

HONG KONG RAINFALL AND LANDSLIDES IN 1997

GEO REPORT No. 97

T.W.K. Lam

**GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING DEPARTMENT
THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION**

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PREFACE

In keeping with our policy of releasing information which may be of general interest to the geotechnical profession and the public, we make available selected internal reports in a series of publications termed the GEO Report series. A charge is made to cover the cost of printing.

The Geotechnical Engineering Office also publishes guidance documents as GEO Publications. These publications and the GEO Reports may be obtained from the Government's Information Services Department. Information on how to purchase these documents is given on the last page of this report.



R.K.S. Chan
Head, Geotechnical Engineering Office
December 1999

EXPLANATORY NOTE

This GEO Report consists of two Special Project Reports on the review of rainfall and landslides in Hong Kong throughout 1997.

They are presented in two separate sections in this Report. Their titles are as follows:

<u>Section</u>	<u>Title</u>	<u>Page No.</u>
1	Hong Kong Rainfall and Landslides in 1997	5
2	Report on the Rainstorm and Landslides of 1-4 July 1997	161

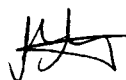
SECTION 1: HONG KONG RAINFALL AND LANDSLIDES IN 1997

T.W.K. Lam

**This report was originally produced in March 1999
as GEO Special Project Report No. SPR 1/99**

FOREWORD

This Report presents a review of rainfall and landslides in Hong Kong throughout 1997. Geotechnical engineers of the District Divisions of the Geotechnical Engineering Office (GEO) provided details of most of the landslides. Supplementary landslide data were provided by the GEO's 1997 Landslide Investigation Consultants, the Agriculture and Fisheries Department, Architectural Services Department, Drainage Services Department, Fire Services Department, Highways Department, Housing Department and Water Supplies Department. The Hong Kong Observatory provided rainfall information. All contributions are gratefully acknowledged.



P.L.R. Pang
Chief Geotechnical Engineer/Special Projects

ABSTRACT

This Report presents a review of rainfall and landslides in Hong Kong throughout 1997. Rainfall information has been obtained from the Geotechnical Engineering Office (GEO) automatic raingauge system and from the Hong Kong Observatory (HKO). Most of the landslide data have been taken from the records of incidents reported to the GEO in 1997. Supplementary data have been obtained from the GEO's 1997 Landslide Investigation Consultants and other Government Departments.

1997 was the wettest year at the Hong Kong Observatory (HKO) since records began in 1884. Rainfall at the HKO amounted to 3343.0 millimetres, 51% above normal and exceeding the previous record set in 1982. The most intense maximum 24-hour rainfall of 799.0 millimetres was recorded at the Chinese University (CU) on 2 and 3 July. The annual rainfall at the CU amounted to 4391.0 millimetres. The maximum annual rainfall of 4907.0 millimetres was recorded at Tai Mo Shan.

Eight Landslip Warnings were issued in 1997. The rainstorms in 1997 resulted in 543 incidents being reported to the GEO, 491 of which were classified as genuine landslides, and 50 of which were major (i.e. an event with a volume of collapsed mass of 50 m³ or more, or where a fatality has occurred). Two fatalities and nine injuries occurred. The consequences resulting from the landslides included the temporary evacuation of 47 squatter huts, 19 houses and 14 flats, the permanent evacuation of 115 squatter huts, and 120 landslides resulted in the blockage of sections of road, pedestrian pavement and/or access.

Report SPR 7/98 provides more detailed information on the rainfall and landslides associated with the rainstorm of 1-4 July 1997.

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1. INTRODUCTION

This Report presents factual data on rainfall and landslide occurrence in 1997. Rainfall information has been obtained from the Geotechnical Engineering Office (GEO) and the Hong Kong Observatory (HKO). Most of the landslide data have been taken from the records of incidents reported to the GEO. Supplementary data have been obtained from the GEO's 1997 Landslide Investigation Consultants and other Government Departments.

In this Report, a landslide is defined as the detachment or excessive lateral displacement of a soil or rock mass, and includes the failure of fill slopes, cut slopes, natural slopes, retaining walls and rock or boulder falls. A 'major' landslide is defined as a failure in which the volume of the collapsed mass is 50 m³ or more, or where a fatality has occurred. The arrangement of this Report is similar to previous annual rainfall and landslide reports (Chen, 1993; Chan, 1994 & 1995; Evans, 1992; Premchitt, 1991a-1991e; Siu, 1991; Tang, 1992; Wong, 1996 & 1997).

This Report reviews rainfall and landslides throughout the year rather than emphasising any one specific rainstorm. A special report on the rainstorm of 1-4 July 1997 (Lam, 1998) has been produced in view of the uncommonly high intensity of rainfall and the number of landslides on this occasion.

2. RAINFALL

2.1 The Raingauge System

In the rugged terrain of Hong Kong, the distribution and intensity of rainfall during a storm can vary dramatically with respect to both geography and time. To provide sufficient coverage for a meaningful analysis of rainfall distribution, the HKO has installed a network of raingauges which, in 1997, comprised 24 automatic and 51 manual raingauges at 68 locations. Three automatic raingauges have also been installed by the Drainage Services Department (DSD). The 'principal' raingauge is located at the HKO's headquarters in Tsim Sha Tsui, and a continuous rainfall record has been kept at this location since 1884.

Since 1978 the GEO, in cooperation with the HKO, has also established an automatic raingauge system (comprising 48 GEO raingauges in 1997) which transmits real-time rainfall data via telephone lines to the GEO and the HKO at five-minute intervals. The locations of the GEO automatic raingauges were selected to supplement the network of other types of raingauges and to provide specific information in areas of particular geotechnical interest. The locations of all GEO, HKO and DSD raingauges are shown in Figure 1.

In this Report, the 'maximum 24-hour' rainfall refers to the maximum rolling 24-hour rainfall (calculated from rolling rainfall amounts using one clock-hour data) and the 'daily' rainfall refers to the 24-clock-hour rainfall (midnight to midnight). The 'daily' rainfall is based on an arbitrary fixed period and does not necessarily represent the maximum rainfall. When rainfall is quoted without reference to the location of measurement, it can be assumed to be from the HKO headquarters in Tsim Sha Tsui.

2.2 Hong Kong Observatory Records

The weather for 1997 was described in the Monthly Weather Summary for December 1997 (HKO, 1997). The comments on rainfall are as follows :

“1997 was the wettest year since records began in 1884. Rainfall at the Hong Kong Observatory amounted to 3343.0 millimetres, 51 percent above normal and exceeding the previous record set in 1982. Over 70% of the rain fell between June and August. This year’s extreme rainfall coincided with an exceptionally strong El Nino event in the equatorial Pacific”.

“Active troughs of low pressure brought a total rainfall of 783.6 millimetres in June making it the seventh wettest June on record. There were four days with rainfall exceeding 100 millimetres recorded at the Observatory”.

“The month’s total rainfall of 746.0 millimetres made it the fourth highest for the month of July and the accumulated rainfall since 1 January of 2154.7 millimetres was 64 percent above normal”.

“A total of 829.0 millimetres of rainfall was recorded, making this August the fourth wettest on record”.

Some rainfall maxima for the heavy rainstorms in 1997 are shown in Table 1, together with some data on the resulting consequences, and these are compared with similar data for selected previous major rainstorms.

The cumulative rainfall for 1997 recorded at the HKO is shown in Figure 2. The daily rainfall at the HKO and the maximum 24-hour rainfall recorded at GEO raingauge stations in the whole of Hong Kong in 1997 are shown in Figures 3a and 3b, and the numbers of landslides reported to the GEO in Figure 3c. Figure 4 shows the monthly rainfall in 1997 in comparison with recorded maximum and mean monthly rainfalls.

Figure 5 shows the hourly rainfall intensities for the three heaviest 24-hour rainstorms recorded at the HKO in 1997. In 1997, the most intense maximum 24-hour rainfall over the whole of Hong Kong was recorded at raingauge station N09 at the Chinese University on 2 and 3 July. Figure 6 shows the hourly rainfall intensities at raingauge station N09 and at the HKO, on 2 and 3 July.

2.3 Geotechnical Engineering Office Records

The maximum 24-hour, maximum five-hour rainfalls (rolling rainfall amounts using one clock hour rainfall as the basic unit) and maximum one-hour rainfall (rolling rainfall amounts using five-minute rainfall as the basic unit) recorded by the GEO raingauges during the 24 heaviest rainstorms in 1997 are given in Table 1.

2.4 Rainfall Distribution

Rainfall distribution with time and location can be assessed by referring to detailed GEO and HKO records. Figure 7 shows the total annual rainfall distribution. Isohyets of 24-hour rainfall for the three heaviest rainfalls recorded at the HKO are shown in Figures 8, 10 and 11, with the 24-hour periods determined with reference to rainfall records at the HKO (an approach consistent with previous reports), and the most intense rainfall event of the year recorded at GEO raingauge station N09 at the Chinese University in Figure 9. Isohyets of maximum 24-hour and maximum hourly rainfall (rolling rainfall amount using one clock hour rainfall as the basic unit) recorded during 1997 are shown in Figures 12 and 13. All the above figures also show the locations of landslide incidents.

2.5 Warnings Issued by the Hong Kong Observatory

Relevant warnings issued by the HKO and Landslip Warnings jointly issued by the GEO and the HKO in 1997 are summarised in Table 2. A total of eight Landslip Warnings were issued in 1997.

2.6 Comparison with Past Rainstorms and Estimated Return Periods

The cumulative rainfall for 1997 is shown in Figure 2 in comparison with the wettest year (1982) and the driest year (1963) since records began in 1884, and the mean rainfall from 1961 to 1990. The 1997 total annual rainfall at the HKO was 3343.0 mm, which is 51 percent above normal and exceeds the previous record set in 1982. Figure 4 shows monthly rainfall in 1997 compared with the recorded maximum (since 1884) and mean (1961-1990) monthly rainfalls.

The return periods of the nine heaviest rainfall events recorded at the HKO in 1997 were estimated for rainfall durations of one hour to fifteen days (Table 3). The estimated return periods were assessed based on 100 years (1884-1939 and 1947-1990) of historical rainfall data at the HKO (Lam & Leung, 1994), and range from two to four years. However, the most intense rainfall in 1997 was recorded at raingauge station N09 at the Chinese University in the New Territories, rather than at the HKO. Table 3 shows the estimated return periods for rainfall durations from one hour to 15 days at raingauge station N09, and range from about 22 to more than 1 000 years based on the rainfall recorded at the HKO (Lam & Leung, 1994).

It should be noted that the estimated return periods at raingauge station N09 based on the rainfall recorded at the HKO may not be representative, given that raingauge station N09 at the Chinese University is about 13 km from the HKO. Using available site-specific rainfall data (1984 to 1997 inclusive) from raingauge station N09, Table 3 also shows the estimated return periods for rainfall durations from one hour to 15 days at this location range from about 10 to 45 years based on Gumbel's method (Lam & Leung, 1994).

3. LANDSLIDES

3.1 Landslide Occurrence in 1997

The numbers of incidents reported to various Government departments in 1997 are summarized in Table 4.

A total of 543 incidents were reported to the GEO, and details of these are summarized in Appendix A. In total, 491 incidents were classified as genuine landslides, 50 (10%) of which were major (summarized in Table A1). The remaining reported incidents were either not landslides or incidents that were of no geotechnical concern, such as fallen trees, and were therefore not considered in the statistical analysis described below. The locations of all the reported incidents are shown in Drawing No. GCSP 8/19, which is attached to this Report. Selected incidents are illustrated in Plates 1 to 20. Further details of these incidents can be found in the incident files of the District Divisions of the GEO and in detailed landslide studies conducted by GEO's 1997 Landslide Investigation Consultants.

Wherever possible, the dates and times of the landslides were assessed by geotechnical engineers. Some incidents were not reported to the GEO until several days or weeks after they had occurred. For these, it was difficult to determine the exact time of occurrence. Out of the 491 reported landslide incidents, the time of occurrence was determined to within one day for 414. Of these 414 incidents, the time of occurrence was determined to within one hour for 145. The numbers of landslide incidents that occurred when the Landslip Warning was raised are shown in Table 5.

Based on GEO's landslide inspection reports, 135 landslides were considered by the inspecting geotechnical engineer to be associated with poor maintenance. This amounted to about 28% of all the reported landslides.

It should be noted that there were almost certainly other landslides which were not reported to GEO, many of which will have occurred in remote areas with no immediate consequences.

3.2 Facilities Affected by Landslides

3.2.1 General

The numbers of landslides affecting various types of facility (building lot, road, etc.) in Hong Kong, Kowloon and the New Territories are shown in Table 6. The numbers of major failures affecting different types of facility are also given in Table 6. It should be noted that a failure may affect more than one type of facility. Landslide consequences, classified according to failure type, are shown in Table 7.

3.2.2 Squatter Areas

A total of 76 landslides affected squatter areas and ten of these were major (Table 6). These landslides led to the permanent evacuation of 115 squatter huts and the temporary evacuation of 47 squatter huts (Table 7). One major incident (MW 97/6/16) is described in

Section 4.

3.2.3 Building Lots

Sixty-nine landslides affected building lots and private properties, and fourteen of these were major (Table 6). These landslides resulted in the temporary evacuation of 19 houses and 14 flats in a part or in total (Table 7). Landslide incidents ME 97/5/7, ME 97/6/13, MW 97/5/18, MW 97/6/12, MW 97/6/22, MW 97/6/56 and MW 97/7/18 are described in Section 4.

3.2.4 Roads and Access

Two-hundred-fifty-three landslides affected sections of road, access, footpath and pedestrian pavement. Thirty-five of these were major (Table 6). One-hundred-twenty landslides resulted in the blockage of sections of road, pedestrian pavement and/or access (Table 7). Incidents ME 97/5/3, ME 97/5/7, ME 97/7/17, MW 97/5/1, MW 97/5/6, MW 97/6/15, MW 97/6/16, MW 97/7/11 and MW 97/7/18 are described in Section 4.

3.2.5 Construction Sites

Three landslides affected construction sites. One of these was major (Table 6).

3.2.6 Carparks, Playgrounds, Gardens and Yards

Fifteen landslides affected carparks, playgrounds, gardens and yards. Three of these were major (Table 6).

3.2.7 Catchwaters and Reservoirs

Landslides affecting catchwaters and reservoirs were dealt with separately by the Water Supplies Department and were not reported to the GEO. A total of 104 incidents were reported to the WSD, of which 93 were landslides, 61 of which affected catchwaters. No landslide of this category was reported to the GEO.

3.2.8 Other Areas

Other areas affected by landslides include country and urban parks, open areas and hillsides, a cemetery and graves. A total of six areas within the country and urban parks were reported to have been affected by landslides, one of which was major. Sixty-five landslides affected open areas and hillsides, and three of these were major. Two landslides affected a cemetery, and both were major.

3.3 Types of Failures

3.3.1 General

Landslides reported to the GEO have been classified into six types of failure, i.e. fill slopes, cut slopes, natural slopes, retaining walls, rock/boulder falls and others. The numbers of different types of landslide are shown in Table 8.

3.3.2 Fill Slopes

There were 36 fill slope failures, forming 7.3% of all landslides reported. Nine of these failures were major. Incidents MW 97/5/18, MW 97/6/15, MW 97/6/56 and MW 97/7/11 are described in Section 4.

3.3.3 Cut Slopes

There were 312 cut slope failures, forming 63.6% of all landslides reported. These were classified further according to types of material involved, i.e. soil, soil/rock and rock.

There were 268 reported incidents for soil cut slopes, 15 of which were major (Incidents ME 97/5/3, ME 97/5/7, ME 97/6/13, ME 97/7/15, ME 97/7/17, MW 97/6/16, MW 97/6/22 are described in Section 4). There were 37 soil/rock cut slope failures, three of which were major (Incident MW 97/7/18 is described in Section 4). There were seven rock cut slope failures, one of which was major.

3.3.4 Retaining Walls

There were 20 reported failures of retaining walls, forming 4.1% of all landslides reported. Three of these were major.

3.3.5 Natural Slopes

There were 88 natural slope failures reported, forming 17.9% of all landslides. Eighteen of these failures were major. Incidents MW 97/5/1 and MW 97/6/12 are described in Section 4.

3.3.6 Rock and Boulder Falls

Thirty-two rock and boulder falls were reported, forming 6.5% of all landslides. One of these incidents was major. Incident MW 97/5/6 is described in Section 4.

3.4 Landslide Volume Distribution

Tables 9 and 10 show the distribution of landslide volume for all landslide incidents

which were reported to the GEO. The approximate volume of failure was recorded for 487 out of 491 reported landslides. Of the landslides for which the volume was recorded, 188 landslides (about 38.3%) involved less than 5 m³ of material. Fifty of the reported landslides (about 10 %) involved a failure volume of 50 m³ or above. Of these 50 major failures, nine were fill slopes, 15 were soil cut slopes, three were soil/rock slopes, one was a rock slope, 18 were natural slopes, three were retaining walls and one was a rock/boulder fall.

3.5 Rainfall-Landslide Relationships

The relationship between rainfall and landslides in 1997 is illustrated in plots of total annual rainfall distribution and landslides in Figure 7, and 24-hour rainfall isohyets during the above four heaviest rainstorms and landslides in Figures 8 to 11. Figure 7 shows the total annual rainfall distribution and the locations of landslides which resulted from rainstorms in 1997. Figures 8 to 11 show the locations of landslides for which both the time and date of occurrence are known.

To further show the relationship between rainfall and landslides for the rainstorms in 1997, Figures 12 and 13 show the maximum rolling 24-hour rainfall and the maximum hourly rainfall, respectively, recorded from raingauge stations in the whole of Hong Kong during 1997 and locations of landslides that occurred as a result. The maximum 24-hour rainfall distribution in Figure 12 and the maximum hourly rainfall distribution in Figure 13 were plotted based on the maximum rolling 24-hour rainfall and the maximum hourly rainfall, respectively, from raingauge stations in the whole of Hong Kong.

4. NOTABLE LANDSLIDES

4.1 General

Out of the 491 landslides reported to the GEO in 1997, fifteen are described in more detail here. Ten major landslides (ME 97/7/1, ME 97/7/3, ME 97/7/5, ME 97/7/30, ME 97/7/51, ME 97/7/69, MW 97/7/10, MW 97/7/27, MW 97/7/70 and Shing Mun Main (Upper) Dam) occurred as a result of the 1-4 July 1997 rainstorm and have been described in detail in a separate report (Lam, 1998). One of these landslides (ME 97/7/3) caused a fatality. The following landslides have been selected mainly on the basis of their failure volume, consequence or technical interest.

