minimum. However, no streams pass through the sites or are situated in the vicinity and thus no significant impacts are predicted.

### **Waste Management**

Waste material generated by the operations will include:

- ◆ soil and rock from excavation;
- ◆ removed shotcrete material;
- ◆ concrete blocks;
- ◆ trees and vegetation; and
- ◆ general refuse

The anticipated volumes of the shotcrete material, soil and rock generated by the slope upgrading works are presented in Table 6 below:

**Table 6: Anticipated Waste Material Arisings**

Feature No.	Removed Shotcrete (m <sup>3</sup> )	Soil (m <sup>3</sup> )	Rock (m <sup>3</sup> )	Total (m <sup>3</sup> )
10SW-C/C119	65	90	0	155
10SW-C/C118	45	100	10	155
10SW-C/C117	180	0	0	180
10SW-C/C116	180	0	0	180
10SW-C/C20	200	0	0	200
10SW-C/C209	50	1000	100	1150
10SW-C/C21	30	900	100	1030
10SW-C/C193	20	800	80	900
10SW-C/C187	60	1400	20	1480
10SW-C/C199	20	1000	100	1120
10SW-C/C198	80	3500	40	3620
10SW-C/C165	30	1000	140	1170

Soil material generated will be small in quantity and may not be suitable for the landscape proposals although some may be retained for use in the proposed planters. As such the majority of soil, together with the rock and removed shotcrete material will be sorted out by the Contractor and transported to the CED public stockpile in Mui Wo. Other materials not suitable for public fill, including the general refuse and vegetation will be transported to the Mui Wo refuse transfer station for ultimate landfill disposal.

The amount of waste material to be generated overall is relatively small and will be produced over the length of the construction period. Thus, little material will need to be handled at any one time and based upon this and the distance of the work areas to the sensitive receivers, it is unlikely that waste management on site would cause visual and dust impacts on nearby sensitive receivers.



In addition, as detailed in the boreholes records in Attachment 9 (numbers BH21/1, BH 187/2 and BH/165/2), the material does not constitute mud and therefore cannot be contaminated and thus, no special handling is required. Therefore, significant issues associated with waste management are not anticipated.

### **Landscape and Visual Impact**

Where re-grading works are proposed they would result in the clearance of some of the existing vegetation on slope faces and in limited areas from the natural hill slopes immediately around the features. They would also result in slight changes in surface topography.

The works include the introduction of slope stabilisation engineering elements, mainly soil nails, rock dowels, toe planters, drainage channels and access steps, and stone pitching surface covers where slope angles are too steep to be re-vegetated. In many areas the works include the removal of existing hard surface covers and the grassing and woodland planting of slopes, which is likely to have a positive landscape and visual impact.

The proposed slope works will result in landscape and visual impacts along the South Lantau Road corridor, both in the short term during the construction and in the long term during operation. During construction there would be the added visual impacts arising from the presence of construction traffic and plant.

Impacts on landscape resources are predicted to be as follows:

- ◆ loss of mature scrub and secondary woodland vegetation from small areas of natural slope that would be disturbed;
- ◆ loss of a few mature trees of poor quality from existing slope faces; and
- ◆ further smoothing out of natural ground topography on slope faces.

The number of trees to be retained and lost during the works on each slope is summarised in Table 7 below and shown in Attachment 10. The felling of trees will be controlled through a formal tree felling application which will also propose suitable mitigation measures to compensate for the loss.

**Table 7: Summary of Predicted Tree Felling**

Feature No.	Number of Trees to be Retained	Number of Trees to be Felled	Number of Trees to be Transplanted
10SW-C/C119	17	4	0
10SW-C/C118			

10SW-C/C117	38	0	0
10SW-C/C116			
10SW-C/C20			
10SW-C/C209	9	2	0
10SW-C/C21	12	5	0

<b>Feature No.</b>	<b>Number of Trees to be Retained</b>	<b>Number of Trees to be Felled</b>	<b>Number of Trees to be Transplanted</b>
10SW-C/C193	9	2	0
10SW-C/C187	17	40	0
10SW-C/C199	11	23	0
10SW-C/C198	24	79	0
10SW-C/C165	43	38	0
<b>TOTAL</b>	<b>180</b>	<b>193</b>	<b>0</b>

In addition, loss of mature vegetation, excavation works, construction traffic and installation of engineering elements are likely to have a significant negative impact on the character of the road corridor during construction. These are likely to be seen as localised as most views along the road take in much longer sections of road that would not be affected. Similarly impacts on the character of the wider landscape are not likely to be significant due to the relatively small-scale nature of the features compared to the landscape setting within which they sit.

As with the landscape impacts, the proposed works would have localised negative visual impacts on road users (notably tourists and commuters) and in longer distance views from hiking trails, due to the relatively small scale and the expansive landscape context within which they would be seen.

#### **4.2.2 Operational Phase**

There will be no adverse impacts on the sensitive receivers during the operational phase. It is expected with the tree planting of native species and the landscaping works proposed, the slope works will result in positive impacts in terms of terrestrial ecology and landscape characters in the long term. No adverse impact will be resulted from the operational phase.

## 5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED

### 5.1 Describe measures to minimise environmental impacts

#### Noise

The results in Attachment 8A indicated that all identified the NSRs would be adversely affected by the noise generated from soil nailing and rock stabilisation (Activities 2 and 3) of the stabilisation work, the major noise contributor in both stages being the process of percussive drilling. The following mitigation measure, detailed in Table 8, is suggested to be applied to the drilling equipment to attenuate the noise.

**Table 8: Recommended Mitigation Measures for the Noisy Equipment**

Plant	Mitigation Measures	Maximum Reduction in dB(A)
Rock Drills and Tools	<ul style="list-style-type: none"> <li>- Fit Suitable designed muffler or sound reduction equipment to reduce noise without impairing machine efficiency.</li> <li>- Ensure all leaks in air line are sealed</li> <li>- used dampened bit to eliminate ringing</li> </ul>	Up to 15

Reference: Noise and vibration control on construction and open sites, BS5228:Part 1:1997,p15-16

For the purposes of this assessment, a 10dB(A) attenuation of the equipment has been assumed and a complete set of mitigated noise results is shown in Attachment 11A, with the maximum attenuation calculation being based on ANoise and Vibration Control on Construction and Open Sites≅ BSI 1997. After the adoption of the mitigation measures, the noise level at all the sensitive receivers will not exceed the statutory requirement during construction and no residual impacts will occur. The mitigation should be applied during drilling works on the following five slopes:

- ◆ 10SW – C/C209;
- ◆ 10SW – C/C193;
- ◆ 10SW – C/C189;
- ◆ 10SW – C/C199; and
- ◆ 10SW – C/C165.

Noise from other slopes will not affect the fixed sensitive receivers due to the distances between them. The noise does have to potential to affect visitors to the country park, however, and while these will not be significantly affected due to their transient nature, it is recommended that the mitigation measures be applied to the drilling works at all slopes to minimise impacts to the country park visitors.

The mitigation measures are also sufficient the take in account the marginal increases experienced during the worst case situation for two sets of equipment operating at the same time, as shown by the results in Attachment 11B.

In addition to the above the Contractor shall be required to transport construction plant, equipment and materials to and from Lantau Island by sea in order to minimise the disturbance of road vehicles.

### **Air Quality**

With the adoption of the relevant pollution control clauses in the Construction Contract as detailed in Attachment 12, environmental nuisance can be kept to a minimum. In addition, it is also recommended that water spraying during rock drilling works be undertaken to minimise any impacts.

### **Ecology**

Care should be taken to avoid damage to areas that do not require any work. Whenever possible trees should be preserved. Any works storage areas should be located on land of low ecological value where practicable and storage of material subject to run-off and exposed areas of soil should be kept to a minimum, especially during the wet season.

It is recommended that in-situ protection of the protected orchid species, *Spiranthes sinensis* should be carried out. Prior to commencement of any slope work, a protective cage will be erected to protect the orchids. The general arrangement for each orchid site should be:

- ◆ the erection of a cage, consisting of a frame made of 50mm GMS angles, covered with a heavy duty GMS mesh, giving a minimum clearance of about 450mm on all sides of the orchids;
- ◆ the whole cage should be painted in dark brown or black;
- ◆ cover the cage with a suitable material to prevent any dust ingress but allow light to reach the plant; and
- ◆ the cage should then be carefully bolted to the surrounding rock for the duration of the contract to prevent any damage caused by the equipment and workers.

The exact size, shape and form of the cage will be worked out on site to suit the spread of the orchids and the local configuration of the rock. The orchids will be protected either as a single stand or in a group of 2-3 based on their distribution pattern. A sketch of how this may work can be seen in Attachment 7c. A qualified horticulturist will confirm the location of the orchid specimens prior to the construction works and supervise the installation of the protective cages. During the construction phase, the condition of the protected orchids will be regularly monitored.

Mitigation in the form of compensatory tree planting for the loss of vegetation and trees is discussed in further detail below but considered sufficient to mitigate the losses predicted. Compensatory planting will be undertaken using native species, whenever possible, to restore the ecological value of the area.

Based upon this, and the overall insignificant impacts, no further mitigation measures are considered to be required.

### **Waste Management**

Based upon the uncontaminated value of the material, the small quantities involved, the process of the removal of all excavated waste from the site as it is excavated and the reuse of the material during the overall construction works, no mitigation is required. Notwithstanding, relevant pollution control clauses will be included in the Construction Contract, as detailed in Attachment 12, so as to minimise the environmental nuisance to the nearby sensitive receivers. In addition, a waste management plan will be prepared by the Contractor in order to keep waste arisings to a minimum and to ensure that waste is handled, transported and disposed of in a suitable manner.

### **Landscape and Visual**

The potential landscape and visual impacts could be mitigated through the following approach:

- ◆ minimise the disturbance to existing vegetation, topography, and landscape features, by limiting the extent of re-grading and minimising the form and extent of proposed stabilisation and surface erosion control measures such as retaining walls, buttresses, drainage channel, access steps etc. and by siting them, wherever possible, in visual less obvious locations;
- ◆ visual treatment of engineering structures including the colouration or patterning of finished surfaces to help blend them into the surrounding landscape setting. Where slopes are too steep to be safely vegetated, stone-pitching cover is required. Close to the road this will be in the form of masonry facing to tie in with the treatment of toe planters small reinforced concrete retaining walls and buttress features. Where a hard surface cover is required higher up, then this will be formed in spray concrete, which will be coloured in deep earth tone;
- ◆ screening of works. Some picture hoarding will be used to screen the works wherever practicable; and
- ◆ incorporating planting into the works. For all soil cut slopes up to 50 degrees the existing hard surface covers will be removed and replaced with grass hydroseeding. Where possible toe planters will be installed using climbers to grow up to cover rocks and stone pitching, and trees to screen views of the slope faces from the road below. Where a hard surface cover has to be used holes will be formed through the hard surface cover into the soil behind to allow self-clinging climbers to be established on the slope face and cover the surface. Plant species will be selected as far as is possible to simulate the natural vegetation in surrounding areas and will be based entirely on species native to HK.

The following Table 9 provides a summary of the proposed landscape proposals for the designated features. The proposals are subject to finalisation under the formal tree felling application process.

**Table 9: Outline Landscape Mitigation Proposals**

Feature Number	Landscape Mitigation Proposal
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Feature Number	Landscape Mitigation Proposal
10SW-C/C119	<ul style="list-style-type: none"> <li>◆ Cut Back to 45°</li> <li>◆ Install erosion control mat</li> <li>◆ Hydroseeding with grass and pit plating with shrubs and trees</li> <li>◆ Toe planter for screen trees.</li> </ul>
10SW-C/C118	<ul style="list-style-type: none"> <li>◆ Cut back to a minimum of 45° on the eastern end and steepen up to 58° within its western portion.</li> <li>◆ Install soil nails in the steep portion of the slope.</li> <li>◆ Recess soil nail heads</li> <li>◆ Install erosion control mat</li> <li>◆ Hydroseeding on slope flatter than 50° with grass and hydromulching on slope steeper than 50° and pit planting with shrubs</li> <li>◆ Toe planter for shrubs and climbers</li> </ul>
10SW-C/C117	<ul style="list-style-type: none"> <li>◆ Replace the existing sprayed concrete cover by hydromulching</li> <li>◆ Install soil nails</li> <li>◆ Recess soil nail heads</li> <li>◆ Install erosion control mat</li> <li>◆ Consider covering the exposed slope with plastic coated wire mesh in dark brown.</li> </ul>
10SW-C/C116	<ul style="list-style-type: none"> <li>◆ Replace the existing sprayed concrete cover by hydromulching</li> <li>◆ Install soil nails</li> <li>◆ Recess soil nail heads</li> <li>◆ Modify existing soil nail heads</li> <li>◆ Install erosion control mats</li> <li>◆ Toe planter with screen trees</li> </ul>
10SW-C/C20	<ul style="list-style-type: none"> <li>◆ Cut back to 55°</li> <li>◆ Replace existing sprayed concrete</li> <li>◆ Install soil nails</li> <li>◆ Recess soil nail heads</li> <li>◆ Modify existing soil nail heads</li> <li>◆ Install erosion control mat</li> <li>◆ hydromulching</li> <li>◆ Toe planter with screen trees</li> </ul>
10SW-C/C209	<ul style="list-style-type: none"> <li>◆ Trim back to 50°</li> <li>◆ Install soil nails</li> <li>◆ Recess soil nail heads</li> <li>◆ Install erosion control mat</li> <li>◆ Hydroseeding with grass and pit planting with shrubs on trimmed surface</li> </ul>

10SW-C/C21	<ul style="list-style-type: none"> <li>◆ Trim back to 50° in the soil slope portion</li> <li>◆ Install soil nails</li> <li>◆ Recess soil nail heads</li> <li>◆ Install erosion control mat</li> <li>◆ Hydroseeding with grass and pit planting with shrubs on</li> </ul>
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Feature Number	Landscape Mitigation Proposal
	trimmed surface ♦ Soil pocket with climbers along toe ♦ Earth tone colour and add rock texture to buttress and rock bolt
10SW-C/C193	♦ Trim back to 45-50° in the soil slope portion ♦ Install soil nails ♦ Recess soil nail heads ♦ Install erosion control mat ♦ Hydroseeding with grass and pit planting with shrubs on trimmed surface ♦ Soil pocket with climbers along toe ♦ Earth tone colour and add rock texture to buttress and rock bolt
10SW-C/C187	♦ Trim back to 45-50° in the soil slope portion (eat half) ♦ Install soil nails ♦ Recess soil nail heads ♦ Install erosion control mat ♦ Hydroseeding with grass and pit planting with shrubs and small trees on trimmed surface ♦ Install stone pitching in area where no trimming after removal of existing sprayed concrete and installation of soil nails.
10SW-C/C199	♦ Trim back to 45-50° ♦ Install soil nails ♦ Recess soil nail heads ♦ Install erosion control mat ♦ Hydroseeding with grass and pit planting with shrubs on trimmed surface
10SW-C/C198	♦ Trim back to 45-55° ♦ Install soil nails ♦ Recess soil nail heads ♦ Install erosion control mat ♦ Hydroseeding with grass and pit planting with shrubs ♦ Toe planter for screen trees and climbers
10SW-C/C165	♦ Trim back to 50° except for the portion which have minor encroachment into private land near its southern end. ♦ Install soil nails ♦ Recess soil nail heads ♦ Install erosion control mat ♦ Hydroseeding with grass and pit planting with shrubs on trimmed surface ♦ Toe planter for screen trees and climbers ♦ Stone pitching on the untrimmed portion and apply hydromulching to provide green effect

In the long term, with the incorporation of the mitigation measures proposed, especially planting on soil cut slope faces, in toe planters, and the visual treatment of engineering elements, is likely to have a slight positive impact in terms of the landscape character landscape resources and landscape planning context of the road. Similarly it is likely to result in slight positive visual impacts on the key VSR's.

## **5.2 Comment on the possible severity, distribution and duration of environmental effects**

Overall the works are localised to an area bordering a stretch of the South Lantau Road and predicted impacts are confined to this area. No adverse residual noise, air, waste, water quality ecology and landscape and visual impacts are predicted with the application of the mitigation measures and pollution control clauses in Attachment 12. In respect of terrestrial ecology, the features are located in the marginal habitats of the Country Parks, in areas which have already been subject to disturbance. As such, loss of relatively small areas of vegetation of generally low ecological importance are not considered significant.

However, orchids were identified growing on natural rock outcrops on two of the designated features and thus particular care should be taken to provide in-situ protection for the orchid species. While significant impacts are not predicted, the proposed mitigation measure is considered sufficient to avoid any disturbances to this protected species.

The duration of the works in any one location is relatively short-term, with key work activities at any one feature lasting approximately 6 months only and all impacts can be reduced to acceptable levels through the application of the recommended mitigation measures. Cumulative impacts have largely been avoided due to careful phasing of the works. However, potential cumulative impacts in two locations have been identified associated with works on two features in the same area being on-going concurrently. However, no cumulative impacts are predicted at the representative sensitive receivers in the vicinity.

The designated features are currently unsafe and also cause high visual impacts to an area of high landscape, visual and ecological sensitivity. Thus, overall, the works are predicted to have a beneficial effect, improving both the safety of the slopes and their visual appearance through extensive landscaping. The landscaping proposals and maintenance responsibilities will be submitted to the authorities as part of the tree felling application.

## **5.3 Comment on any further implications**

Consultation with interested parties, including Lantau and Hong Kong green groups, rural committee members and representatives of the Hong Kong Tourist Association, was undertaken in August 2000. The objectives and scope of the project was highlighted at the meeting. Overall, the works were supported by the attendees with key concerns relating to compensatory tree planting, the use of native trees in the planting for bird species, safety of the features after upgrading and traffic management during the works. These issues have been addressed by the project with the tree felling application defining the use of native species for compensatory planting and proposed upgrading works sufficient to ensure the slopes are safe. Comprehensive temporary traffic management has been determined based upon the phasing of the works shown in Attachment 4.

Overall, the works are relatively minor in scope and due to their safety and aesthetic benefits are considered to be generally supported by interested parties and therefore, should not be particularly sensitive to public or political scrutiny.



#### **5.4 Use of Previously Approved EIAs**

There are no previously approved EIAs relevant to this project. The application for an environmental permit is therefore made under Section 5 (11) of the EIAO.

## **References**

Siu, G.L.P, (2000), Orchidaceae of Hong Kong, *Memoirs of the Hong Kong Natural History Society* 23

Planning Department, HKSAR, (1999), *Draft Recommended Strategy of the South West New Territories Development Strategy Review*.

Mouchel Asia Ltd. (2000), *Lantau North-South Road Link between Tai Ho Wan and Mui Wo Investigation Assignment, Final EIA Report*.

**ATTACHMENT 1**

**PROJECT LOCATION MAP**

**2010**

1. RECONSTRUCTION SYSTEMS:  
 (A) CUT SLOPE  
 (B) GRADE CONTROL  
 (C) SOIL NAIL WALL  
 (D) CEMENT GRADE STABILIZATION WALL  
 (E) RETAINING WALL  
 (F) TIE BACK WALL  
 (G) MECHANICAL WALL  
 (H) FILL AND DRAP  
 (I) STEEP SLOPE PROTECTION WALL

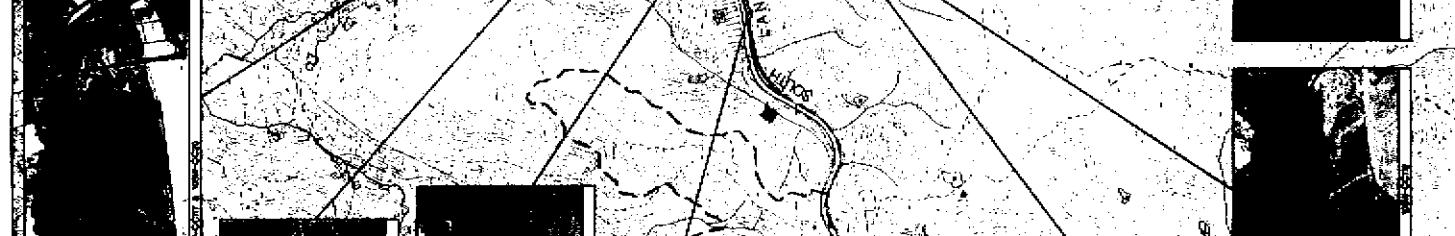
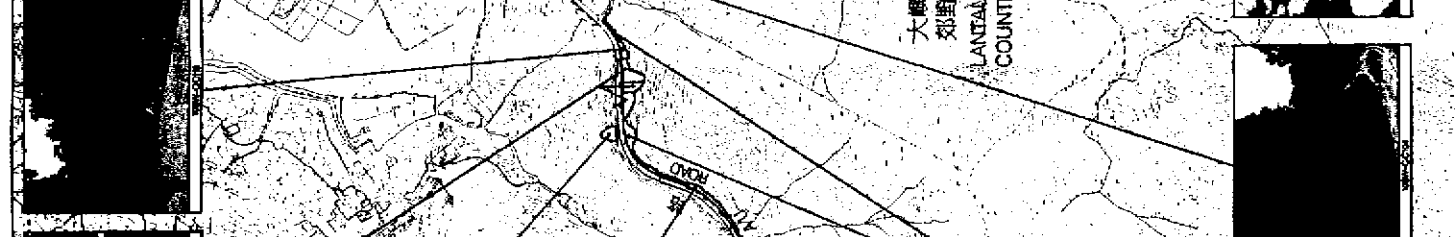
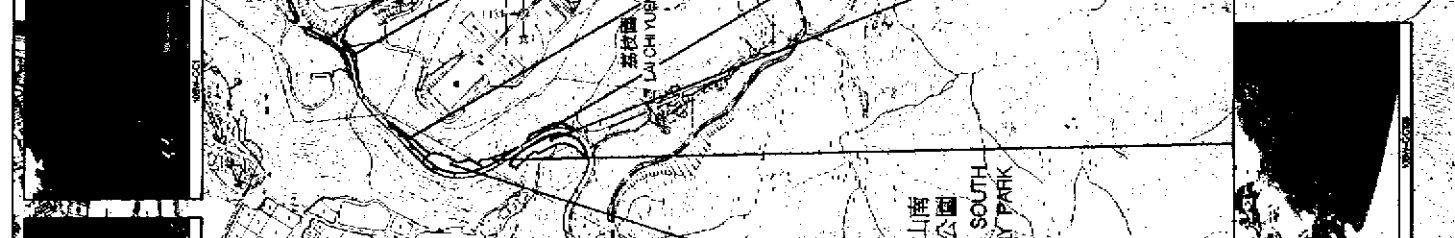
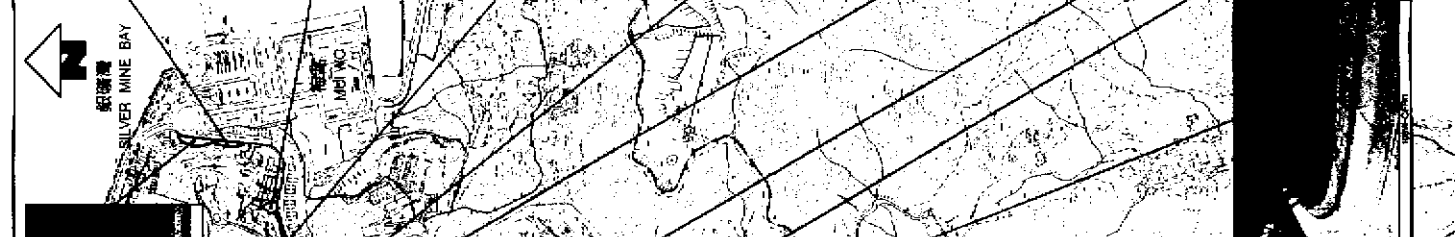
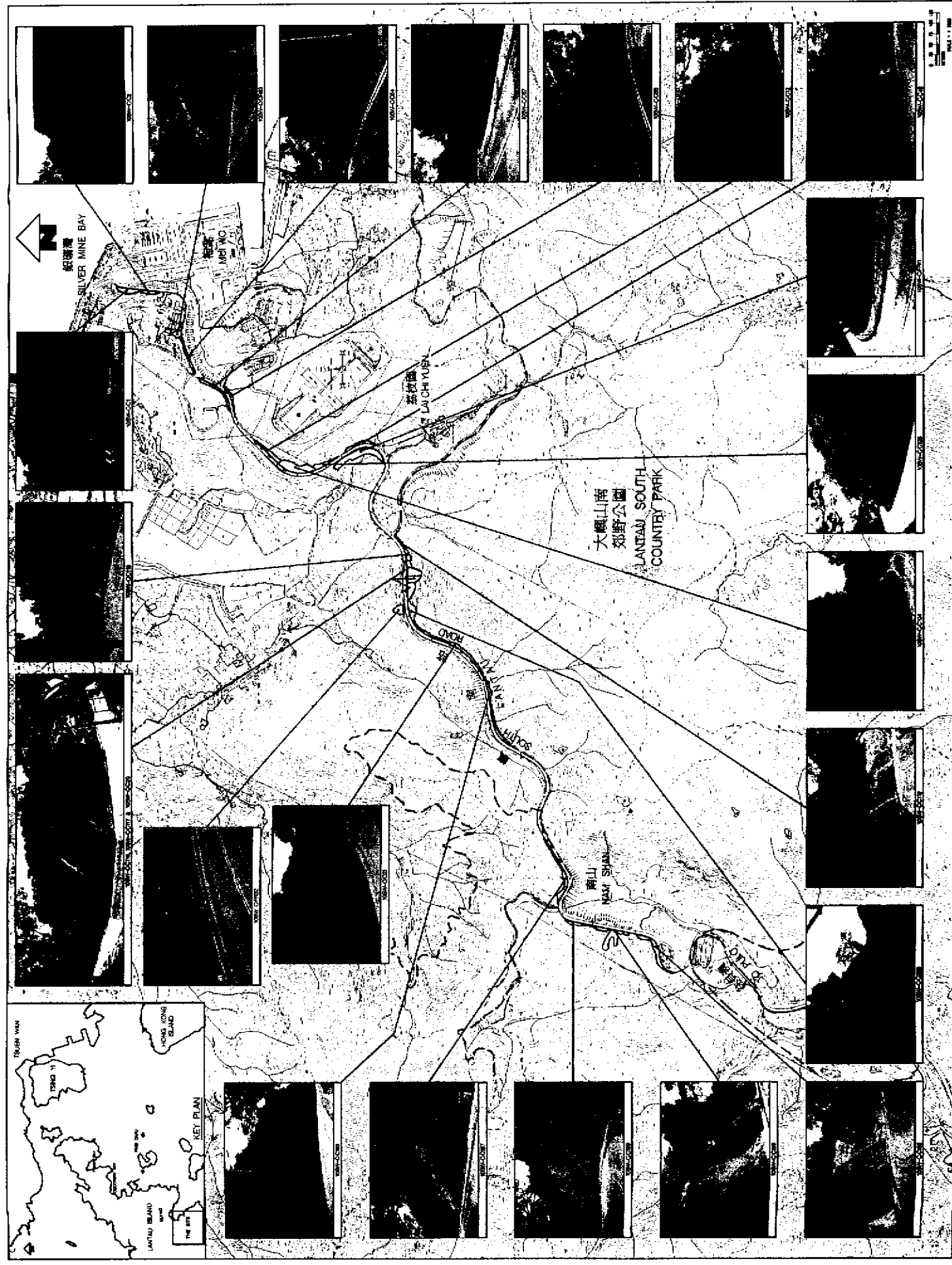
2. GENERAL NOTES:  
 (A) THE DESIGNER HAS CONDUCTED VISUAL INSPECTION OF THE PROJECT AREA AND HAS FOUND NO SIGNIFICANT OBSTACLES TO THE PROPOSED PROJECT.  
 (B) THE DESIGNER HAS CONDUCTED VISUAL INSPECTION OF THE PROJECT AREA AND HAS FOUND NO SIGNIFICANT OBSTACLES TO THE PROPOSED PROJECT.  
 (C) THE DESIGNER HAS CONDUCTED VISUAL INSPECTION OF THE PROJECT AREA AND HAS FOUND NO SIGNIFICANT OBSTACLES TO THE PROPOSED PROJECT.