4.2 Incident ME 97/5/3: Clear Water Bay Road near Ta Ku Ling, Sai Kung

(A soil cut slope failure resulting in the closure of one road lane, Plate 1)

A soil cut slope failure (Slope No. 11-NE-B/C143) occurred on the morning of 8 May 1997 at Clear Water Bay Road near Ta Ku Ling, Sai Kung. Prior to failure, the 5 m high cut slope was covered by poor vegetation and had a slope angle of about 70°. The failure scar was about 4 m high and failure volume was 20 to 30 m³. The travel angle was estimated to be 30° as measured from the crest of the failure to the distal end of the landslide debris. The landslide debris accumulated at the toe of the cut slope and resulted in the closure of one lane of Clear Water Bay Road.

The cut slope failure was probably triggered by the infiltration of intense rainfall into unlined surface channels and the bare surface on the slope crest. Insufficient drainage maintenance was considered a contributing factor to the failure.

4.3 Incident ME 97/5/7: House Nos. 47 and 48 Hiu Po Path, Sheung Sze Wan, Sai Kung

(A soil cut slope failure resulting in the evacuation of a house, also affecting an adjacent house and causing the closure of a pedestrian pavement, Plate 2)

On the morning of 8 May 1997, a soil cut slope failure occurred adjacent to house Nos. 47 & 48 Hiu Po Path, Sheung Sze Wan, Sai Kung. The cut slope was about 8 to 10 m high and covered by chunam before the failure. The volume of the failure was estimated to be about 30 m³. The landslide debris accumulated at the rear area of house No.47 and some debris from this landslide travelled down to house No.48, resulting in the evacuation of house No.47, affecting house No.48 and causing the closure of a pedestrian pavement.

The failure at Sheung Sze Wan was probably triggered by the infiltration of intense rainfall into a poorly maintained chunam surface and overflow of rainfall runoff from surface channels at the crest of the slope.

4.4 Incident ME 97/6/13: House Nos. 4 and 5 Pak Shek Wo Sun Tsuen, Clear Water Bay Road, Sai Kung

(A soil cut slope failure which resulted in the evacuation of two houses, Plate 3)

At 10:00 a.m. on 4 June 1997, a soil cut slope failure occurred on slope No.11NE-B/C405 at Pak Shek Wo Sun Tsuen, Clear Water Bay, Sai Kung. Prior to failure, the 8 m high cut slope was covered by chunam and had a slope angle of 60°. The failure scar was about 5 m wide and 6 m high. The volume of the failure was estimated to be about 20 m³. The landslide debris toed against a wall of a two-storey building located behind house Nos.4 and 5, which were evacuated.

The failure was probably triggered by the infiltration of intense rainfall exacerbated by insufficient surface drainage due to the blockage of channel drains at the slope crest.

4.5 Incident ME 97/7/15: Pak Kong Water Treatment Plant, Sai Kung

(A soil cut slope failure resulting in structural distress on a crib wall affecting a water treatment plant, Plates 4 and 5)

A soil cut slope failure (Slope No.8SW-C/C175) occurred at 8:30 a.m. on 4 July 1997 at Pak Kong Water Treatment Plant, Sai Kung. The soil cut slope with berms was 30 m high, comprising a 7.5 m high slope with a gradient of 80° at the toe, with the remaining upper slope having a gradient of about 26°. The near-vertical 7.5 m high slope at the toe was retained by a crib wall and the remaining upper slope was covered by moderate vegetation with surface drainage channels. Surface subsidence was observed on the slope berms with

extensive tension cracks, concrete slab cracks and drainage channel cracks. Significant cracking and bulging were noted on the crib wall concrete members associated with backfill materials emerging from the toe of the crib wall. The volume of the unstable mass was estimated to be about 100 m³.

The failure was probably triggered by intense rainfall associated with a rise in perched groundwater levels and possibly the presence of adverse geological conditions.

4.6 Incident ME 97/7/17: Opposite to a Pumping Station at Sui Wo Road, Fo Tan

(A soil cut slope failure resulting in the blockage of one road lane, Plates 6 & 7)

A soil cut slope failure (Slope No.7SE-A/C2) occurred at 7:45 a.m. on 4 July 1997 opposite to a pumping station at Sui Wo Road, Fo Tan. The slope was about 47 m high. The lower 7 m of the slope was covered by chunam, while the remaining upper slope was covered by poor vegetation. The failure scarp was about 4 m high with a failure volume of about 44 m³. This failure resulted in the blockage of one lane of Sui Wo Road.

The landslide was probably triggered by infiltration following intense rainfall associated with a rise in groundwater level. Insufficient drainage maintenance was also considered a contributing factor to the failure.

4.7 Incident MW 97/5/1: Behind Blocks 3 and 4 Wonderland Villas, Kwai Chung

(A major natural slope failure which resulted in the partial blockage of the southbound lane of Wah King Hill Road, Plates 8 & 9)

A major natural slope failure occurred between 10:00 a.m. and 10:30 a.m. on 8 May 1997 at the crest of a natural hillside below Wonderland Villas, Kwai Chung. The landslide scar was about 16.5 m long and 8 m wide, with an average depth of less than 1 m and a maximum depth of 1.5 m. The landslide debris entered a drainage line, in which it was washed downstream over a roadside cut slope (No. 11NW-A/C33) and onto Wah King Hill Road. The estimated failure volume was about 80 m³. Landslide debris travelled about 200 m downslope onto Wah King Hill Road and partly blocked the southbound lane. The failure caused superficial damage to a roadside cut slope (No. 11NW-A/C33) and disruption to traffic on Wah King Hill Road.

This landslide was probably triggered by intense short duration rainfall immediately before the failure. The probable cause of the failure was the build up of a transient water table above a less weathered zone at the base of the detachment scar.

A comprehensive investigation into this landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998a).

4.8 Incident MW 97/5/6: Opposite to Container Terminal No.2, Kwai Chung

(A rockfall failure which resulted in the blockage of one lane of Kwai Chung Road, Plate 10)

A rockfall failure occurred at 11:00 a.m. on 8 May 1997, and affected the lower rock slope portion of Slope No.11NW-A/C79 adjacent to Kwai Chung Road. The base of the failure was about 1 m above the road level. The failure was 5 m long, 3 m wide and 1.5 m deep with an estimated volume of about 23 m³. The debris comprised several large angular blocks and numerous small angular blocks and boulders. The debris was deposited on the verge and partially blocked the inside lane of the Kowloon-bound carriageway of Kwai Chung Road.

The failure was probably triggered by the infiltration of water during severe rainstorms into the rock slope via high-angle discontinuities, with resulting development of critical water pressures that destabilized the rock mass.

A comprehensive investigation into the landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998b).

4.9 Incident MW 97/5/18: Glorious Praise Christian Centre, Kwai Chung

(A fill slope failure which affected a school and a Christian centre, Plate 11)

A fill slope failure was reported at 10:00 a.m. on 8 May 1997 on a slope between Kwai Chung Public School (KCPS) and the Glorious Praise Christian Centre (GPCC), Kwok Shui Road, Kwai Chung. The failure was up to 5.8 m long, 4.9 m wide and 0.8 m deep. The failure volume was about 20 m³. Debris from the landslide accumulated at the toe of the slope adjacent to the GPCC. The landslide also undermined part of a fill platform of KCPS at the crest of the slope.

The failure was probably triggered by intense short duration rainfall causing stormwater infiltration at the crest of the slope and runoff from the edge of the platform onto the unsurfaced slope below, due to the partial blockage of a U-channel and a discharge point above the crest of the slope.

A comprehensive investigation into the landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998c).

4.10 Incident MW 97/6/12: 19-23 Sha Tin Heights Road, Sha Tin

(A major natural terrain landslide which inundated the garden area of No.9 Woodcrest Hill, Plates 12 and 13)

Between 7:00 a.m. and 8:41 a.m. on 4 June 1997, a major landslide occurred on the

heavily-vegetated hillside to the south of Sha Tin Heights Road, Sha Tin. The landslide occurred below the western block of Happy View House (No.21 Sha Tin Heights Road) near the crest of the hillside. The main scarp was about 20 m long and 15 m wide, with an average depth of about 1.5 m. The volume of failed materials was estimated to be about 150 m³. The travel angle of the landslide debris, measured from the crest of the failure to the distal end of the debris, was about 28°. Debris from the landslide travelled down a natural gully line and inundated the garden area of No.9 Woodcrest Hill at the mouth of the gully. Considerable signs of distress were observed immediately upslope of the retaining wall (No.7SW-DR2), together with a tilted guardhouse and cracks in the adjacent hardstanding area and within a wall around Albert Villa.

The landslide was probably caused primarily by infiltration of intense rainfall immediately before the landslide, together with possible prolonged leakage from the drainage channels in the area.

A comprehensive investigation into the landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998d).

4.11 Incident MW 97/6/15: Chung Shan Terrace, Lai King Hill Road, Kwai Chung

(A major fill slope failure which resulted in the collapse of a buried retaining wall, blocking of Lai King Hill Road and an access road to Chung Shan Terrace, Plate 14)

A major fill slope failure occurred at 7:15 a.m. on 4 June 1997 at Chung Shan Terrace, Kwai Chung. The incident involved the failure of an unregistered fill body and resulted in the collapse of a buried retaining wall. The landslide was 15 m long, 18 m wide and an average of 3 m deep. The estimated volume of landslide debris was 450 m³. The height of the main scarp varied from about 2 m in its eastern part adjacent to a U-channel, to about 4 m in the northern corner where a podium of the Green Regency development was slightly undermined. The travel angle of the landslide was 18° as measured from the crest to the distal end of the debris. The landslide ran out about 45 m from the toe of the slope, mostly over the gently inclined and lower part of the Chung Shan Terrace access road. Landslide debris from the landslide completely blocked Lai King Hill road and an access road to Chung Shan Terrace. A car travelling on the access road was carried by the landslide debris to the far side of Lai King Hill Road.

The landslide at Chung Shan Terrace was probably triggered by the intense rainfall immediately before the failure. Probable contributory factors include: (a) the loose nature of the fill which was susceptible to collapse and liquefaction, (b) leakage of a combined stormwater and foulwater drainage system at Crawford Court, (c) the absence of surface protection to the fill which allowed infiltration, and (d) the existence of a buried retaining wall which restricted water flow.

A comprehensive investigation into the landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998e).

4.12 Incident MW 97/6/16: Hut No. 26 Kau Wa Keng Upper Village, New Territories

(A major soil cut slope failure which resulted in one fatality, five injuries, damage to a squatter hut, the blockage of a footpath and two lanes of Castle Peak Road, Plates 15 & 16)

Two landslides occurred either side of the squatter hut identified as No.26 at Kau Wa Keng Upper Village, above Castle Peak Road near the junction with an access road to Chung Shan Terrace, Kau Wa Keng, New Territories. The northern landslide occurred at 7:25 a.m. on 4 June 1997 and the southeastern landslide occurred sometime later.

The main part of the northern landslide involved Slope No.11NW-A/C416 and a significant portion of the hillside above. A subsidiary part of the northern landslide affected the southern end of Slope No.11NW-A/C415. The landslide released an estimated 360 m³ of landslide debris. About 280 m³ originated from the main scar which was about 10 m long and 12 m wide. The remaining debris came from the subsidiary scar, about 5 m long and 8 m wide. The average vertical depth of the failure was about 2 m to 2.5 m. The travel angle of the landslide debris was about 30°. The northern landslide resulted in one fatality, five injuries and damage to a squatter hut. Some debris from this landslide was washed downslope and blocked two lanes of Castle Peak Road. The southeastern landslide occurred on the same cut slope (Slope No.11NW-A/C416) and involved about 25 m³ of debris over a scar width of 6 m. Significant seepage was observed over the slip surface within the northern part of the main scar. The southeastern landslide occurred closer to the damaged squatter hut and also damaged two ancillary structures.

These landslides were probably caused by an increase in groundwater pressure in the weathered granite hillside following very heavy rainfall, coupled with adverse hydrogeological conditions.

A comprehensive investigation into the landslides was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998f).

4.13 Incident MW 97/6/22: No.7 Keng Hau Road, Sha Tin

(A major soil cut slope failure which destroyed the southern part of a terraced garden, Plate 17)

On the morning of 4 June 1997, a major soil cut slope failure (No.7SW-D/C700) occurred immediately to the east of No.7 Keng Hau Road, Sha Tin. The detached failure surface was about 10 m to 12 m wide extending from the original toe of the cut slope to the eastern wall of the building podium. The maximum depth of failure was between 1.5 m and 2 m. The estimated volume of failure was 150 m³. The travel angle of the landslide debris was 19°. Some debris travelled down a natural gully and ran out onto a cultivated low-lying area. The failure resulted in the destruction of part of a terrace garden, and partly undermined the podium of No.7 Keng Hau Road.

The landslide was probably triggered by intense short duration rainfall, direct

infiltration of surface water into the steep soil cut slope and development of high pore water pressures. The poor condition of the slope surface may have been a contributory factor in the failure.

A comprehensive investigation into the landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998g).

4.14 Incident MW 97/6/56: Kau Wah Keng San Tsuen, Lai Chi Kok

(A major fill slope failure which resulted in the evacuation of a house, Plate 18)

A major fill slope failure occurred at 7:00 a.m. on 4 June 1997 near No.139C Kau Wah Keng San Tsuen, Lai Chi Kok. Prior to failure, the slope was bare with no vegetation cover. The failure was 35 m long, 11 m wide and 4 m deep. The failure volume was about 500 m³. An initial failure most likely occurred at the front of the fill slope where the gradient was steep, followed by a washout caused by surface water flow from an ephemeral stream. The travel angle of the initial landslide debris was slightly in excess of 30°. The failure resulted in the permanent evacuation of house No.139C.

The landslide was probably triggered by intense short duration rainfall. Probable contributory factors include: (a) the concentrated discharge of surface water, (b) the rapid saturation of soil layers by concentrated infiltration of surface water, (c) ponding of water on a level area in the upper part of the fill slope, and (d) the development of transient groundwater pressures.

A comprehensive investigation into the landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998h).

4.15 Incident MW 97/7/11: Tuen Mun Road near Ting Kau

(A major fill slope failure resulting in the blockage of an access road and the closure of two lanes of Tuen Mun Road, Plate 19)

A major fill slope failure occurred at 9:30 a.m. on 2 July 1997 on slope No.6SE-C/F10 below the westbound carriageway of Tuen Mun Road, near Ting Kau. The landslide was located between two bridge piers (D2/2 and D2/3) which had been constructed for the viaduct for the Country Park Section of the Route 3 Project. The failure was up to 12 m long, 25 m wide and 1.2 m deep. The failure volume was about 200 m³. The travel angle of the landslide debris was 28°. The main scarp undermined part of the verge of Tuen Mun Road and formed a void up to 5 m wide, 1.2 m high and 1.5 m deep. The debris from the landslide blocked an access road at the toe of the fill slope and resulted in the closure of two lanes of Tuen Mun Road.

The landslide was probably triggered by heavy rainfall causing wetting of the fill and the development of pore water pressure as a result of infiltration. The concentrated

discharge of surface water onto the slope from a blocked drainage channel during the period of heavy rain was probably the principal source of water. In addition, the removal of support from the toe of the fill slope due to cutting into the slope by construction activities at the site was probably a contributory factor.

A comprehensive investigation into the landslide was carried out by the GEO's 1997 Landslide Investigation Consultants. Details of the investigation and its findings can be found in GEO (1998i).

4.16 Incident MW 97/7/18: Lung Tsai Tsuen Road, Lung Tsai Tsuen, Cheung Chau

(A major soil/rock cut slope failure which resulted in the evacuation of three houses and the closure of a pedestrian footpath, Plate 20)

At 23:05 p.m. on 2 July 1997, a major soil/rock cut slope failure occurred on Slope Nos.14NW-D/R206 and 14NW-D/CR208 at Lung Tsai Tsuen Road, Lung Tsai Tsuen, Cheung Chau. Prior to the failure, a fill platform with a brick retaining wall was placed on top of a near-vertical soil/rock cut slope covered by chunam to a total high of 8 m. The failure scar extending from the fill platform to near the toe of the cut slope was about 15 to 20 m wide and 3 m deep maximum. The estimated failure volume was about 70 m³. A portion of house No.1A near the crest of the slope was undermined and the landslide debris travelled down the slope and toed against the walls of houses No.49 and No.49A. The failure resulted in the evacuation of three houses (Nos.1A, 49 and 49A) and the closure of a pedestrian footpath.

The failure was probably triggered by intense rainfall infiltration and insufficient surface drainage due to broken channel drains at the crest of the slope.

5. CONCLUSIONS

1997 was the wettest year at the Hong Kong Observatory (HKO) since records began in 1884. Rainfall at the HKO amounted to 3343.0 millimetres, 51% above normal and exceeding the previous record set in 1982. The maximum annual rainfall of 4907.0 mm was recorded at Tai Mo Shan. Over 70% of the rain fell during June, July and August.

Eight Landslip Warnings were issued in 1997. The rainstorms in 1997 resulted in 543 incidents being reported to the GEO, 491 of which were classified as genuine landslides, and 50 of which were major. Two fatalities and nine injuries occurred. The consequences resulting from the landslides included the temporary evacuation of 47 squatter huts, 19 houses and 14 flats, the permanent evacuation of 115 squatter huts, and 120 landslides resulted in the blockage of sections of road, pedestrian pavement and/or access.

Based on GEO's landslide inspection reports, 135 of the landslides (about 28%) which occurred in 1997 were considered by the inspecting geotechnical engineers to be related to poor slope maintenance.

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Table 1 - Rainfall and Landslide in 1997, Compared with Selected Previous Major Rainstorms

Date ⁽¹⁾ of Event	Maximum Rainfall (mm) ⁽²⁾								Landslide Consequences			
	Hong Kong Observatory					GEO Raingauges ⁽³⁾			Number of Reported Landslides ⁽⁴⁾		Persons Killed (Injured)	Number of Huts Evacuated Permanently
	24-hr	5-hr	1-hr	Antecedent		24-hours	5-hours	1-hour	GEO ⁽⁶⁾	FSD ⁽⁶⁾		
				4 days	15 days							
21-22 Aug 97 ⁽⁵⁾	221	169	68	19	257	283 (N14)	200 (N14)	89 (N14)	17	-	-	-
2-3 Aug 97 ⁽⁵⁾	179	56	16	52	120	351 (N14)	111 (N17)	48 (H14)	17	1	-	-
13-14 Jun 97 ⁽⁵⁾	161	99	29	5	241	211 (H16)	113 (H16)	68 (H20)	5	-	-	1
3-4 Jun 97 ⁽⁵⁾	150	91	46	2	34	367 (N04)	270 (N04)	92 (H11)	68	2	1	23
1-2 Jul 97 ⁽⁵⁾	149	111	45	35	337	244 (N16)	183 (K08)	92 (K08)	94	6	1(9)	59
16 Jun 97	119	48	18	180	421	269 (H14)	184 (H14)	38 (N13)	5	-	-	-
7-8 Sep 97	112	40	18	6	116	177 (H16)	60 (N03)	36 (K01)	1	-	-	-
2-3 Jul 97 ⁽⁵⁾	110	49	18	183	380	799 (N09)	296 (N09)	125 (N01)	118	6	1(9)	59
15-16 Jul 97	99	68	34	30	481	116 (N06)	85 (N06)	54 (K05)	2	-	-	-
11-12 Aug 97	94	71	32	75	340	301 (N14)	233 (N14)	97 (N14)	19	-	-	-
4-5 Jun 97 ⁽⁵⁾	83	71	23	151	164	238 (N16)	191 (N16)	129 (N04)	70	-	1(0)	25
16-17 Jul 97	83	62	30	128	447	125 (H07)	88 (H09)	57 (K07)	5	-	-	-
3-4 Jul 97 ⁽⁵⁾	81	32	18	292	459	142 (N17)	76 (N12)	50 (K06)	48	-	-	-
8-9 May 97 ⁽⁵⁾	78	46	29	88	89	279 (N03)	235 (N03)	129 (N04)	43	1	-	5
7-8 Aug 97	68	35	16	3	244	120 (H08)	60 (N04)	55 (N04)	2	-	-	-
13-14 Apr 97	65	64	36	50	68	119 (N13)	109 (N13)	72 (N06)	1	-	-	-
18-19 Jul 97	64	38	21	209	415	163 (N11)	125 (N11)	51 (N11)	18	1	-	-
17-18 Oct 97	59	59	39	0	52	106 (H16)	91 (H12)	70 (H12)	0	-	-	-
24-25 Aug 97	59	34	20	266	436	88 (N15)	60 (N15)	38 (N15)	3	-	-	-
26 Jun 97	58	58	46	98	457	71 (K02)	71 (K02)	63 (K02)	0	-	-	-
9-10 Jul 97	56	40	17	29	479	76 (K06)	55 (H16)	34 (N02)	4	-	-	-
2-3 Feb 97	55	23	7	4	38	77 (K05)	35 (K05)	14 (N12)	0	-	-	-
17-18 Jun 97 ⁽⁵⁾	51	34	15	300	541	82 (H09)	55 (H09)	69 (H14)	7	-	-	-
10 Apr 97	50	49	22	4	25	79 (H20)	78 (H20)	58 (H20)	0	-	-	-
Selected Previous Major Rainstorms (for comparison only)												
29 May 82	394	153	44*	1	11	430	237	111*	551	15	22(26)	1153
17 Jun 83	347	274	69*	2	77	460	303	101*	155	5	(2)	149
20-21 May 89	388	149	37*	28	42	566	224	51	340	3	2(3)	199
8 May 92	324	196	110*	65	71	385	244	110	350	9	3(5)	92
4-5 Nov 93	107	31	9*	8	8	742	350	94	377	2	-	25
Notes :												
(1)	The events in 1997 are arranged in order of the intensity of 24-hour rainfall recorded at the Hong Kong Observatory, Tsim Sha Tsui.											
(2)	The maximum 24-hour rainfall, the maximum five-hour rainfall and the maximum 1-hour rainfall with an asterisk are the rolling rainfall amounts using one-clock hour rainfall as the basic unit. The maximum 1-hour rainfall values without an asterisk are the rolling rainfall amounts using 5-minute rainfall as the basic unit.											
(3)	The maxima are selected from the 48 GEO Raingauges for the rainstorms. The GEO Raingauge reference number is shown in brackets.											
(4)	Reported totals are for genuine reported landslides known to have occurred on specific dates.											
(5)	Landslip warnings were issued for these events.											
(6)	GEO = Geotechnical Engineering Office; FSD = Fire Services Department.											

Table 2 - Warnings Issued by the Hong Kong Observatory in 1997

Month	Monthly Total Rainfall (mm)	Dates on which Warnings were in Effect				
		Thunderstorm	Flood	Landslip	Tropical Storm	Rainstorm
January	44.6	-	-	-	-	-
February	111.7	2-3	-	-	-	-
March	34.8	16, 19, 20, 21, 29	-	-	-	-
April	133.2	4, 10, 13-14, 15, 15-16, 30	10, 13-14	-	-	-
May	300.8	1, 3-4, 4-5, 6, 7, 8, 8-9, 16-17, 18, 19, 19-20	4, 6, 8, 8-9, 10, 16-17, 18	8(11:06a.m.) - 9(9:20a.m.)	-	8(Red)
June	783.6	3, 4, 5, 5-6, 10, 13, 13-14, 14, 14-15, 15-16, 22, 23, 24, 26, 28, 29, 30,	3, 4, 13, 13-14, 17, 24, 26	4(7:40a.m.) - 5(9:00a.m.), 13(5:45p.m.) - 14(9:10a.m.), 17(5:20a.m.-2:30p.m.)	-	4(Red)
July	746.0	1, 2, 2-3, 3-4, 6, 7, 8, 9, 9-10, 11, 14, 15-16, 18, 18-19, 25	1, 2, 2-3, 3-4, 15, 17, 19, 25,	1(7:38a.m.-2:00p.m.), 2(6:25a.m.) - 5(8:40a.m.)	31 Jul - 3 Aug (Signal 1-9, Victor)	1(Red, Black) 2(Red) 3(Red)
August	829.0	3, 7, 8, 9, 10, 11, 11-12, 12, 12-13, 14, 16, 17, 20, 22, 25	2-3, 7, 9, 11, 12, 20, 22	2(10:25p.m.)-3(8:35p.m.) 22(1:15p.m.)-23(6:45a.m.)	31 Jul - 3 Aug (Signal 1-9, Victor) 20 Aug - 22 Aug (Signal 1-3, Zita)	22(Red, Black)
September	232.9	2, 3, 7, 8, 13, 14	14	-	-	-
October	112.8	12,17	-	-	-	-
November	7.1	-	-	-	-	-
December	6.5	-	-	-	-	-
Total	3343.0	83 days	36 days	8 Warnings	3 Warnings	6 days
Notes : (1) Landslip Warnings were issued after consultation between GEO and HKO. (2) Information in this Table was based on HKO (1997).						

Table 3 - Maximum Rainfall Recorded at the Hong Kong Observatory and the Chinese University in 1997 and Estimated Return Periods

The Hong Kong Observatory

Duration	Rainfall ⁽²⁾ (mm)	Ending Time		Estimated Return Period (Years) ⁽¹⁾
		Date	Time	
1 hour	68	22/8/97	13:00	4
4 hours	146	22/8/97	15:00	4
8 hours	182	22/8/97	16:00	3
12 hours	189	22/8/97	17:00	3
24 hours	221	22/8/97	16:00	2
2 days	259	3/7/97	5:00	2
4 days	369	4/7/97	8:00	3
7 days	391	6/7/97	16:00	2
15 days	592	18/6/97	2:00	4
Notes : (1) Return periods were assessed from Gumbel's method, based on 100 years (1884-1939 and 1947 -1990) rainfall data at the Hong Kong Observatory, after Lam & Leung (1994). (2) Rainfall maxima as recorded at the Hong Kong Observatory, Tsim Sha Tsui.				

The Chinese University

Duration	Rainfall ⁽³⁾ (mm)	Ending Time		Estimate Return Period (Years) ⁽¹⁾	Estimated Return Period (Years) ⁽²⁾
		Date	Time		
1 hour	95	2/7/97	7:00	22	10
4 hours	245	2/7/97	9:00	35	20
8 hours	356	3/7/97	1:00	56	30
12 hours	432	3/7/97	1:00	93	30
24 hours	799	3/7/97	3:00	>1 000	45
2 days	897	4/7/97	3:00	>1 000	40
4 days	1 002	4/7/97	8:00	659	35
7 days	1 064	6/7/97	15:00	550	40
15 days	1 308	6/7/97	13:00	574	25
Notes : (1) Return periods were assessed from Gumbel's method, based on 100 years (1884-1939 and 1947 -1990) rainfall data at the Hong Kong Observatory, after Lam & Leung (1994). (2) Return periods were assessed from the Gumbel's method (Lam & Leung, 1994), based on fourteen years (1984 - 1997) rainfall data at raingauge N09 at the Chinese University. (3) Rainfall maxima as recorded at the Chinese University, Raingauge Station N09.					

Table 4 - Number of Incidents Reported to Various Departments in 1997

Department	Total Number	Type of Incident		
		Landslide	Flooding	Others
Agriculture & Fisheries Department	31	30	1	0
Architectural Services Department	37	14	1	22
Drainage Services Department	503	0	503	0
Fire Services Department	36	11	23	2
Geotechnical Engineering Office, Civil Engineering Department	543	491	3	49
Highways Department	505	118	73	314
Housing Department	15	7	1	7
Water Supplies Department	104	93	1	10
<p>Notes : (1) "Others" includes minor signs of distress and incidents of no geotechnical concern such as fallen trees.</p> <p>(2) Two landslide incidents (ME97/1/1 and MW97/2/1) reported to GEO in 1997 were found to have occurred in 1996. These have been excluded from this Table.</p>				

Table 5 - Number of Landslides Occurring when the Landslip Warning was Raised in 1997

Landslip Warning Period	No. of Landslides with Dates of Occurrence Known	No. of Landslides with Time of Occurrence Known to within One Hour			
	Occurred on the Days of Warning	Occurred within 24 hours before Warning Issued	Occurred when Warning was in Force	Occurred within 24 hours after Warning Cancelled	Occurred in the Period from 24 Hours before Warning Issued to 24 Hours after Warning Cancelled
8/5(11:06) - 9/5(9:20)	43	12	3	1	16
4/6(7:40) - 5/6(9:00)	69	14	18	1	33
13/6(17:45) - 14/6(9:10)	5	2	0	0	2
17/6(5:20-14:30)	5	4	1	0	5
1/7(7:38-14:00)	1	0	0	20	20
2/7(6:25) - 5/7(8:40)	146	5	41	1	47
2/8(22:25)-3/8(20:35)	17	1	6	0	7
22/8(13:15)-23/8(6:45)	17	3	2	0	5
Notes : (1) Total number of landslides reported to the GEO in 1997 was 491. (2) 414 landslides were recorded with known dates of occurrence. (3) 145 landslides were recorded with the time of occurrence given to within one hour. (4) The above was based on the time and date estimated by GEO's Inspection Officers, which might not be accurate.					

Table 6 - Number of Landslides Reported to GEO Affecting Different Facilities

Affected Facility	Districts ⁽⁴⁾				All
	Hong Kong	Kowloon	New Territories		
			Mainland East	Mainland West	
Squatters	0(0)	2(0)	19(4)	55(6)	76(10)
Building Lots/Properties	8(0)	2(0)	24(5)	35(9)	69(14)
Roads	20(1)	4(1)	38(6)	52(9)	114(17)
Pedestrian Pavements	6(1)	1(0)	20(4)	20(4)	47(9)
Footpaths, Lanes, Private Access, Footbridges	10(0)	1(0)	32(4)	49(5)	92(9)
Construction Sites	0(0)	0(0)	1(0)	2(1)	3(1)
Country and Urban Parks	2(0)	0(0)	2(1)	2(0)	6(1)
Open Areas/Hillside	8(0)	2(0)	34(1)	21(2)	65(3)
Catchwaters/Conduits/Culverts	0(0)	0(0)	0(0)	0(0)	0(0)
Carparks, Playgrounds, Gardens, Yards	2(0)	1(0)	6(0)	6(3)	15(3)
Cemetery/Graves	0(0)	0(0)	2(2)	0(0)	2(2)
Unclassified	6(0)	2(0)	36(4)	15(1)	59(5)
Legend :					
35(9) Thirty five landslides of which nine were <u>major</u> .					
Notes :					
(1) Incidents which were not genuine landslides have been excluded.					
(2) The numbers of landslides affecting different types of facility are based on Sections 11 and 12 of GEO's Incident Reports.					
(3) One landslide may affect more than one type of facility.					
(4) Based on GEO's district boundaries, which are shown in Drawing No.GCSP 8/19.					

Table 8 - Number of Landslides Reported to GEO Classified by Type of Failure

Type of Failure ⁽¹⁾		Number	Percentage (%)
Fill Slope		36(9)	7.3
Cut Slope	Soil	268(15)	54.6
	Soil/Rock	37(3)	7.6
	Rock	7(1)	1.4
Retaining Wall		20(3)	4.1
Natural Slope		88(18)	17.9
Rock/Boulder Fall		32(1)	6.5
Others (e.g. subsidence)		3(0)	0.6
Total		491(50)	100.0
Legend :			
36(9) Thirty six landslides of which nine were <u>major</u> failures.			
Notes : (1) Incidents which were not genuine landslides have been excluded. (2) Data shown in this table are based on Sections 5 and 6 of GEO's Incident Reports. Where a landslide involved more than one type of failure, the predominant type has been adopted.			

Table 9 - Landslide Volume Distribution with Respect to District

Volume of Failure (m ³)	Districts ⁽²⁾				All
	Hong Kong	Kowloon	New Territories		
			Mainland East	Mainland West	
<5	31	7	70	80	188(38.3%)
≥5 to <10	10	3	26	44	83(16.9%)
≥10 to <20	8	2	37	40	87(17.7%)
≥20 to <50	3	2	35	39	79(16.1%)
≥50 to <200	2	0	9	16	27(5.5%)
≥200 to <500	0	0	4	6	10(2.1%)
≥500 to <1000	0	0	4	3	7(1.4%)
≥1000	0	1	3	2	6(1.2%)
Not Recorded	2	0	2	0	4(0.8%)
Non-genuine	[10]	[1]	[25]	[18]	[54]
Total	56(11.4%)	15(3.1%)	190(38.7%)	230(46.8%)	491(100%)
Legend :					
88(17.9%) 88 landslides, which amount to 17.9% of the 491 landslides reported to GEO.					
Notes : (1) Incidents which were not genuine landslides have been excluded. (2) Based on GEO's district boundaries, which are shown in Drawing No. GCSP 8/19 .					

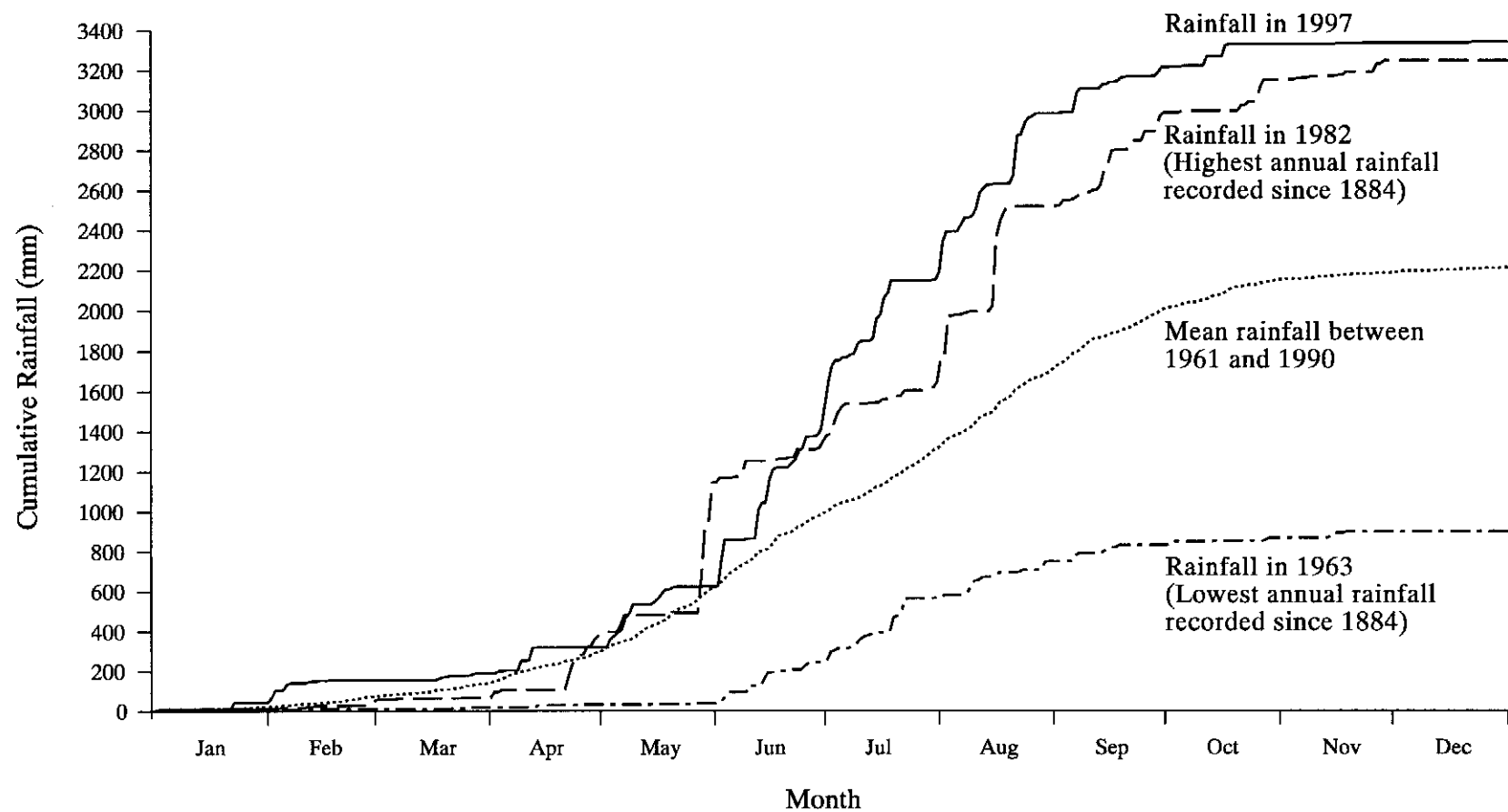
Table 10 - Landslide Volume Distribution with Respect to Type of Failure

Volume of Failure (m ³)	Fill Slope	Cut Slope			Retaining Wall	Natural Slope	Rock/Boulder Fall	Others (e.g. subsidence)	Total
		Soil	Soil/Rock	Rock					
<5	10	109	12	2	8	20	25	2	188(38.3%)
≥5 to <10	6	51	10	1	2	11	2	0	83(16.9%)
≥10 to <20	5	46	7	2	3	20	4	0	87(17.7%)
≥20 to <50	6	45	5	1	3	18	0	1	79(16.1%)
≥50 to <200	5	8	3	0	2	9	0	0	27(5.5%)
≥200 to <500	3	4	0	0	1	2	0	0	10(2.1%)
≥500 to <1000	1	1	0	0	0	5	0	0	7(1.4%)
≥1000	0	2	0	1	0	2	1	0	6(1.2%)
Not Recorded	0	2	0	0	1	1	0	0	4(0.8%)
Total	36(7.3%)	268(54.6%)	37(7.6%)	7(1.4%)	20(4.1%)	88(17.9%)	32(6.5%)	3(0.6%)	491(100%)
Note : (1) Incidents which were not genuine landslides have been excluded.									