3. EXPLANATION:  
 (A) PROJECT BOUNDARY  
 (B) EXISTING ROAD  
 (C) PROPOSED ROAD  
 (D) PROPOSED CUT SLOPE  
 (E) PROPOSED GRADE CONTROL WALL  
 (F) PROPOSED SOIL NAIL WALL  
 (G) PROPOSED CEMENT GRADE STABILIZATION WALL  
 (H) PROPOSED RETAINING WALL  
 (I) PROPOSED TIE BACK WALL  
 (J) PROPOSED MECHANICAL WALL  
 (K) PROPOSED FILL AND DRAP  
 (L) PROPOSED STEEP SLOPE PROTECTION WALL

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DESIGNED BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]  
 SCALE: 1:500  
 PROJECT NO.: [Number]  
 SHEET NO.: [Number]

HAOKROW  
 香港中環德輔道中  
 11/F, DE FUCHANG BUILDING  
 GEOTECHNICAL ENGINEERING OFFICE  
 11/F, DE FUCHANG BUILDING  
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 11/F, DE FUCHANG BUILDING  
 GEOTECHNICAL ENGINEERING OFFICE



SURVEY SHEET NOS: 108N-101, 108N-102, 108N-103, 108N-104, 108N-105, 108N-106, 108N-107, 108N-108, 108N-109, 108N-110, 108N-111, 108N-112, 108N-113, 108N-114, 108N-115, 108N-116, 108N-117, 108N-118, 108N-119, 108N-120, 108N-121, 108N-122, 108N-123, 108N-124, 108N-125, 108N-126, 108N-127, 108N-128, 108N-129, 108N-130, 108N-131, 108N-132, 108N-133, 108N-134, 108N-135, 108N-136, 108N-137, 108N-138, 108N-139, 108N-140, 108N-141, 108N-142, 108N-143, 108N-144, 108N-145, 108N-146, 108N-147, 108N-148, 108N-149, 108N-150, 108N-151, 108N-152, 108N-153, 108N-154, 108N-155, 108N-156, 108N-157, 108N-158, 108N-159, 108N-160, 108N-161, 108N-162, 108N-163, 108N-164, 108N-165, 108N-166, 108N-167, 108N-168, 108N-169, 108N-170, 108N-171, 108N-172, 108N-173, 108N-174, 108N-175, 108N-176, 108N-177, 108N-178, 108N-179, 108N-180, 108N-181, 108N-182, 108N-183, 108N-184, 108N-185, 108N-186, 108N-187, 108N-188, 108N-189, 108N-190, 108N-191, 108N-192, 108N-193, 108N-194, 108N-195, 108N-196, 108N-197, 108N-198, 108N-199, 108N-200.

**ATTACHMENT**

**FEATURE CONSTRUCTION**

**建築詳情（各個斜坡的建議工程）**

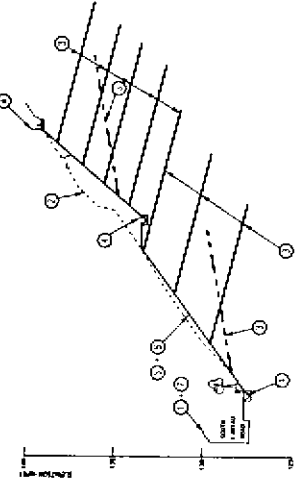
**斜坡護坡 (泥土新坡)**  
**FEATURE NO : 105W-C/1B7 (SOIL PORTION)**

SEQUENCE OF WORKS :

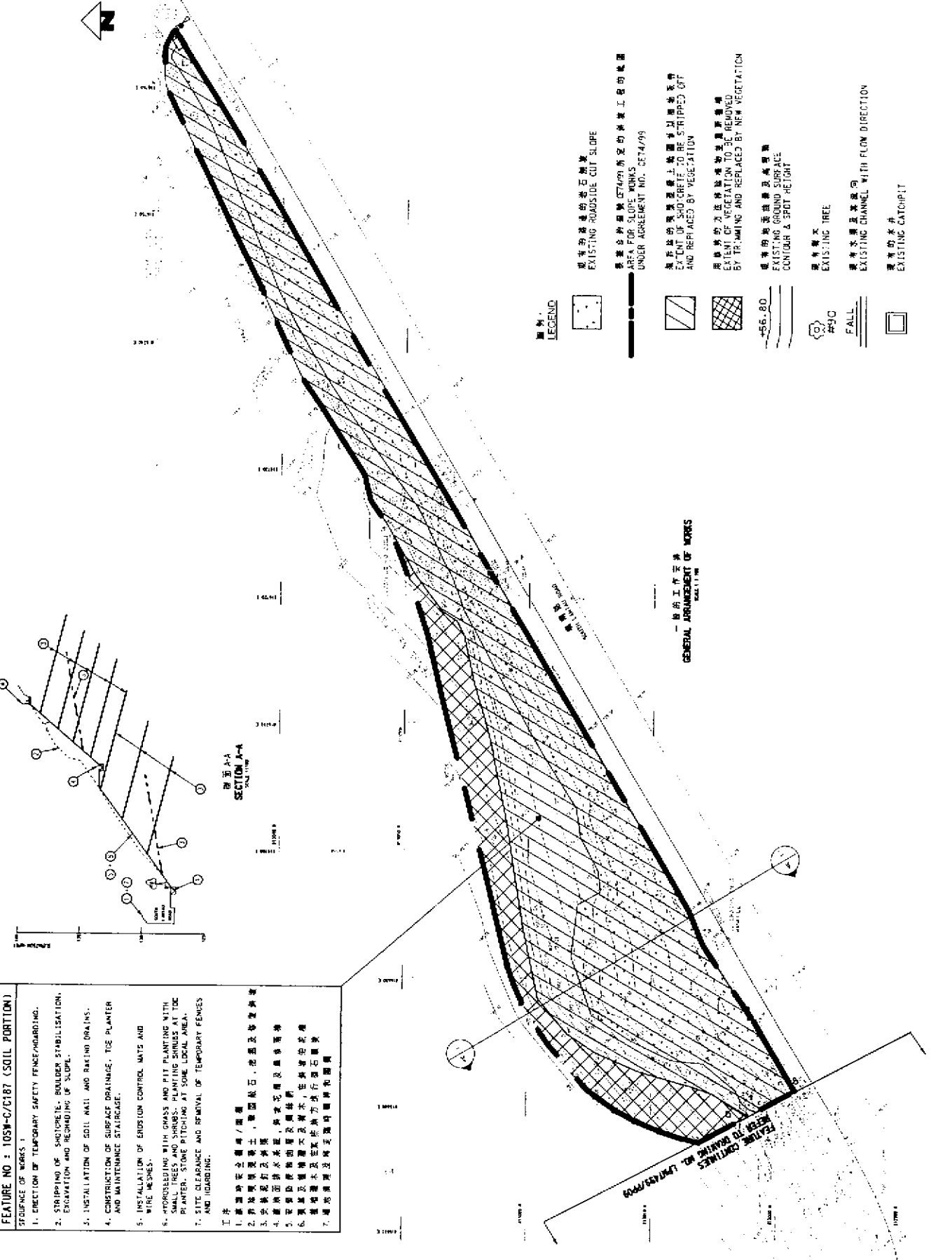
1. ERECTION OF TEMPORARY SAFETY FENCE/BOARDING.
2. STRIPPING OF SURFACETOP SOIL, SHOULDER STABILISATION, EROSION AND REPAIRING OF SLOPE.
3. INSTALLATION OF SOIL NAIL AND RAKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE, TOE PLANTER AND MAINTENANCE STAIRCASE.
5. INSTALLATION OF EROSION CONTROL MATS AND WIRE MESHES.
6. HYDROSEEDING WITH GRASS AND PITT PLANTING WITH SMALL TREES AND SHRUBS. PLANTING SHRUBS AT THE PLANTER. STONE PITCHING AT SOME LOCAL AREA.
7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND BOARDING.

工作程序

1. 新設臨時安全圍欄/圍板
2. 削去表面腐爛泥土, 圍固岩石, 泥面及修補護坡
3. 安裝泥釘及排渠
4. 施作表面排水系統, 碎石泥面及修補護坡
5. 安裝防沖刷物(草及樹苗)及樹木, 在植樹的穴填
6. 填植草皮及在局部地方進行石鋪裝
7. 清除圍欄及修補圍板



第五 A-A  
SECTION A-A  
SOIL NAIL



- 圖例**  
**LEGEND**
- 現有的路邊切土新坡  
EXISTING ROADSIDE CUT SLOPE
  - 根據合約編號 0274/99 所定的斜坡工程的工作範圍  
AREA FOR SLOPE WORKS  
UNDER AGREEMENT NO. 0274/99
  - 斜坡的腐爛泥面上範圍將以腐草及樹苗  
EXTENT OF SHOULDER TO BE STRIPPED OFF  
AND REPLACED BY VEGETATION
  - 腐爛的泥面及腐爛的泥面將被修剪  
EXTENT OF VEGETATION TO BE REMOVED  
BY TRIMMING AND REPLACED BY NEW VEGETATION
  - 現有的地面輪廓及高度  
EXISTING GROUND SURFACE  
CONTOUR & SPOT HEIGHT
  - 現有的樹木  
EXISTING TREE
  - 現有的水渠及其流向  
EXISTING CHANNEL WITH FLOW DIRECTION
  - 現有的水井  
EXISTING CATCHPIT

一般的工作安排  
**GENERAL ARRANGEMENT OF WORKS**  
 SCALE 1:100

1. ALL DIMENSIONS ARE IN METERS  
 UNLESS OTHERWISE SPECIFIED  
 2. ALL LEVELS ARE IN B.M. 4.00  
 METERIAL DATUM.

PROJECT NO.	105W-C/1B7
DATE	10/10/99
SCALE	1:100
PROJECT NAME	CONSTRUCTION OF A NEW ROAD AND SLOPE STABILISATION WORKS AT SHEWAN ROAD, HONG KONG
CLIENT	CONSTRUCTION DEPARTMENT HONG KONG GOVERNMENT
DESIGNER	HOLOKOW CONSULTANTS LTD.
APPROVED BY	(Signature)
DATE	10/10/99

HOLOKOW CONSULTANTS LTD.  
 2/F, 100, WING LOK STREET, HONG KONG  
 香港中環皇后大道中100號2樓

HOLOKOW CONSULTANTS LTD.  
 2/F, 100, WING LOK STREET, HONG KONG  
 香港中環皇后大道中100號2樓

HOLOKOW CONSULTANTS LTD.  
 2/F, 100, WING LOK STREET, HONG KONG  
 香港中環皇后大道中100號2樓

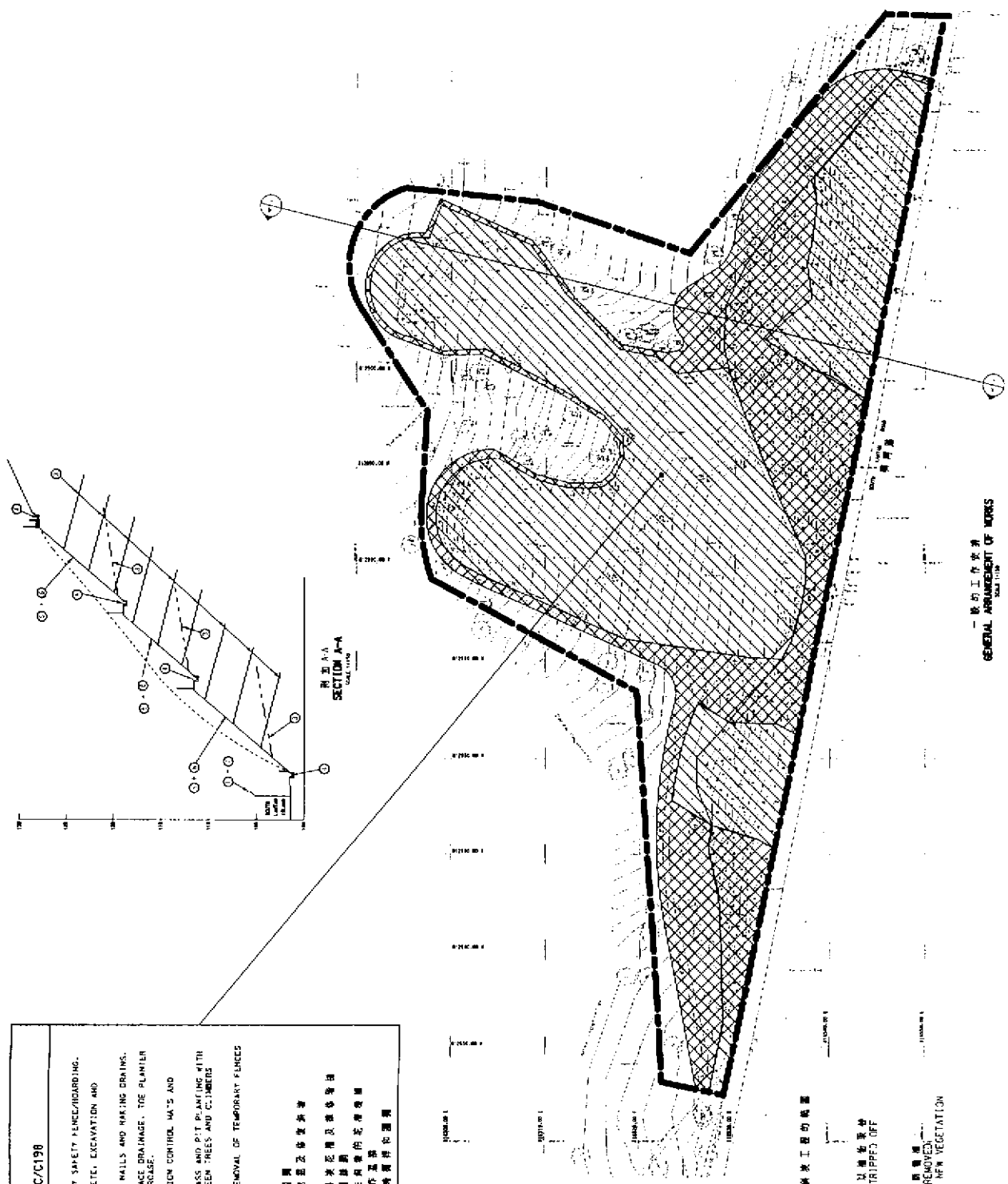
**斜坡編號**  
FEATURE NO: 105W-C/C198

**SEQUENCE OF WORKS:**

1. ERECTION OF TEMPORARY SAFETY FENCE/BOARDING.
2. STRIPPING OF SIDERECEL, EXCAVATION AND REGRADING OF SLOPE.
3. INSTALLATION OF SOIL NAILS AND MAKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE, THE PLANTER AND MAINTENANCE STAIRCASE.
5. INSTALLATION OF EMISSION CONTROL MATS AND WIRE MESHES.
6. HYDROSEEDING WITH GRASS AND PITT PLANTING WITH SHRUBS, PLANTING SCREEN TREES AND COLUMNES AT THE PLANTER.
7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND BOARDING.

**工完**

1. 設置臨時安全圍欄/圍板
2. 清除側面石塊, 挖空及修復斜坡
3. 安裝泥釘及排水
4. 建造表面排水系統, 植綠花園及維修樓梯
5. 安裝防塵地面層及鐵絲網
6. 噴草及種植灌木, 在綠花園的左邊種植
7. 清除圍欄及圍板



剖面 A-A  
SECTION A-A  
SCALE 1:10

一般的工作範圍  
GENERAL ALIGNMENT OF WORKS

1. ALL DIMENSIONS ARE IN METERS  
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED  
3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED

Project Name	Project No.	Scale
Client	Contract No.	Revision
Design No.	Issue No.	Date
Author	Checked	Approved
Drawn	Reviewed	Accepted
Checked	Accepted	Issued
Accepted	Issued	Final

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 2. 所有尺寸均以面為準, 除非另有說明  
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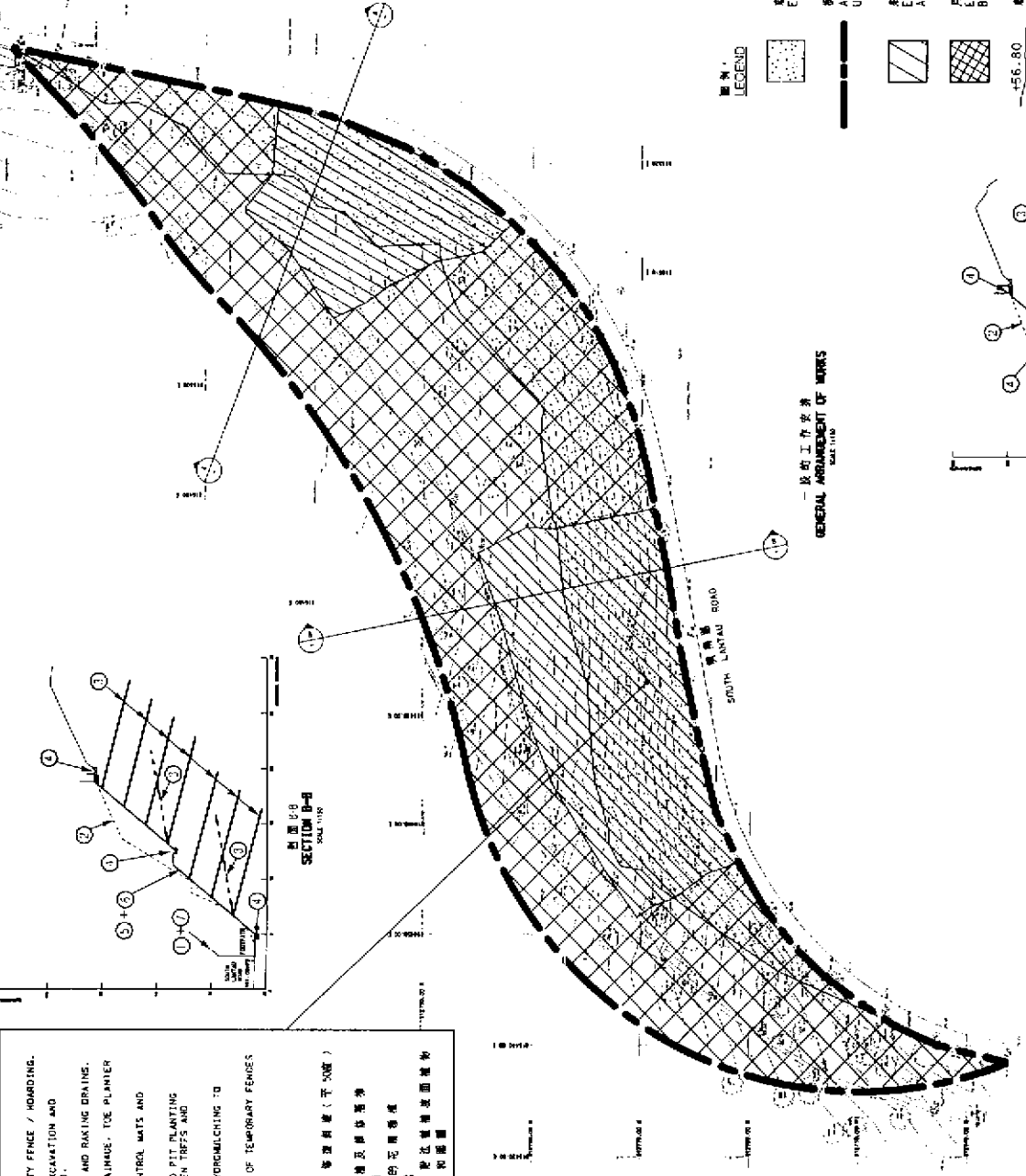
**圖例**  
LEGEND

- 現有道路 (EXISTING ROAD/ST. CUT) ST. OFF
- 斜坡工程範圍 (AREA FOR SLOPE WORKS) UNDER AGREEMENT NO. 02/4/09
- 將被清除的植被 (VEGETATION TO BE STRIPPED OFF AND REPLACED BY VEGETATION)
- 將被清除的植被 (EXTENT OF VEGETATION TO BE REMOVED) BY TRIMMING AND REPLACED BY NEW VEGETATION
- 現有地面輪廓及高度 (EXISTING GROUND SURFACE CONTOUR & SPOT HEIGHT)
- 現有樹木 (EXISTING TREE)
- 現有樹木及其走向 (EXISTING CHANNEL WITH FLOW DIRECTION)
- 現有樹木 (EXISTING CATOPIIT)

SCALE: 1:500  
PROJ. NO.: 108P-C/C165  
DATE: 10/2014

- 斜坡編號**  
FEATURE NO : 108P-C/C165
- SEQUENCE OF WORKS :**
1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
  2. STRIPPING OF SHOULDER, EXCAVATION AND REGRADING OF SLOPE (TO 50').
  3. INSTALLATION OF SOIL NAILS AND BAKING DRAINS.
  4. CONSTRUCTION OF SURFACE DRAINAGE - TOE PLANNER AND INTERMEDIATE STAIRCASE.
  5. INSTALLATION OF EROSION CONTROL MATS AND WIRE MESHES.
  6. HYDROSEEDING WITH GRASS AND PIT PLANTING WITH SHRUBS, PLANTING SCREEN TREES AND CLIMBERS AT THE PLANTER.
  7. STONE PITCHING AND APPLY HYDROMULCHING TO PROVIDE GREEN EFFECT.
  8. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.

- 工作**
1. 建造臨時安全圍欄/圍板。
  2. 拆去路邊泥土，挖掘及修整斜坡 (至 50')。
  3. 安裝圓釘及土釘。
  4. 安裝表面排水溝及梯級。
  5. 安裝及燒結鋼絲網，作作土釘的托架。
  6. 噴草及植樹及植草坑，於植樹坑內種植灌木及爬藤植物。
  7. 進行石工及噴草，以提供綠化效果。
  8. 清除地盤及移走臨時圍欄和圍板。



現有路邊舊土石斜坡  
EXISTING ROADSIDE CUT SLOPE

根據合約編號 108P-C/C165 的保養工程估價單  
AREA FOR SLOPE WORKS  
UNDER AGREEMENT NO. C/C165/14

斜坡的危險區域已用斜線表示  
EXTENT OF SHOOTING TO BE STRIPPED OFF  
AND REPLACED BY VEGETATION

只保留的力茲特種植物及草種  
EXTENT OF VEGETATION TO BE PRECISED  
BY TRIMMING AND REPLACED BY NEW VEGETATION

現有地面高度及高度  
EXISTING GROUND SURFACE  
CONTOUR & SPOT HEIGHT

原有樹木  
EXISTING TREE

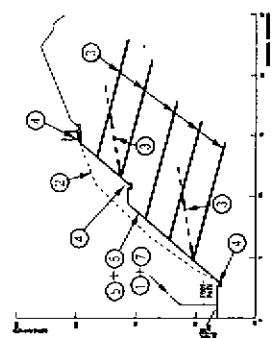
原有水渠及其流向  
EXISTING CHANNEL WITH FLOW DIRECTION

原有的水坑  
EXISTING CATCH PIT

圖例  
LEGEND



一般的工作安排  
GENERAL ARRANGEMENT OF WORKS



108P-C/C165

108P-C/C165  
SLOPE PROTECTION  
SOUTH LANTAU ROAD

108P-C/C165  
SLOPE PROTECTION  
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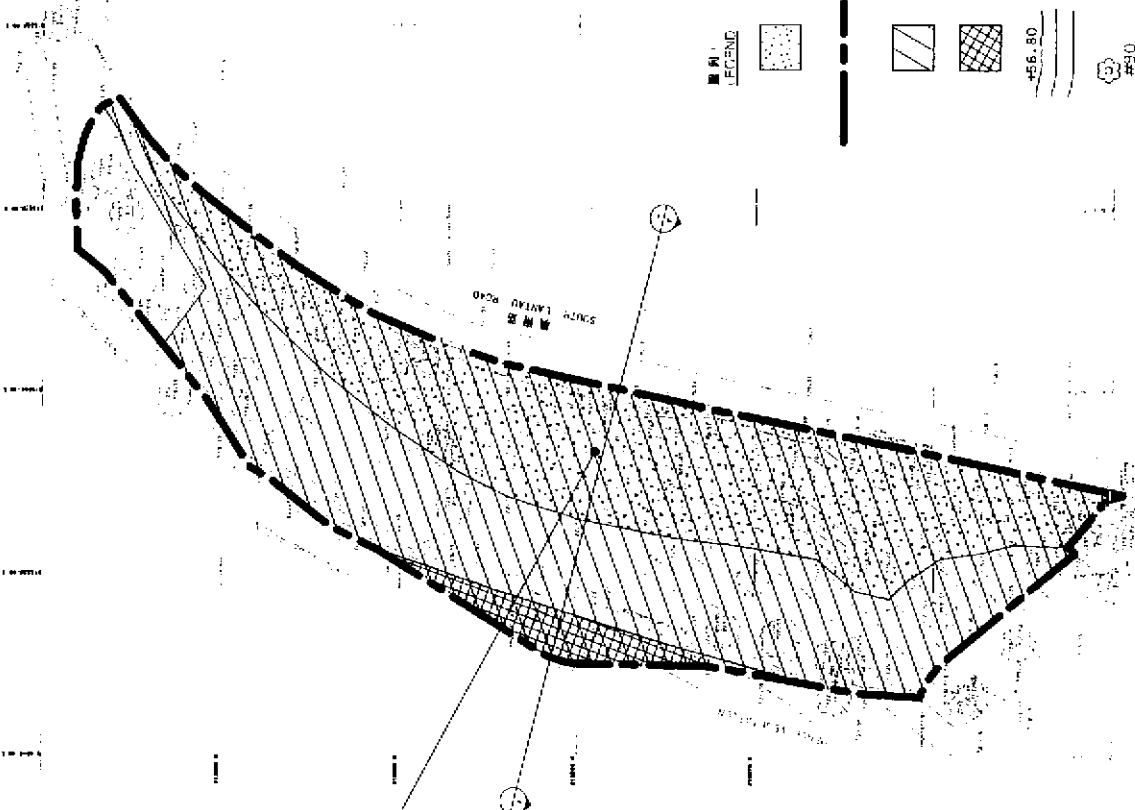
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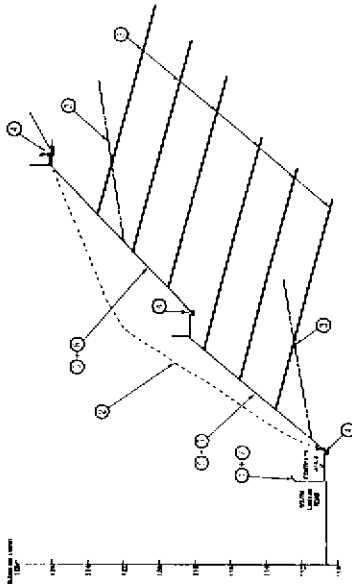


1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL DISTANCES ARE TO CENTRE LINE UNLESS OTHERWISE SPECIFIED.
3. ALL DISTANCES ARE TO FACE UNLESS OTHERWISE SPECIFIED.



- 圖例 / LEGEND**
- 填補的現有路邊切坡範圍 AREA FOR SLOPE WORKS UNDER AGREEMENT NO. CE/74/99
  - 填補的現有路邊切坡範圍內之植物植被 EXTENT OF SHOTBREE TO BE STRIPPED OFF AND REPLACED BY VEGETATION
  - 填補的現有路邊切坡範圍內之植物植被將被保留 BY TRIMMING AND REPLACED BY NEW VEGETATION
  - 填補的地面由填土及原有地面 EXISTING GROUND SURFACE OUTSIDE & SPOT HEIGHT
  - 現有樹木 EXISTING TREE
  - 填補水渠及其流向 EXISTING CHANNEL WITH FLOW DIRECTION
  - 現有排水井 EXISTING CATCHPI

- 斜坡填補**  
**FEATURE NO : 10SK-C/CI99**
- SEQUENCE OF WORKS :**
1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
  2. STRIPPING OF SHOTBREE, EXCAVATION AND REGRADING OF SLOPE (1:0.50).
  3. INSTALLATION OF SOIL NAILS AND RAKING DRAINS.
  4. CONSTRUCTION OF SURFACE DRAINAGE, TOE PLANTER AND MAINTENANCE STAIRCASE.
  5. INSTALLATION OF EROSION CONTROL MATS AND WIRE MESHES.
  6. HYDROSEEDING WITH GRASS AND PIT PLANTING WITH TREES AND SHRUBS. PLANTING SHRUBS AT TOE PLANTER.
  7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.
- 工程**
1. 填補安全圍欄/圍板
  2. 清除現有路邊切坡土，挖溝及修復斜坡 (1:0.50)
  3. 安裝泥釘及排泥渠
  4. 填補面排水系統，安裝坑道及填土階梯
  5. 安裝面排水及土網
  6. 填補及種植草皮及樹木，在坡腳的泥坑種植灌木
  7. 清除現有及移去臨時圍欄和圍板



**剖面 A-A**  
**SECTION A-A**  
 SCALE 1:100

**一般的工作安排**  
**GENERAL ARRANGEMENT OF WORKS**

**Heaton**  
 測量師行

測量師行  
 502 GARDEN ROAD  
 5/F, GARDEN BUILDING  
 HONG KONG  
 香港中區花園道502號5樓

測量師  
 伍子明  
 測量師  
 伍子明  
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工程測量師  
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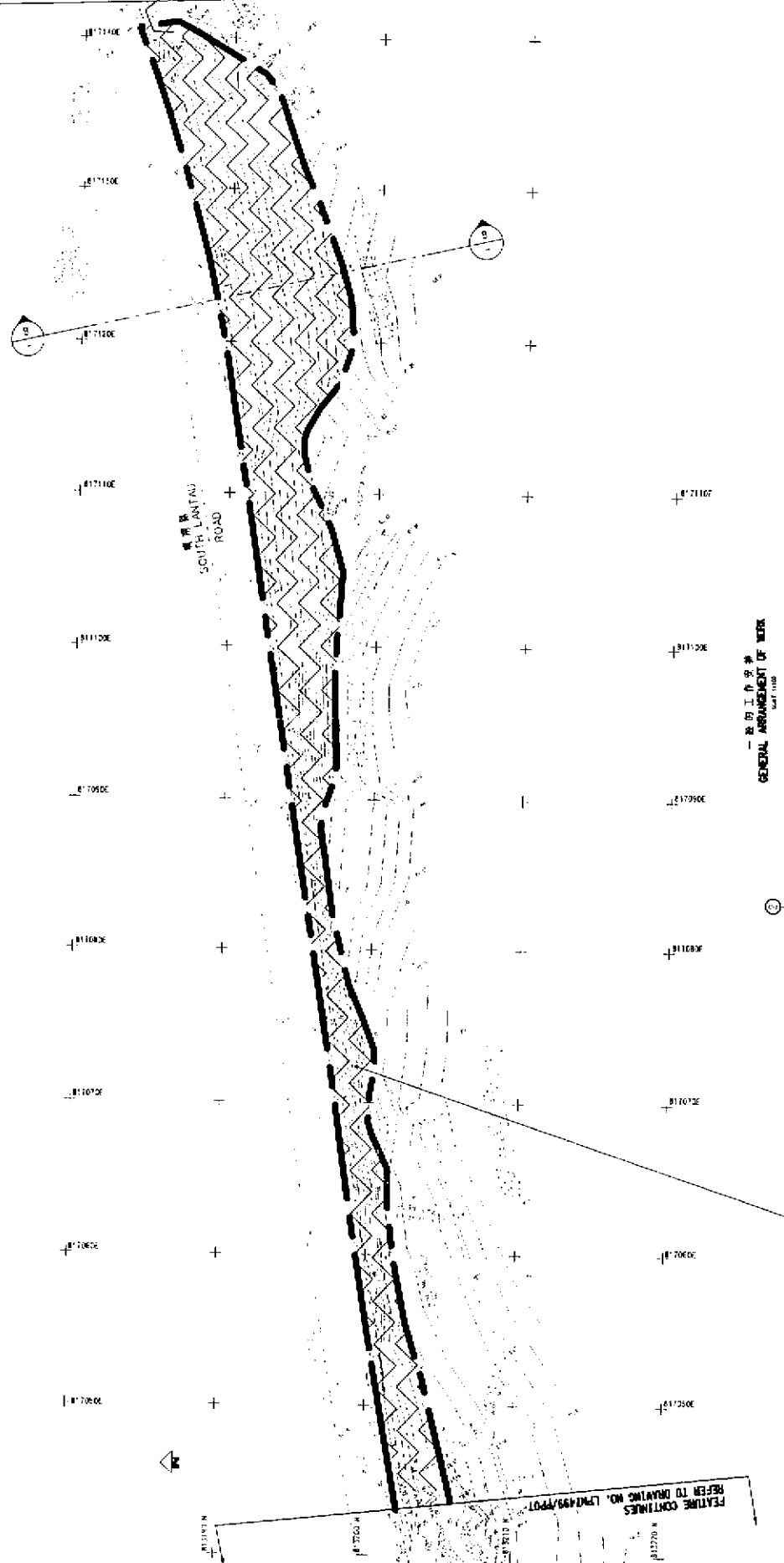
土地測量師  
 伍子明  
 土地測量師  
 伍子明

地籍測量師  
 伍子明  
 地籍測量師  
 伍子明

測量師  
 伍子明  
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 伍子明

測量師  
 伍子明  
 測量師  
 伍子明

1. ALL DIMENSIONS ARE IN METERS  
UNLESS OTHERWISE SPECIFIED.  
2. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.  
3. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.