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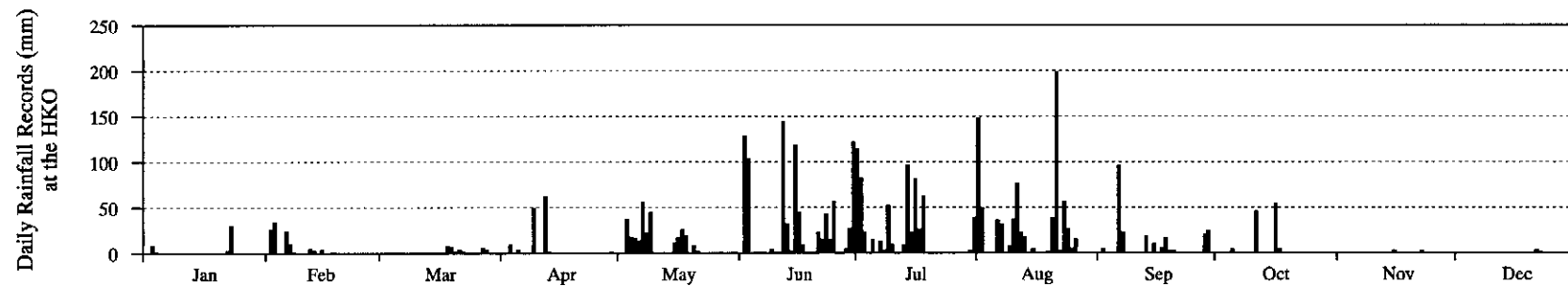
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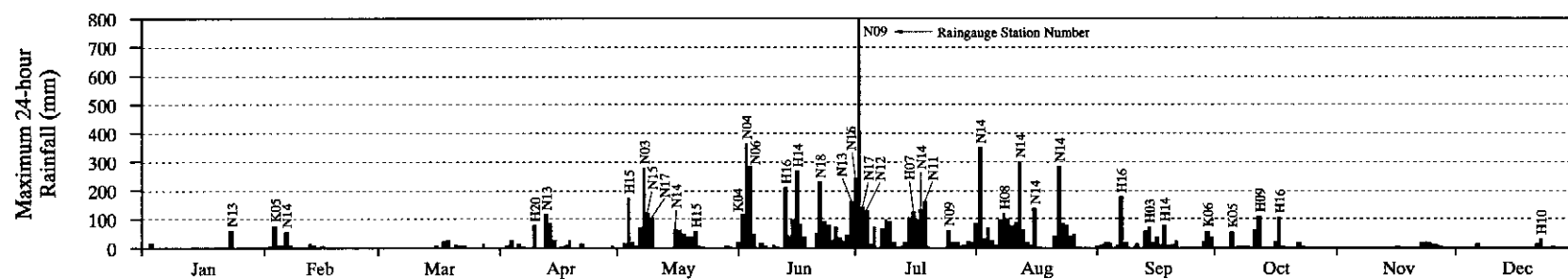


Note : Rainfalls recorded at the Hong Kong Observatory, Tsim Sha Tsui are shown.

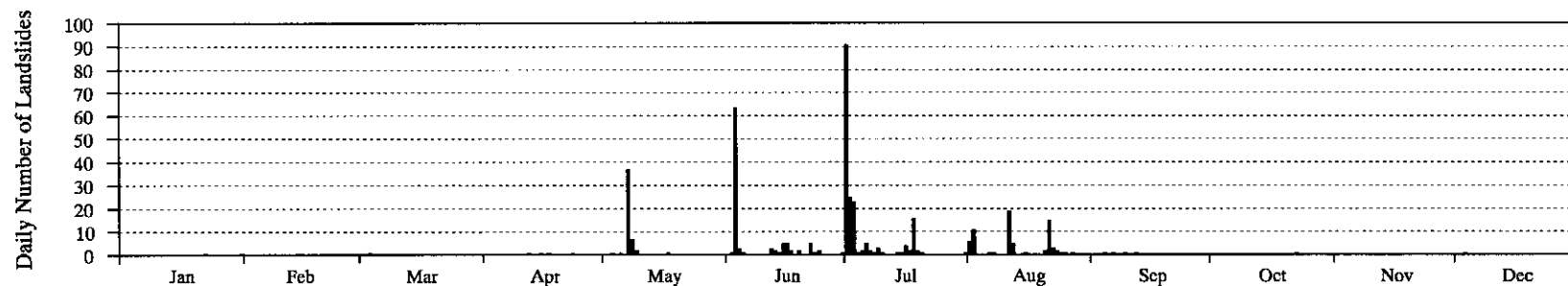
Figure 2 - Cumulative Rainfall for 1997 and Recorded Highest, Mean and Lowest Cumulative Rainfalls



(a) Daily Rainfall Intensities Recorded at the HKO



(b) Maximum 24-hour Rainfall Intensities Recorded at GEO Raingauge Stations



(c) Daily Number of Landslides Reported to GEO

Note : Number of landslides known to have occurred on specific dates is shown.

Figure 3 - Daily Rainfall Recorded at the HKO, Maximum 24-hour Rainfall Recorded at GEO Raingauge Stations and Daily Landslides Reported to GEO in 1997

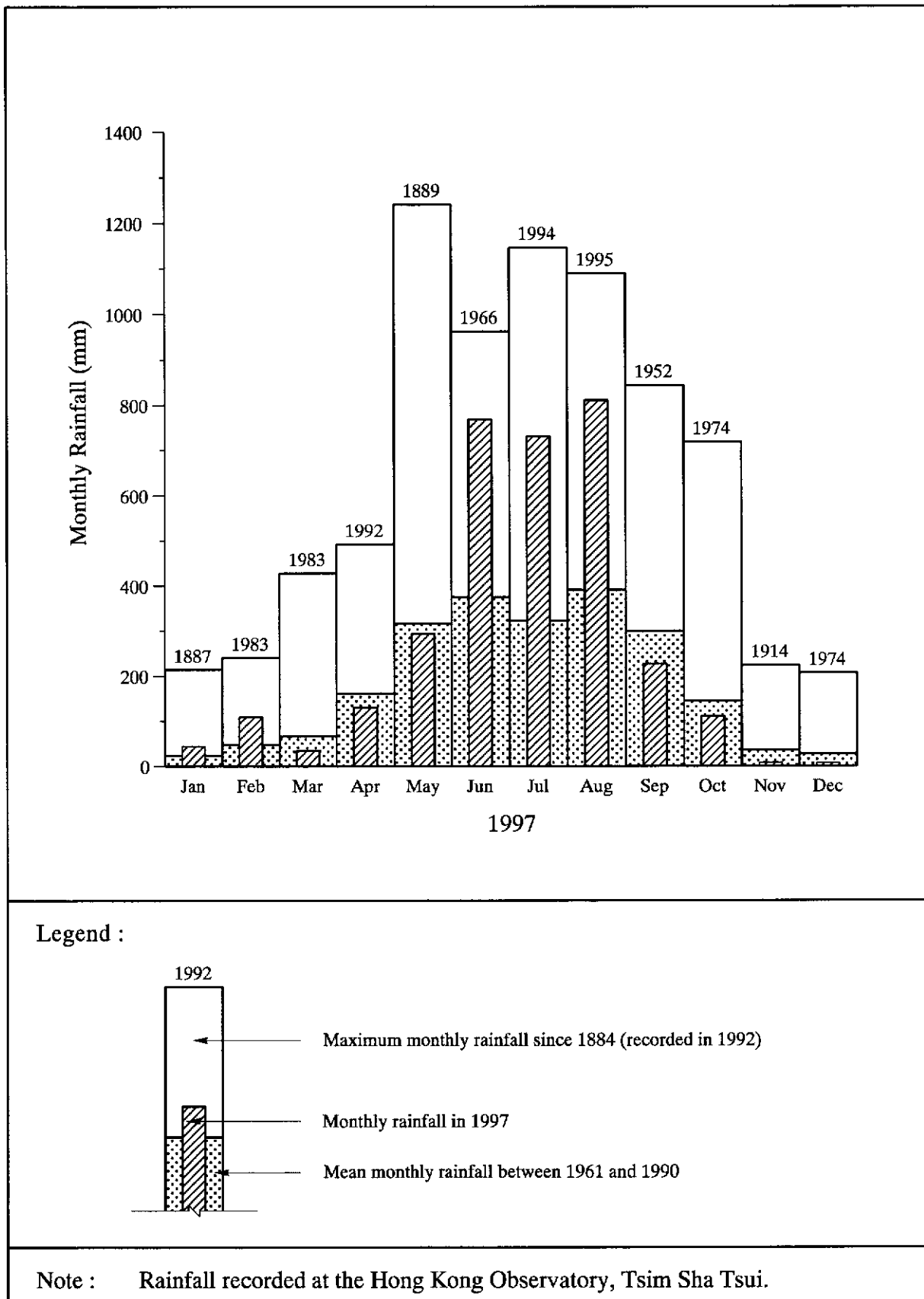


Figure 4 - Monthly Rainfall in 1997 in Comparison with Recorded Maximum and Mean Monthly Rainfall

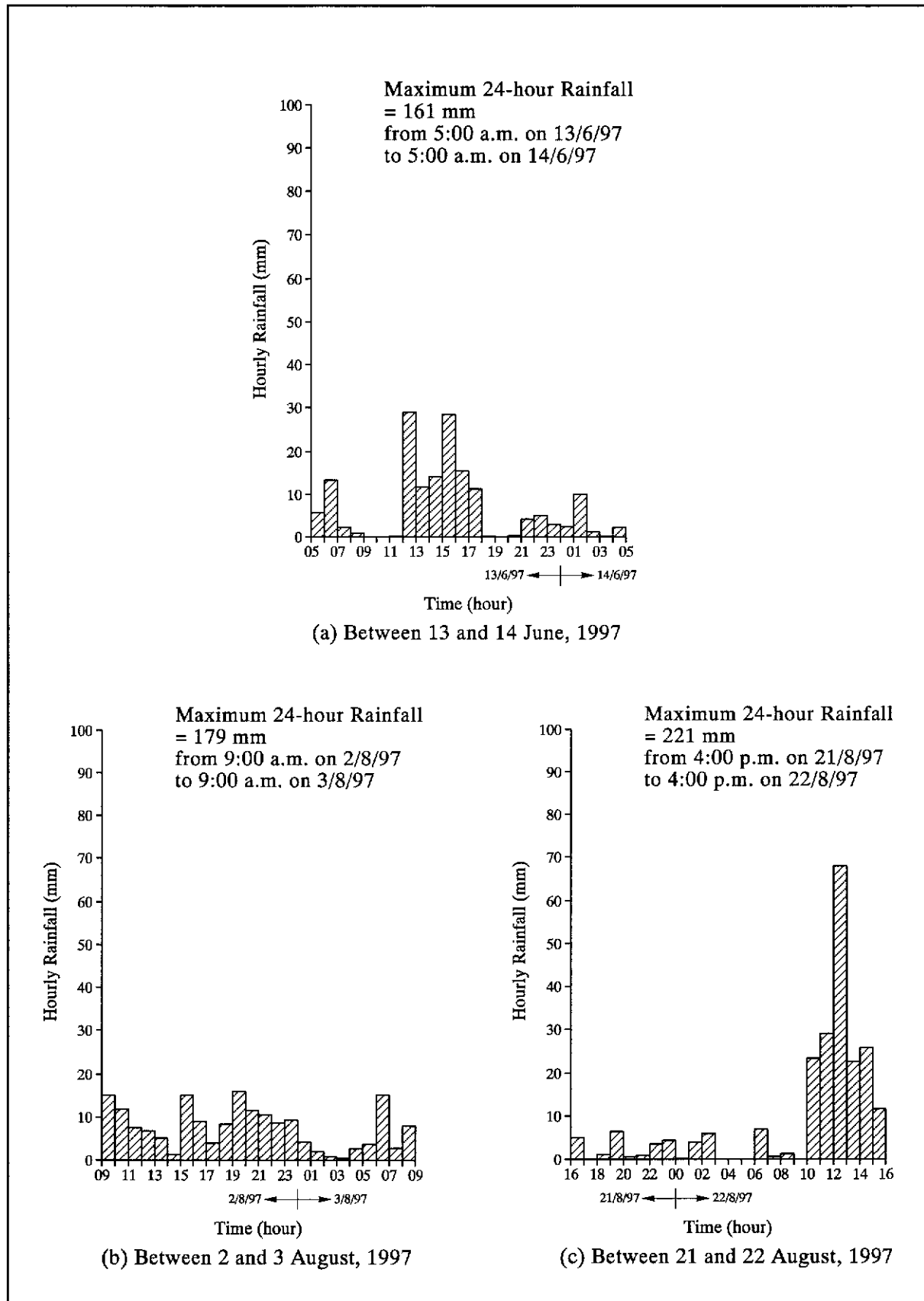
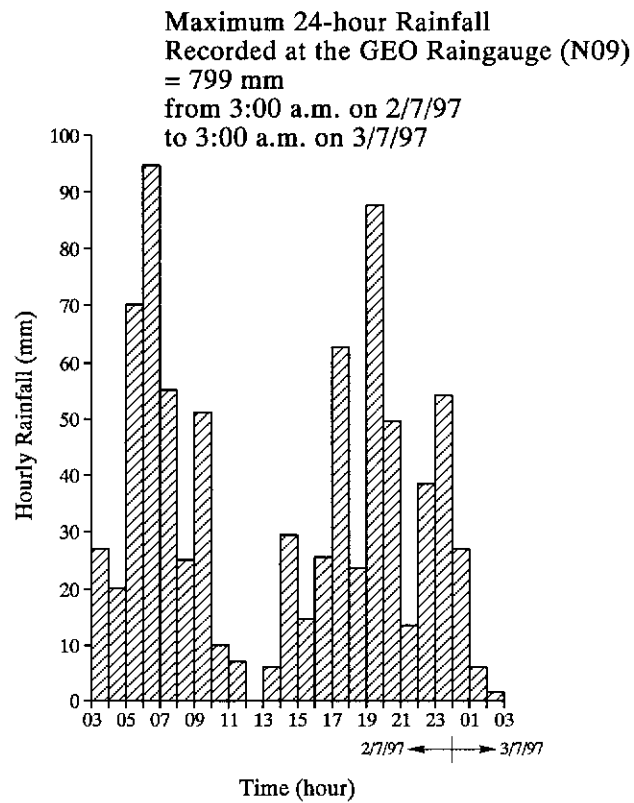
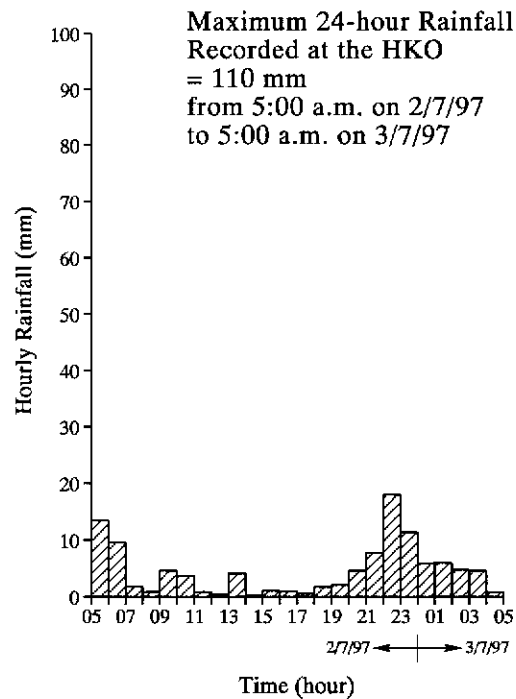


Figure 5 - Hourly Rainfall Intensities for the Three Heaviest Maximum 24-hour Rainfall Recorded at the HKO in 1997



(a) Recorded at the GEO Raingauge Station (N09)
at the Chinese University



(b) Recorded at the HKO

Figure 6 - Hourly Rainfall Intensities for the Heaviest Maximum 24-hour Rainfall Recorded at Raingauge Station N09 in 1997 in Comparison with the 24-hour Rainfall Recorded at the HKO