**圖例 LEGEND**

- 在現有斜坡的岩石崩落區進行石塊穩定措施  
EXISTING ROADSIDE ROCK CUT SLOPE WITH ROCK SLOPE STABILISATION MEASURES
- 根據合約圖號 C274029 規定的永久二層的檢查區 FOR SLOPE MONITORING AREA UNDER AGREEMENT NO. CE/14/99
- 現有的地面輪廓及高程線 EXISTING GROUND SURFACE CONTOUR & SPOT HEIGHT
- 現有樹木 EXISTING TREE
- 現有水渠及其流向 EXISTING CHANNEL WITH FLOW DIRECTION
- 現有的水溝 EXISTING CATCHPI

圖例 LEGEND

- 岩石崩落區 (岩石斜坡)
- 臨時安全圍欄/圍網
- 鋼筋石塊穩定措施
- 安裝岩石穩定措施鋼釘及鋼索
- 現有樹木
- 現有水渠及其流向
- 現有水溝

**一般的工作安排**  
GENERAL ARRANGEMENT OF WORK  
Part 1100

**圖面 B-B**  
SECTION B-B  
Scale 1:100

**斜坡編號 (岩石斜坡)**  
FEATURE NO : 105W-C/193 (ROCK POSITION)

**SEQUENCE OF WORKS :**

1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
2. SCALING OF ROCK - BOULDER STABILISATION
3. INSTALLATION OF ROCK BOLTS, ROCK DOMES AND RAKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE AND MAINTENANCE STRIP/INSE.
5. INSTALLATION OF WIRE MESHES.
6. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.

**工作**

1. 設置臨時安全圍欄/圍網
2. 削去岩石及鋼筋石塊穩定措施
3. 安裝岩石穩定措施鋼釘及鋼索
4. 現有樹木
5. 現有水渠及其流向
6. 現有水溝

REFER TO DRAWING NO. LPM7498/PROB FOR  
FEATURE CONTAINING NO. LPM7498/PROB

香港測量師學會註冊測量師  
測量師 伍志強  
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1. ALL DIMENSIONS ARE IN METERS  
AND TO NEAREST CENTIMETER.  
2. METRIC UNITS.

**斜溝編號**  
FEATURE NO. : 105W-C/C118

**SEQUENCE OF WORKS :**

1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
2. STRIPPING OF SHOTCRETE, BULKER STABILISATION, EXCAVATION AND REGRADING OF SLOPE (45°-55°).
3. INSTALLATION OF SOIL NAILS AND RAKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE TOE PLANTER AND WATERFENCE STAIRCASE.
5. INSTALLATION OF EROSION CONTROL MATS AND WIRE MESHES.
6. HYDROSEEDING (SLOPE ANGLE < 50°) AND BROADCASTING (SLOPE ANGLE > 50°) WITH DRONDROCOYS. PIT PLANTING WITH SHRUBS, PLANTING CLIMBERS AND SHRUBS AT THE PLANTER.
7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.

**工作**

1. 設置臨時安全圍欄 / 圍護
2. 剝除現存噴射混凝土，空區碎石，挖開及修復斜坡
3. 安裝泥釘及拉釘，外置排水，修補噴溝
4. 建造泥釘外排水，外置排水，修補噴溝
5. 安裝表面噴射式鋼筋網
6. 噴草 (坡度小於 50 度) 及播種或新法 (坡度大於 50 度) 播種泥釘面噴草，播種灌木。在泥釘的尾端種植爬藤植物
7. 清除圍護及拆去臨時圍欄和圍護

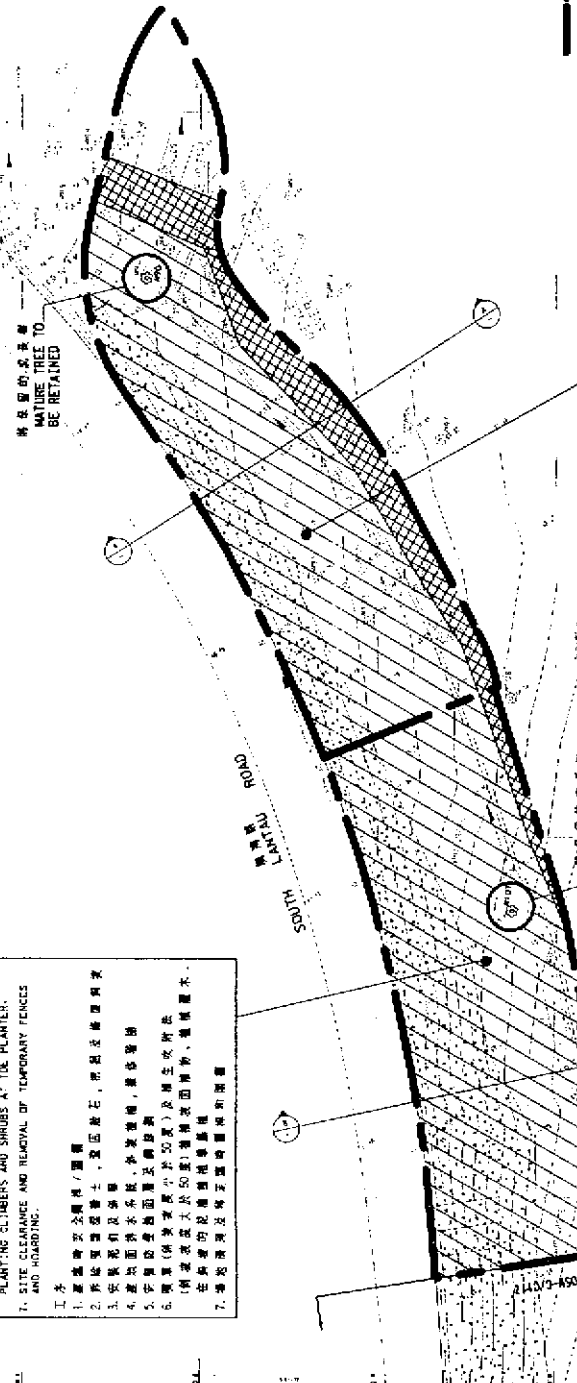
**斜溝編號**  
FEATURE NO. : 105W-C/C119

**SEQUENCE OF WORKS :**

1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
2. STRIPPING OF SHOTCRETE, EXCAVATION AND REGRADING OF SLOPE (70-85°).
3. INSTALLATION OF RAKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE TOE PLANTER AND WATERFENCE STAIRCASE.
5. HYDROSEEDING WITH GRASS AND PIT PLANTING WITH SHRUBS AND TREES. PLANTING SCREEN TREES AT THE PLANTER.
7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.

**工作**

1. 設置臨時安全圍欄 / 圍護
2. 剝除現存噴射混凝土，空區碎石，挖開及修復斜坡
3. 安裝泥釘外排水，外置排水，修補噴溝
4. 建造泥釘外排水，外置排水，修補噴溝
5. 播草及種植爬藤植物
6. 種植泥釘尾端爬藤植物
7. 清除圍護及拆去臨時圍欄和圍護



**圖例**  
LEGEND

- 現有路邊切坡  
EXISTING ROADSIDE CUT SLOPE
- 根據合約圖則 C274/99，填海工程由地務署  
AREA FOR SLOPE WORKS  
UNDER AGREEMENT NO. CE/4/99
- 須拆掉的噴草及噴土區圍護並以新噴草  
AND REPLACED BY VEGETATION
- 用噴草的斜坡修補噴草  
EXTENT OF VEGETATION TO BE REMOVED  
BY TREEMING AND REPLACED BY NEW VEGETATION
- 現有噴草的輪廓及高度  
EXISTING GROUND SURFACE  
CONTOUR & SPOT HEIGHT
- 現有噴草  
EXISTING TREE
- 現有排水溝及溝渠  
EXISTING CHANNEL & DRAIN DIRECTION
- 現有排水井  
EXISTING CATCHPIT

**圖例**  
LEGEND

- ±55.00
- FAIL

**斜溝編號**  
FEATURE NO. : 105W-C/C119

**GENERAL ARRANGEMENT OF WORKS**  
SCALE 1:100

**斜溝編號**  
FEATURE NO. : 105W-C/C118

**SECTION A-A (FEATURE NO. 105W-C/C119)**  
SCALE 1:100

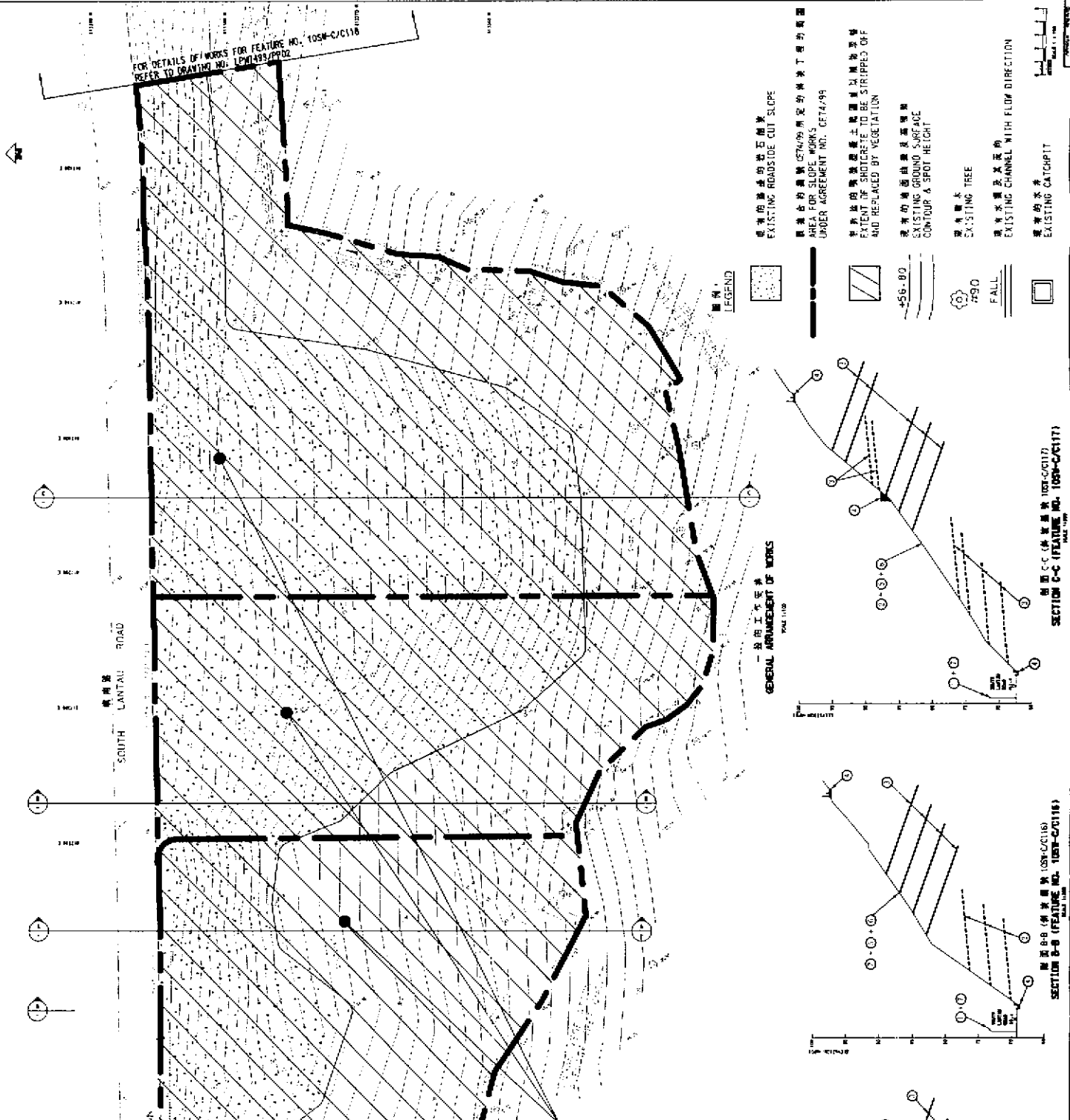
**SECTION B-B (斜溝編號 105W-C/C118)**  
**SECTION B-B (FEATURE NO. 105W-C/C118)**  
SCALE 1:100

1. ALL DIMENSIONS ARE IN METERS  
 2. ALL UNITS ARE TO BE METRIC  
 3. ALL UNITS ARE TO BE METRIC

REVISIONS	
NO.	DESCRIPTION

PROJECT NO.	108W-C/020-C/0116-C/0117
CLIENT	
DESIGNER	
DATE	
DRAWN BY	
CHECKED BY	
SCALE	



THESE PROPOSED ROADSIDE CUT SLOPE ARE TO BE STRIPPED OFF AND REPLACED BY VEGETATION

EXTENT OF SHOULDER TO BE STRIPPED OFF AND REPLACED BY VEGETATION

EXISTING GROUND SURFACE CONTOUR & SPOT HEIGHT

EXISTING CHANNEL WITH FLOW DIRECTION

EXISTING TREE

EXISTING CHANNEL WITH FLOW DIRECTION

EXISTING CATCHMENT

GRASS MAT

ROCK

RETAINING WALL

FALL

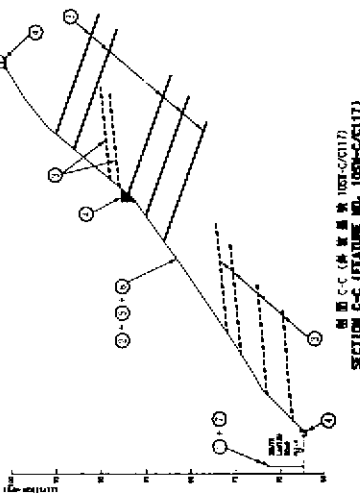
FALL

FALL

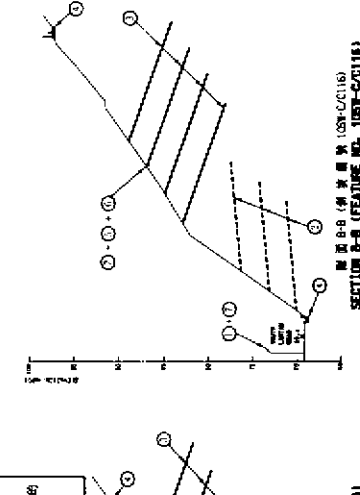
FALL

LEGEND

GENERAL ARRANGEMENT OF WORKS



SECTION 8-8 (FEATURE NO. 108W-C/016)



SECTION 8-8 (FEATURE NO. 108W-C/016)

- 斜坡編號  
 FEATURE NOS: 108W-C/020-C/0116-C/0117
- SEQUENCE OF WORKS:
1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
  2. BOLLARD STABILISATION, STRIPPING OF SHOULDER, WINDOW TRIMMING AND BOUNDING OF SLOPE.
  3. INSTALLATION OF SOIL NAILS AND DRINKING DRINKING.
  4. CONSTRUCTION OF SURFACE DRAINAGE, BERM, TREE PLANTER AND MAINTENANCE STAIRCASE.
  5. HYDROMULCHING WITH GROUNDCOVERS, PLANTING SHRUBS AND SCREEN TREES AT TOE PLANTER.
  6. INSTALLATION OF EROSION CONTROL MATS AND WIRE MESHES.
  7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.
- 工作  
 1. 設置安全圍欄/ 圍欄  
 2. 設置圓錐石, 削除護路邊坡, 少量修整  
 3. 安裝鋼筋及土釘  
 4. 安裝表面排水溝, 側水溝, 樹木基及  
 5. 使用防草植物及纖維網  
 6. 填土收坡及增加邊面的樹木覆蓋, 在斜坡的  
 7. 清除圍欄及作天際線樹木和圍欄

FOR DETAILS OF WORKS FOR FEATURE NO. 108W-C/020-C/0116-C/0117 REFER TO DRAWING NO. LP41499/PP102

FOR DETAILS OF WORKS FOR FEATURE NO. 108W-C/016 REFER TO DRAWING NO. LP41499/PP102

108W-C/020-C/0116-C/0117  
 108W-C/016  
 108W-C/020

HEALOW  
 香港中環皇后大道中 2 號

108W-C/020-C/0116-C/0117  
 108W-C/016  
 108W-C/020

108W-C/020-C/0116-C/0117  
 108W-C/016  
 108W-C/020

- 橫坡編號**  
**FEATURE NO : 105M-C/0209**
- SEQUENCE OF WORKS :**
1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
  2. STRENGTHENING OF CONCRETE/ROUNDER STABILIZATION, EXCAVATION AND REGRADING OF SLOPE (TO 50%).
  3. INSTALLATION OF SOIL NAIL AND MAKING DRAINS.
  4. CONSTRUCTION OF SURFACE DRAINAGE, COUNTERFORT DRAINS AND MAINTENANCE STAIRCASE.
  5. INSTALLATION OF EROSION CONTROL MATS AND WIRE NETS.
  6. HYDROSEEDING WITH GRASS AND PIT PLANTING WITH SHRUBS.
  7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.
- 工序**
1. 建造臨時安全圍欄/圍欄
  2. 新設或修補圓石、碎石墊石、挖填及修補橫坡
  3. 安裝配打及斜樁
  4. 建造面排水、表面排水、溝水長溝及橫坡排水
  5. 安裝防沖擊油管及鋼絲網
  6. 植草及種植灌木
  7. 場址清理及移走臨時圍欄和圍欄

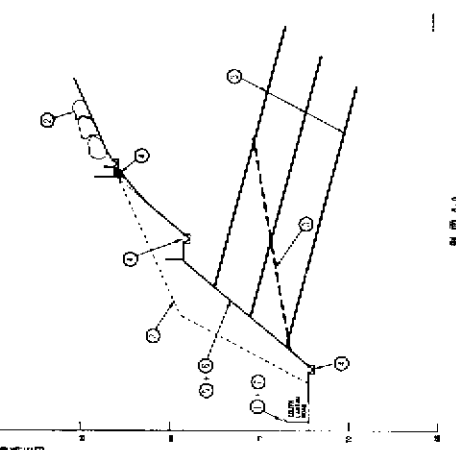
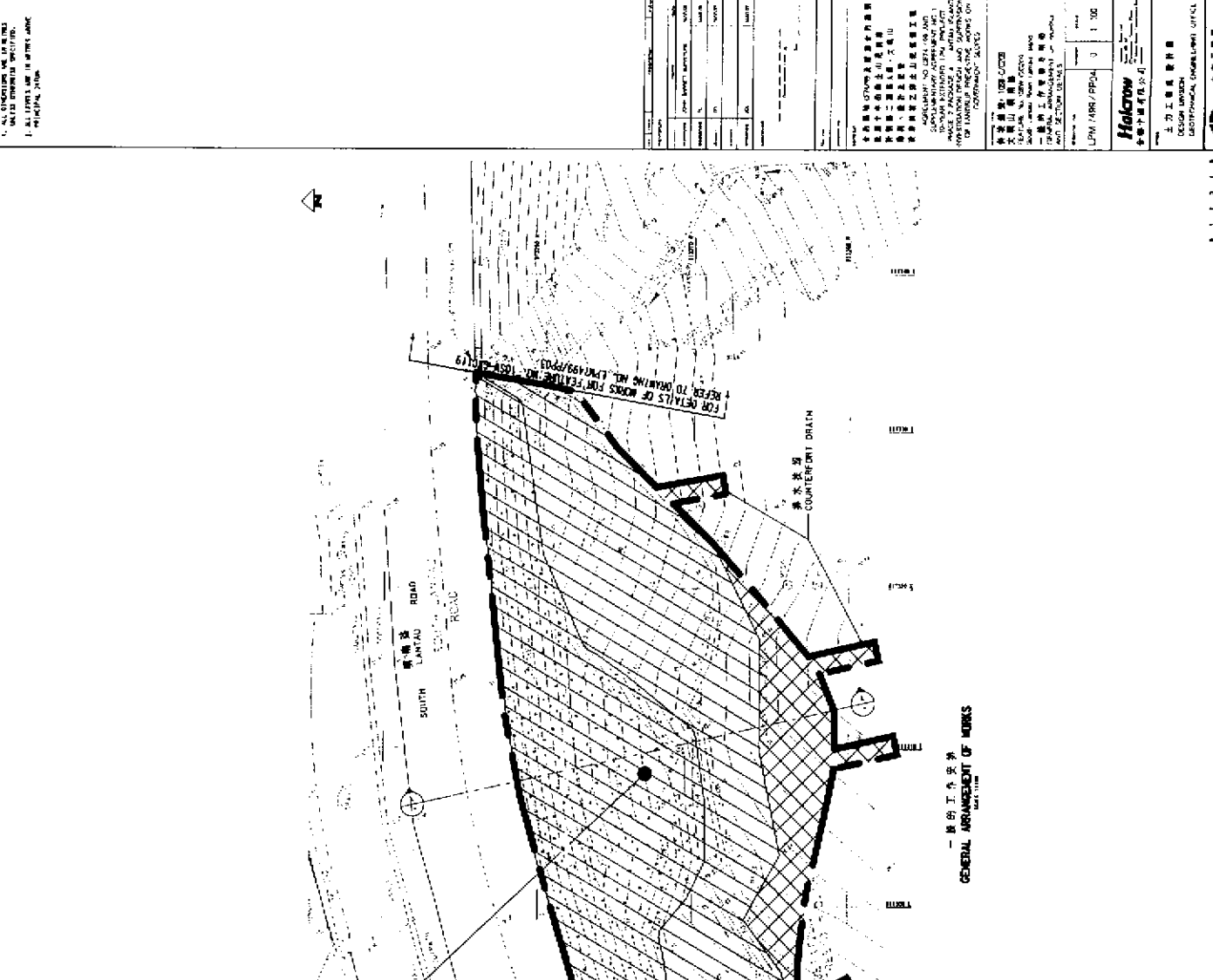


圖 4.3  
SECTION A-A  
FALL 1:100

- 圖例 / LEGEND:**
- 現有路邊切坡  
EXISTING ROADSIDE CUT SLOPE
  - 同意合約的斜坡工程區  
AREA FOR SLOPE WORKS UNDER AGREEMENT NO. C274/99
  - 應清除的現有植被及應被新植被取代的範圍  
EXTENT OF VEGETATION TO BE STRIPPED OFF AND REPLACED BY VEGETATION
  - 現有地面輪廓及標高  
EXISTING GROUND SURFACE CONTOUR & SPOT HEIGHT
  - 現有樹木  
EXISTING TREE
  - 現有坡度及方向  
EXISTING CHANNEL WITH FLOW DIRECTION
  - 現有的方井  
EXISTING CATCHPIT



1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.  
2. ALL LEVELS ARE IN METERS ABOVE MEAN SEA LEVEL.

PROJECT NO.	
DATE OF ISSUE	
SCALE	
DESIGNER	
CHECKED	
APPROVED	
DATE	
PROJECT NAME	
LOCATION	
SHEET NO.	
TOTAL SHEETS	
CLIENT	
CONSULTANT	
PROJECT ADDRESS	

**項目編號**

**日期**

**比例**

**設計人**

**校核人**

**批准人**

**日期**

**項目名稱**

**地點**

**圖號**

**圖張數**

**客戶**

**顧問**

**項目地址**

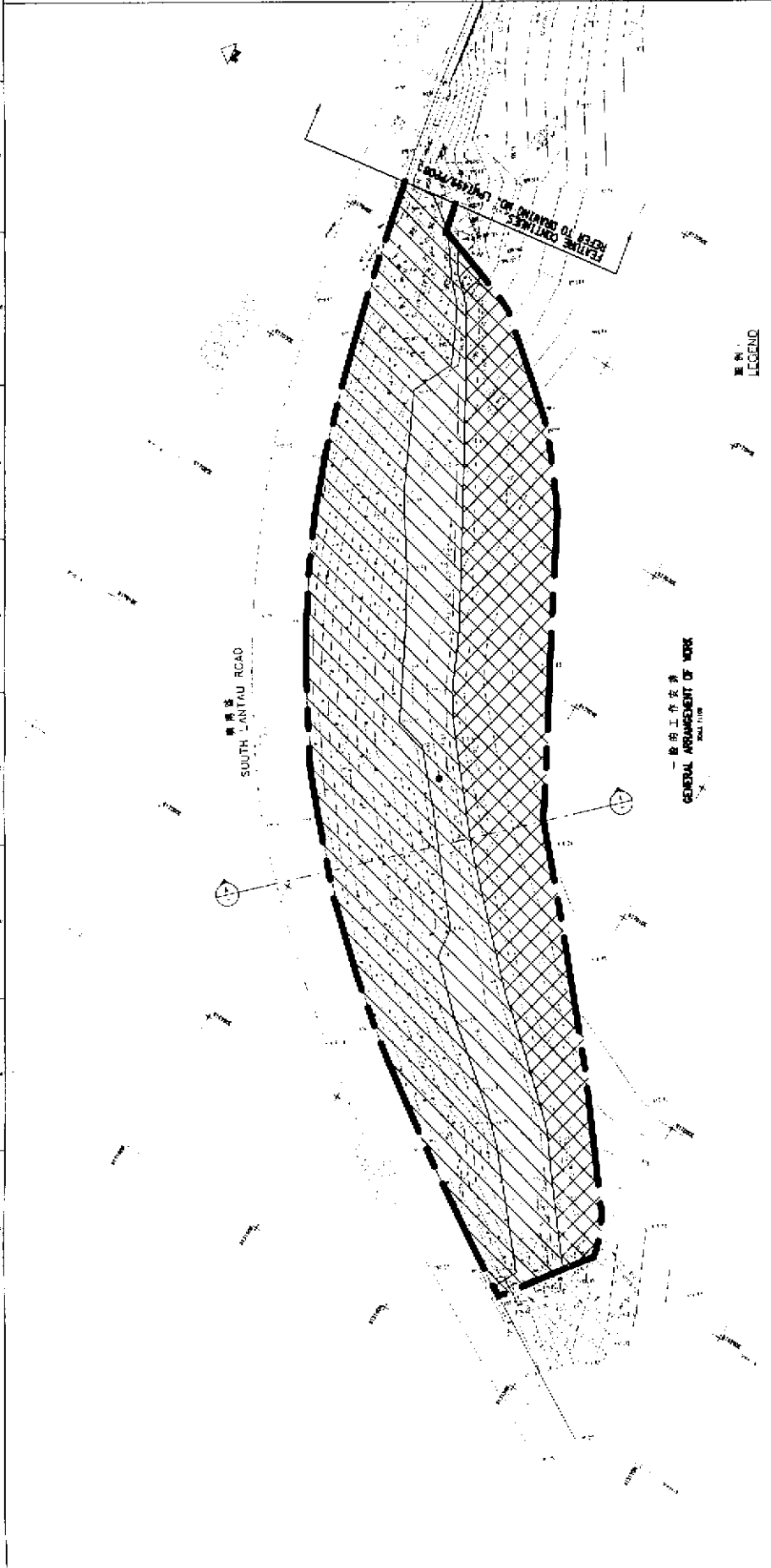
UPW/499/PP/03 1/100

**Helcon**

土力工程顧問  
DESIGN DIVISION  
GEOTECHNICAL ENGINEERING OFFICE  
土力工程師  
CIVIL ENGINEERING  
香港中區干諾道中

1. ALL DIMENSIONS ARE IN METERS  
 2. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED  
 3. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED

PROJECT NO.	UPM 798/PROJ. 9
SCALE	1:100
DATE	
DESIGNED BY	
CHECKED BY	
APPROVED BY	
DATE	
PROJECT NAME	UPM 798/PROJ. 9
PROJECT LOCATION	
PROJECT DESCRIPTION	
CLIENT	
DESIGNER	
APPROVED BY	
DATE	



**LEGEND**

- Existing roadside cut slope
- Area for slope works under agreement no. C274/99
- Existing ground surface contour & spot height
- Existing tree
- Existing channel with flow direction
- Existing catchpit

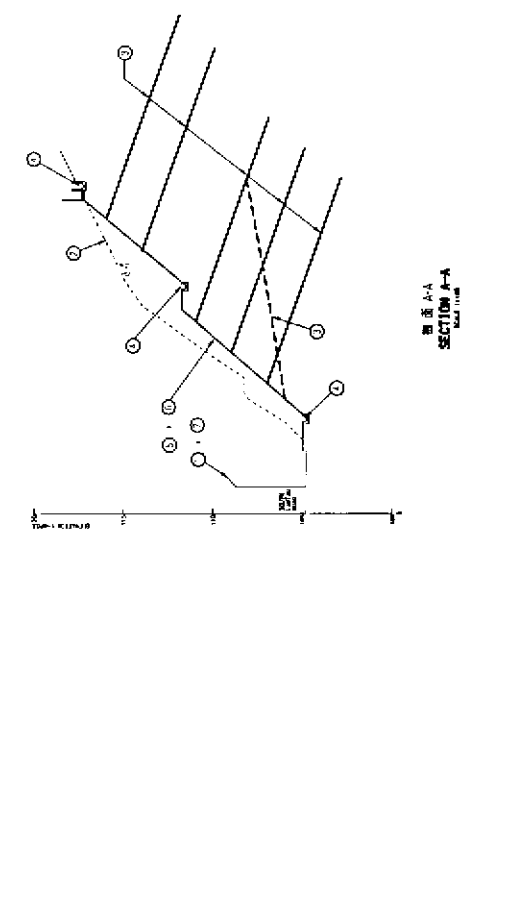
**斜裝編號 (泥土斜裝) (SOIL STABILIZATION)**  
 FEATURE NO. : 105N-C/193

**SEQUENCE OF WORKS :**

1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
2. STRIPPING OF SHIFORETE, SOULDER STABILISATION LIGNATION AND REGRADING OF SLOPE (TO 50%).
3. INSTALLATION OF SOIL WALLS AND RAKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE AND MAINTENANCE STAIRCASE.
5. INSTALLATION OF EROSION CONTROL MATS AND WIRE NETTING.
6. HYDRSEEDING WITH GRASS AND PITT PLANTING WITH SHRUBS. PLANTING OF CLIMBERS ALONG THE SLOPE TOE.
7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.