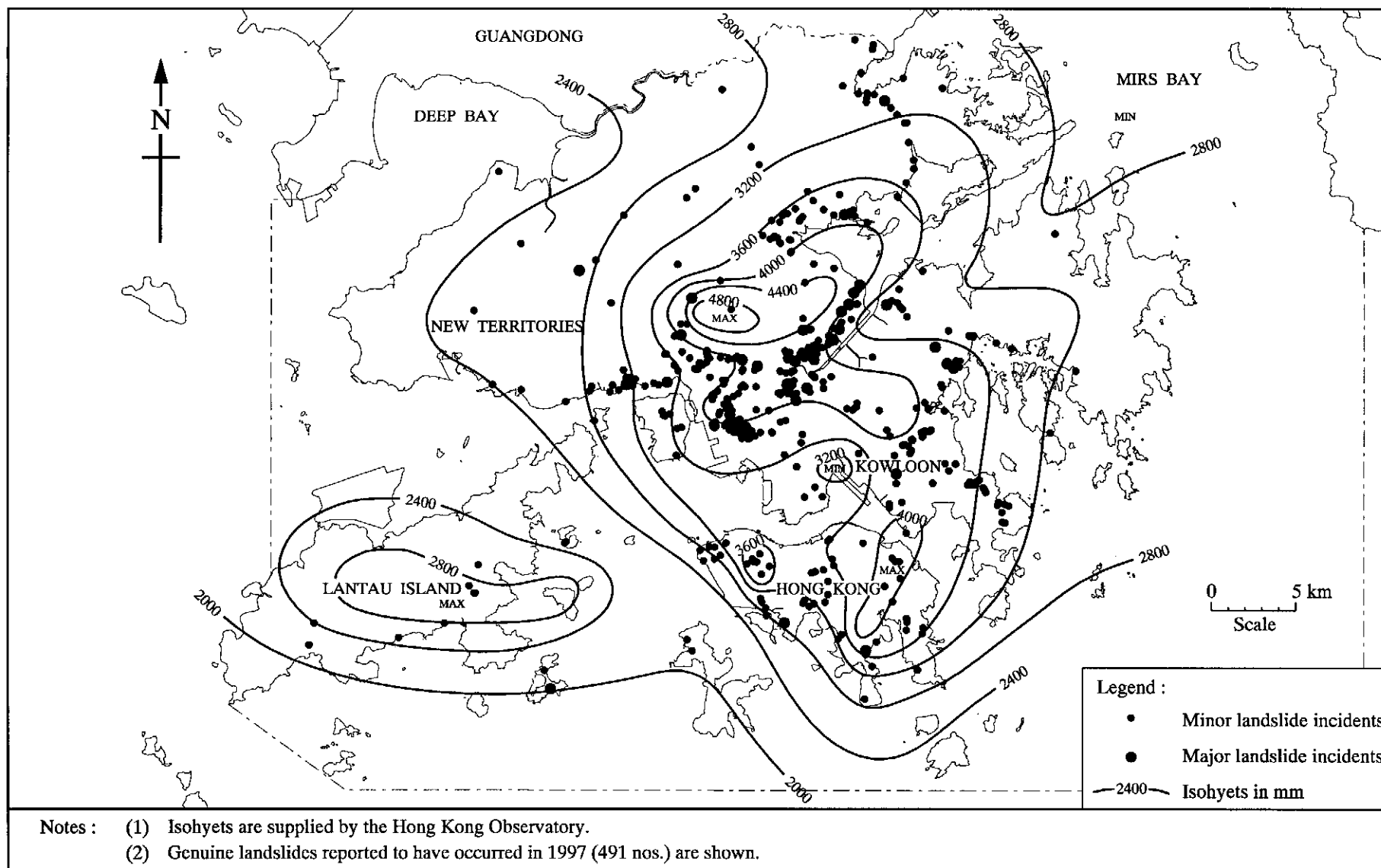


Figure 7 - Total Annual Rainfall Distribution and Locations of Landslides in 1997

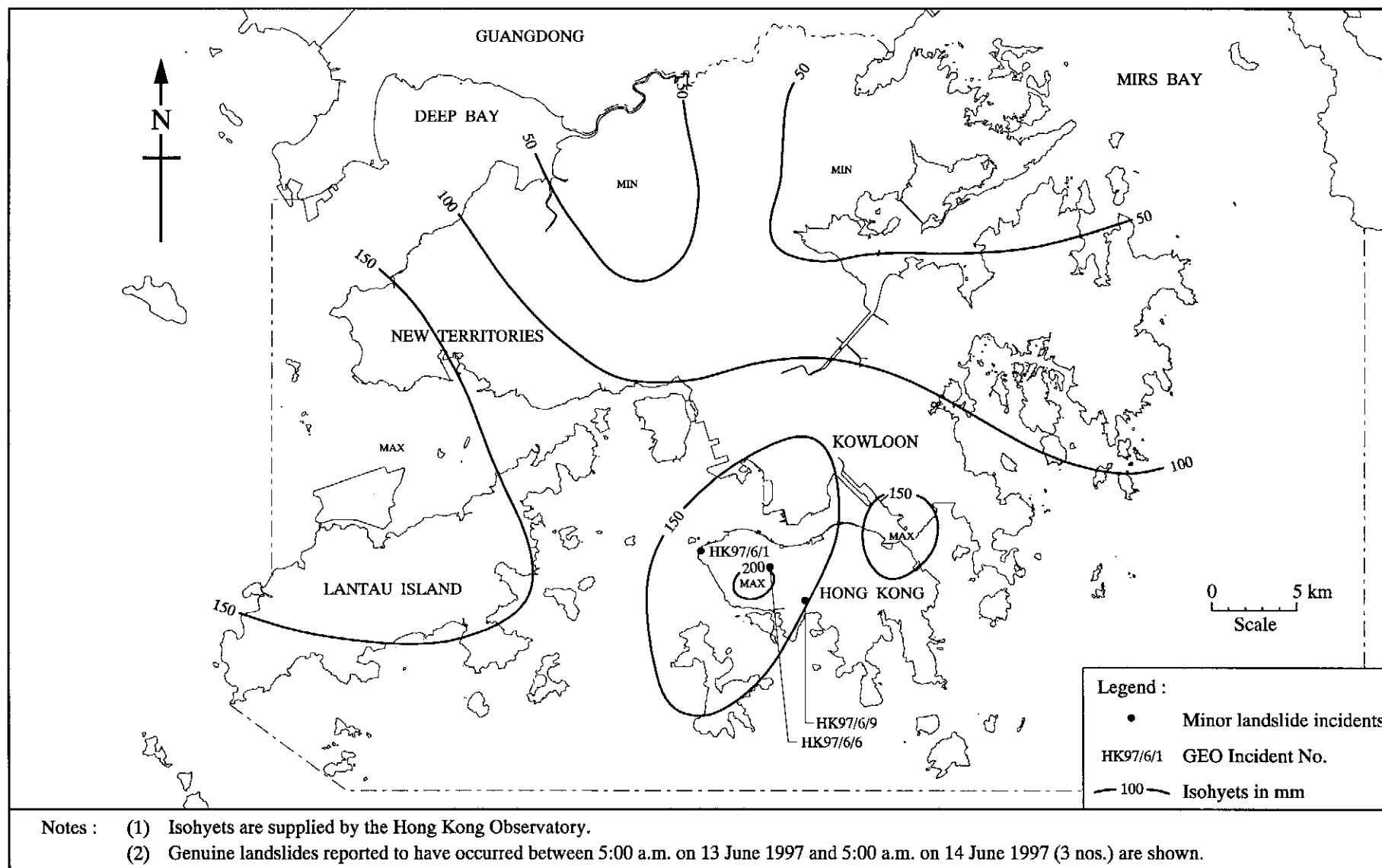


Figure 8 - 24-hour Rainfall Distribution from 5:00 a.m. on 13 June 1997 to 5:00 a.m. on 14 June 1997 and Locations of Landslides

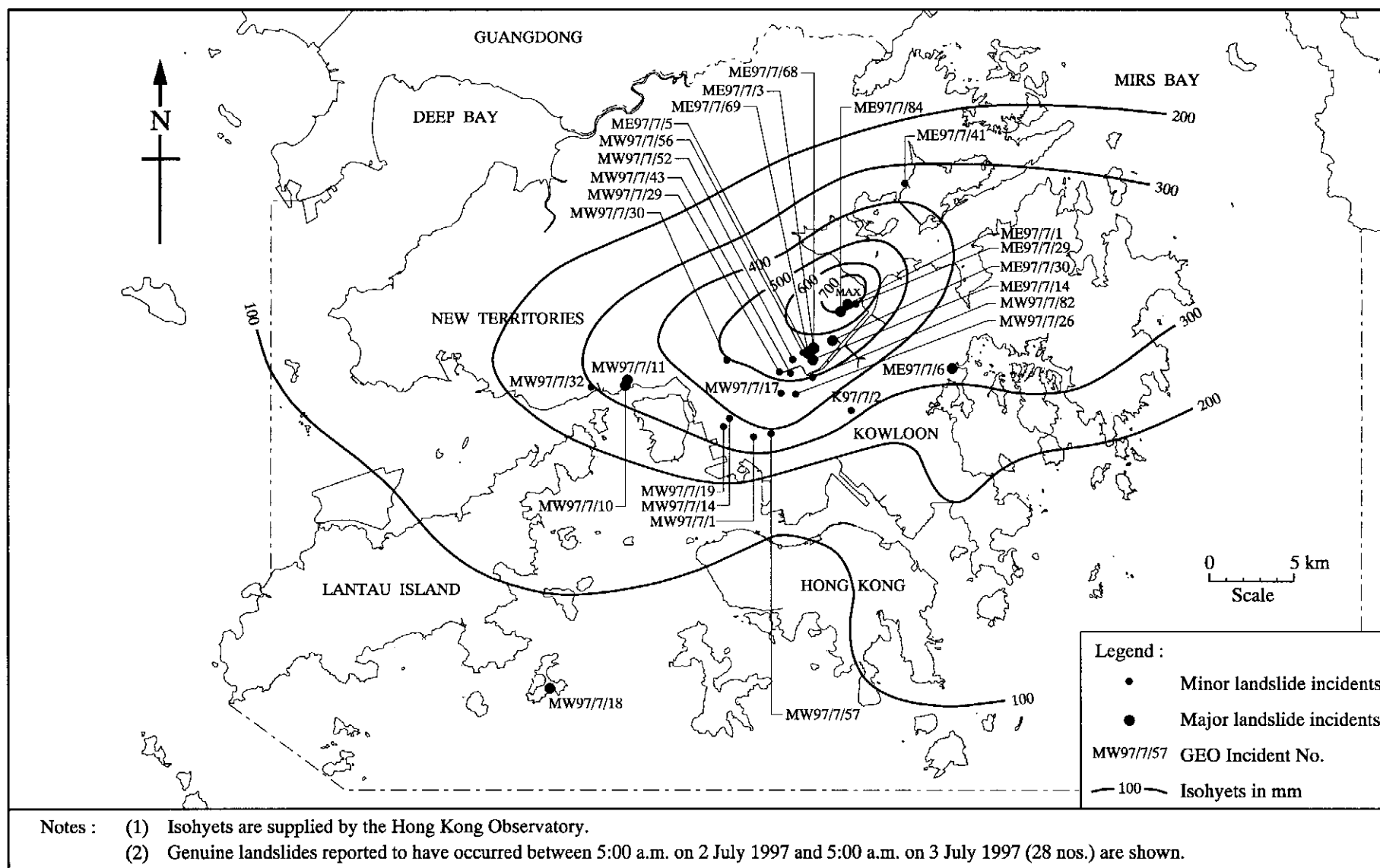


Figure 9 - 24-hour Rainfall Distribution from 5:00 a.m. on 2 July 1997 to 5:00 a.m. on 3 July 1997 and Locations of Landslides

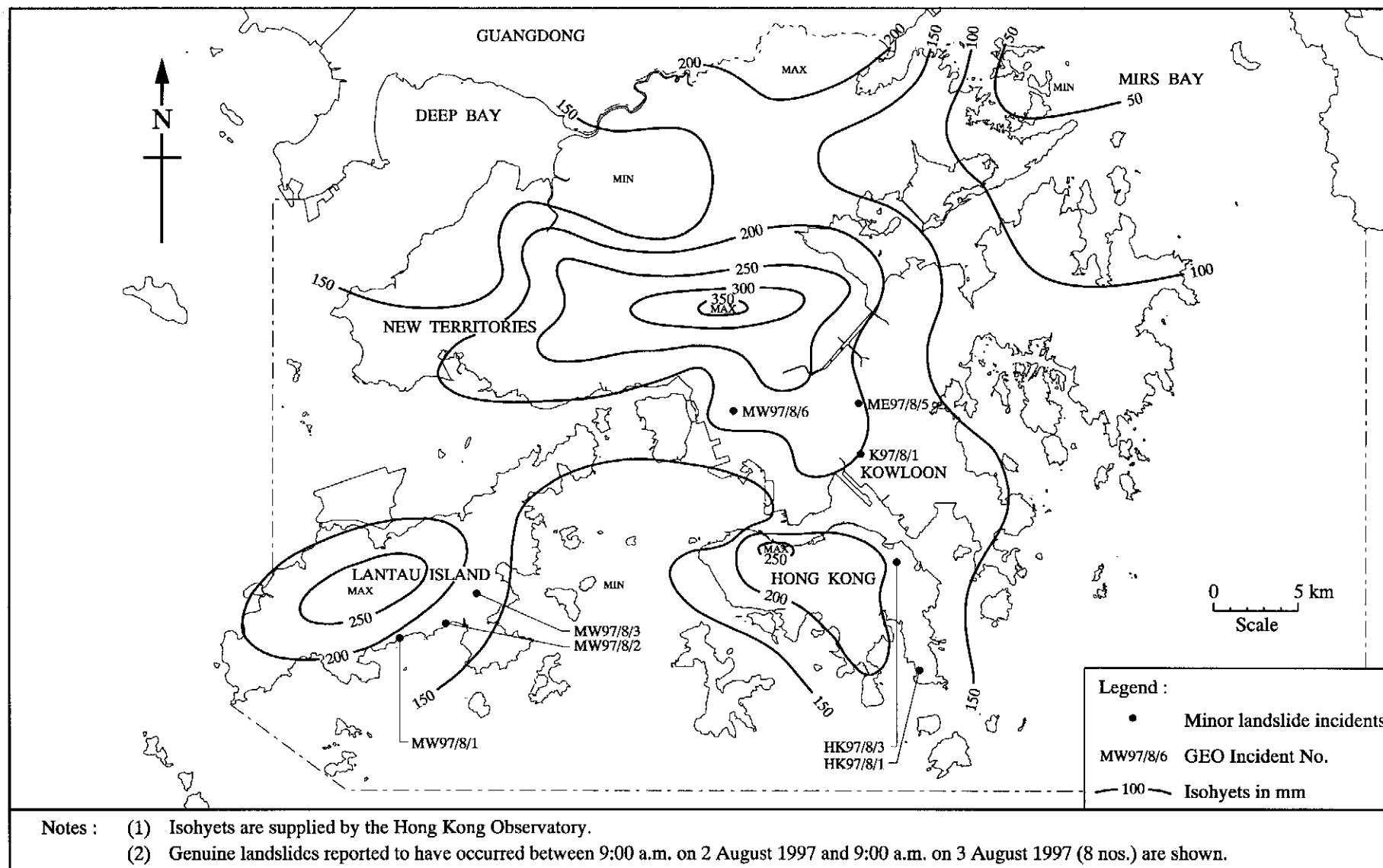


Figure 10 - 24-hour Rainfall Distribution from 9:00 a.m. on 2 August 1997 to 9:00 a.m. on 3 August 1997 and Locations of Landslides

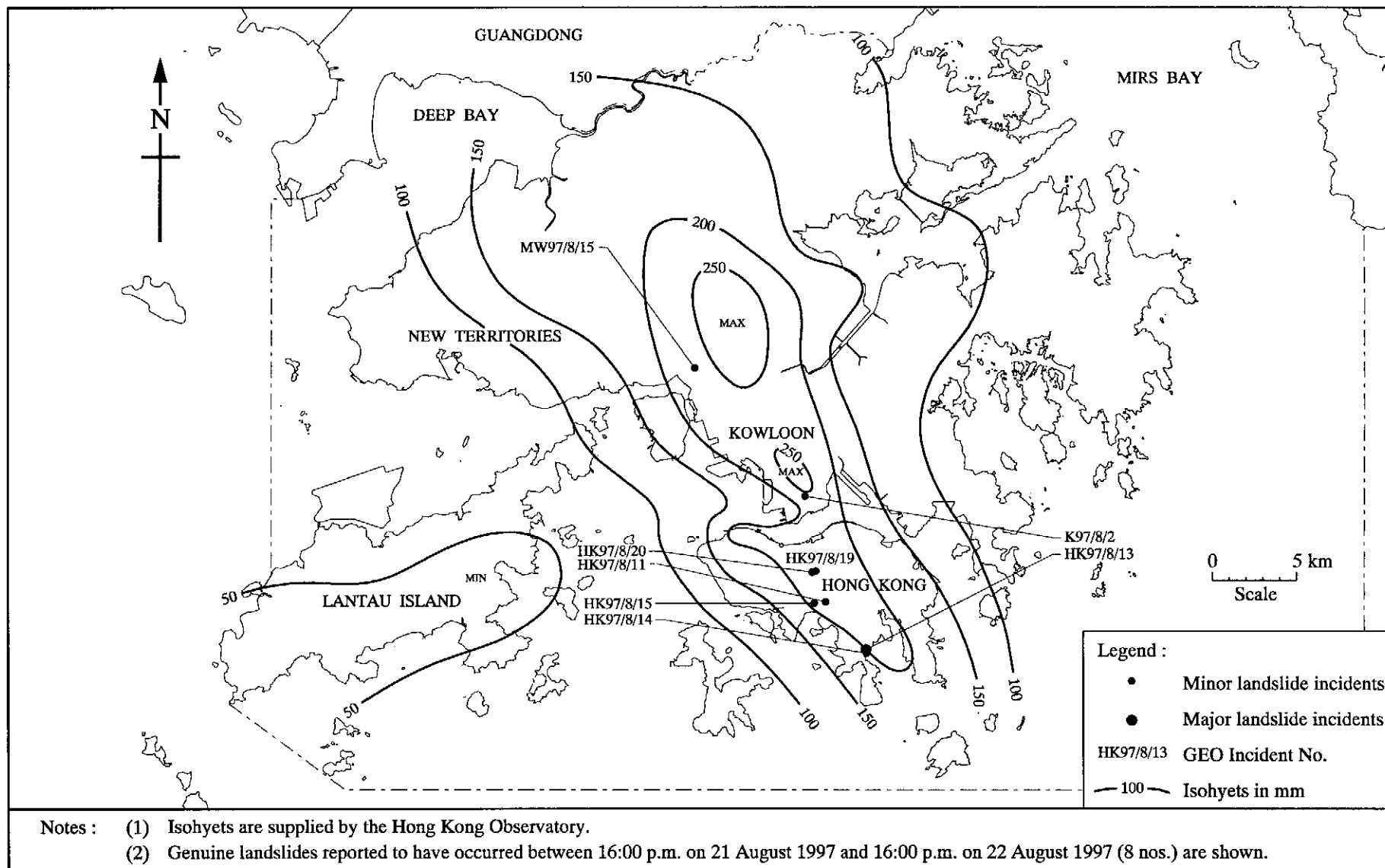


Figure 11 - 24-hour Rainfall Distribution from 16:00 p.m. on 21 August 1997 to 16:00 p.m. on 22 August 1997 and Locations of Landslides