**工作程序 :**

1. 設置臨時安全圍欄 / 圍欄
2. 拆去斜裝泥土, 整平及修補
3. 安裝泥土斜裝及排水
4. 安裝表面排水及維修樓梯
5. 安裝及修補泥土, 植草及種植灌木
6. 植草及種植灌木, 沿斜坡種植爬藤植物
7. 清除現場及拆除臨時圍欄及圍欄



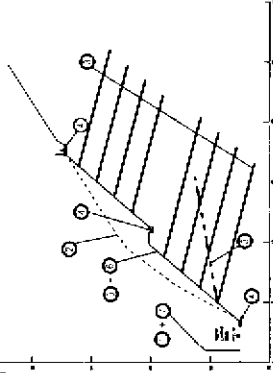
**斜溝編號 (泥土箱架)**  
**FEATURE NO.: 10SW-C/C21 (SOIL PORTION)**

**SEQUENCE OF WORKS :**

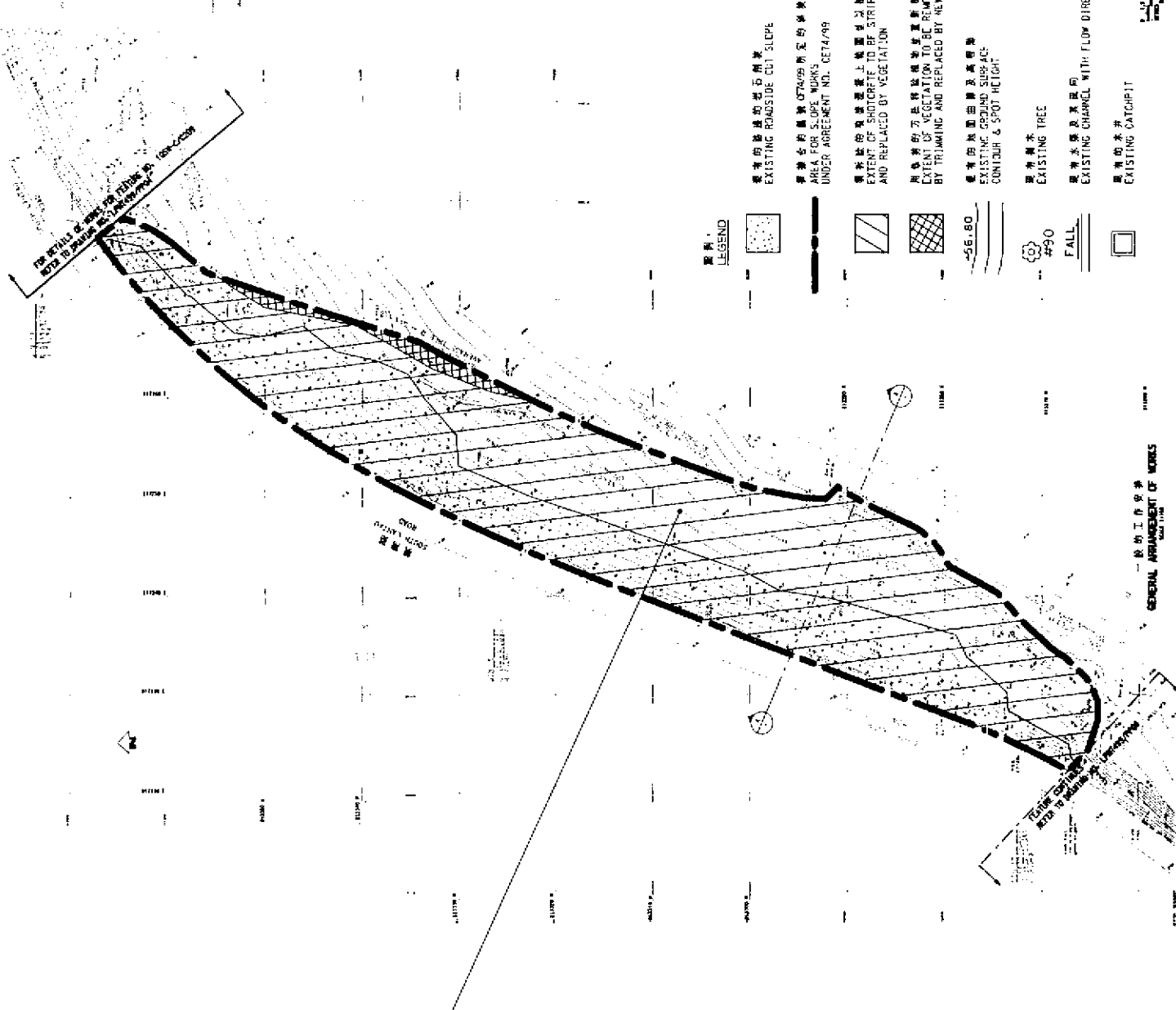
1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
2. EXCAVATION OF ANTI-CIRCULAR BOULDER STABILIZATION, EXCAVATION AND RECORDING OF SLOPE (1D 5D').
3. INSTALLATION OF SOIL NAILS AND RAKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE, AND MAINTENANCE STAIRCASE.
5. INSTALLATION OF EROSION CONTROL MATS AND WIRE NETS.
6. HYDROSEEDING WITH GRASS AND PIT PLANTING WITH SHRUBS AND 0.1 METRES TALLING SCOPE TUBES.
7. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.

**土序**

1. 設置臨時安全圍欄/圍板
2. 斜溝圓形石堆架、挖除及紀錄斜坡
3. 安裝防沖水石框及拉基溝
4. 建造防沖表面排水及樓梯
5. 安裝防沖表面網及鋼絲網
6. 噴草及種植草皮及木樁  
(在坑底進行)
7. 清除臨時圍欄及圍板



剖面 A-A  
**SECTION A-A**  
 Scale 1:10



**圖例 / LEGEND**

- 現有的路邊切石斜坡  
EXISTING ROADSIDE CUT SLOPE
- 署發給的編號 0274/99 所定的斜坡工程的範圍  
AREA FOR SLOPE WORKS UNDER AGREEMENT NO. 0274/99
- 原斜坡的植被應在上圖面予以清除並由  
EXTENT OF SHORTRIFE TO BE STRIPPED OFF AND REPLACED BY VEGETATION
- 用修剪的方法將該處植被清除並  
EXTENT OF VEGETATION TO BE REMOVED BY TRIMMING AND REPLACED BY NEW VEGETATION
- 原有地面曲線及高度  
EXISTING GROUND SURFACE CONTOUR & SPOT HEIGHT
- 原有樹木  
EXISTING TREE
- 原有水渠及其流向  
EXISTING CHANNEL WITH FLOW DIRECTION
- 原有的水坑  
EXISTING CATCHPIT



一般的工作安排  
 GENERAL ARRANGEMENT OF WORKS  
 DATE 11/08

<p>1. ALL DIMENSIONS IN METERS                  2. ALL DIMENSIONS TO FACE UNLESS OTHERWISE SPECIFIED                  3. ALL LEVELS ARE IN METRES ABOVE PRACTICAL WATER</p>	<table border="1"> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DESCRIPTION	DATE			
NO.	DESCRIPTION	DATE					
<p>                 1. 所有尺寸均以米為單位                  2. 所有尺寸均以面為準，除非另有說明                  3. 所有高度均以實際水位為基準             </p>	<table border="1"> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DESCRIPTION	DATE			
NO.	DESCRIPTION	DATE					



1. ALL LEVELS ARE IN METRIC UNITS  
 2. ALL LEVELS ARE IN METRIC UNITS  
 3. ALL LEVELS ARE IN METRIC UNITS

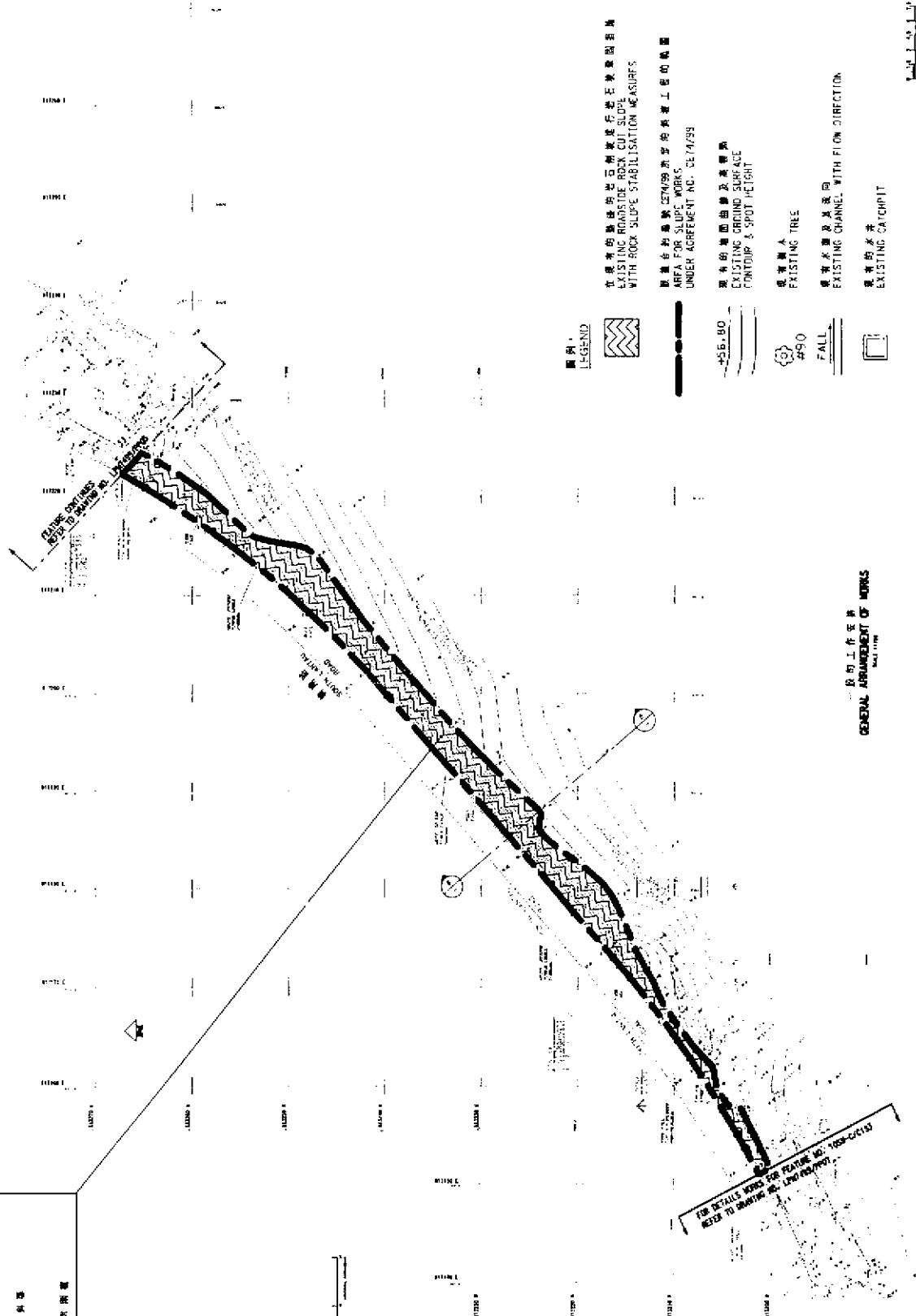
**斜裝護坡 (岩石斜坡)**  
**FEATURE NO: 105W-C/021 (ROCK PORTION)**

SEQUENCE OF WORKS:

1. ERECTION OF TEMPORARY SAFETY FENCE / HOARDING.
2. SCALING OF ROCK, BOLLER STABILISATION
3. INSTALLATION OF ROCK BOLTS, ROCK DOWELS AND RACKING DRAINS.
4. CONSTRUCTION OF SURFACE DRAINAGE.
5. INSTALLATION OF WIRE MESHES.
6. SITE CLEARANCE AND REMOVAL OF TEMPORARY FENCES AND HOARDING.

一字

1. 設置安全圍欄/圍欄
2. 剝離岩石及穩定岩石
3. 安裝岩石螺栓及石釘
4. 安裝表面排水
5. 安裝鋼絲網
6. 清除現場及拆除臨時圍欄及圍欄



**圖例 LEGEND**

在標定的區域內岩石斜坡將進行岩石穩定措施  
 WITH ROCK SLOPE STABILISATION MEASURES

該區域將進行斜坡工程的工作  
 AREA FOR SLOPE WORKS UNDER AGREEMENT NO. CE174/99

現有的地面曲線及高度  
 EXISTING GROUND SURFACE CONTOUR & SPOT HEIGHT

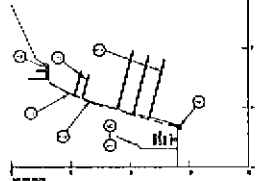
現有的樹木  
 EXISTING TREE

現有的水渠及其流向  
 EXISTING CHANNEL WITH FLOW DIRECTION

現有的水溝  
 EXISTING CATCHPIT

±5.6+0.00

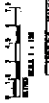
FALL #90



圖五 B-B  
 SECTION B-B  
 SCALE 1:10

FOR DETAILS REFER TO DRAWING NO. 105W-C/021  
 REFER TO DRAWING NO. 105W-C/021

工程工作圖  
 GENERAL ARRANGEMENT OF WORKS  
 DATE: 1/1/99



1. 所有高度均以公制單位表示 2. 所有高度均以公制單位表示 3. 所有高度均以公制單位表示	1. 所有高度均以公制單位表示 2. 所有高度均以公制單位表示 3. 所有高度均以公制單位表示
1. 所有高度均以公制單位表示 2. 所有高度均以公制單位表示 3. 所有高度均以公制單位表示	1. 所有高度均以公制單位表示 2. 所有高度均以公制單位表示 3. 所有高度均以公制單位表示

**ATTACHMENT 1**

**INDICATIVE WORKS PROGRAMME**

**工程施工程序圖**



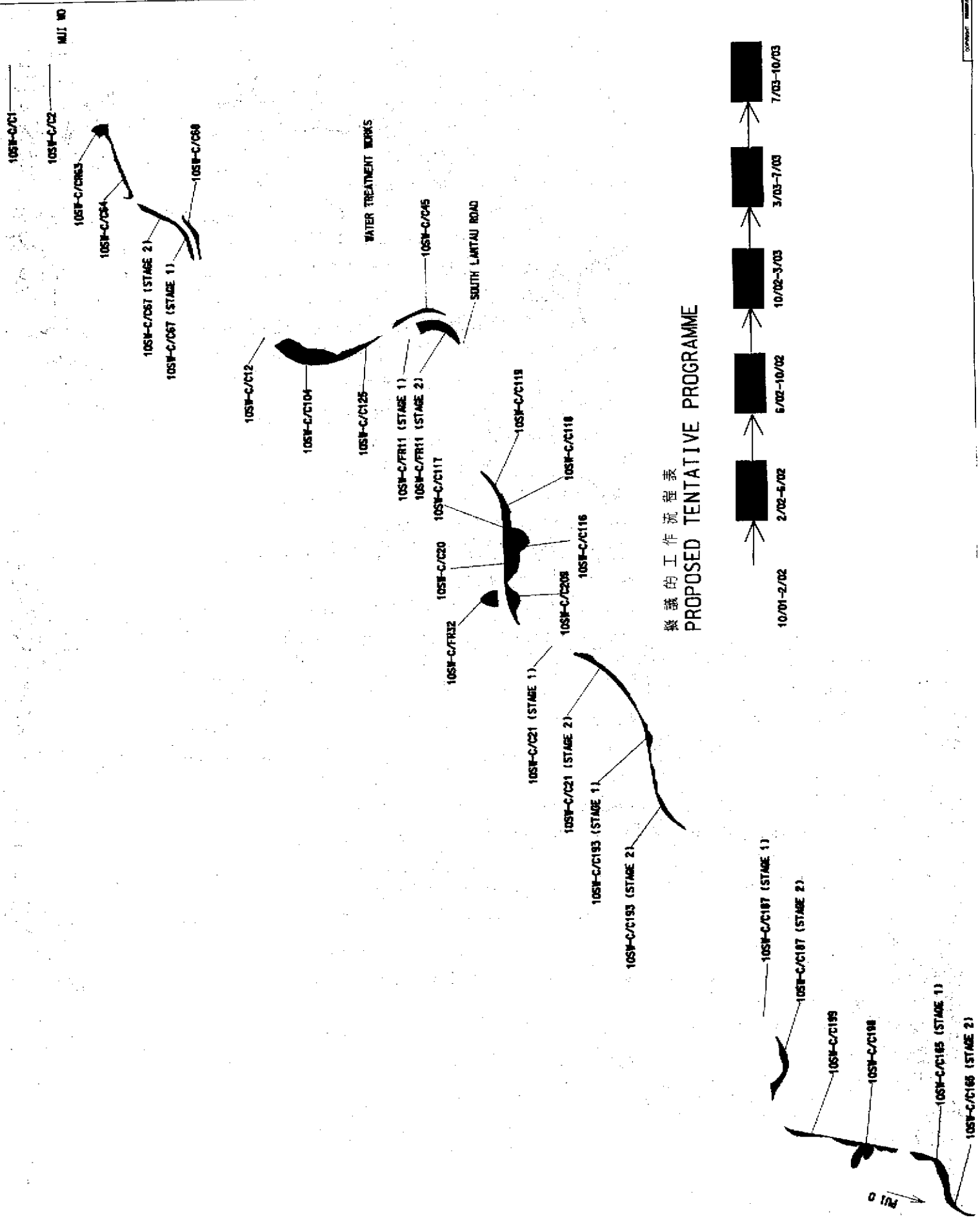
**ATTACHMENT**

**附件**

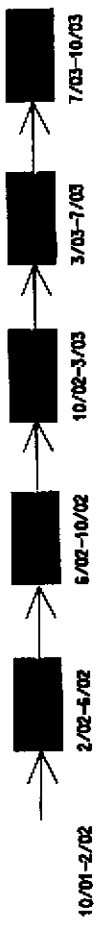
**PROPOSED TENTATIVE PROGRAM**

**WORKS PACKAGE**

**工程配套的建議工作總綱**



擬議的工作流程表  
PROPOSED TENTATIVE PROGRAMME



NO.	DATE	REVISION
1	10/01/02	ISSUED FOR TENDER
2	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
3	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
4	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
5	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
6	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
7	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
8	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
9	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER
10	10/01/02	REVISED TO REFLECT THE RESULTS OF THE TENDER



CIVIL ENGINEERING  
DEPARTMENT  
HONG KONG

香港工程師學會  
MEMBER OF THE INSTITUTE OF STRUCTURAL ENGINEERS

香港工程師學會  
MEMBER OF THE INSTITUTE OF STRUCTURAL ENGINEERS

AGREEMENT NO. CE2408 AND  
SUPPLEMENTARY AGREEMENT NO. 1  
TO THE EXTENDED LTN PROJECT,  
PHASE 2 PACKAGE A - LANDSLIDE AND  
SLOPE STABILISATION WORKS ON  
SOUTH LANTAU ROAD  
GOVERNMENT SLOPES

AGREEMENT NO. CE2408 AND  
SUPPLEMENTARY AGREEMENT NO. 1  
TO THE EXTENDED LTN PROJECT,  
PHASE 2 PACKAGE A - LANDSLIDE AND  
SLOPE STABILISATION WORKS ON  
SOUTH LANTAU ROAD  
GOVERNMENT SLOPES

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SUPPLEMENTARY AGREEMENT NO. 1  
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SLOPE STABILISATION WORKS ON  
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PHASE 2 PACKAGE A - LANDSLIDE AND  
SLOPE STABILISATION WORKS ON  
SOUTH LANTAU ROAD  
GOVERNMENT SLOPES

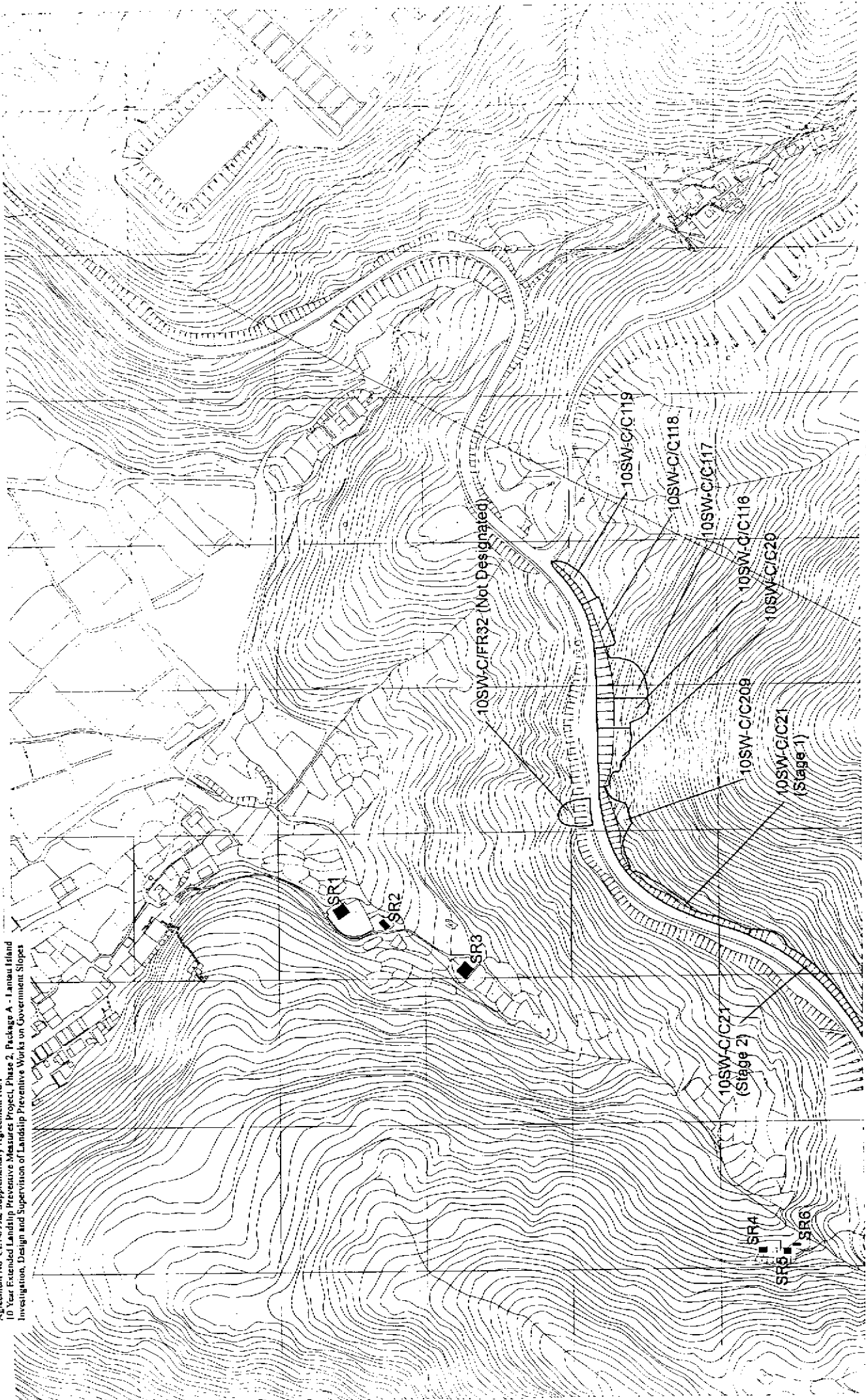
AGREEMENT NO. CE2408 AND  
SUPPLEMENTARY AGREEMENT NO. 1  
TO THE EXTENDED LTN PROJECT,  
PHASE 2 PACKAGE A - LANDSLIDE AND  
SLOPE STABILISATION WORKS ON  
SOUTH LANTAU ROAD  
GOVERNMENT SLOPES

AGREEMENT NO. CE2408 AND  
SUPPLEMENTARY AGREEMENT NO. 1  
TO THE EXTENDED LTN PROJECT,  
PHASE 2 PACKAGE A - LANDSLIDE AND  
SLOPE STABILISATION WORKS ON  
SOUTH LANTAU ROAD  
GOVERNMENT SLOPES

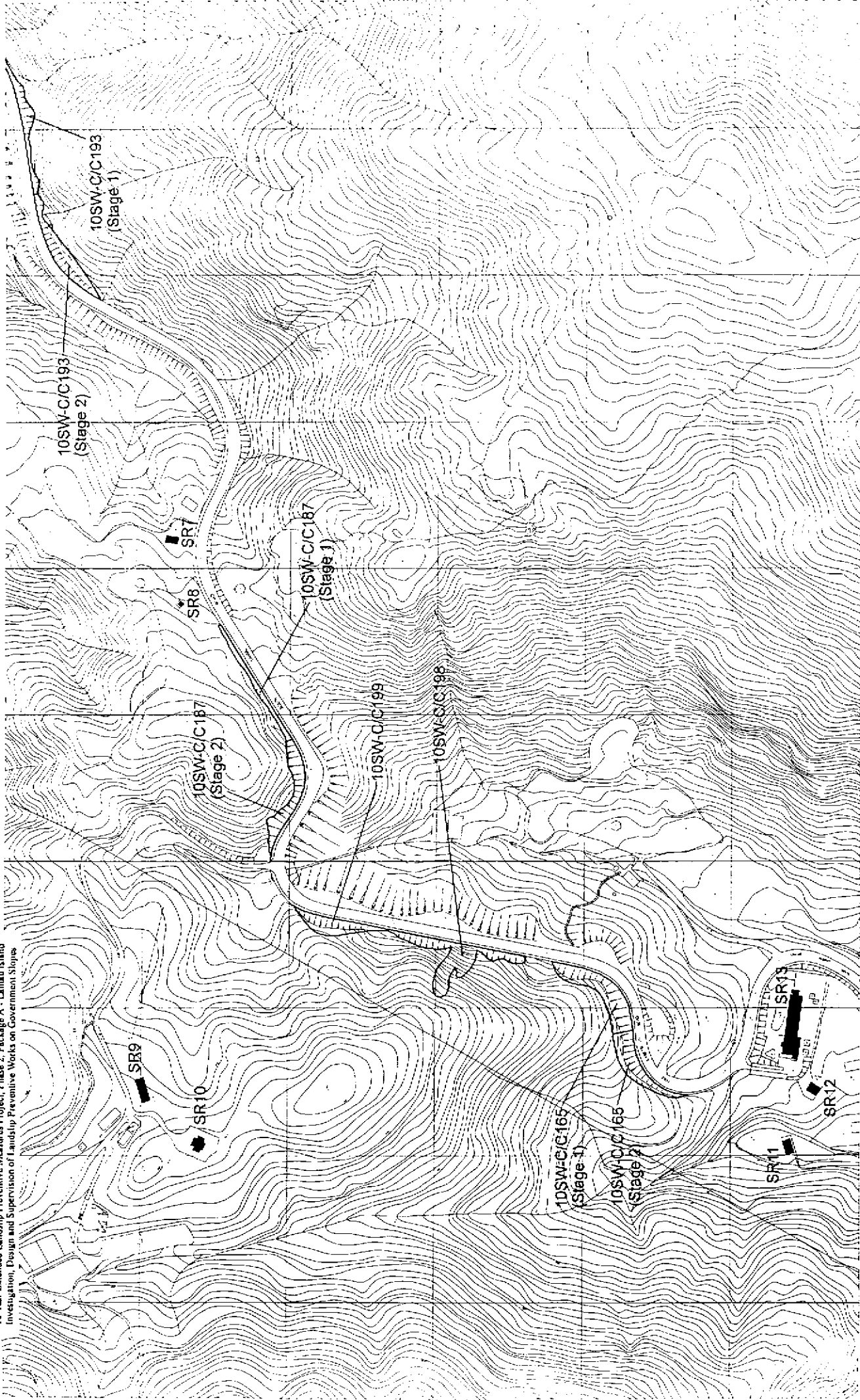
DATE: 10/01/02

ATTACHED

LOCATION OF  
SENSITIVE RECEIVERS  
噪音感應強的地方位置圖



Location of Selected Noise Sensitive Receivers  
噪音感應項的地方位置圖



Location of Selected Noise Sensitive Receivers  
噪音感應強的地方位置圖



ATTACHMENT

PLANT SPECIES LIST

指定工程項目斜坡內所紀錄的植物品種

**ATTACHMENT 6a Plant Species recorded within Designated Slopes**  
**附件 6a 指定斜坡內所錄得的植物品種**

Feature No. 斜坡編號

10SW-C/C165, 10SW-C/C198, 10SW-C/C199, 10SW-C/C118, 10SW-C/C119, 10SW-C/C187, 10SW-C/C209

**Woodlands and Shrublands 林地及灌木**

Botanical Name 植物名稱
<b>Trees 樹</b>
<i>Octophylla</i> saplings
<i>Mallotus</i> saplings
<i>Machilus</i> saplings
<i>Machilus breviflora</i>
<i>Cinnamomum camphora</i>
<i>Sapium</i> saplings
<i>Acacia confusa</i>
<i>Pinus massoniana</i>
<i>Mallotus paniculatus</i>
<i>Celtis sinensis</i>
<i>Litsea glutinosa</i>
<i>Albizia lebbek</i>
<i>Sapium discolor</i>
<i>Tristania conferta</i>
<b>Shrubs 灌木</b>
<i>Rahaphiolepis indica</i>
<i>Psychotria rubra</i>
<i>Litsea rotunda</i>
<i>Zanthoxylum</i> spp
<i>Microcos paniculata</i>
<i>Melastoma sanguineum</i>
<i>Melastoma candidum</i>
<i>Rosa</i> spp.
<i>Phyllanthus cochinchinensis</i>
<b>Climbing Plants 攀藤植物</b>
<i>Dalbargin hancei</i>
<i>Rubus reflexus</i>
<i>Jasminum polyanthum</i>
<i>Tetracera asiatica</i>
<i>Smilax glaber</i>
<i>Smilax</i> spp.
<b>Herbs 草</b>
<i>Lantana camara</i>
<i>Scutella indica</i>
<i>Dianella ensifolia</i>
<i>Emila sonchifolia</i>
<b>Ferns 蕨類植物</b>
<i>Dicranopteris linearis</i>
<i>Tectaria subtriphylla</i>
<i>Sphenomeris chinensis</i>
<i>Pteris</i> spp
<i>Lygodium</i> spp.
<i>Lophatherum</i> sp.

Feature No. 斜坡編號

10SW-C/C193, 10SW-C/C21

**Rocky slopes and soil portion 岩石坡及泥土部分**

Botanical Name 植物名稱
<b>Trees 樹</b>
<i>Octophylla</i> saplings
<i>Rhus</i> sapling
<i>Mallotus</i> saplings
<i>Machilus breviflora</i>
<i>Cinnamomum camphora</i>
<i>Sapium</i> saplings
<b>Shrubs 灌木</b>
<i>Rahaphiolepis indica</i>
<i>Melastoma sanguineum</i>
<i>Lonicera</i> sp.
<i>Melastoma candidum</i>
<i>Phyllanthus cochinchinensis</i>
<b>Climbing Plants 攀藤植物</b>
<i>Dalbargin hancei</i>
<i>Rubus reflexus</i>
<i>Smilax glaber</i>
<b>Herbs 草</b>
<i>Eriocaulon wallichian</i>
Club moss
<i>Scutella indica</i>
<i>Dianella ensifolia</i>
<i>Emila sonchifolia</i>
<b>Sedge</b>
<i>Carex</i> spp.
<b>Ferns 蕨類植物</b>
<i>Dicranopteris linearis</i>
<i>Tectaria subtriphylla</i>
<i>Sphenomeris chinensis</i>
<i>Osmunda vachelii</i>
<i>Lygodium</i> spp.
<b>Orchid 蘭花</b>
* <i>Spiranthes sinensis</i>

\* Protected species under the Forestry Regulation  
 列於林務規例內的受保護品種

The botanical survey does not include features 10SW-C/C116,117,20 as the proposed works will be carried out on shotcreted areas only

因工程只在已噴漿的表面動工，故植物調查並不包括以下斜坡：10SW-C/C116,117,20

		斜坡編號 Slope No. 10SW-C/C						
Botanical Name 植物名稱	165	198 & 199	193	118&119	187	21	209	
<b>Herbs 草</b>								
<i>Lantana camara</i>		O						
<i>Eriocaulon wallichian</i>			O			F		
Club moss			R					
<i>Scutella indica</i>			O	O		F		
<i>Oxalis spp.</i>				O				
<i>Dianella ensifolia</i>			R		O	R		
<i>Emilia sonchifolia</i>			R			R		
<b>Sedge</b>								
<i>Carex spp.</i>			O					
<b>Ferns 蕨類植物</b>								
<i>Dicranopteris linearis</i>	A	F	A			F		
<i>Tectaria subtriphylla</i>	R		O					
<i>Sphenomeris chinensis</i>	O		O					
<i>Pteris spp</i>	O						R	
<i>Osmunda vachelii</i>			O					
<i>Lygodium spp.</i>			O	O				
<i>Lophatherum sp.</i>				R				
<b>Orchid 蘭花</b>								
* <i>Spiranthes sinensis</i>			O			O		

\* Protected species under the Forestry Regulation 列於林務規例內的受保護品種

The botanical survey does not include the following slope features as proposed works will be carried out on shotcreted areas only : 10SW-C/C116, 117, 20

因工程只在已噴漿的表面動工，故植物調查並不包括以下斜坡：10SW-C/C116,117,20

DAFOR - A methodology used to describe the plant distribution within the specified site.

DAFOR- 用來形容研究範圍內植物分布的方法

D- Dominant

A - Abundant

F - Frequent

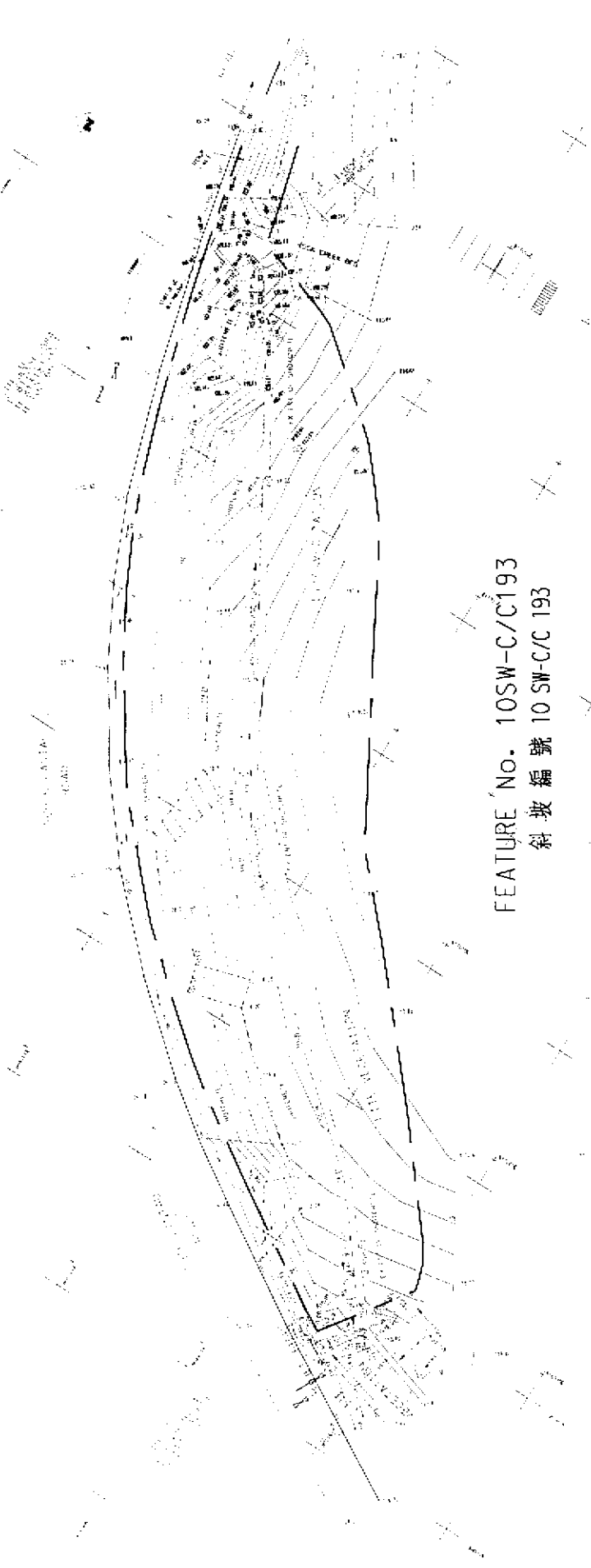
O -Occasion

R - Rare (locally rare at the specified site)

**ATTACHMENT**

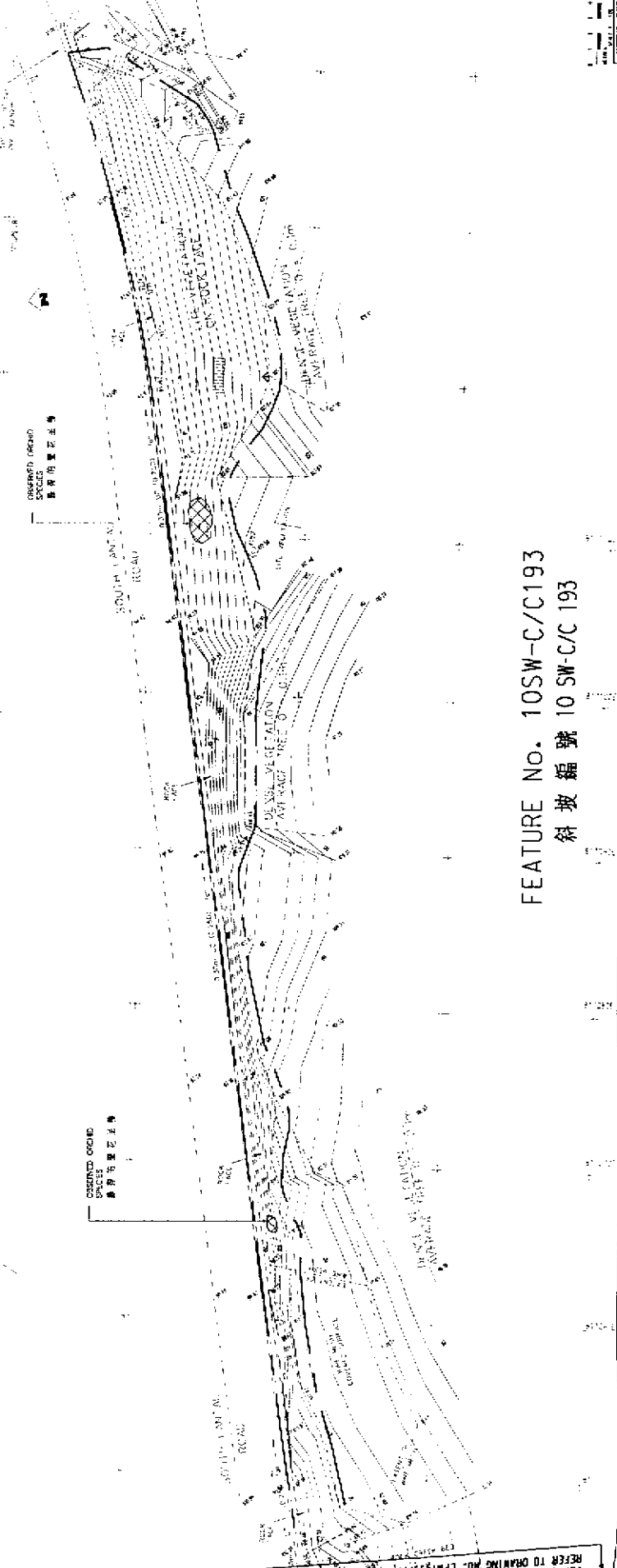
**ORCHID LOCATION PLANS AND  
SKETCH OF ORCHID PROTECTION CASE  
蘭花位置圖及蘭花保護罩草圖**

LEGEND  
 OBSERVED ORCHID  
 觀察的蘭花品種



FEATURE NO. 10SW-C/C193  
 斜坡編號 10 SW-C/C 193

OBSERVED ORCHID  
 觀察的蘭花品種



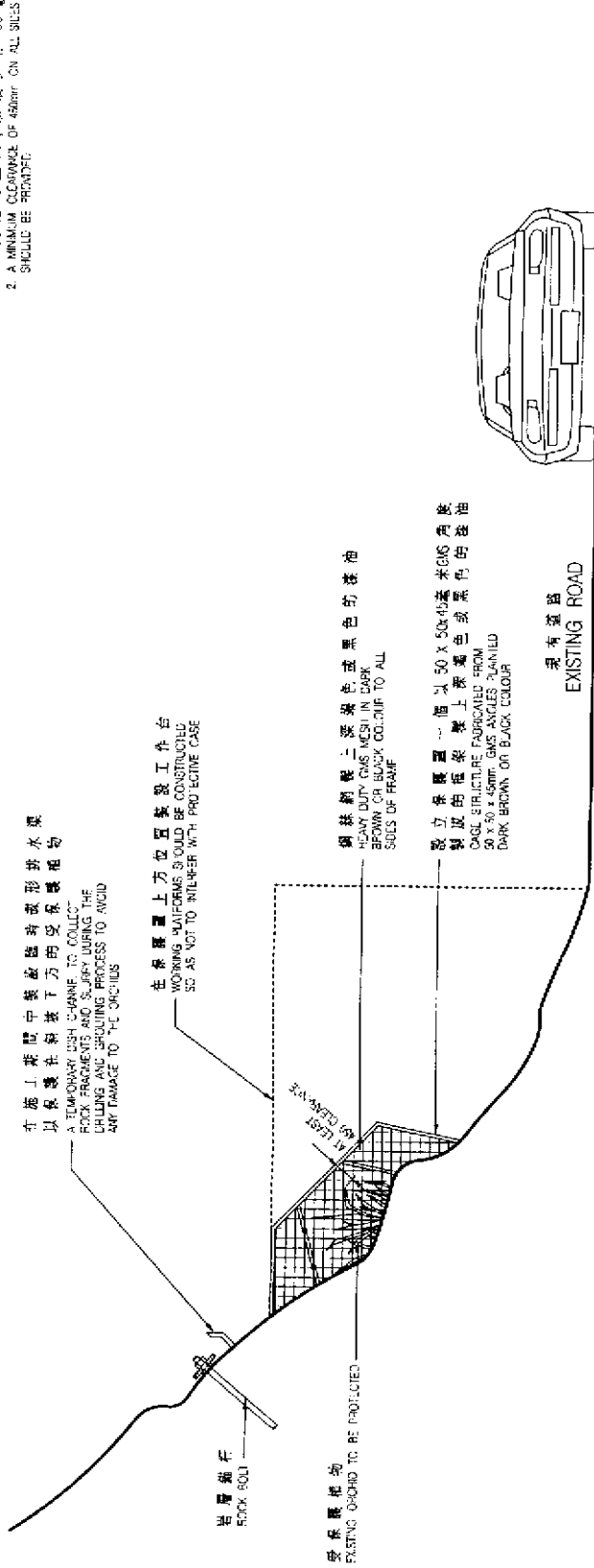
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 斜坡編號 10 SW-C/C 193

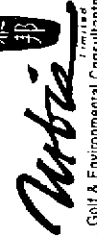
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DRAWN BY: [Name] CHECKED BY: [Name] DATE: [Date]	
SCALE: 1:100 ATTACHMENT: 78	
<b>Halcrow</b> 0000000000	
DESIGN DIVISION GEOTECHNICAL ENGINEERING OFFICE	
CIVIL ENGINEERING DEPARTMENT HONG KONG	

REFER TO DRAWING NO. LPH1899/PP1

註:  
NOTE

1. 除另外註明，所有尺寸以毫米為單位  
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. 有蘭花色凹處，須最少有 450 毫米空間  
2. A MINIMUM CLEARANCE OF 450mm ON ALL SITES OF THE ARCHES SHOULD BE PROVIDED.



Amendment No.	Date	Description	Drawn by	Checked by	Approved by	Date
			IL	KC		28/3/01
Drawing Title 10 - YEAR EXTENDED LPM PROJECT PHASE 2, PACKAGE A - LANTAU ISLAND						
Drawing No. HAP11/SK /01						
Scale NTS.						
Job No. HAP11						
Date 28/3/01						
 Planning, Urban Design, Landscape, Golf & Environmental Consultants Units Limited, 11/F Sun On Centre, 118 Lockhart Road, Wan Chai, Hong Kong. Tel: (852) 3533 3333 Fax: (852) 3533 3332						



**ATTACHED**

**PREDICTED MAXIMUM NOISE LEVEL  
WITHOUT MITIGATION  
噪音感應強的地方最高噪音水平  
(採取緩解措施前)**



Attachment 8A

附件 8A

Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers without Mitigation Measures

對噪音感應強地方的最高噪音水平(採取緩解措施前) [dB(A)]

Receivers Reference 參考編號	Closest Slopes Reference 最接近斜坡參考編號	Slant Distance (m) 斜距(米)	Noise Level 噪音水平 [dB(A)]				
			Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1		196	64	77	-	58	53
SR2	10SW-C/C209	173	65	78	-	59	54
SR3		131	68	81	-	62	56
SR4		109	69	82	82	63	58
SR5	10SW-C/C193	96	70	83	83	65	59
SR6		91	71	84	84	65	60
SR7	10SW-C/C189	123	68	81	-	62	57
SR8		90	71	84	-	65	60
SR9	10SW-C/C199	169	65	79	-	60	54
SR10		173	65	78	-	59	54
SR11		98	70	83	-	64	59
SR12	10SW-C/C165	106	70	83	-	64	58
SR13		100	70	83	-	64	59

Noise level over the standard criteria before mitigation 噪音水平於採取緩解措施前超出標準

\* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施, 只適用於石坡

**Attachment 8B**  
**附件 8B**

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers without Mitigation Measures at Individual Slope Work at 10SW-C/FR32 and 10SW-C/C21(Stage 2)**

**對噪音敏感地方最高噪音水平(採取緩解措施前)[dB(A)]**  
**於 10SW-C/FR32 和 10SW-C/C21 (階段二) 的斜坡工程**

Receivers Reference 參考編號	Slant Distance from slope (m) 與 斜坡斜距(米) 10SW-C/FR32	Noise Level 噪音水平 [dB(A)]					Slant Distance from Slope (m) 與斜坡 斜距(米) 10SW- C/C21 (階段二)	Noise Level 噪音水平 [dB(A)]				
		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	170	65	78	-	60	54	308	60	73	73	54	49
SR2	150	66	80	-	61	55	279	61	74	74	55	50
SR3	170	68	81	-	62	57	221	63	76	76	57	52
SR4	330	60	73	-	54	48	198	64	77	77	58	53
SR5	337	59	73	-	54	48	197	64	77	77	58	53
SR6	335	60	73	-	54	48	194	64	77	77	58	53

Noise level over the standard criteria before mitigation 噪音水平於採取緩解措施前超出標準  
 \* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施, 只適用於石坡

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers without Mitigation Measure Cumulative Effect of Slope Work at 10SW-C/FR32 and 10SW-C/C21(Stage 2)**

**對噪音敏感地方最高噪音水平(採取緩解措施前)[dB(A)]**  
**於 10SW-C/FR32 和 10SW-C/C21 (階段二) 斜坡工程的累積影響**

Receivers Reference 參考編號	Noise Level 噪音水平 [dB(A)]				
	Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	67	80	73	61	55
SR2	68	81	74	62	56
SR3	69	82	76	63	58
SR4	65	78	77	60	54
SR5	65	78	77	60	54
SR6	66	79	77	60	54

Noise level over the standard criteria before mitigation 噪音水平於採取緩解措施前超出標準  
 \* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施, 只適用於石坡

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers without Mitigation Measures at Individual Slope Work at Slope 10SW-C/C209 and 10SW-C/C193 (Stage 2)**

**對噪音敏感地方最高噪音水平(採取緩解措施前)[dB(A)]**  
**於 10SW-C/C209 和 10SW-C/C193 (階段二) 的斜坡工程**

Receivers Reference 參考編號	Slant Distance from slope (m) 與 斜坡斜距(米) 10SW-C/C209	Noise Level 噪音水平 [dB(A)]					Slant Distance from Slope (m) 與斜坡 斜距(米) 10SW- C/C193 (階段二)	Noise Level 噪音水平 [dB(A)]				
		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	196	64	77	-	58	53	362	59	72	72	53	48
SR2	173	65	78	-	59	54	427	57	70	70	52	46
SR3	131	68	81	-	62	56	456	57	70	70	51	46
SR4	110	60	73	-	54	49	109	69	82	82	63	58
SR5	117	60	73	-	54	49	96	70	83	83	65	59
SR6	317	60	73	-	54	49	91	71	84	84	65	60

Noise level over the standard criteria before mitigation 噪音水平於採取緩解措施前超出標準  
 \* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施, 只適用於石坡

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers without Mitigation Measure Cumulative Effect of Slope Work at Slope 10SW-C/C209 and 10SW-C/C193**

**對噪音敏感地方最高噪音水平(採取緩解措施前)[dB(A)]**  
**於 10SW-C/C209 和 10SW-C/C193 (階段二) 斜坡工程的累積影響**

Receivers Reference 參考編號	Noise Level 噪音水平 [dB(A)]				
	Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	65	78	72	60	54
SR2	66	79	70	60	55
SR3	68	81	70	62	57
SR4	70	83	82	64	59
SR5	71	84	83	65	60
SR6	71	84	84	65	60

Noise level over the standard criteria before mitigation 噪音水平於採取緩解措施前超出標準  
 \* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施, 只適用於石坡

**ATTACHED**

**BOREHOLE LOGS**  
**具代表性的鑽探紀錄**

FEATURE NO. 10SW-CC21

817200 E

817300 E



813400 N

斜坡編號  
FEATURE NO.  
10SW-C/C21

鑽孔編號  
BH/21/1

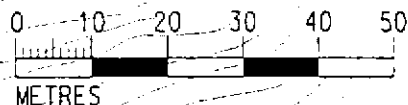
813500 N

813200 N

線南路

NO. 20

LANE



SCALE 1:1000

24 APR 2001 8:49:51 AM ANT\AU\BH-114\Fig1.dgn

EXTRACTED FROM 10SW-17C, 17D, 22A & 22S

AGREEMENT NO. CE 7499 AND SUPPLEMENTARY AGREEMENT  
NO. 1 GEO 10-YEAR EXTENDED LPM PROJECT

**Malcrow**

BOREHOLE LOCATION PLAN 鑽孔位置圖

FIGURE 1



**GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.**  
**GROUND INVESTIGATION DEPARTMENT**

HOLE NO. **BH/21/1**

SHEET **1** of **1**

**DRILLHOLE RECORD**

CONTRACT NO. **GE/2000/09**

PROJECT **10 - Year Extended LPM Project, Phase 2, Package A - Ground Investigation Works for Slopes on Lantau Island, Feature No. 10SW-C/C21 South Lantau Road, Lantau Island.**

METHOD **Rotary** CO-ORDINATES Works Order No. **0009/GI/SLR/114/003**

MACHINE & No. **DR121** N **813333.38** DATE from **15/01/2001** to **17/01/2001**

FLUSHING MEDIUM **Air-foam** ORIENTATION **Vertical** GROUND LEVEL **87.19 mPD**

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
15/01/2001	HX		90					T2101	87.19	0.24			Firm to stiff, brown (7.5YR 4/2), sandy SILT with some angular to subangular fine to coarse gravel and cobble sized rock fragments. (COLLUVIUM) From 0.24m to 0.59m : A boulder sized fragments of moderately decomposed granite. From 0.91m to 1.28m : A boulder sized fragments of moderately decomposed granite.
			86					T2101		0.91			
15/01/2001		Dry at 18:00	86					T2101	85.47	1.72		VI	Firm to stiff, yellow (2.5YR 7/8), sandy SILT with some angular to subangular fine to medium gravel sized rock fragments. (RESIDUAL SCIL)
16/01/2001		Dry at 08:00	82					1 T2101		2.70			
			80					2 T2101	83.39	3.80		V	Extremely weak, reddish brown (5YR 4/3), completely decomposed, fine to medium grained QUARTZ SYENITE. (Silty fine to coarse SAND with some angular to subangular fine to coarse gravel sized rock fragments) From 3.80m to 4.90m : Yellowish brown.
			50					3 T2101		4.90			
	HX 5.25		100	98	90	2.3	3.5 5.8, 7.1D N=28	4 T2101		5.35			
18/01/2001		Dry at 18:00	100	100	100			5 T2101		6.05		II	Strong to very strong, grey spotted white and pink, slightly decomposed, fine to medium grained QUARTZ SYENITE. Joints are closely to medium spaced with occasional widely spaced, rough planar and rough stepped, extremely narrow, stained by iron and manganese oxide, dipping at 0° to 10°, 30° to 40° and 50° to 60°. From 7.58m to 8.26m : 80° to vertical joint and sandy silt infilled up to 4mm thick.
17/01/2001		Dry at 08:00	100					6 T2101		6.87			
			100	62	53	NI		7 T2101		8.18		IV/III	From 8.18m to 8.41m : Weak to moderately weak and highly to moderately decomposed.
			100	98	98	3.3		8 T2101		8.71		II	
17/01/2001		Dry at 18:00							77.94	9.25			Hole completed at 9.25m.

- 1 SMALL DISTURBED SAMPLE    △ WATER SAMPLE
- ↑ LARGE DISTURBED SAMPLE    ▲ PIEZOMETER TIP
- SPT LINER SAMPLE    □ STANDPIPE
- ▨ U78 UNDISTURBED SAMPLE    ⊥ STANDARD PENETRATION TEST
- ▩ U100 UNDISTURBED SAMPLE    ⊥ PERMEABILITY TEST
- ▧ MAZDA SAMPLE    ⊥ IMPRESSION PACKER TEST
- ▩ PISTON SAMPLE    ⊥ IN-SITU VANE SHEAR TEST
- ⊥ PACKER TEST

LOGGED **M. Chiu**  
 DATE **18/01/2001**  
 CHECKED **James Lu**  
 DATE **19/01/2001**

REMARKS  
 1. Piezometer tip installed at 5.50m depth.