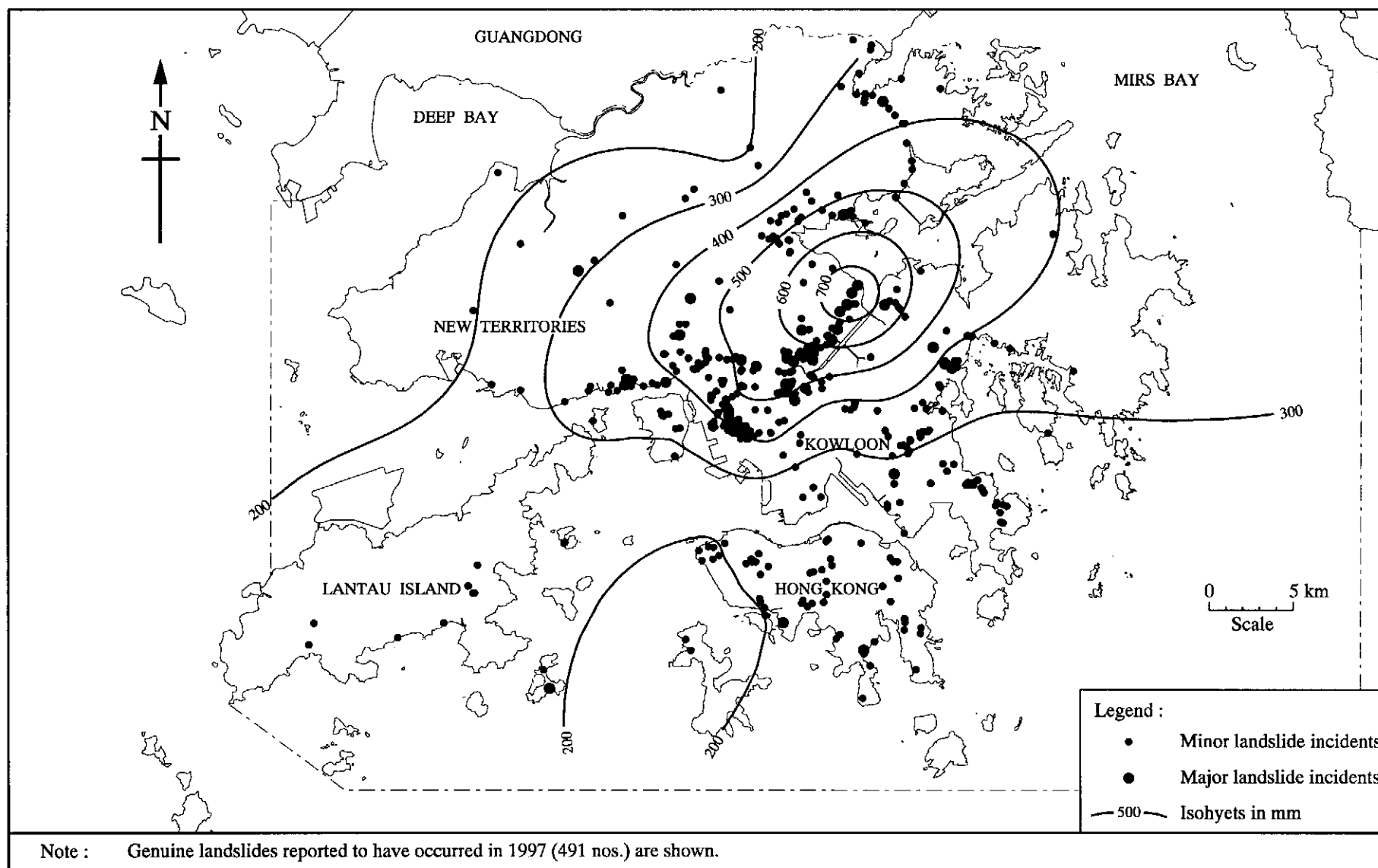


Figure 12 - Maximum 24-hour Rainfall Distribution in 1997 and Locations of Landslides

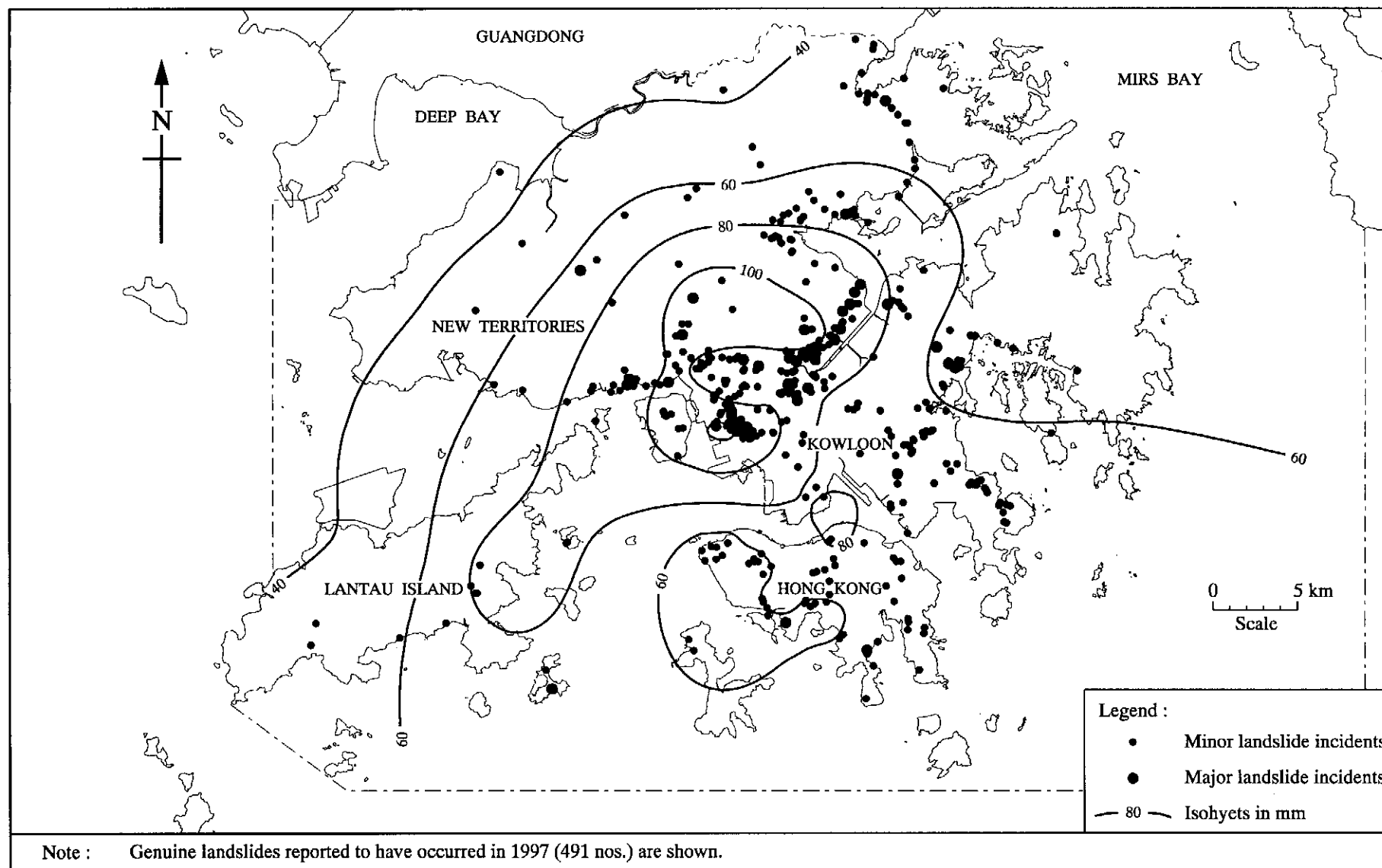


Figure 13 - Maximum Hourly Rainfall Distribution in 1997 and Locations of Landslides

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Negative No. 97/061/3 Taken on : 8-5-97

Description : A soil cut slope failure resulting in the closure of one lane of Clear Water Bay Road.

Plate 1 - Clear Water Bay Road near Ta Ku Ling, Sai Kung
(Incident ME 97/5/3)



Negative Nos. ME 97/061/23, 24

Taken on : 8-5-97

Description : A soil cut slope failure resulting in the evacuation of No. 47
Hiu Po Path, Sheung Sze Wan.

Plate 2 - House Nos. 47 and 48 Hiu Po Path, Sheung Sze Wan, Sai Kung
(Incident ME 97/5/7)



Negative Nos. ME 97/082/11, 12 Taken on : 5-6-97

Description : A soil cut slope failure which resulted in the evacuation of
two houses, Nos. 4 and 5 Pak Shek Wo Sun Tsuen.

Plate 3 - House Nos. 4 and 5 Pak Shek Wo Sun Tsuen, Clear Water Bay Road,
Sai Kung (Incident ME 97/6/13)



Negative Nos. ME 97/108/9-11 Taken on 4-7-97

Description : A soil cut slope failure resulting in structural distress on a crib wall and backfill materials emerged from the toe of the crib wall.

Plate 4 - Pak Kong Water Treatment Plant, Sai Kung (Incident ME 97/7/15)



Negative No. ME 97/108/15 Taken on : 4-7-97

Description : Concrete slab cracks on top of the crib wall.

Plate 5 - Pak Kong Water Treatment Plant, Sai Kung
(Incident ME 97/7/15)



Plate 6 - Negative No. 97/109/20

Taken on : 4-7-97



Plate 7 - Negative No. 97/109/24

Taken on : 4-7-97

Description : A soil cut slope failure which resulted in the blockage of one lane of Sui Wo Road.

Plates 6 & 7 - Opposite to a Pumping Station at Sui Wo Road, Fo Tan (Incident ME 97/7/17)

Plate 8 - Negative No.
MW 97064-09
Taken on 8-5-97



Plate 9 - Negative No. MW 97064-06 Taken on : 8-5-97

Description : A natural slope failure behind Wonderland Villas.

Plates 8 & 9 - Behind Blocks 3 and 4 Wonderland Villas, Kwai Chung (Incident MW 97/5/1)



Negative Nos. MW 97067-10, 11C

Taken on : 8-5-97

Description : A rock fall failure which resulted in the blockage of one lane of Kwai Chung Road at the underpass of Kwai Chung Viaduct.

Plate 10 - Opposite to Container Terminal No. 2, Kwai Chung
(Incident MW 97/5/6)



Negative Nos. 97073-1, 2C Taken on : 9-5-97

Description : A fill slope failure which undermined part of a fill platform
of Kwai Chung Public School at crest of slope.

Plate 11 - Glorious Praise Christian Centre, Kwai Chung
(Incident MW 97/5/18)



Negative Nos. MW 97095-20C, 21C Taken on : 4-6-97

Description : Looking northeast across the main scarp of a major natural terrain landslide.

Plate 12 - 19-23 Sha Tin Heights Road, Sha Tin (Incident MW 97/6/12)



Negative No. MW 97095-19C Taken on : 4-6-97

Description : Signs of distress on the retaining wall.

Plate 13 - 19-23 Sha Tin Heights Road, Sha Tin
(Incident MW 97/6/12)



Negative Nos. 97/01-12, 13C Taken on : 4-6-97

Description : A major fill slope failure which resulted in the collapse of a buried retaining wall, blocking of Lai King Hill Road and an access road to Chung Shan Terrace.

Plate 14 - Chung Shan Terrace , Lai King Hill Road, Kwai Chung
(Incident MW 97/6/15)



Negative No. 2/55/97 Taken on : 4-6-97

Description : An aerial view of a major soil cut slope failure resulting in one fatality, five injuries, damaged to a squatter hut and the blockage of a footpath and two lanes of Castle Peak Road.

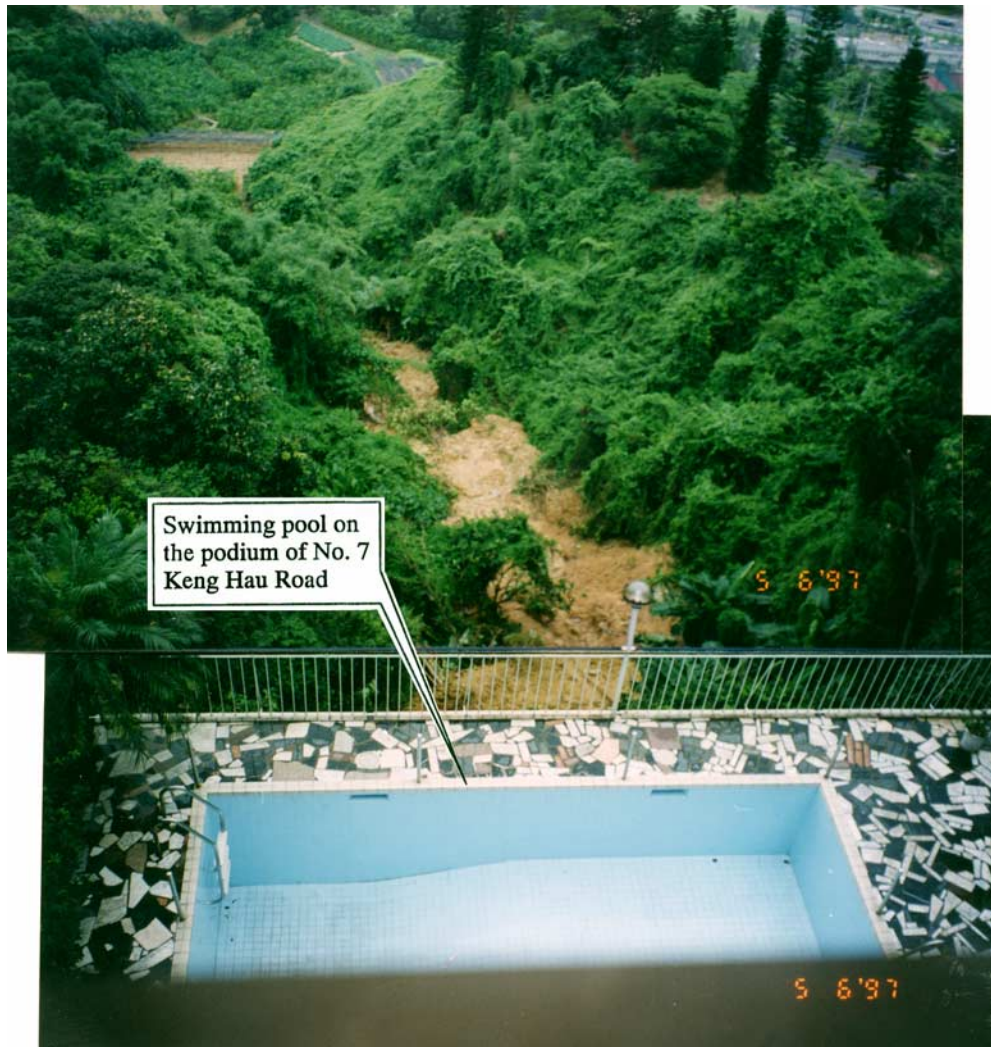
Plate 15 - Hut No. 26 Kau Wa Keng Upper Village, New Territories (Incident MW 97/6/16)



Negative Nos. GS 97034C/12, 13 Taken on : 6-6-97

Description : A close view of a squatter hut damaged by the northern landslide.

Plate 16 - Hut No. 26 Kau Wa Keng Upper Village, New Territories (Incident MW 97/6/16)



Negative Nos. MW 97100-9, 10C

Taken : on 5-6-97

Description : A soil cut slope failure which destroyed a terraced garden area and partly undermined the podium of No. 7 Keng Hau Road.

Plate 17 - No. 7 Keng Hau Road, Sha Tin (Incident MW 97/6/22)



Negative Nos. MW 97 113-01, 02, 03, 04C

Taken on : 19-6-97

Description : A major fill slope failure which resulted in the permanent evacuation of a house.

Plate 18 - Kau Wah Keng San Tsuen, Lai Chi Kok (Incident MW 97/6/56)



Negative Nos. 97/24-12, 13, 14 Taken on : 2-7-97

Description : A major fill slope failure resulting in the blockage of an access road and the closure of two lanes of Tuen Mun Road.

Plate 19 - Tuen Mun Road near Ting Kau (Incident MW 97/7/11)



Negative Nos. MW 97/25-7C, 8C Taken on : 4-7-97

Description : A major soil/rock cut slope failure which resulted in the evacuation of three houses and the closure of a pedestrian footpath.

Plate 20 - Lung Tsai Tsuen Road, Lung Tsai Tsuen, Cheung Chau (Incident MW 97/7/18)

APPENDIX A

LIST OF INCIDENTS REPORTED TO THE GEO

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Table A1 - List of Major Landslides Reported to GEO in 1997 (Sheet 1 of 6)

Incident No.	Location (Slope No.)	Failure						Facility Affected	Consequence
		Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)		
HK97/7/14	Nam Long Shan Road, Aberdeen.	20/7 (12:30)	Fill slope	Major (50)				Road	1 road closed.
HK97/8/13	Junction of Tai Tam Road and Stanley Village Road, Stanley. (15NE-A/F100)	22/8 (morning)	Fill slope	Major (52)		14		Pedestrian pavement	Pedestrian pavement closed.
K97/12/1	Development site of Sau Mau Ping Estate Phase 5 & 6. (11NE-D/C7)	4/12 (14:20)	Rock fall	Major (~1 000) ⁺				Road	4 roads closed.
ME97/7/1	Lai Ping Road, Kau To Shan, Sha Tin. (7NE-C/C95)	2/7 (20:00) ⁺	Soil cut slope	Major (100 000) ⁺				Road	Totally blocked Lai Ping Road and trapped a truck driver.
ME97/7/3	Behind Kun Yam Din, Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/C116)	2/7 (6:15)*	Soil cut slope	Major (1 500)*		25*	32*	Building lot, access road, open area	1 person killed, 1 person injured, 1 building damaged and an annex building was buried.
ME97/7/4	Near Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/CR114)	2/7	Fill slope	Major (200)	5	20		Building lot, footpath	Whole monastery evacuated.
ME97/7/5	Tao Fung Shan Christian Cemetery, Sha Tin. (7SW-B/R50 and R51)	2/7 (6:30)*	Retaining wall	Major (400)*	22*	28*	35*	Squatter area, footpath, cemetery	4 huts permanently evacuated, 1 hut temporarily evacuated. Closure of the cemetery.
ME97/7/6	Hong Tsuen Road, Sai Kung. (8SW-C/C3)	3/7 (0:23)*	Soil cut slope	Major (250)*	15	25*	25*	Road, pedestrian pavement	2 roads blocked.
ME97/7/9	Tai Mong Tsai Road, Sai Kung. (8SW-A/C10)	2/7	Soil cut slope	Major (50)	10		30	Road	2 roads closed.