斜坡編號  
FEATURE NO.  
10SW-C/C187

鑽孔編號  
BH/187/2

觀南路

SOUTH LANTAU ROAD

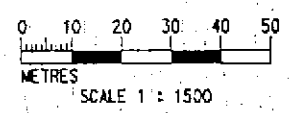
813100 N

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EXTRACTED FROM 10SW-22A

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PH111P1

AGREEMENT NO. CE 7499 GEO 10-YEAR EXTENDED LPM PROJECT

LOCATION PLAN OF FEATURE 鑽孔位置圖

**Halcrow**

FIGURE 1



**GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.**

**GROUND INVESTIGATION DEPARTMENT**

HOLE NO. **BH/187/2**

SHEET **1** of **2**

**DRILLHOLE RECORD**

CONTRACT NO. **GE/2000/09**

PROJECT **10 - Year Extended LPM Project, Phase 2, Package A - Ground Investigation Works for Slopes on Lantau Island, Feature No. 10SW-C/C187 South Lantau Road, Lantau Island.**

METHOD **Rotary** CO-ORDINATES **E 816685.94** Works Order No. **0009/GI/SLR/116/006**

MACHINE & No. **YBM, DR113** **N 813019.65** DATE from **16/01/2001** to **19/01/2001**

FLUSHING MEDIUM **Air-foam** ORIENTATION **Vertical** GROUND LEVEL **133.63 mPD**

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
15/01/2001	PX								132.63	1.00		IV/V	Dark brown (7.5YR 3/2), fine to coarse sandy SILT with some angular to subangular fine to coarse gravel and cobble sized rock fragments, occasionally rootlets. (COLLUVIUM)
	PX 7.10 HX		92					1					Weak to very weak, red (10R 6/4), dappled brownish yellow, highly to completely decomposed, QUARTZ SYENITE. (Fine to coarse SILT with much angular to subangular fine to coarse gravel sized rock fragments)
			100	0			24.25 87.100/45mm (187/120mm)	2	131.27	2.36			From 2.10m to 2.36m : Grey dappled red.
			100	0				3		2.54		III/IV	Moderately strong to moderately weak, red dappled brownish yellow and black, moderately decomposed, highly fractured, QUARTZ SYENITE, stained by iron and manganese oxide.
			100	0				4		2.96		III	From 2.36m to 2.46m : Moderately strong to strong and moderately to slightly decomposed.
			100	0						3.27			From 3.50m to 3.62m : Weak and highly decomposed.
			95	0						3.66		IV	
			100	0						4.22		III	From 4.10m to 4.22m : An 80° to vertical joint.
		18:00 Dry at 08:00	98	0						4.71			
			100	38						5.14			From 4.95m to 5.04m : An 80° to vertical joint.
			100	37						5.36		III/IV	Moderately strong to strong, reddish grey, moderately to slightly decomposed, QUARTZ SYENITE.
			100	22						5.90		III	Joints are very closely to closely spaced, rough planar and rough stepped, extremely narrow, stained by iron and manganese oxide, dipping at 10° to 20°, 20° to 30° and 40° to 50°, occasionally 50° to 60° and 60° to 70°.
			92	0						6.57			From 5.36m to 7.50m : Moderately strong to moderately weak and moderately decomposed.
			100	0						6.83			From 6.10m to 6.15m : An 80° to vertical joint.
			95	63						7.15			From 6.90m to 7.15m : An 80° to vertical joint.
		18:00 Dry at 08:00	98	34			10.0			7.80		III/IV	From 7.80m to 8.80m : Moderately strong to moderately weak and moderately decomposed.
			85	21			12.2			8.24		III	
			97							8.80			No core recovered, assumed to be completely decomposed QUARTZ SYENITE.
			90	25			10.0			9.20		IV/V	Weak to very weak, red (10R 6/4), spotted and mottled white dappled black, highly to completely decomposed, QUARTZ SYENITE. (Clayey silty fine to coarse SAND with much angular to
			93	0			>20			9.70		III	

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U75 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- △ WATER SAMPLE
- ▲ PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED **M. Chiu**

DATE **20/01/2001**

CHECKED **James Lu**

DATE **22/01/2001**

REMARKS

1. Piezometer tip installed at 12.58m depth.



**GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.**  
**GROUND INVESTIGATION DEPARTMENT**

HOLE NO. **BH/187/2**  
 SHEET **2** of **2**

**DRILLHOLE RECORD**

CONTRACT NO. **GE/2000/09**

PROJECT **10 - Year Extended LPM Project, Phase 2, Package A - Ground Investigation Works for Slopes on Lantau Island, Feature No. 105W-CIC187 South Lantau Road, Lantau Island.**

METHOD **Rotary** CO-ORDINATES **E 816685.94** Works Order No. **0009/GI/SLR/116/006**

MACHINE & No. **YBM, DR113** N **813019.65** DATE from **16/01/2001** to **19/01/2001**

FLUSHING MEDIUM **Air-foam** ORIENTATION **Vertical** GROUND LEVEL **133.63 mPD**

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description	
0.0	5 IX 24		98	15	0	NI			123.24	10.29	x x x	IV/V	<p>Subangular fine to coarse gravel sized rock fragments)</p> <p>Moderately strong to moderately weak, red, moderately decomposed, QUARTZ SYENITE. Joints are very closely to closely spaced, rough planar and rough stepped, extremely narrow, stained by iron and manganese oxide, dipping at 0° to 10°, 10° to 20° and 60° to 70°.</p> <p>From 10.29m to 10.50m : Weak to very weak, red (10YR 6/4), dappled black, highly to completely decomposed. (Silty fine to coarse sand with much angular to subangular fine to coarse gravel sized rock fragments)</p> <p>Moderately strong, grey dappled red, moderately decomposed, QUARTZ SYENITE. Joints are very closely to closely spaced, rough planar and rough stepped, extremely narrow, stained by iron and manganese oxide, occasionally calcite infilled, dipping at 20° to 30°, 30° to 40°, occasionally 60° to 70° and 70° to 80°.</p> <p>From 12.03m to 12.15m : Weak and highly decomposed.</p> <p>From 12.15m to 12.42m : Moderately strong to strong and moderately to slightly decomposed.</p> <p>From 12.42m to 12.69m : Weak and highly decomposed.</p> <p>From 12.42m to 13.08m : Red dappled brown.</p> <p>Hole completed at 13.08m.</p>	
0.1		Dry at 13:00	93	12	0	>20		T2-01	123.13	10.50	x x x	III		
0.2		Dry at 08:00	98	75	25	14.9		T2-01	122.04	11.41	x x x	III		
0.3			90	48	48	9.5		T2-01		12.21	x x x	IV		
0.4			90	25	0	>20		T2-01		12.69	x x x	IV		
0.5		Dry at 13:00	90			>20		T2-01	120.55	13.08	x x x	III		
1.0														
2.0														
3.0														
4.0														
5.0														
6.0														
7.0														
8.0														
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12.0														
13.0														
14.0														
15.0														
16.0														
17.0														
18.0														
19.0														
20.0														

<ul style="list-style-type: none"> <li>I SMALL DISTURBED SAMPLE</li> <li>II LARGE DISTURBED SAMPLE</li> <li>III SPT LINER SAMPLE</li> <li>IV U78 UNDISTURBED SAMPLE</li> <li>V U100 UNDISTURBED SAMPLE</li> <li>VI MAZDER SAMPLE</li> <li>VII PISTON SAMPLE</li> <li>△ WATER SAMPLE</li> <li>▲ PIEZOMETER TIP</li> <li>○ STANOPIPE</li> <li>⊥ STANDARD PENETRATION TEST</li> <li>⊥ PERMEABILITY TEST</li> <li>⊥ IMPRESSION PACKER TEST</li> <li>∇ IN-SITU VANE SHEAR TEST</li> <li>⊥ PACKER TEST</li> </ul>	LOGGED <u>M. Chiu</u> DATE <u>20/01/2001</u> CHECKED <u>James Lu</u> DATE <u>22/01/2001</u>
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REMARKS



816400 E

816500 E



812900 N

812800 N

斜坡編號  
FEATURE NO.  
10SW-C/C165

鑽孔編號  
BH/165/2



嶺南路



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EXTRACTED FROM 10SW- 21B & 22A

AGREEMENT NO. CE 7499 GEO 10-YEAR EXTENDED LPM PROJECT

**Halcrow**

LOCATION PLAN OF FEATURES 鑽孔位置圖

FIGURE 1

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**GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.**  
**GROUND INVESTIGATION DEPARTMENT**

HOLE NO. **BH/165/2**  
 SHEET **1** of **2**

**DRILLHOLE RECORD**

CONTRACT NO. **GE/2000/09**

PROJECT **10 - Year Extended LPM Project, Phase 2, Package A - Ground Investigation Works for Slopes on Lantau Island. Feature No. 10SW-C/165 South Lantau Road, Lantau Island.**

METHOD **Rotary** CO-ORDINATES **E** Works Order No. **0009/GI/SLR/120/009**

MACHINE & No. **YBM, DR115** **N** DATE from **31/01/2001** to **01/02/2001**

FLUSHING MEDIUM **Air-foam** ORIENTATION **Vertical** GROUND LEVEL **mPD**

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
31/01/2001	PX									0.00			Firm, dark brown (7.5YR 3/2), slightly sandy clayey SILT with some angular to subangular fine to coarse gravel sized rock fragments and rootlets. (COLLUVIUM)
			85							1.00			Firm, yellowish red (5YR 7/8), slightly sandy clayey SILT with some angular to subangular fine to coarse gravel sized rock fragments and occasional rootlets. (COLLUVIUM)
	PX 2.10 HX						2.2 3.4, 3.3 NA=13			2.10			
			92							2.55		V	Extremely weak, reddish brown (5YR 4/3), spotted and mottled white, completely decomposed, medium grained QUARTZ SYENITE. (Firm, sandy clayey SILT with occasional angular to subangular fine to medium gravel sized rock fragments)
							3.3 5.5, 5.5 NA=20			3.65		V	Extremely weak, brown (7.5YR 4/2), spotted and mottled white, completely decomposed, medium grained QUARTZ SYENITE. (Silty fine to coarse SAND with some subangular to subrounded fine to medium gravel sized rock fragments)
			94							4.10		IV	Weak to moderately weak, brown, highly decomposed, medium grained QUARTZ SYENITE. (Sandy angular to subangular fine to coarse GRAVEL with occasional cobble sized rock fragments)
			94							4.64		V	Extremely weak, brown (7.5YR 4/2), spotted and mottled white, completely decomposed, medium grained QUARTZ SYENITE. (Firm, sandy clayey SILT with occasional subangular to subrounded fine gravel sized rock fragments)
							14.5 16.6, 6.6 NA=24			5.74			From 4.74m to 5.74m : Reddish brown.
			83							6.19			From 6.19m to 6.92m : With much angular to subangular fine to coarse gravel sized rock fragments
	HX 5.19									6.92		III/III	Strong, greenish grey spotted and mottled white, slightly to moderately decomposed, medium grained QUARTZ SYENITE.
			97	46	16	>20	NI			7.85		IV/V	Joints are closely to medium spaced, occasionally very closely spaced, rough planar and rough stepped, extremely narrow, stained by iron and manganese oxide, dipping at 0° to 10°, 20° to 30° and 40° to 50°, occasionally 50° to 60°
		Dry at 12:00					12.5			8.10		II/III	From 7.05m to 7.14m : Weak to very weak, brown spotted and mottled white, highly to completely decomposed quartz syenite. (Slightly silty fine to coarse SAND with much angular to subangular fine to coarse gravel sized rock fragments)
		Dry at 09:00	100	72	52	>20	NI			8.30		II/III	From 7.27m to 7.52m : Weak to very weak, brown spotted and mottled white, highly to
			96	83	74	10.3	NR			8.63		VII/V	
							1.9			8.94		II/III	
							4.3			9.85			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPI LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U700 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED M. Chiu  
 DATE 02/02/2001  
 CHECKED James Lu  
 DATE 03/02/2001

REMARKS  
 1. Piezometer tip installed at 7.50m depth



GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.  
GROUND INVESTIGATION DEPARTMENT

HOLE NO. BH/165/2

SHEET 2 of 2

DRILLHOLE RECORD

CONTRACT NO. GE/2000/09

PROJECT 10 - Year Extended LPM Project, Phase 2, Package A - Ground Investigation Works for Slopes on Laniau Island. Feature No. 10SW-C/C165 South Laniau Road, Laniau Island

METHOD Rotary CO-ORDINATES Works Order No. 0009/GI/SLR/120/009

MACHINE & No. YBM, DR115 DATE from 31/01/2001 to 01/02/2001

FLUSHING MEDIUM Air-foam ORIENTATION Vertical GROUND LEVEL mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
16			80	36	14.3					16.5	x x x	II	<p>completely decomposed quartz syenite. (Slightly silty fine to coarse sand with much angular to subangular fine to coarse gravel sized rock fragments)</p> <p>From 7.94m to 8.06m : An 80° to vertical joint.</p> <p>From 8.53m to 8.84m : No core recovered, assumed to be completely to highly decomposed quartz syenite.</p> <p>From 9.70m to 9.85m : An 80° to vertical joint.</p> <p>Strong to very strong, greenish grey spotted and mottled white, slightly decomposed, medium grained QUARTZ SYENITE.</p> <p>Joints are closely to medium spaced, occasionally very closely spaced, rough planar and rough stepped, extremely narrow, stained by iron and manganese oxide, occasionally calcite infilled, dipping at 20° to 30°, 30° to 40° and 40° to 50°, occasionally 50° to 60° and 70° to 80°.</p> <p>From 9.85m to 10.56m : Brown.</p> <p>From 11.10m to 11.84m : Brown.</p> <p>From 11.21m to 11.31m : An 80° to vertical joint.</p> <p>From 11.30m to 11.60m : Moderately strong and moderately decomposed.</p> <p>From 12.17m to 12.32m : An 80° to vertical joint.</p> <p>From 12.40m to 12.60m : 80° to vertical joints.</p>
					10.3			7201			x x x		
			100	89	45	20				11.18	x x x	III	
					13.3			7201			x x x	I	
					7.0						x x x		
					10.3			7201			x x x		
					>20						x x x		
			100	100	95	9.3				12.60	x x x		
					4.5			7201			x x x		
					3.5						x x x		
								7201		13.96	x x x		
			100	95	89						x x x		
								7201			x x x		
										15.1	x x x		
15		Dry at 18:00			15.2						x x x		
16													
17													
18													
19													
20													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U75 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED M. Chiu  
 DATE 02/02/2001  
 CHECKED James Lu  
 DATE 03/02/2001

REMARKS

ATTACHED

TREE FELLING

砍伐树木

GENERAL NOTES:  
 1. ALL LEVELS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.  
 2. ALL LEVELS ARE TO BE TAKEN ABOVE FINISHING ON THE SURFACE OF THE ROAD.  
 3. THE DRAINAGE OF THE ROAD SHALL BE COMPLETED BY THE CONTRACTOR.  
 4. THE TOLERANCE FOR THE FINISHING SHALL BE AS FOLLOWS:  
 (a) GRADE: ± 10 mm  
 (b) CURB: ± 10 mm  
 (c) SIDEWALK: ± 10 mm  
 (d) DRIVEWAY: ± 10 mm  
 (e) PAVEMENT: ± 10 mm  
 (f) FINISHING: ± 10 mm  
 (g) FINISHING: ± 10 mm  
 (h) FINISHING: ± 10 mm  
 (i) FINISHING: ± 10 mm  
 (j) FINISHING: ± 10 mm  
 (k) FINISHING: ± 10 mm  
 (l) FINISHING: ± 10 mm  
 (m) FINISHING: ± 10 mm  
 (n) FINISHING: ± 10 mm  
 (o) FINISHING: ± 10 mm  
 (p) FINISHING: ± 10 mm  
 (q) FINISHING: ± 10 mm  
 (r) FINISHING: ± 10 mm  
 (s) FINISHING: ± 10 mm  
 (t) FINISHING: ± 10 mm  
 (u) FINISHING: ± 10 mm  
 (v) FINISHING: ± 10 mm  
 (w) FINISHING: ± 10 mm  
 (x) FINISHING: ± 10 mm  
 (y) FINISHING: ± 10 mm  
 (z) FINISHING: ± 10 mm

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES.  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES AND PLANTS.  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING BUILDINGS AND STRUCTURES.  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING ROADS AND HIGHWAYS.  
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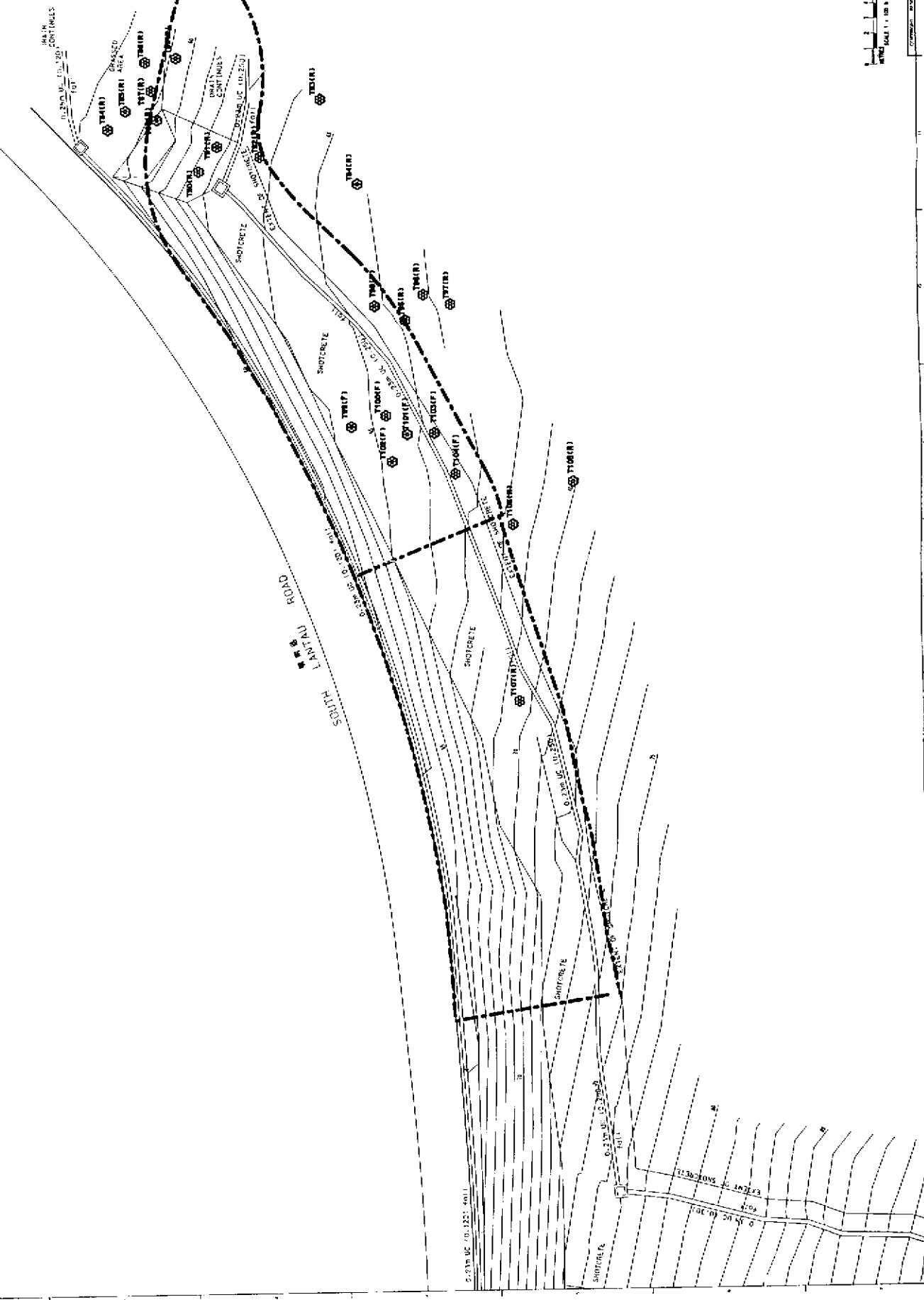
THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES.  
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 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES AND PLANTS.  
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 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING ROADS AND HIGHWAYS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES.  
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES AND PLANTS.  
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 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING ROADS AND HIGHWAYS.



SCALE 1:1000  
 CONTRACT NO. 1071  
 DATE 1/1/2011

CONTRACT NO. 1071  
 DATE 1/1/2011  
 PROJECT NAME: SOUTH LANTAU ROAD  
 PROJECT LOCATION: SOUTH LANTAU ROAD  
 PROJECT DESCRIPTION: ROADWORK AND UTILITIES  
 PROJECT OWNER: HONG KONG  
 PROJECT MANAGER: HONG KONG  
 PROJECT ENGINEER: HONG KONG  
 PROJECT ARCHITECT: HONG KONG  
 PROJECT SURVEYOR: HONG KONG  
 PROJECT CONTRACTOR: HONG KONG  
 PROJECT SUBCONTRACTOR: HONG KONG  
 PROJECT CONSULTANT: HONG KONG  
 PROJECT DESIGNER: HONG KONG  
 PROJECT DRAWING NO.: 1071-001  
 PROJECT DRAWING DATE: 1/1/2011  
 PROJECT DRAWING SCALE: 1:1000  
 PROJECT DRAWING SHEET NO.: 1071-001  
 PROJECT DRAWING SHEET TOTAL: 1071-001

CONTRACT NO. 1071  
 DATE 1/1/2011  
 PROJECT NAME: SOUTH LANTAU ROAD  
 PROJECT LOCATION: SOUTH LANTAU ROAD  
 PROJECT DESCRIPTION: ROADWORK AND UTILITIES  
 PROJECT OWNER: HONG KONG  
 PROJECT MANAGER: HONG KONG  
 PROJECT ENGINEER: HONG KONG  
 PROJECT ARCHITECT: HONG KONG  
 PROJECT SURVEYOR: HONG KONG  
 PROJECT CONTRACTOR: HONG KONG  
 PROJECT SUBCONTRACTOR: HONG KONG  
 PROJECT CONSULTANT: HONG KONG  
 PROJECT DESIGNER: HONG KONG  
 PROJECT DRAWING NO.: 1071-001  
 PROJECT DRAWING DATE: 1/1/2011  
 PROJECT DRAWING SCALE: 1:1000  
 PROJECT DRAWING SHEET NO.: 1071-001  
 PROJECT DRAWING SHEET TOTAL: 1071-001



GENERAL NOTES:  
 1. ALL DIMENSIONS ARE TO UNLESS OTHERWISE SPECIFIED.  
 2. ALL LEVELS ARE IN METERS ABOVE MEAN SEA LEVEL.  
 3. THE EXISTING GRADE OF THE ROAD IS SHOWN BY DASHED LINES.  
 4. THE PROPOSED GRADE OF THE ROAD IS SHOWN BY SOLID LINES.  
 5. THE PROPOSED GRADE OF THE ROAD IS TO BE MAINTAINED AT ALL TIMES.  
 6. THE PROPOSED GRADE OF THE ROAD IS TO BE MAINTAINED AT ALL TIMES.  
 7. THE PROPOSED GRADE OF THE ROAD IS TO BE MAINTAINED AT ALL TIMES.

所有尺寸均按圖面所示，除非另有說明。  
 所有高度均指平均海平面以上之高度。  
 現有路面之標高以虛線表示。  
 建議路面之標高以實線表示。  
 建議路面之標高應在整個工程期間內予以維持。

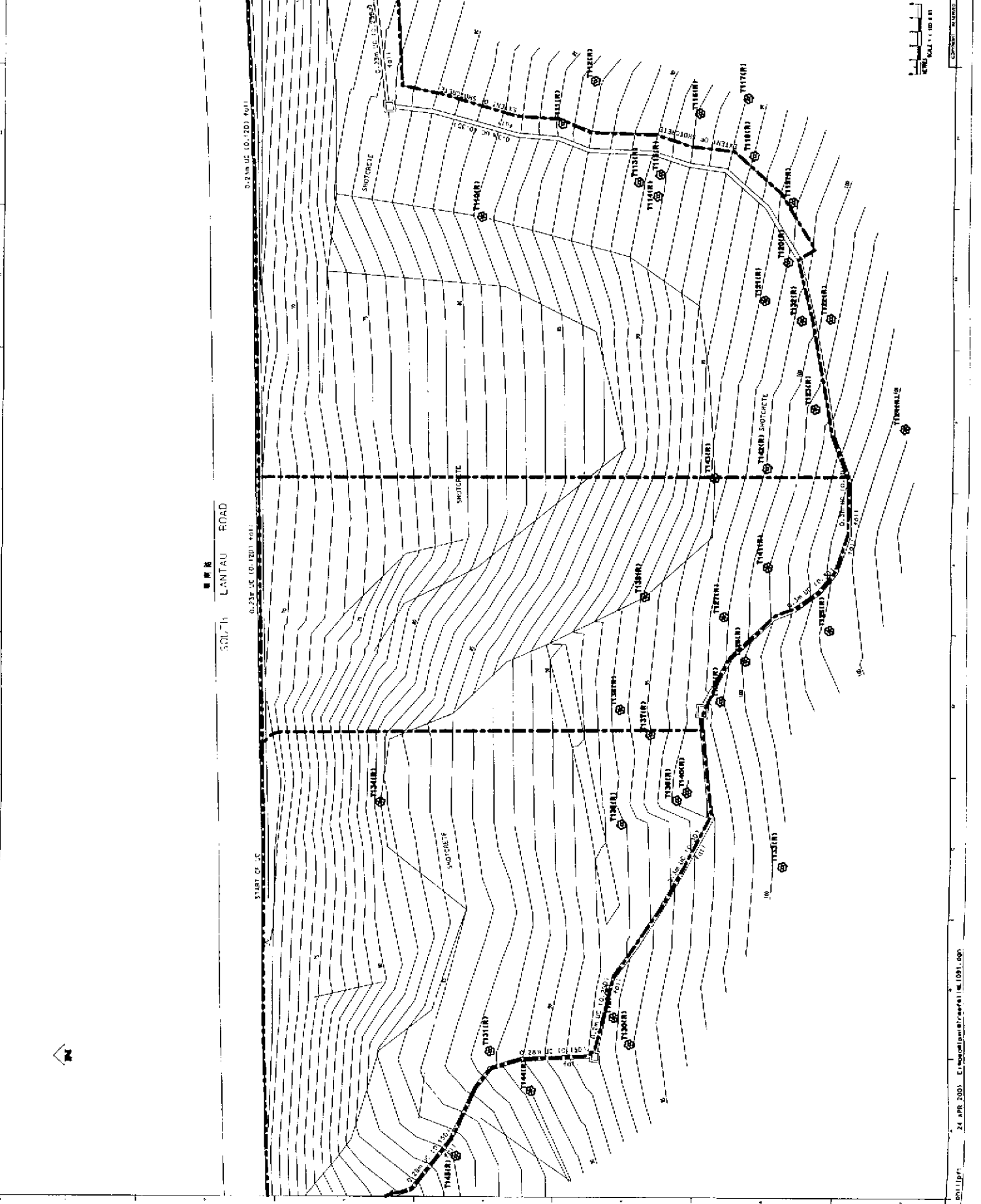
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 現有路面之標高以虛線表示。  
 建議路面之標高以實線表示。  
 建議路面之標高應在整個工程期間內予以維持。

NO.	DESCRIPTION	DATE	BY	CHECKED
1	ISSUED FOR TENDER	15/06/00	J.M.	J.M.
2	REVISED TO SHOW	15/06/00	J.M.	J.M.
3	REVISED TO SHOW	15/06/00	J.M.	J.M.
4	REVISED TO SHOW	15/06/00	J.M.	J.M.
5	REVISED TO SHOW	15/06/00	J.M.	J.M.

CONTRACT NO. C200  
 CONTRACT NO. C200  
 CONTRACT NO. C200  
 CONTRACT NO. C200  
 CONTRACT NO. C200

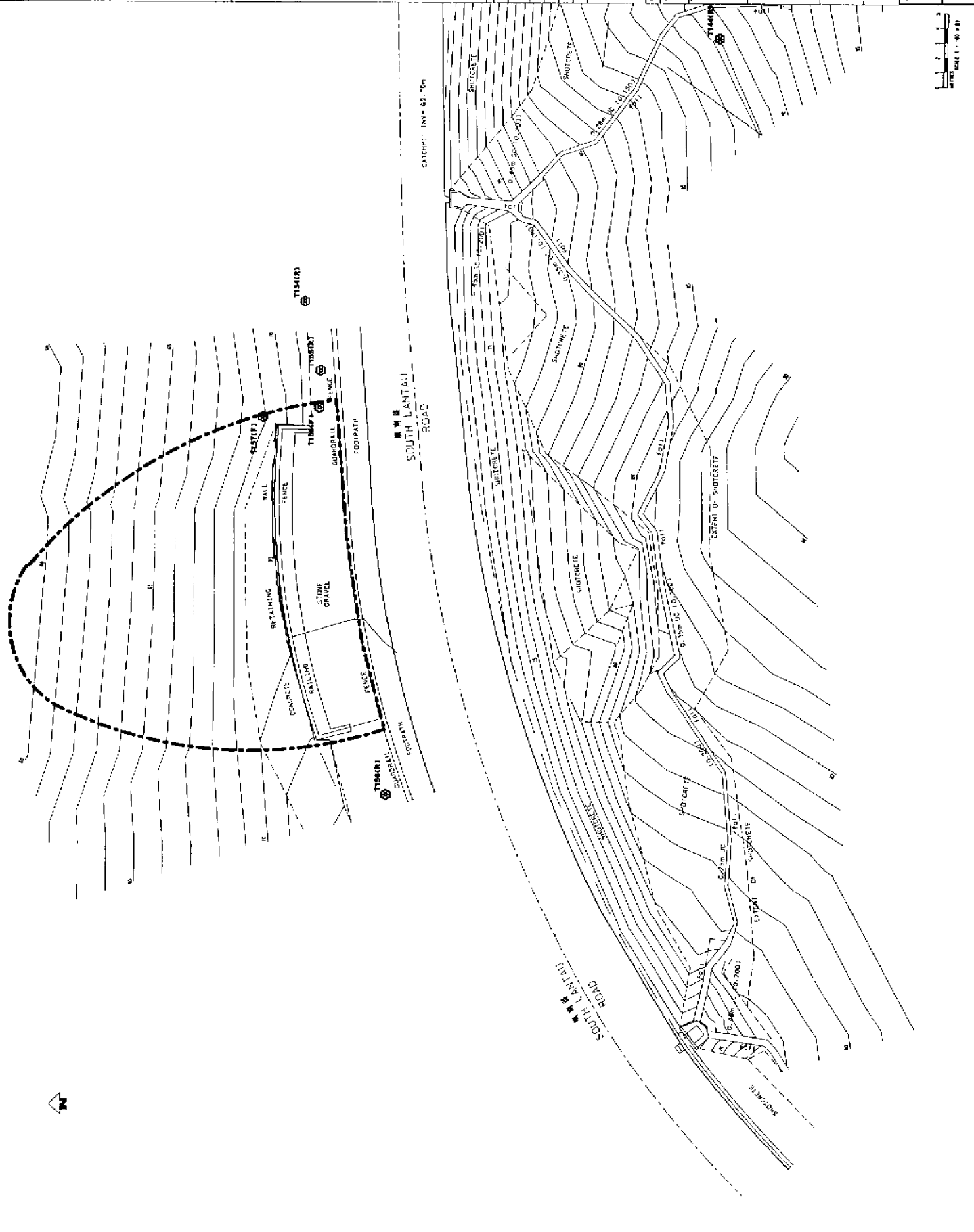
CONTRACT NO. C200  
 CONTRACT NO. C200  
 CONTRACT NO. C200  
 CONTRACT NO. C200  
 CONTRACT NO. C200

Halcrow  
 DESIGN DIVISION  
 GEOTECHNICAL ENGINEERING OFFICE  
 CIVIL ENGINEERING  
 HONG KONG



1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.  
 2. ALL LEVELS ARE TO BEING ABOVE MEAN SEA LEVEL UNLESS OTHERWISE SPECIFIED.  
 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
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 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.

圖例  
 1. 臨時圍欄  
 2. 臨時圍欄  
 3. 臨時圍欄  
 4. 臨時圍欄  
 5. 臨時圍欄  
 6. 臨時圍欄  
 7. 臨時圍欄  
 8. 臨時圍欄  
 9. 臨時圍欄  
 10. 臨時圍欄



NO.	DATE	DESCRIPTION	BY	CHECKED
1	10/01/2001	ISSUED FOR TENDER	Y. CHAN	J. CHAN
2	10/01/2001	REVISED FOR TENDER	Y. CHAN	J. CHAN
3	10/01/2001	REVISED FOR TENDER	Y. CHAN	J. CHAN
4	10/01/2001	REVISED FOR TENDER	Y. CHAN	J. CHAN
5	10/01/2001	REVISED FOR TENDER	Y. CHAN	J. CHAN

CONTRACT NO. LK/01/02  
 AND/OR PREVIOUS WORKS  
 FOR S.O.P.S. ON LANTAU ISLAND  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02

PHASE 1 PROPOSAL A  
 CONTRACT NO. LK/01/02  
 AND/OR PREVIOUS WORKS  
 FOR S.O.P.S. ON LANTAU ISLAND  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02  
 CONTRACTOR: LK/01/02

Scale: 1:1000  
 Date: 10/01/2001  
 Drawing No: LPM 0108/L1121  
 PI AS SHOWN  
**Halcrow**  
 CIVIL ENGINEERING DEPARTMENT  
 HONG KONG











GENERAL NOTES:  
 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
 2. ALL LEVELS ARE IN METERS ABOVE MEAN SEA LEVEL UNLESS OTHERWISE SPECIFIED.  
 3. THE EXACT BOUNDARY OF THE WORKS SHALL BE CONFIRMED BY THE SURVEYOR ON SITE.  
 4. NO TIME ALLOWANCE IS PERMITTED FOR DELAYS CAUSED BY THE CONTRACTOR'S NEGLIGENCE OR INADEQUATE RESOURCES.  
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
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 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.

圖則說明:  
 1. 合約人須負責向有關當局取得一切必要之牌照及批准。  
 2. 所有高度均以海平面上方之米數為準，除非另有說明。  
 3. 工程之準確邊界須由現場之測量師予以確認。  
 4. 因合約人之疏忽或資源不足而導致之延誤，概不獲准。  
 5. 合約人須負責向有關當局取得一切必要之牌照及批准。  
 6. 合約人須負責向有關當局取得一切必要之牌照及批准。  
 7. 合約人須負責向有關當局取得一切必要之牌照及批准。  
 8. 合約人須負責向有關當局取得一切必要之牌照及批准。  
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 10. 合約人須負責向有關當局取得一切必要之牌照及批准。


NO.	DESCRIPTION	DATE	BY	CHECKED
1	ISSUED FOR TENDER	15/04/2011	[Signature]	[Signature]
2	REVISED FOR CONTRACT	24/04/2011	[Signature]	[Signature]
3	REVISED FOR CONSTRUCTION	24/04/2011	[Signature]	[Signature]

PROJECT NO: 10/2010/001/001  
 PROJECT NAME: SOUTH LANTAU ROAD  
 PROJECT LOCATION: SOUTH LANTAU  
 PROJECT PHASE: PHASE 2 - PAVEMENT A

CONTRACT NO: 10/2010/001/001/001  
 CONTRACT NAME: SOUTH LANTAU ROAD  
 CONTRACT LOCATION: SOUTH LANTAU  
 CONTRACT PHASE: PHASE 2 - PAVEMENT A

DESIGN NO: 10/2010/001/001/001  
 DESIGN NAME: SOUTH LANTAU ROAD  
 DESIGN LOCATION: SOUTH LANTAU  
 DESIGN PHASE: PHASE 2 - PAVEMENT A

DESIGN DIVISION  
 GEO TECHNICAL ENGINEERING OFFICE  
 CIVIL ENGINEERING DEPARTMENT  
 HONG KONG



Halcrow  
 合誠中環有限公司





1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.  
 2. ALL LEVELS ARE IN METRES ABOVE MEAN SEA LEVEL UNLESS OTHERWISE SPECIFIED.  
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 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.

圖則  
 1. 所有尺寸均以毫米為單位，除非另有說明。  
 2. 所有高度均以平均海平面為基準，除非另有說明。  
 3. 合約人須負責向有關當局取得一切必要之牌照及批准。  
 4. 合約人須負責向有關當局取得一切必要之牌照及批准。  
 5. 合約人須負責向有關當局取得一切必要之牌照及批准。

圖例  
 1. 永久工程  
 2. 臨時工程  
 3. 現有工程  
 4. 天然地物  
 5. 測量點  
 6. 邊界  
 7. 道路  
 8. 水渠  
 9. 電力線  
 10. 電話線  
 11. 鐵線

1. 永久工程  
 2. 臨時工程  
 3. 現有工程  
 4. 天然地物  
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 8. 水渠  
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 10. 電話線  
 11. 鐵線

NO.	DESCRIPTION	DATE
1	ISSUED FOR TENDER	15/05/2006
2	REVISED DRAWING	15/05/2006
3	REVISED DRAWING	15/05/2006
4	REVISED DRAWING	15/05/2006
5	REVISED DRAWING	15/05/2006
6	REVISED DRAWING	15/05/2006
7	REVISED DRAWING	15/05/2006
8	REVISED DRAWING	15/05/2006
9	REVISED DRAWING	15/05/2006
10	REVISED DRAWING	15/05/2006

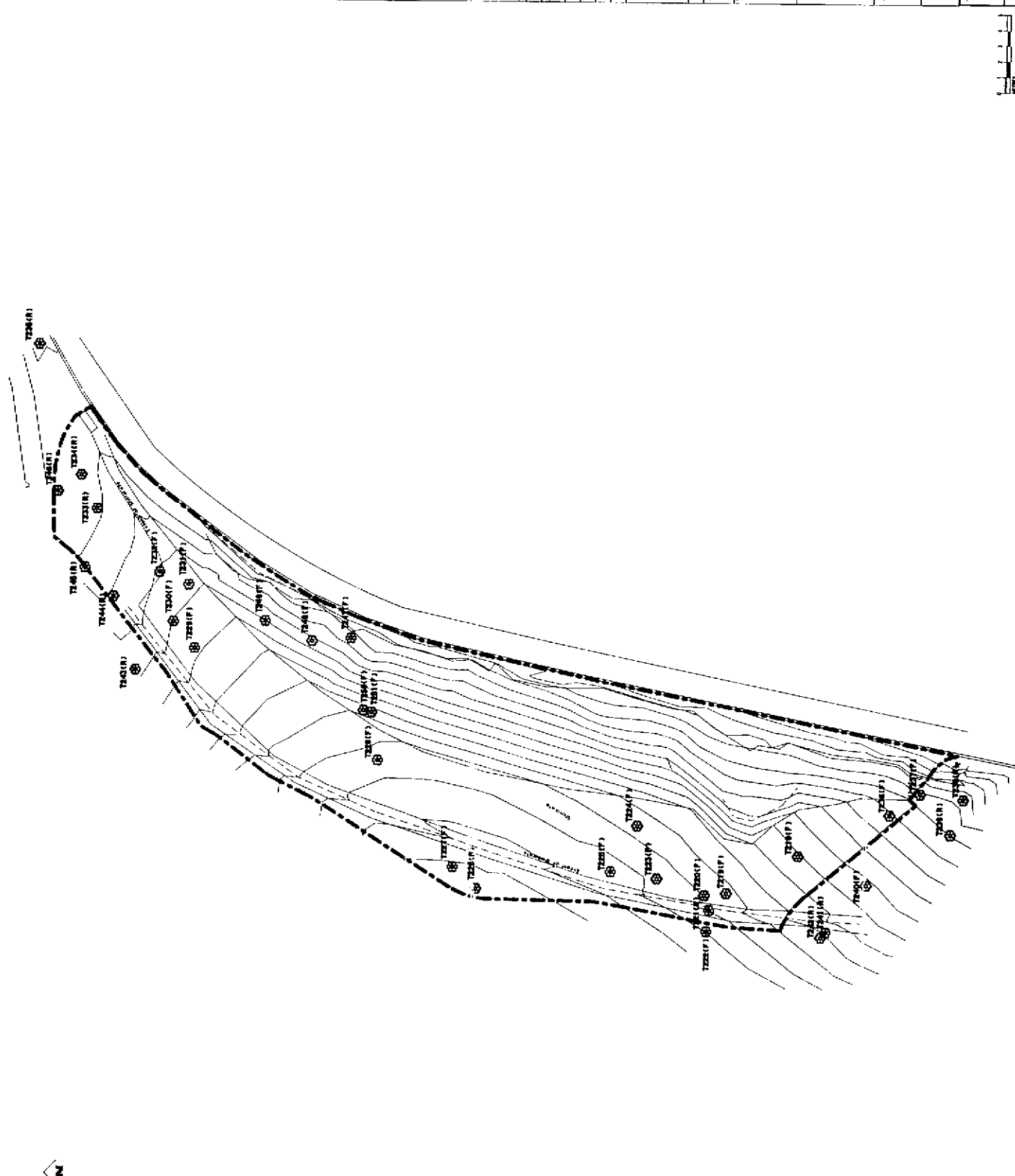
NO.	DESCRIPTION	DATE
1	ISSUED FOR TENDER	15/05/2006
2	REVISED DRAWING	15/05/2006
3	REVISED DRAWING	15/05/2006
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7	REVISED DRAWING	15/05/2006
8	REVISED DRAWING	15/05/2006
9	REVISED DRAWING	15/05/2006
10	REVISED DRAWING	15/05/2006

PROJECT NO. PM 0106/1117  
 PROJECT NAME: PI AS SHOUAN  
 CONTRACT NO. 105W-CC-99  
 CONTRACT NAME: SOUTH LANTAU ROAD  
 CONTRACT VALUE: HK\$ 105,000,000.00  
 CONTRACT DATE: 15/05/2006  
 CONTRACT TYPE: ROADWORKS  
 CONTRACT LOCATION: SOUTH LANTAU ROAD, SOUTH LANTAU, HONG KONG

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Scale: 1:1000  
 Date: 15/05/2006  
 Drawing No: 1117-01  
 Drawing Title: PI AS SHOUAN  
 Drawing Description: ROADWORKS  
 Drawing Location: SOUTH LANTAU ROAD, SOUTH LANTAU, HONG KONG

Halow  
 GEOTECHNICAL ENGINEERING OFFICE  
 CIVIL ENGINEERING DEPARTMENT  
 HONG KONG

DESIGN NO. PM 0106/1117  
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 CONTRACT DATE: 15/05/2006  
 CONTRACT TYPE: ROADWORKS  
 CONTRACT LOCATION: SOUTH LANTAU ROAD, SOUTH LANTAU, HONG KONG

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.  
 2. ALL DIMENSIONS ARE TO BE TAKEN FROM THE FACE UNLESS SPECIFICALLY NOTED OTHERWISE.  
 3. THE WORK SHALL BE COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE CONTRACT DOCUMENTS.  
 4. NO TREE FELLING IS PERMITTED WITHIN THE AREA OF THE CONTRACT UNLESS APPROVED BY THE LANDLORD. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE LANDLORD AND THE RELEVANT AUTHORITIES PRIOR TO COMMENCING WORK.  
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LANDLORD AND THE RELEVANT AUTHORITIES PRIOR TO COMMENCING WORK.  
 6. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL EXISTING SERVICES AT ALL TIMES.

所有尺寸均以毫米為單位，除非另有說明。  
 所有尺寸均應從面取，除非另有說明。  
 工程必須在合約規定的時間內完成。  
 除獲地庫人批准外，不得在合約範圍內進行任何樹木砍伐。  
 承包商必須在開始工作前，從地庫人及有關當局取得所有必要的許可證及批准。  
 承包商必須負責獲得所有必要的許可證及批准。  
 承包商必須確保所有現有服務在整個工程期間保持暢通。

1. 所有尺寸均以毫米為單位，除非另有說明。  
 2. 所有尺寸均應從面取，除非另有說明。  
 3. 工程必須在合約規定的時間內完成。  
 4. 除獲地庫人批准外，不得在合約範圍內進行任何樹木砍伐。  
 5. 承包商必須在開始工作前，從地庫人及有關當局取得所有必要的許可證及批准。  
 6. 承包商必須負責獲得所有必要的許可證及批准。  
 7. 承包商必須確保所有現有服務在整個工程期間保持暢通。

NO.	DATE	DESCRIPTION
1	10/01/2024	ISSUED FOR TENDER
2	15/01/2024	REVISED DRAWING
3	20/01/2024	REVISED DRAWING
4	25/01/2024	REVISED DRAWING

CONTRACT NO. HK-2024-001  
 LANDSLIP PROTECTION WORKS  
 FOR SITES ON Lantau Island


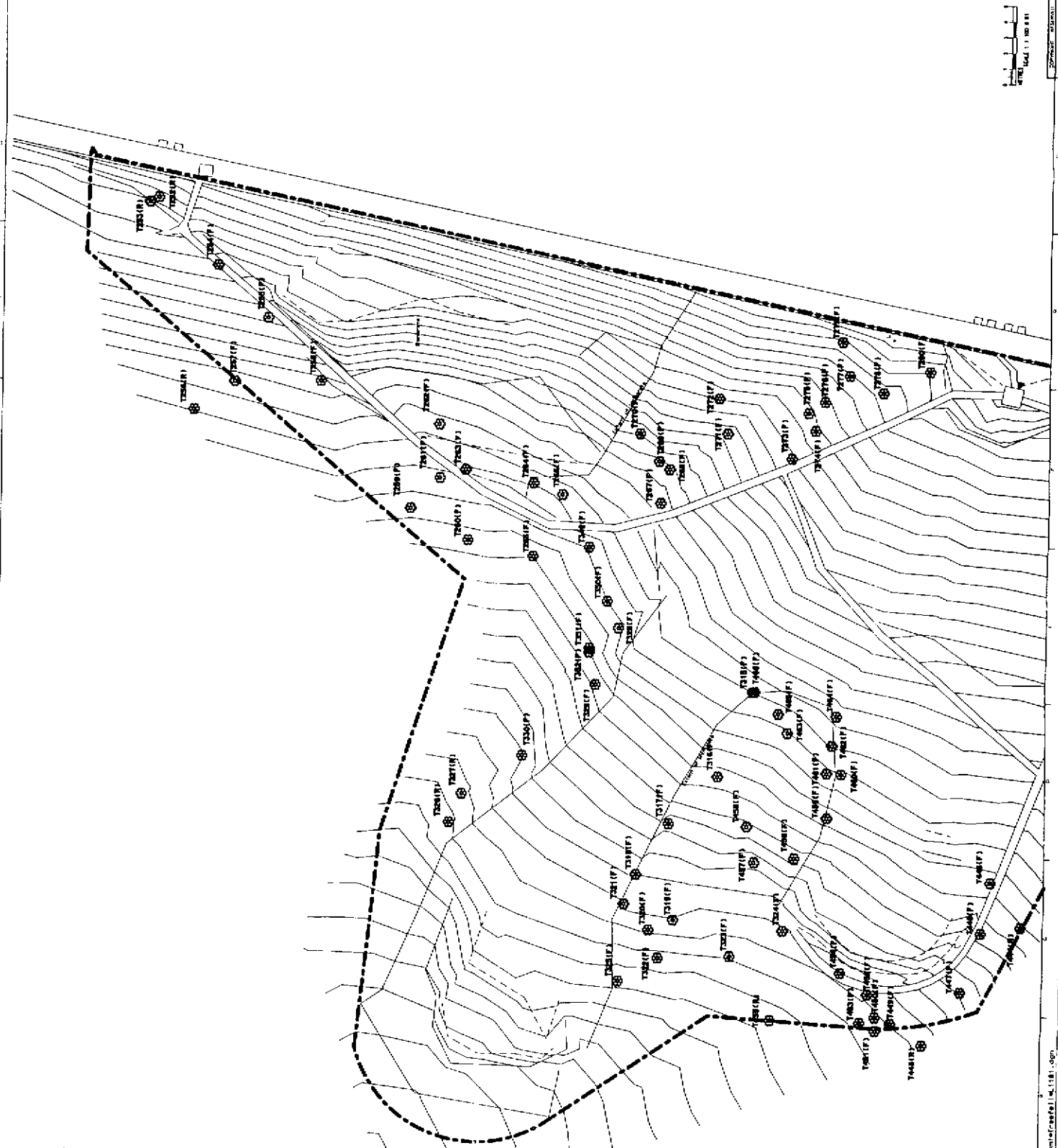
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1PM 0106 / L101 P1 AS SHOWN

**Halcrow**  
 香港地庫人有限公司

GENERAL DIVISION  
 GEOTECHNICAL ENGINEERING OFFICE

CIVIL ENGINEERING  
 DEPARTMENT  
 HONG KONG

North Arrow pointing upwards.



VERTICAL CURVES TO BE ILLUSTRATED UNLESS OTHERWISE SPECIFIED.  
 1. ALL LEVELS ARE TO BE IN METERS ABOVE MEAN SEA LEVEL UNLESS OTHERWISE SPECIFIED.  
 2. THE EXISTING GRADE OF THE ROAD IS TO BE SHOWN BY THE DOTTED LINE.  
 3. THE PROPOSED GRADE IS TO BE SHOWN BY THE SOLID LINE.  
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註  
 1. 所有高度均以海平面上方之米數表示，除非另有說明。  
 2. 現狀地勢以虛線表示。  
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CONTRACT NO. HONGKONG  
 LANDSLIP PREVENTIVE WORKS  
 FOR SLOPES ON LANTAU ISLAND  
 SHEET 2 OF 2

DESIGN DIVISION  
 GEOTECHNICAL ENGINEERING OFFICE  
 CIVIL ENGINEERING DEPARTMENT  
 HONG KONG

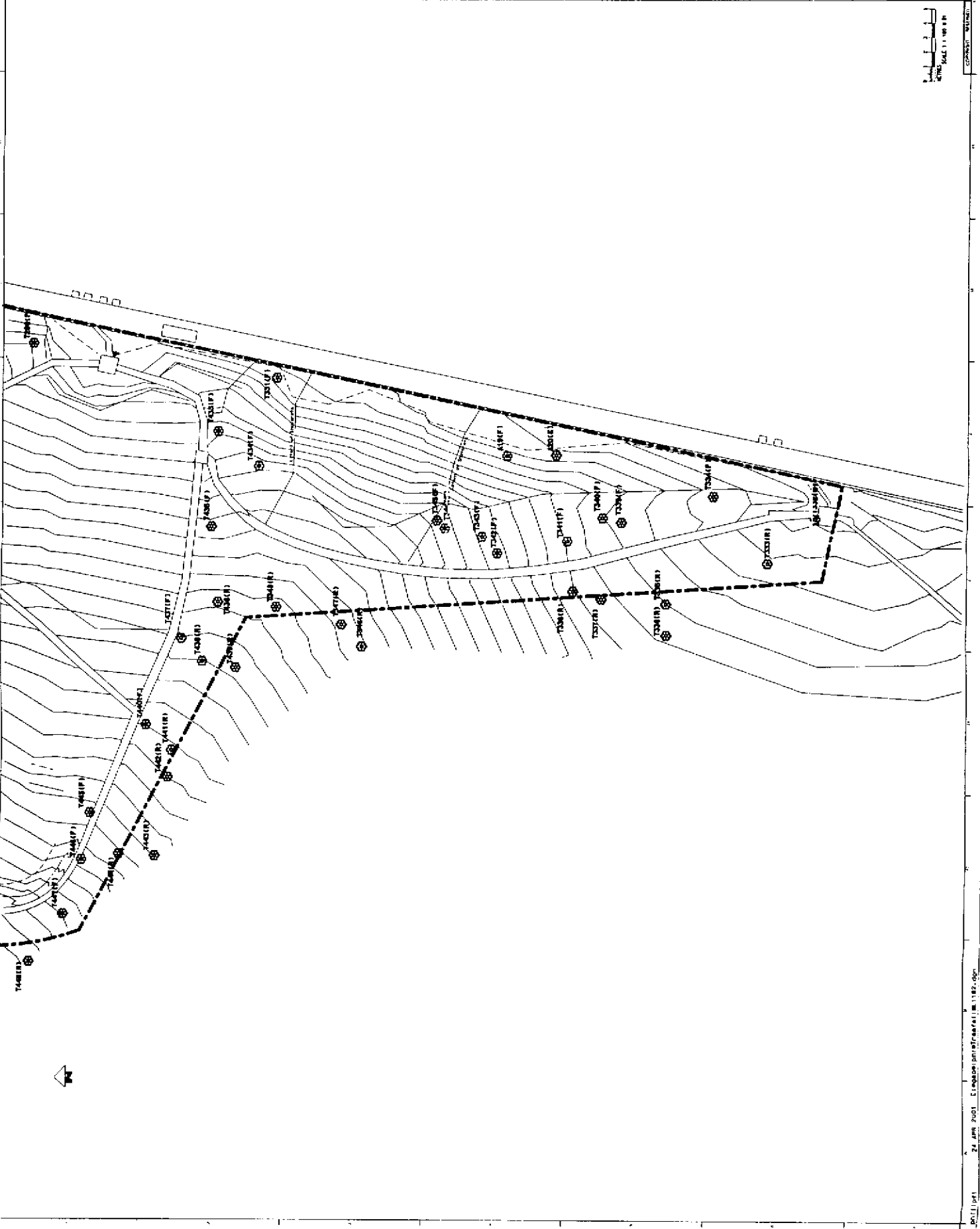
DATE	1987.11.11
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CHECKED BY	Y. S. CHAN
APPROVED BY	Y. S. CHAN
DATE	1987.11.11
BY	Y. S. CHAN
CHECKED BY	Y. S. CHAN
APPROVED BY	Y. S. CHAN

CONTRACT NO. HONGKONG  
 LANDSLIP PREVENTIVE WORKS  
 FOR SLOPES ON LANTAU ISLAND  
 SHEET 2 OF 2

DESIGN DIVISION  
 GEOTECHNICAL ENGINEERING OFFICE  
 CIVIL ENGINEERING DEPARTMENT  
 HONG KONG

CONTRACT NO. HONGKONG  
 LANDSLIP PREVENTIVE WORKS  
 FOR SLOPES ON LANTAU ISLAND  
 SHEET 2 OF 2

DESIGN DIVISION  
 GEOTECHNICAL ENGINEERING OFFICE  
 CIVIL ENGINEERING DEPARTMENT  
 HONG KONG



1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.  
 2. ALL LEVELS ARE IN METERS ABOVE MEAN SEA LEVEL UNLESS OTHERWISE SPECIFIED.  
 3. THE LOCAL AUTHORITY OF THE WORKS SITE SHALL BE CONSULTED BY THE CONTRACTOR IN THIS REGARD.  
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND THE PUBLIC WORKS DEPARTMENT.  
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND THE PUBLIC WORKS DEPARTMENT.  
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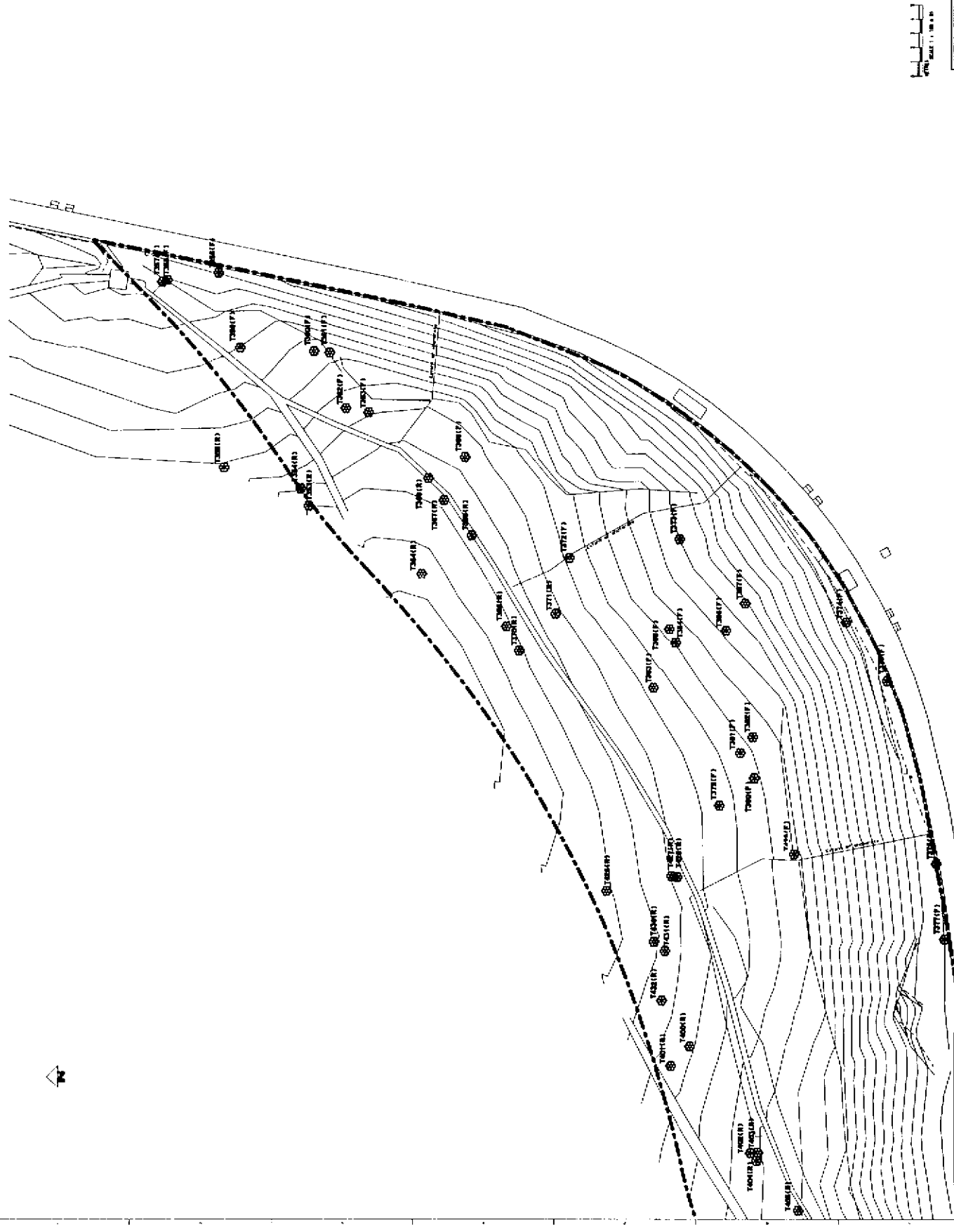
1. 所有尺寸均以公尺為單位，除非另有說明。  
 2. 所有高度均以平均海平面為基準，除非另有說明。  
 3. 承包商應與工程地點之當地政府當局商討。  
 4. 承包商應負責向當地政府當局及公共工程處取得一切必要之牌照及批准。  
 5. 承包商應負責向當地政府當局及公共工程處取得一切必要之牌照及批准。  
 6. 承包商應負責向當地政府當局及公共工程處取得一切必要之牌照及批准。  
 7. 承包商應負責向當地政府當局及公共工程處取得一切必要之牌照及批准。

NO.	REVISION	DATE
1	ISSUED FOR TENDER	JAN 2011
2	FOR INFORMATION	JAN 2011
3	FOR INFORMATION	JAN 2011
4	FOR INFORMATION	JAN 2011
5	FOR INFORMATION	JAN 2011

CONTRACT NO. GP/2009/001  
 PROJECT NAME: ...  
 SHEET NO. ...