Table A1 - List of Major Landslides Reported to GEO in 1997 (Sheet 2 of 6)

Incident No.	Location (Slope No.)	Failure						Facility Affected	Consequence
		Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)		
ME97/7/14	Hut No. 366, Pai Tau, Sha Tin.	2/7 (17:00)	Soil cut slope	Major (150)		15		Squatter area	5 huts permanently evacuated. Obstructed the northbound KCRC rail track.
ME97/7/15	Pak Kong Water Treatment Plant, Sai Kung. (8SW-C/C175)	4/7 (8:30)	Retaining wall	Major (100)				Treatment works	
ME97/7/23	Near Lamp Post N88788, Ting Kok Road, Tai Po. (7NE-A/C8)	4/7 (am)	Soil cut slope	Major (>200)	30	25	30	Pedestrian pavement	
ME97/7/30	North-bound Track about 250m from Fo Tan Station, KCRC, Sha Tin.	2/7 (0:40-5:54)*	Natural slope*	Major (100)*		8*	30-38*	Railway track	
ME97/7/51	Opposite to Shing On Temporary Housing Area, Ma On Shan Road, Ma On Shan.	2/7(am) - 3/7(16:00)*	Natural slope	Major (3 000)*		10-20*	26*	Pedestrian pavement, bicycle track, country park	
ME97/7/56	Wong Chuk Yeung Tsuen Path, Fo Tan. (7SW-B/C141)	Unknown	Soil cut slope	Major (50)	7			Road	
ME97/7/63	Slope near house no.2 Wo Liu Hang, Fo Tan. (7SE-A/C116)	3/7	Soil/rock cut slope	Major (100)	15			Squatter area	
ME97/7/67	Behind Yuk Wong Din, Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/C113)	2/7 (4:00-5:00)	Natural slope	Major (750)	16	15		Building lot	
ME97/7/68	Near Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/FR7 and F9)	2/7 (7:00)	Natural slope	Major (500)		20		Building lot	

Table A1 - List of Major Landslides Reported to GEO in 1997 (Sheet 3 of 6)

Incident No.	Location (Slope No.)	Failure						Facility Affected	Consequence
		Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)		
ME97/7/69	Tao Fung Shan Christian Cemetery, Sha Tin. (7SW-B/C425 and C426)	2/7 (6:30)*	Fill slope*	Major (600)*		52*	30*	Squatter area, Cemetery	Closure of the cemetery.
ME97/7/81	Chinese University of Hong Kong, Sha Tin. (7NE-C/C53)	3/7 (pm)	Soil cut slope	Major (80)				Pedestrian pavement	
ME97/7/84	22 Ma Niu Village, Kau To Shan, Sha Tin.	2/7 (6:00)	Natural slope	Major (150)		20		Building lot, access road	
ME97/7/88	Near L/P Nos. EB08142 & EB08121, Bride's Pool Road, Tai Po. (3NE-D/C3)	19/7 (morning)	Soil/rock cut slope	Major (180)	30	15		Road	2 roads closed.
No incident number was assigned	Near University Station, KCRC, Tai Po Road, Ma Liu Shui.	Before 4/7	Natural slope	Major (100)				Road, railway track	2 roads blocked.
MW97/5/1	Opposite Block 3, Wonderland Villas, Kwai Chung.	8/5 (10:00-10:30)	Natural slope	Major (80)*		8*	34*	Road	1 road closed.
MW97/5/16	Pump Fong Sheung Chuen, Kwai Chung.	9/5 (8:00)	Soil cut slope	Major (100)	12	10		Footpath	
MW97/5/30	The Society of Homes for the Handicapped, Shung Man Road, Tsuen Wan.	9/5	Natural slope	Major (78)	10	12		Access road	
MW97/6/12	19-23 Sha Tin Heights Road, Sha Tin.	4/6 (7:00 - 8:41)*	Natural slope	Major (150)*	38*	15*	28*	Building lot	

Table A1 - List of Major Landslides Reported to GEO in 1997 (Sheet 4 of 6)

Incident No.	Location (Slope No.)	Failure						Facility Affected	Consequence
		Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)		
MW97/6/15	Chung Shan Terrace, Lai King Hill Road, Kwai Chung.	4/6 (7:15)*	Fill slope	Major (450)*	23*	18*	18*	Building lot, road, pedestrian pavement	2 roads closed, pedestrian pavement closed.
MW97/6/16	Hut No. 26, Kau Wah Keng Upper Village, Castle Peak Road, Kwai Chung. (11NW-A/C64)	4/6 (7:25)*	Soil cut slope	Major (360)*	15*	8-12*	30*	Squatter area, road, footpath	1 person killed, 1 hut permanently evacuated, 2 roads closed, footpath closed.
MW97/6/20	House Nos. 4-5, Chung Shan Terrace, Kwai Chung. (11NW-A/R6)	4/6 (8:30)*	Soil cut slope	Major (85) *	10	16		Building lot, carpark	3 flats evacuated.
MW97/6/22	7 Keng Hau Road, Sha Tin. (7SW-D/C700)	4/6* (am)	Fill slope	Major (150)*	28*	10-12*	19*	Building lot	
MW97/6/23	Woodcrest Hill, Sha Tin Heights, Sha Tin.	4/6 (8:00)	Natural slope	Major (170)*	28*	11.5*	23*	Building lot	
MW97/6/25	Hut No. RTW/9D/369, Kwai Chung Au, Mile Stone 6-6.5, Castle Peak Road, Kwai Chung.	4/6 (16:00)	Natural slope	Major (100)	15	15		Squatter area	1 hut permanently evacuated.
MW97/6/43	Cheung Hang Road, Kwai Chung. (11NW-A/C113)	4/6 (8:00)	Natural Slope	Major (100)	20		42	Road	
MW97/6/44	Cheung Hang Road, Kwai Chung. (11NW-A/C113)	4/6 (8:00)	Natural slope	Major (200)	20	27		Road, pedestrian pavement	
MW97/6/50	Behind Hut No. 73, Kau Wah Keng San Tsuen, Kwai Chung.	4/6 (6:00)	Retaining wall	Major (54)	10*	9*	26*	Squatter area	1 hut temporarily evacuated.

Table A1 - List of Major Landslides Reported to GEO in 1997 (Sheet 5 of 6)

Incident No.	Location (Slope No.)	Failure						Facility Affected	Consequence
		Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)		
MW97/6/56	Hut No. 139C, Kau Wah Keng San Tsuen, Kwai Chung.	4/6 (7:00)	Natural slope	Major (500)*		11*	~30*	Squatter area	1 hut permanently evacuated.
MW97/7/7	Mei Chung Court, Sha Tin. (7SW-D/C790, C791 and C801)	2/7 (early morning)	Soil cut slope	Major (100)*				Building lot, pedestrian pavement, open area, carpark	Flood damage included severe erosion of slopes, undermining and erosion of paved areas. Pedestrian pavement closed.
MW97/7/9	Opposite Block 3, Bay View Gardens, Castle Peak Road, Tsuen Wan. (6SE-D/C24)	2/7 (9:30)*	Fill slope	Major (70)*		11*	48*	Road, pedestrian pavement	2 roads closed.
MW97/7/10	Tsuen Wan Police Station, Lido Beach, Castle Peak Road, Ting Kau.	2/7 (11:45)	Natural slope	Major (750)*	20*	25*	20*	Building lot, road, pedestrian pavement	8 persons injured, 4 flats evacuated, 2 roads closed, pedestrian pavement closed.
MW97/7/11	Near Ting Kau Bridge, Tuen Mun Highway, Ting Kau. (6SE-C/F10)	2/7 (9:30)	Fill slope	Major (200)*		25*	28*	Road	2 roads closed.
MW97/7/15	Happy View House, 19 Sha Tin Height Road, Sha Tin.	2/7 (before 7:00)	Natural slope	Major (2 000)				Building lot	
MW97/7/18	House Nos. 1A, 49 and 49A, Lung Tsai Tsuen Road, Lung Tsai Tsuen, Cheung Chau. (14NW-D/R206 and CR208)	2/7 (23:05)	Soil/rock cut slope	Major (70)	8	15-20		Building lot, footpath, building access	3 houses evacuated, footpath closed.
MW97/7/24	Above Ka Tin Court, Sha Tin.	2/7	Natural slope	Major (150)*		10*	30*	Stream course	Stream course blocked.

Table A1 - List of Major Landslides Reported to GEO in 1997 (Sheet 6 of 6)

Incident No.	Location (Slope No.)	Failure						Facility Affected	Consequence
		Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)		
MW97/7/27	Mile Stone 6-1/2, Tai Po Road, Sha Tin Heights, Sha Tin. (7SW-D/F158)	4/7* (14:00)	Fill slope	Major (50)		10		Squatter area	6 huts permanently evacuated.
MW97/7/53	Hut Nos. 103-104, Area 3, Pak Tin Tsuen, Sha Tin. (7SW-B/F68 and F67)	2/7	Fill slope	Major (>50)				Squatter area	3 huts permanently evacuated.
MW97/7/55	King Tan Court, Hung Mui Kuk Road, Sha Tin. (7SW-D/C235)	5/7	Soil cut slope	Major (>50)				Carpark	
MW97/7/70	Opposite Dragon Industrial Building, Ching Cheung Road, Kwai Chung. (11NW-A/C55)	7/7 (9:00)	Soil cut slope	Major (500)*	10	50	30	Road, construction site	4 roads closed.
MW97/7/76	Near Tsuen Lung, Route Twisk, Tsuen Wan. (6SE-B/C5)	4/7	Soil cut slope	Major (70)	11			Open area	
MW97/8/14	Near Observation Deck, Route Twisk, Tai Mo Shan.	22/8	Natural slope	Major (400)	35	15		Road	2 roads closed.
No incident number was assigned	Shing Mun Main (Upper) Dam, Tsuen Wan.	2/7	Rock cut slope	Major (3 000)+	60+	45+	38-41+	Country park	

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 1 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/1/1	Opposite to No.5, Repulse Bay Road, Repulse Bay.	24/1	HyD/HK	22/1	Natural slope	Minor (8)				Road		Washout of slope surface caused by rupture of watermains.
HK97/2/1	Between 45 and 46 Tai Tam Road, Kwai Pui Wan.	3/2	HyD/HK	31/1 (20:30)	Natural slope	Minor (10)				Open area		
HK97/3/1	Below 37-39A Tin Hau Temple Road, North Point. (11SE-A/C15)	4/3	HyD/HK	4/3 (7:00)	Rock fall	Minor (0)				Pedestrian pavement	Pedestrian pavement closed.	No failure, only tree fallen.
HK97/4/1	Tai Hang Road, Jardine's Lookout. (11SE-C/C87)	13/4	Police	Unknown		Minor (2)				Road	2 roads closed.	
HK97/4/2	Correctional Services Department Staff Training Institute, Tung Tau Wan Road, Stanley. (15NE-C/FR24)	16/4	Arch SD	13/4	Fill slope	Minor (3)				Open area		
HK97/4/3	Near 98 Pokfulam Road, Mount Davis. (11SW-A/C409)	18/4	Police	18/4 (20:30)	Soil cut slope	Minor (5)				Road	1 road closed.	
HK97/5/1	Shek O Road, Shek O. (15NE-B/C47)	4/5	HyD/HK	4/5 (5:00)	Rock fall	Minor (6)				Road		

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 2 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/5/2	72 Hill Road, Sai Wan. (11SW-A/FR24)	9/5	Police	9/5 (2:00)		Minor (<1)				Carpark	1 car was damaged.	No failure, only tree fallen and dislodgement of masonry wall surface. No geotechnical concern, only collapse of floor slab.
HK97/5/3	House Nos. 52C & 52D, Kung Man Tsuen, Kennedy Town.	9/5		9/5 (17:45)		N/A				Road	2 roads closed	
HK97/5/4	Junction of Wan Tsui Road and Chai Wan Road, Chai Wan. (11SE-D/C49)	10/5	Police	10/5 (7:10)	Rock fall	Minor (<0.5)				Pedestrian pavement	Pedestrian pavement closed.	
HK97/6/1	Home for the Aged, 404 Victoria Road, Mount Davis. (11SW-A/C415)	13/6	Police	13/6 (17:00 -18:00)	Boulder fall	Minor (3)				Building lot		
HK97/6/2	Block 5, 61 Mount Davis Road, Mount Davis. (11SW-C/C437)	16/6	BD	16/6 (16:00)	Soil cut slope	Minor (5)	4.5	4.5		Building lot, pedestrian pavement	Pedestrian pavement closed.	
HK97/6/3	Adjacent 97 Pokfulam Road, Kennedy Town.	16/6	Public	15/6	Natural slope	Minor (5)				Staircase		
HK97/6/4	Hut Nos. 19, 19A, 20 and 25L, Pokfulam Village, Pokfulam.	16/6	DO	16/6 (12:00)		N/A				Squatter area	4 huts permanently evacuated.	No failure, dislodgement of masonry wall blocks.

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 3 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/6/5	21 Shek O Road, Shek O. (15NE-B/C122)	17/6	HyD/HK	17/6 (before 8:00)	Soil cut slope	Minor (20)	8	7	49	Building lot	1 flat evacuated.	No failure, only erosion of slope surface caused by rupture of watermains.
HK97/6/6	17 Barker Road, The Peak. (11SW-C/C452)	17/6	Arch SD	13/6 (15:30)	Soil cut slope	Minor (2)	5			Access road		
HK97/6/7	Behind Public Latrine, Old Peak Road, The Peak.	17/6	HyD/HK	16/6	Soil cut slope	Minor (<1)	2.5		56	Public latrine		
HK97/6/8	Wah Fu Estate, Pokfulam.	17/6	FSD	17/6 (4:00)		Minor (8)				Building lot, road		
HK97/6/9	Wong Chuk Hang Path, Wong Chuk Hang.	16/6	HyD/HK	13/6 (16:30)	Soil/ rock cut slope	Minor (5)	3.5		52	Road		
HK97/6/10	14 Shouson Hill Road, Shouson Hill.	17/6	Police	17/6 (8:00)	Soil/ rock cut slope	Minor (2~3)	3		56	Road	1/2 road blocked.	
HK97/6/11	Sai Wan Morning Trail, Lei Yu Mun Park, Chai Wan. (11SE-D/C374)	18/6	USD, Public	18/6 (before 16:00)	Soil/ rock cut slope	Minor (7)	6			Country park		
HK97/6/12	Shek O Road, Mount Collinson. (11SE-D/C107)	23/7	HyD/HK	23/6 (morning)	Soil/ rock cut slope	Minor (1)	6			Road	1 road closed.	

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 4 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/6/13	Near Lamp Post No. 24250, Harlech Road, The Peak.	25/6		25/6	Rock fall	N/A				Road		
HK97/6/14	Rochester House, Block 22, Stanley Fort, Stanley. (15NE-C/C56)	27/6	Arch SD	25/6	Soil cut slope	Minor (4)	8		47	Building lot		
HK97/7/1	Near 14 Kennedy Road, Mid-Levels. (11SW-B/C205)	3/7	Police	3/7 (6:00)		N/A				Road	1 road closed.	Not a landslide incident, only dislodgement of slope surface caused by rupture of watermain.
HK97/7/2	No. 4 - 14, Shek O Road, Lan Nai Wan, near Catchpit No. 41. (15NE-B/C36)	3/7	HyD/HK, Police	3/7 (9:30)	Rock slope	Minor (1)				Road	1 road closed.	
HK97/7/3	Peel Rise, Aberdeen.	3/7	HyD/HK	3/7 (10:00)	Soil/rock cut slope	Minor (3.5)	3.5	2	44	Road	1 road closed.	
HK97/7/4	Behind Block E and F, Pine Court, 5 Old Peak Road, Mid-Levels. (11SW-B/CR67 & C292)	3/7	HyD/HK	3/7 (6:00)	Soil cut slope	Minor (2)				Building lot		
HK97/7/5	Near 25 Lugard Road, The Peak.	4/7	HyD/HK	3/7	Fill slope	Minor (3)				Private or building access		

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 5 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/7/6	Tai Tam Road, Tai Tam. (11SE-D/C138)	4/7	HyD/HK	4/7 (10:00)	Soil cut slope	Minor (2)						
HK97/7/7	Behind Salesian English School, 16 Chai Wan Road, Shau Kee Wan.	4/7	Public	4/7 (8:00)	Boulder fall	Minor (0.1)				Open area		
HK97/7/8	Below Block C, Police Quarters, Ka Wai Man Road, Kennedy Town. (11SW-A/C106)	10/7	Police	Likely before 9/7	Soil cut slope	Minor (<1)				Pedestrian pavement		
HK97/7/9	Below 17 Shek O Road, Shek O. (15NE-B/C17)	16/7	HyD/HK	16/7 (13:00)	Rock fall	Minor (1)	7			Road	1 road closed.	
HK97/7/10	Water Supplies Department Pumping Station, 76 Pokfulam Road, Pokfulam. (11SW-A/C151)	14/7	GEO	11/7	Rock slope	Minor (~15)	15	3.5	56	Road, open area	1 road closed.	
HK97/7/11	Near 35 South Bay Road, Repulse Bay. (15NE-A/C95)	17/7	Public	17/7 (14:15)	Rock fall	Minor (0.5)	3.5		60	Road	1/2 road blocked.	
HK97/7/12	BBQ Area between Stanley Main Beach and Hairpin's Beach, Stanley.	17/7	USD	17/7 (12:20)	Rock fall	Minor (0.5)	2.5			Footpath	Footpath closed.	

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 6 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/7/13	36 San Shi Street, Ap Lei Chau. (15NW-B/C133)	17/7	HyD/HK	18/7 (17:00)	Soil cut slope	Minor (48)	7			Building lot, open area	1 house evacuated.	No failure, only tree fallen.
HK97/7/14	Nam Long Shan Road, Aberdeen.	20/7	GEO	20/7 (12:30)	Fill slope	Major (50)				Road	1 road closed.	
HK97/8/1	Cape D'Aguilar Road, Cape D'Aguilar Peninsula.	3/8	Police	Late night of 2/8 to early morning of 3/8	Boulder fall	Minor (10)				Road	1 road closed.	
HK97/8/2	2 Perkins Road, Jardine's Lookout. (11SE-C/C178)	2/8	BD	2/8 (11:00)		Minor (<0.2)				Access road		
HK97/8/3	Shau Kei Wan Firestation, 34 Chai Wan Road, Shau Kei Wan. (11SE-D/C285)	3/8	FSD	3/8 (7:00)	Soil cut slope	Minor (2)				Open area		
HK97/8/4	12 Quarry Bay Street, Shau Kei Wan. (11SE-A/C179)	3/8	Police	3/8 (10:00)	Rock fall	Minor (<5)	4		49	Access road		
HK97/8/5	Lower Shouson Hill Nursery, Shouson Hill.	5/8	Arch SD	2/8	Soil cut slope	Unknown						
HK97/8/6	11 Cloud View Road, North Point. (11SE-A/C32)	5/8	Public	5/8 (morning)		N/A						Tree fallen.