DESIGNER: ...  
 CHECKER: ...  
 DATE: ...

**Halcrow**  
 CONSULTANTS  
 DESIGN OFFICE  
 GEOTECHNICAL ENGINEERING OFFICE  
 2/F, ...  
 HONG KONG



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 Drawing No: ...



1. ALL LEVELS AND IN SETTING SHALL BE TO THE FINISHED GRADE UNLESS OTHERWISE SPECIFIED.  
 2. THE EXACT BOUNDARY OF THE WORK SITE SHALL BE CONFIRMED BY THE SURVEYOR IN THE FIELD.  
 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
 4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL EXISTING UTILITIES AND SERVICES AT ALL TIMES THROUGHOUT THE DURATION OF THE WORK.  
 5. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND SERVICES AT ALL TIMES THROUGHOUT THE DURATION OF THE WORK.  
 6. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL EXISTING UTILITIES AND SERVICES AT ALL TIMES THROUGHOUT THE DURATION OF THE WORK.  
 7. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL EXISTING UTILITIES AND SERVICES AT ALL TIMES THROUGHOUT THE DURATION OF THE WORK.

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TRAFFIC CONTROL MEASURES TO BE TAKEN DURING THE CONSTRUCTION PERIOD

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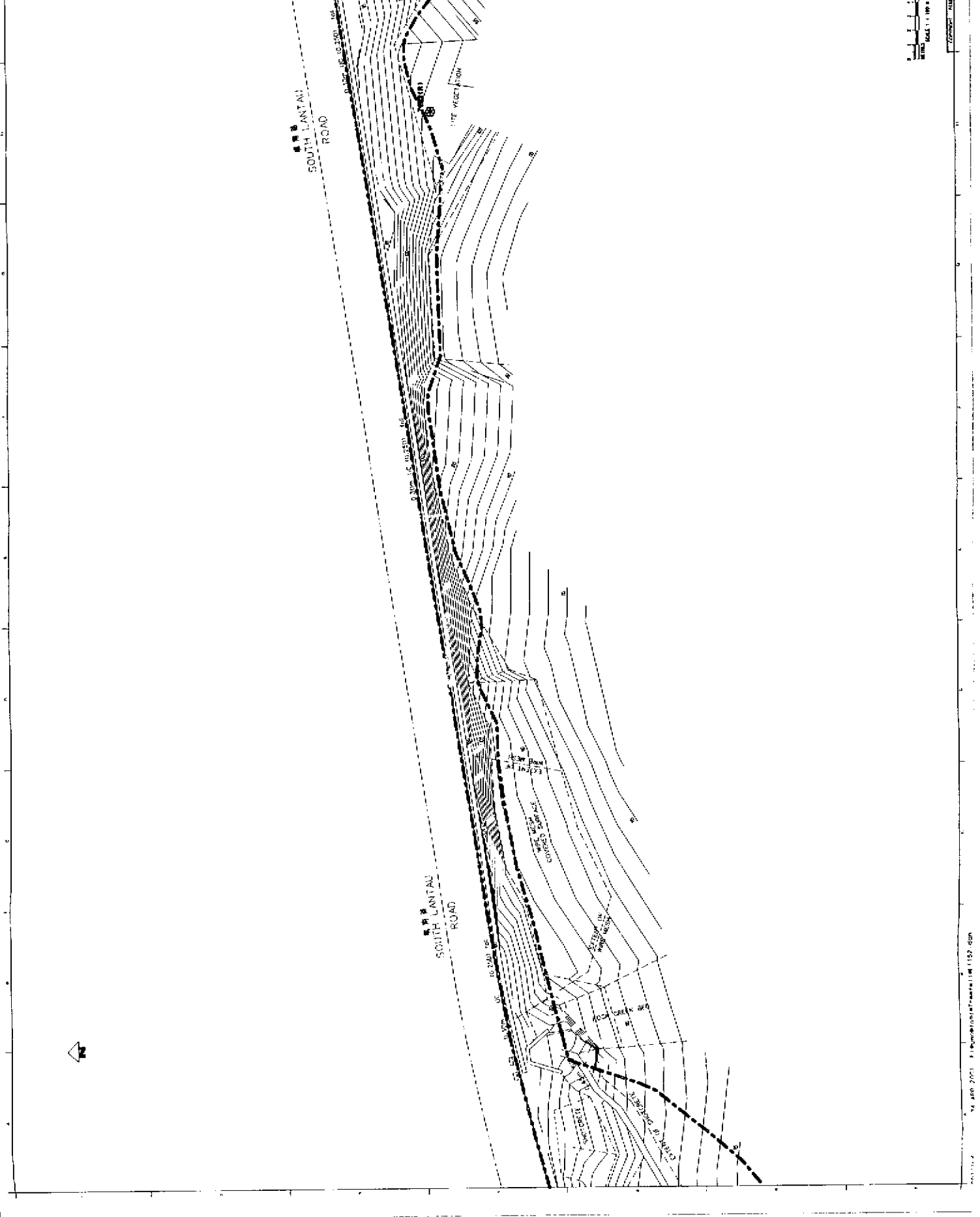
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TRAFFIC CONTROL MEASURES TO BE TAKEN DURING THE CONSTRUCTION PERIOD



DATE: 2001.11.14  
 PROJECT: SOUTH LANTAU ROAD  
 SHEET: 1 OF 1  
 SCALE: 1:1000  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]

CONTRACT: NO. 100/2001  
 LANDSCAPE ARCHITECTURE WORKS  
 FOR SOUTH LANTAU ROAD

10 YEAR EXTENDED  
 LMA PROJECT  
 PHASE 2 - PLANTING A

CONTRACTOR: LMA GROUP  
 100, HINGSHANG  
 DEPARTMENT  
 HONG KONG

DESIGNER: Halcrow  
 11/F, 110, HINGSHANG  
 DEPARTMENT  
 HONG KONG

DATE: 2001.11.14  
 PROJECT: SOUTH LANTAU ROAD  
 SHEET: 1 OF 1  
 SCALE: 1:1000  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]







PROVISIONAL DRAWING  
 NOT TO BE USED FOR CONSTRUCTION  
 ALL OTHER NECESSARY DIMENSIONS, MATERIALS AND FINISHES TO BE DETERMINED BY THE CONTRACTOR IN CONSULTATION WITH THE ENGINEER.  
 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.  
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.  
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圖例  
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 初步圖樣  
 最終圖樣  
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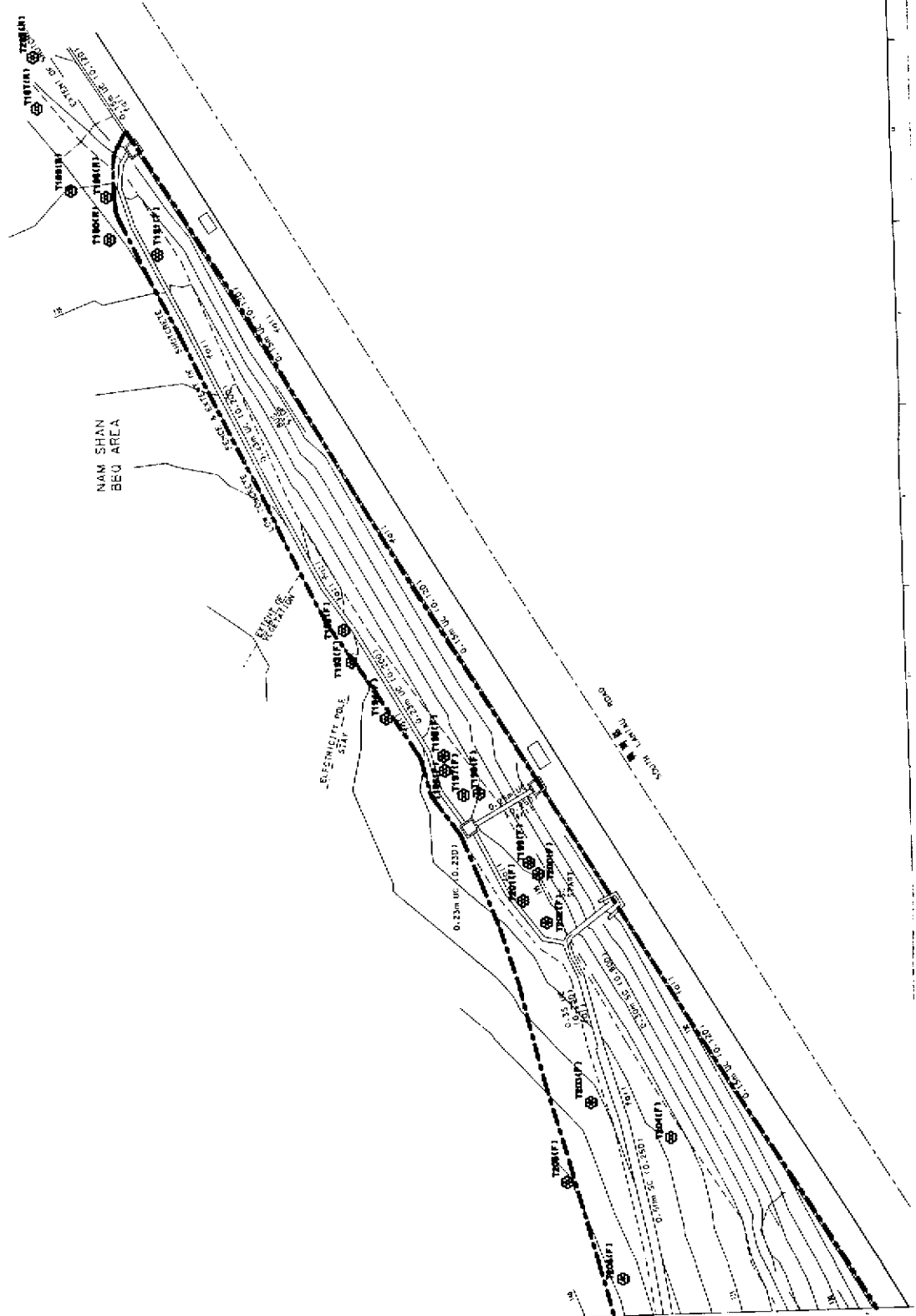
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2	REVISED FOR CONSTRUCTION	11/10/2011	XXX	YYY

DESIGNER: 10/10/2011  
 CHECKED: 11/10/2011  
 APPROVED: 12/10/2011

DESIGNER: 10/10/2011  
 CHECKED: 11/10/2011  
 APPROVED: 12/10/2011

DESIGNER: 10/10/2011  
 CHECKED: 11/10/2011  
 APPROVED: 12/10/2011

DESIGNER: 10/10/2011  
 CHECKED: 11/10/2011  
 APPROVED: 12/10/2011



SCALE: 1:1000



CIVIL ENGINEERING DEPARTMENT  
 HONG KONG

Halcrow  
 香港中環皇后大道中  
 香港中環皇后大道中

DESIGN DIVISION  
 CIVIL ENGINEERING DEPARTMENT  
 HONG KONG

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 CHECKED: 11/10/2011  
 APPROVED: 12/10/2011

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ATTACHED

PREDICTED MAXIMUM NOISE LEVEL  
WITH MITIGATION  
噪音感應強的地方最高噪音水平  
(採取緩解措施後)

**Attachment 11B**  
**附件 11B**

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers with Mitigation Measures at Individual Slope Slope Work at 10SW-C/FR32 and 10SW-C/C21(Stage 2)**  
**對噪音敏感地方最高噪音水平(採取緩解措施後)[dB(A)]**  
**於 10SW-C/FR32 和 10SW-C/C21(階段二)的斜坡工程**

Receivers Reference 參考編號	Slant Distance from slope (m) 與斜坡斜距 (米) 10SW- C/FR32	Noise Level 噪音水平 [dB(A)]					Slant Distance from Slope (m) 與斜坡 斜距 (米) 10SW- C/C21(階段二)	Noise Level 噪音水平 [dB(A)]				
		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	170	65	69	-	60	54	308	60	64	64	54	49
SR2	150	66	70	-	61	55	279	61	65	65	55	50
SR3	130	68	71	-	62	57	321	63	67	67	57	52
SR4	330	60	63	-	54	48	198	64	68	68	58	53
SR5	337	59	63	-	54	48	197	64	68	68	58	53
SR6	335	60	63	-	54	48	194	64	68	68	58	53

\* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施，只適用於石坡

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers with Mitigation Measure Cumulative Effect of slope work at 10SW-C/FR32 and 10SW-C/C21(Stage 2)**  
**對噪音敏感地方最高噪音水平(採取緩解措施後)[dB(A)]**  
**於 10SW-C/FR32 和 10SW-C/C21(階段二)斜坡工程的累積影響**

Receivers Reference 參考編號	Noise Level 噪音水平 [dB(A)]				
	Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	67	70	64	61	55
SR2	68	71	65	62	56
SR3	69	73	67	63	58
SR4	65	69	68	60	54
SR5	65	69	68	60	54
SR6	66	69	68	60	54

\* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施，只適用於石坡

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers with Mitigation Measures at Individual Slope Slope Work at 10SW-C/C209 and 10SW-C/C193(Stage 2)**  
**對噪音敏感地方最高噪音水平(採取緩解措施後)[dB(A)]**  
**於 10SW-C/C209 和 10SW-C/C193(階段二)的斜坡工程**

Receivers Reference 參考編號	Slant Distance from slope (m) 與斜坡斜距 (米) 10SW- C/C209	Noise Level 噪音水平 [dB(A)]					Slant Distance from Slope (m) 與斜坡 斜距 (米) 10SW- C/C193(階段二)	Noise Level 噪音水平 [dB(A)]				
		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五		Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	196	64	68	-	58	53	362	59	63	63	53	48
SR2	173	65	69	-	59	54	427	57	61	61	52	46
SR3	131	68	71	-	62	56	456	57	61	61	51	46
SR4	310	60	64	-	54	49	109	69	73	73	63	58
SR5	317	60	64	-	54	49	96	70	74	74	65	59
SR6	317	60	64	-	54	49	91	71	75	75	65	60

\* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施，只適用於石坡

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers with Mitigation Measure Cumulative Effect of slope work at Slope 10SW-C/C209 and 10SW-C/C193(Stage 2)**  
**對噪音敏感地方最高噪音水平(採取緩解措施後)[dB(A)]**  
**於 10SW-C/C209 和 10SW-C/C193(階段二)斜坡工程的累積影響**

Receivers Reference 參考編號	Noise Level 噪音水平 [dB(A)]				
	Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1	65	69	63	60	54
SR2	66	70	61	60	55
SR3	68	72	61	62	57
SR4	70	73	73	64	59
SR5	71	74	74	65	60
SR6	71	75	75	65	60

\* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施，只適用於石坡

**Attachment 11A**

**附件 11A**

**Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers with Mitigation Measures**

**對噪音敏感地方最高噪音水平(採取緩解措施後) [dB(A)]**

Receivers Reference 參考編號	Closest Slopes Reference 最接近斜坡參考編號	Slant Distance (m) 斜距(米)	Noise Level 噪音水平 [dB(A)]				
			Activity 1 活動一	Activity 2 活動二	Activity 3* 活動三*	Activity 4 活動四	Activity 5 活動五
SR1		196	64	68	-	58	53
SR2	10SW-C/C209	173	65	69	-	59	54
SR3		131	68	71	-	62	56
SR4		109	69	73	73	63	58
SR5	10SW-C/C193	96	70	74	74	65	59
SR6		91	71	75	75	65	60
SR7	10SW-C/C189	123	68	72	-	62	57
SR8		90	71	75	-	65	60
SR9	10SW-C/C199	169	65	69	-	60	54
SR10		173	65	69	-	59	54
SR11		98	70	74	-	64	59
SR12	10SW-C/C165	106	70	73	-	64	58
SR13		100	70	74	-	64	59

\* Activity 3 - Rock Slope stabilisation Measures (RSSM) for Rock Slope Only \* 活動三 - 石坡鞏固措施，只適用於石坡

## **ATTACHMENT 12**

### **RECOMMENDED POLLUTION CONTROL CLAUSES FOR CONSTRUCTION CONTRACTS**

#### **AVOIDANCE OF NUISANCE**

- (i) All works are to be carried out in such a manner as to cause as little inconvenience as possible to nearby residents, property and to the public in general, and the Contractor shall be held responsible for any claims which may arise from such inconvenience.
- (ii) The Contractor shall be responsible for the adequate maintenance and clearance of channels, gullies etc. and shall also provide and maintain such pedestrian and vehicular access as shall be directed within the works site.
- (iii) Water shall be used to prevent dust rising and the Contractor shall take every precaution to prevent the excavated materials from entering into the public drainage system.
- (iv) The Contractor shall carry out the Works in such a manner as to minimize adverse impacts on the environment during execution of the Works.
- (v) The Contractor shall transport construction plant, equipment and materials to and from Lantau Island by sea. He shall allow a time for marine transportation in his construction programme.

#### **NOISE POLLUTION CONTROL**

##### **General Requirements**

- (i) The Contractor shall comply with and observe the Noise Control Ordinance and its subsidiary regulations in force in Hong Kong.
- (ii) If required, the Contractor shall provide an approved integrating sound level meter to IEC 651: 1979 (Type 1) and 804 : 1985 (Type 1) and the manufacturer's recommended sound level calibrator for the exclusive use of the Engineer at all times. The Contractor shall maintain the equipment in proper working order and provide a substitute when the equipment are out of order or otherwise not available.
- (iii) The sound level meter including the sound level calibrator, if required, shall be verified by the manufacturers every two years to ensure they perform the same levels of accuracies as stated in the manufacturer's specifications. That is to say at the time of measurements, the equipment shall have been verified within the last two years.
- (iv) In addition to the requirements imposed by the Noise Control Ordinance, to control noise generated from equipment and activities for the purpose of carrying out any construction work other than percussive piling during the time period from 0700 to 1900 hours on any day not being a general holiday (including Sundays), the following requirements shall

also be complied with : -

- (a) The noise level measured at 1m from the most affected external facade of any nearby noise sensitive receivers from the construction work alone during any 30 minute period shall not exceed an equivalent sound level (Leq) of 75 dB(A).
- (b) The noise level measured at 1m from the most affected external facade of any nearby schools from the construction work along during any 30 minute period shall not exceed an equivalent sound level (Leq) of 70dB(A) [65dB(A) during school examination periods].

The contractor shall liaise with the schools and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the Contract.

- (c) Should the limits stated in the above sub-clauses (a) and (b) be exceeded, the construction shall stop and shall not recommence until appropriate measures acceptable to the Engineer that are necessary for compliance have been implemented.

Any stoppage or reduction in output resulting from compliance with this clause shall not entitle the Contractor to any extension of time for completion or to any additional costs whatsoever.

- (v) Before the commencement of any work, the Engineer may require the methods of working, equipment and sound-reducing measures intended to be used on the Site to be made available for inspection and approval to ensure that they are suitable for the project.
- (vi) The Contractor shall devise, arrange methods of working and carry out the Works in such a manner so as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.
- (vii) The Contractor shall ensure that all plant and equipment to be used on Site are properly maintained in good operating condition and noisy construction activities shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means to avoid disturbance to any nearby noise sensitive receivers.
- (viii) Notwithstanding the requirements and limitations set out in clause (iv) above and subject to compliance with clauses (vi) and (vii) above, the Engineer may upon application in writing by the Contractor, allow the use of any equipment and the carrying out of any construction activities for any duration provided that he is satisfied with the application which, in his opinion, to be of absolute necessity and adequate noise insulation has been provided to the educational institutions to be affected, or of emergency nature, and not in contravention with the Noise Control Ordinance in any respect.

- (ix) No excavator-mounted breaker shall be used within 125m from any nearby noise sensitive receivers. The Contractor shall use hydraulic concrete crusher whenever applicable.
- (x) For the purposes of the above clauses, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, or performing arts centre or office building shall be considered a noise sensitive receiver.
- (xi) The Contractor shall, when necessary, apply as soon as possible for a construction noise permit in accordance with the Noise Control (General) Regulations, display the permit as required and copy to the Engineer.

### **DUST SUPPRESSION MEASURES**

- (i) The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. The air pollution control system installed shall be operated whenever the plant is in operation.
- (ii) The Contractor shall at his own cost, and to the satisfaction of the Engineer, install effective dust suppression equipment and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver the concentration of air-borne dust shall not exceed 0.5 milligrams per cubic meter, at standard temperature (25<sup>B</sup>C) and pressure (1.0 bar) averaged over one hour, and 0.26 milligrams per cubic metre, at standard temperature (25<sup>B</sup>C) and pressure (1.0 bar) averaged over 24 hours.
- (iii) In the process of material handling, any material which has the potential to create dust shall be treated with water or sprayed with wetting agent.
- (iv) Where dusty materials are being discharged to vehicle from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust should be provided for this enclosure and vented to a fabric filter system.
- (v) Any vehicle with an open load carrying area used for moving materials which have the potential to create dust shall have properly fitting side and tail boards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.
- (vi) Any stockpile of dusty material shall be either:
  - (a) covered entirely by impervious sheeting;
  - (b) placed in an area sheltered on the top and three sides; or
  - (c) sprayed with water or dust suppression chemical so as to maintain the entire surface wet.
- (vii) Implementation of mitigation measures under the Air Pollution Control (Construction Dust)

Regulation where appropriate.

- (viii) The Contractor shall frequently clean and water the site to minimize the fugitive dust emissions.
- (ix) The Contractor shall restrict all motorized vehicles to a maximum speed of 8km per hour and confine haulage and delivery vehicles to designated roadways inside the site. Areas of roadway longer than 100m where movement of motorized vehicles exceeds 100 vehicular movements/day or as directed by the Engineer shall be furnished with a flexible pavement surfacing.
- (x) Wheel washing facilities shall be installed and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer prior to construction of the facility. Such wheel washing facility shall be usable prior to any earthworks excavation activity on the Site. The Contractor shall also provide a hard-surfaced road between washing facility and the public road.
- (xi) Conveyor belts shall be fitted with windboards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize emission of dust. All conveyors carrying materials which have the potential to create dust shall be totally enclosed and fitted with belt cleaners.

## **WATER POLLUTION CONTROL**

### **Discharge into Sewers and Drains**

- (i) The Contractor shall not discharge directly or indirectly (by runoff) or cause or permit or suffer to be discharged into any public sewer, storm-water drain, channel, stream-course or sea, any effluent or foul or contaminated water or cooling or hot water without the prior consent of the relevant Authority who may require the Contractor to provide, operate and maintain at the Contractor's own expense, within the premises or otherwise, suitable works for the treatment and disposal of such effluent or foul or contaminated or cooling or hot water.
- (ii) If any office, site canteen or toilet facilities is erected, foul water effluent shall, subject to paragraph (I) above, be directed to a foul sewer or to a sewage treatment facility.
- (iii) The Contractor's attention is drawn to the Building Ordinance, the Water Pollution Control Ordinance and the Technical Memorandum >Standard for Effluent Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters.= and ProPECC PN 1/94 AConstruction Site Drainage=.

## **WASTE MANAGEMENT**

### ***General***

- (i) The Contractor is responsible for waste control within the Site, removal of waste materials produced from the Works and to implement any mitigation measures to minimise waste or to redress problems from waste arising from the Works. The waste may include any sewage, waste water or effluent containing sand, cement, silt or any other suspended solid or dissolved material to flow from the Works onto any adjoining land, storm water or foul water sewer, or any waste matter or surplus material or refuse to be deposited outside the Site or to be deposited permanently anywhere within the Works. The illegal ‘fly-tipping’ of any wastes or surpluses which may arise from the Works is strictly prohibited.
- (ii) The overall waste management strategy to be adopted involves minimisation of the waste generation, coupled with the maximum reuse and recycling of waste, where practicable, in accordance with the general principles of the waste management hierarchy.
- (iii) Unless otherwise stated in the Contract, all Construction and Demolition (C&D) Material arising from or in connection with the Works shall become the property of the Contractor. The Contractor shall promptly remove all sorted and processed materials not suitable for inclusion in the Works.
- (iv) The Contractor shall comply with the Waste Disposal Ordinance, the Dumping at Sea Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance and any other relevant legislation that may be brought into force when undertaking waste management.
- (v) The Contractor shall be responsible for obtaining the relevant license / permit, such as the effluent discharge licence, the chemical waste producer registration etc.

### ***Removal of Waste Material***

- (i) The Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Site onto any adjoining land or allow any waste matter or refuse to be deposited anywhere within the Site or onto any adjoining land and shall have all such matter removed from the Site.
- (ii) The Contractor shall be liable for any damages caused to adjoining land through his failure to comply with sub-clause (i).
- (iii) The Contractor shall be responsible for temporary training; diverting or conducting of open streams or drains intercepted by any works and for reinstating these to their original courses on completion of the Works.
- (iv) The Contractor shall be responsible for adequately maintaining any existing site drainage system at all times including removal of solids in sand traps, manholes and stream beds.
- (v) Any proposed stream course and nullah temporary diversions shall be submitted to the



Engineer for agreement one month prior to such diversion works being commenced. Diversions shall be constructed to allow the water flow to discharge without overflow, erosion or washout. The area through which the temporary diversion runs is to be reinstated to its original condition or as agreed by the Engineer after the permanent drainage system has been completed.

- (vi) The Contractor shall furnish, for the Engineer's information, particulars of the Contractor's arrangements for ensuring that material from any earthworks does not wash into the drainage system. If at any time such arrangements prove to be ineffective, the Contractor shall take such additional measures as the Engineer shall deem necessary and shall remove all silt which may have accumulated in the drainage system whether within the Site or not.
- (vii) The Contractor shall segregate all inert construction waste material suitable for reclamation or land formation and shall dispose of such material at such dumping areas as may be specified from time to time by the Director of Civil Engineering.
- (viii) All non-inert construction waste material deemed unsuitable for reclamation or land formation and all other waste material shall be disposed of at a public landfill.
- (ix) The Contractor's attention is drawn to the Waste Disposal Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance. It shall be the Contractor's responsibility, at his own cost, to obtain all licences, permits and the like which may be necessary for compliance with the above or other ordinance.

## **ECOLOGY**

- (i) The Contractor shall observe and comply with relevant flora and fauna conservation ordinances. He shall maintain on site, and provide one copy for the Engineer, with copies of the relevant enacted ordinances and their regulations, which shall include but not be limited to the followings:
  - a) Forest and Countryside Ordinance, Chapter 96;
  - b) Forest Regulations; and
  - c) Wild Animal Protection Ordinance (Cap. 170).
- (ii) The Contractor shall, prior to the commencement of any Portion of the Site, liaise with the Engineer and his employed horticulturist regarding an existence of protected flora at the respective Portion of the Site.
- (iii) If any protected flora is found on the Site, the Contractor shall inform to the Engineer and provide a protection as specified in sub-clause (3) to the protected flora, or an alternative protection proposed by the Contractor and agreed by the Engineer. Notwithstanding the provision of this sub-clause, the Contractor shall not claim for extension of time to the Employer.
- (iv) The Contractor shall erect a protective cage around the protected flora site. The protective cage should be consisted of a frame made of 50mm GMS angles, covered with

a heavy duty GMS mesh. A minimum clearance between the cage and all side of the protected flora shall be 450mm. The whole cage shall be painted in dark brown or black colour and should be carefully fixed to the surrounding rock or ground surface for the duration of the Works. The exact shape or a form of the cage shall be determined on site by the Engineer to suit the spread of the protected flora and the local configuration of rock or ground condition. Tarpauline sheets or other dust protection net/gauze shall be erected around the protected flora site, in particular, during site operations which will generate dust. No works should be commenced until the protection to the protected flora is completed to the satisfaction of the Engineer.

- (v) The Contractor shall pay attention to Feature 10SW-C/C21 and Feature 10SW-C/C193, at where protected flora have been identified.

#### ***Horticulurist***

- (vi) The Contractor shall provide a qualified and experienced horticulturist, as approved by the Engineer, to be responsible for the supervision and quality control of all landscaping and establishment works on site.
- (vii) The horticulturist shall be responsible to identify any protected flora on the Site before commencement of site clearance works.

#### ***Trees***

- (viii) A plant is considered as a tree if its girth i.e. circumference of the trunk, measures 300 mm or more at a height of 1000 mm above ground level. No trees, except withered trees, shall be trimmed or cut down unless prior agreement is obtained from the Engineer. The Contractor shall ensure that all trees which are to be retained are not damaged by his construction operation. Trees shall only be felled when they are directed to be felled by the Engineer in writing. Tree felling, if ordered, shall only be carried out in the presence of the Engineer's staff.

#### ***Limit of site clearance***

- (ix) Where ordered, site clearance shall be carried out within the limits as directed by the Engineer. Site clearance beyond such limits shall not be permitted unless authorised by the Engineer. Any unauthorised site clearance shall be reinstated by the Contractor at his own expense. The Contractor shall confirm with the Engineer regarding the locations and extent of site clearance prior to the execution of works.