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 7 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/8/7	Near Lamp Post No. 33798, Shek O Road, Shek O, (15NE-B/C43)	12/8	Police	12/8 (morning)	Soil cut slope	Minor (0.5)	3.5	1		Road	1 road closed.	No geotechnical concern, only rubble fallen from the concrete paving of the abandoned squatter.
HK97/8/8	Opposite 81-95 Peak Road, The Peak. (11SW-D/C242)	13/8	Police	13/8 (13:00)	Soil cut slope	Minor (0.5)	5	2		Road	1 road blocked.	
HK97/8/9	Between Kwun Lung Lau and Sai Wan Estate, Sai Wan.	12/8	HD	Unknown		Minor (<1.0)				Footpath		
HK97/8/10	St. Philip Primary School, Clementi Road, Jardine's Lookout. (11SE-C/C432)	23/8	BD	22/8	Soil cut slope	Unknown				Carpark		
HK97/8/11	12 Repulse Bay Road, Repulse Bay. (11SE-C/C7)	22/8	Police	22/8 (1:00)	Rock fall	Minor (5)	9			Road	2 roads closed.	
HK97/8/12	Peel Rise, Aberdeen.	22/8	HyD/HK	22/8	Rubble abutment	Minor (2)				Road	1 road closed.	Failure of the rubble abutment.

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 8 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/8/13	Junction of Tai Tam Road and Stanley Village Road, Stanley. (15NE-A/F100)	25/8	USD	22/8 (morning)	Fill slope	Major (52)		14		Pedestrian pavement	Pedestrian pavement closed.	
HK97/8/14	BBQ Area between Stanley Main Beach and Hairpin Beach, Stanley.	25/8	USD	22/8 (morning)	Natural slope	Minor (10)	9	4	45	Footpath		
HK97/8/15	48 Deep Water Bay Road, Shouson Hill. (11SW-D/C126)	22/8	HyD/HK	22/8 (14:00)	Soil cut slope	Minor (2)	2					
HK97/8/16	Behind 64-70 Aberdeen Old Main Street, Aberdeen. (11SW-D/C644)	23/8	HyD/HK	22/8	Rock fall	Minor (1.5)	4			Back lane		
HK97/8/17	Glenealy, Central. (11SW-B/C292)	25/8	HyD/HK	23/8 (morning)	Soil cut slope	Unknown				Carpark		
HK97/8/18	Building Contractors' Association School, 62 Tin Hau Temple Road, North Point. (11SE-A/CR101)	25/8	Public	24/8	Soil cut slope	Minor (10)		4				
HK97/8/19	Po Kok Girl's School, 11 Shan Kwong Road, Happy Valley.	22/8	Public	22/8 (morning)	Soil cut slope	Minor (0.2)	1			Building lot	1 flat evacuated.	

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 9 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/8/20	Behind 35-41 Village Terrace, Happy Valley. (11SW-D/CR658)	22/8	Police	22/8 (12:30)	Soil/ rock cut slope	Minor (12)	8	3		Building lot, access road, private or building access, open area	1 flat evacuated.	
HK97/8/21	26 Lugard Road, The Peak.	24/8	HyD/HK	24/8 (morning)	Rock fall	Minor (1)				Pedestrian pavement		
HK97/8/22	Opposite 102 Repulse Bay Road, Repulse Bay. (15NE-A/C111)	28/8	HyD/HK	28/8	Rock slope	Minor (36.8)	7	5	45	Road	2 roads closed.	
HK97/8/23	Hong Kong Cemetery, Wong Nai Chung Road, Happy Valley. (11SW-D/C235)	22/8	Police	22/8 (13:30)		N/A				Tram	Tram services disrupted by two hours.	No failure, only tree fallen and signs of distress were observed.
HK97/9/1	Below 25 Cooper Road, Jardine's Lookout.	3/9	Public	26/8	Natural slope	Minor (2)				Open area		
HK97/9/2	Adjacent 25 Tai Hang Drive, Tai Hang.	7/9	Police	7/9	Boulder fall	Minor (0.5)				Road	2 roads closed.	

Table A2 - List of Incidents in Hong Kong Island Reported to GEO in 1997 (Sheet 10 of 10)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
HK97/9/3	Near 23 Mount Davis Road, Mount Davis.	11/9	HyD/HK	5/9	Staircase /side channel	Minor (~20)				Access road		Staircase/side channel, erosion of fill beneath staircase caused by improper water discharge.
HK97/9/4	BBQ Area between Stanley Main Beach and Hairpin Beach, Stanley.	15/9	USD	13/9 (15:30)	Boulder fall	Minor (0.05)				Footpath, BBQ area		
HK97/9/5	Sir Cecil's Ride, Tai Hang Reservoir, Tai Hang.	22/9	AFD	10/9	Soil cut slope	Minor (10)	5	4	50	Country park		
Legend :												
+ Information from GEO Detailed Investigation.												
* Information from GEO's 1997 Landslide Investigation Consultants.												
(1) Height of Landslide is the difference in elevation measured from the crest of failure to the distal end of the main body of the landslide debris.												
(2) Width of Landslide is the maximum width of landslide scar.												
(3) Estimated travel angle of landslide is the angle between the crest of failure to the distal end of the main body of landslide debris and the horizontal ground.												

Table A3 - List of Incidents in Kowloon Reported to GEO in 1997 (Sheet 1 of 3)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
K97/5/1	Above Temporary Sitting-out Area, Wai Wan Lane, Hung Hom.	9/5	USD	9/5 (morning)	Natural slope	Minor (<1)				Open area		
K97/6/1	Grand Court, 109-135 Kadoorie Avenue, Mong Kok.	4/6	BD	4/6 (8:30)	Soil cut slope	Minor (15)				Building lot	2 flats evacuated.	
K97/6/2	Sha Tin Au Road, Tze Wan Shan.	4/6	HyD/K	Unknown	Soil cut slope	Minor (5-7)		5		Road	1 road closed.	
K97/6/3	Hut No. 20, Cha Kwo Ling Tsuen, Yau Tong.	6/6	DO/KT	4/6	Rock fall	Minor (1)	12			Squatter area	3 huts permanently evacuated.	
K97/6/4	Behind Ko Shan Theatre, Ko Shan Park, Ko Shan Road, Hung Hom. (11NW-D/C45)	16/6	Arch SD	Unknown	Soil/rock cut slope	Minor (4)				Rock trench		
K97/6/5	Near the Staircase Leading from Hiu Yuk Path to Hiu Ming Street Playground, Sau Mau Ping.	19/6	Arch SD	18/6	Boulder fall	Minor (<1)				Staircase		
K97/6/6	Hut No. RKT/12/E/554, Ma Wan Tsuen, Lei Yue Mun.	20/6	DO/KT	20/6	Fill slope	Minor (2)				Squatter area	2 huts permanently evacuated.	
K97/7/1	Roadside Slope at Kai Tin Road, Lam Tin. (11NE-D/C106)	1/7	Police	1/7 (am)	Soil cut slope	Minor (1)				Pedestrian pavement	Pedestrian pavement closed.	

Table A3 - List of Incidents in Kowloon Reported to GEO in 1997 (Sheet 2 of 3)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
K97/7/2	Roadside Slope at Sha Tin Pass Road, Tze Wan Shan. (11NE-A/C353)	3/7	HyD/K	2/7 (10:00)	Soil/rock cut slope	Minor (<1)	2.5		56	Road	1/3 road blocked.	No failure, but signs of distress were observed.
K97/7/3	No. 1, 3 and 5, Ede Road, Beacon Hill. (11NW-B/F299)	3/7	FSD	3/7	Fill slope	Minor (10)				Carpark		
K97/7/4	Below Police Post, Fei Ngo Shan Road, Tze Wan Shan. (7SE-C/C42)	10/7	HyD/K	10/7 (17:30)		N/A				Road		
K97/7/5	Laguna City Phase 3, Sin Fat Road, Kwun Tong.	4/7	Public	4/7	Soil/rock cut slope	Minor (40)				Open area		
K97/7/6	Man Kee Mansion, 86-86E Waterloo Road, Ho Man Tin. (11NW-D/C280)	17/7	Public	17/7 (10:00)	Soil/rock cut slope	Minor (6)	12			Back lane, sitting-out area		
K97/8/1	St. Joseph Anglo Primary School, 57 Kwun Tong Road, Ngau Tau Kok. (11NE-A/c69)	4/8	Public	3/8 (2:00)	Soil/rock cut slope	Minor (25*)	9	5*		Building lot		
K97/8/2	Near Wylie Court, Princess Margaret Road, Ho Man Tin. (11NW-D/CR448)	22/8	HyD/K	22/8 (11:30)	Soil cut slope	Minor (12)	5		40	Road	1 road blocked.	

Table A3 - List of Incidents in Kowloon Reported to GEO in 1997 (Sheet 3 of 3)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
K97/12/1	Development site of Sau Mau Ping Estate Phase 5 & 6, (11NE-D/C7)	4/12	Police	4/12 (14:20)	Rock fall	Major (~1 000) ⁺				Road	4 roads closed.	Rock fall from construction site following blasting.
Legend : + Information from GEO Detailed Investigation. * Information from GEO's 1997 Landslide Investigation Consultants. (1) Height of Landslide is the difference in elevation measured from the crest of failure to the distal end of the main body of the landslide debris. (2) Width of landslide is the maximum width of landslide scar. (3) Estimated travel angle of landslide is the angle between the crest of failure to the distal end of the main body of landslide debris and the horizontal ground.												

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 1 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/1/1	Sha Kui of Leung Shuen Wan behind house No. 3-4.	13/12	DO/SK	Summer of 1996	Soil/rock cut slope	Minor (<5)				Backyards		No failure, dislodgement of chunam surface. No failure, only dislodgement of slope surface protection caused by root action.
ME97/1/2	House No. 25, Po Lo Che Sun Tsuen, Sai Kung.	14/1	DO/SK	Unknown		Minor (1)				Building lot		
ME97/5/1	Near Ta Ku Ling San Tsuen, Clear Water Bay Road, Sai Kung. (11NE-B/C824)	2/5	HyD/NT	Unknown	Soil cut slope	Minor (0.5-1)	2			Pedestrian pavement		
ME97/5/2	House No. 19, Ha Yeung, Clear Water Bay Road, Sai Kung.	8/5	Police	8/5 (pm)		Minor (0.2)				Access road		
ME97/5/3	Near Ta Ku Ling, Clear Water Bay Road, Sai Kung. (11NE-B/C143)	8/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (20-30)	5		30	Road	1 road closed.	
ME97/5/4	Near Pan Long Wan, Clear Water Bay Road, Sai Kung.	8/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (20-30)	3.5			Road	1 road closed.	

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 2 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/5/5	Mile Stone 11.5, Clear Water Bay Road, Sai Kung. (12NW-C/C92)	8/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (15-20)	3		49	Road	1 road closed.	No failure, but signs of distress were observed.
ME97/5/6	Near Sheung Ycung, Clear Water Bay Road, Sai Kung. (12NW-C/C92)	8/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (15)	2.5				1/4 road blocked.	
ME97/5/7	House Nos. 47 and 48, Hiu Po Path, Sheung Sze Wan, Sai Kung.	8/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (30)	8-10				1 house evacuated.	
ME97/5/8	House No. 117 Lobster Bay Villa, Tai Hang Hau, Sai Kung.	8/5	DO/SK	8/5 (am)	Natural slope	Minor (<1)				Open area		
ME97/5/9	Lamp Post EB1432, Near Tai Au Mun, Clear Water Bay Road, Sai Kung. (12SW-A/C43)	8/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (26.5)	6		45	Road	1 road blocked.	
ME97/5/10	House No. 61, Lok Lo Ha, Sha Tin.	8/5	DO/ST	8/5 (am)		N/A				Footpath, private or building access	Footpath closed.	
ME97/5/11	Near House No. 19, Kwai Tei New Village, Fo Tan.	7/5	DO/ST	6/5	Fill slope	Minor (12)	18			Footpath	Footpath closed.	

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 3 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degrec)			
ME97/5/12	Wong Chuk Yeung Tsuen Path, Fo Tan. (7SW-B/C151)	9/5	DO/ST	9/5 (9:00)	Soil cut slope	Minor (20)	15			Road, construction site		
ME97/5/13	Near O Long Village, Po Lo Che Road, Sai Kung. (8SW-C/C177)	12/5	DO/SK	9/5	Soil cut slope	Minor (3)	3		50	Pedestrian pavement	Pedestrian pavement closed.	
ME97/5/14	Tai Mong Tsai Road, Tso Wo Hang, Sai Kung.	12/5	HyD/NT	10/5	Soil/rock cut slope	Minor (12)	4			Pedestrian pavement	Pedestrian pavement closed.	
ME97/5/15	Lot 157, DD223, Pik Uk Village, Sai Kung. (11NE-B/C684)	6/5	BD	Unknown	Soil cut slope	Minor (2)	3.5			Carpark		
ME97/5/16	Hang Hau Wing Lung Road, Hang Hau, Tseung Kwan O.	15/5	HyD/NT	8/5	Soil cut slope	Minor (1)		1		Pedestrian pavement		
ME97/5/17	House Nos. 29-30, Yau Yuc Wan Village, Tseung Kwan O. (11NE-D/C515)	22/5	DO/SK	8/5	Soil cut slope	Minor (>3)				Back lane		
ME97/6/1	Near Fat Kwong Buddhist Monastery, Pak Sha Wan, Sai Kung.	2/6	Public	Unknown	Soil cut slope	Minor (3-5)	5			Building lot		
ME97/6/2	Lot 223, DD214, Nam Wai, Sai Kung. (11NE-B/C565)	4/6	DO/SK	4/6 (am)	Soil cut slope	Minor (48)	5		32	Carpark		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 4 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/6/3	Lot 341-342, DD253, Tseng Lan Shue, Sai Kung.	4/6	Public	4/6 (am)	Soil cut slope	Minor (4)	4			Building lot		
ME97/6/4	House No. 58, Pai Tau, Sha Tin. (7SW-B/C357)	4/6	HyD/NT	4/6 (7:15)	Soil cut slope	Minor (6)				Building lot	1 house evacuated.	
ME97/6/5	Lot 232, DD223, Air House, Clear Water Bay Road, Sai Kung. (11NE-B/C145)	4/6	Police	4/6 (am)	Soil cut slope	Minor (20)	6		45	Road		
ME97/6/6	Ruin Pigsty Adjacent to House No. 83, Pak Shek Wo Sun Tsuen, Sai Kung.	4/6	Public	4/6 (am)	Soil cut slope	Minor (3)	2			Ruin pigsty		
ME97/6/7	Venic Villa, Ho Chung, Sai Kung.	4/6	Public	4/6 (am)	Soil cut slope	Minor (2.2)	5.5			Road	1/4 road blocked.	
ME97/6/8	House No. 28, Hung Uk Village, Mang Kung Uk, Sai Kung. (12NW-C/C379)	4/6	DO/SK	4/6 (am)	Soil cut slope	Minor (1)				Building lot		
ME97/6/9	Junction of Anderson Road and Clear Water Bay Road, Sai Kung. (11NE-B/C69)	4/6	Public	4/6 (am)	Soil cut slope	Minor (18)	8		46		1 road blocked.	
ME97/6/10	Fei Ngo Shan Road, Sai Kung.	4/6	HyD/NT	4/6 (am)	Soil cut slope	Minor (7)	6		48	Road	1/4 road blocked.	

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 5 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (dcgrcc)			
ME97/6/11	Near Scout Camp Site, Fei Ngo Shan Road, Sai Kung.	4/6	HyD/NT	4/6 (am)	Soil cut slope	Minor (2-3)	5		49	Road	1/2 road blocked.	No failure, dislodgement of rubble wall blocks.
ME97/6/12	House No. 41, Tseng Lan Shue, Sai Kung. (11NE-B/C709)	4/6	Police	4/6	Soil cut slope	Minor (15)	3			Building lot		
ME97/6/13	House Nos. 4-6, Pak Shek Wo Sun Tsuen, Clear Water Bay Road, Sai Kung. (11NE-B/C405)	5/6	DO/SK	4/6 (10:00)	Soil cut slope	Minor (20)	8	5		Building lot	2 houses evacuated.	
ME97/6/14	Near House No. 2, Sam Long Village, Sai Kung. (11NE-B/C493)	5/6	DO/SK	4/6 (am)	Soil cut slope	Minor (5)	2.5			Footpath		
ME97/6/15	Near House No. 11, Sam Long Village, Sai Kung.	5/6	DO/SK	4/6 (am)		Minor (0.1)	2			Footpath		
ME97/6/16	House No. 1A, Habitat Hebe Haven, Sai Kung. (7SE-D/C85)	10/6	DO/SK	4/6 (am)	Soil cut slope	Minor (2)				Open area		
ME97/6/17	Near Pak Fa Lam, Fei Ngo Shan Road, Sai Kung.	4/6	HyD/NT	4/6 (am)	Rock fall	Minor (1)				Road	1/4 road blocked.	

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 6 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/6/18	House No. 24, Mau Wu Tsai Village, Po Lam Road, Sai Kung.	10/6	DO/SK	4/6 (10:00)	Soil cut slope	Minor (6.3)	4			Building lot		
ME97/6/19	Primary School, Mang Kung Uk, Sai Kung. (12NW-C/C263)	11/6	DO/SK	4/6	Soil cut slope	Minor (10)	6			Building lot		
ME97/6/20	Kwong Fuk Road, Tai Po. (7NW-B/C466)	17/6	RSD	17/6	Soil cut slope	Minor (2)	2.2			Staircase	Staircase closed.	
ME97/6/21	O Long Tsuen, Sai Kung.	17/6	Public	17/6 (am)	Soil cut slope	Minor (-)	2.5			Open area		
ME97/6/22	Junction of Clear Water Bay Road and Tai Au Mun Road, Sai Kung.	17/6	HyD/NT	17/6 (am)	Rock fall	Minor (0.1)	3			Road	1/2 road closed.	
ME97/6/23	House No. 13, Pak Shek Wo Sun Tsuen, Clear Water Bay Road, Sai Kung. (11NE-B/C408)	13/6	DO/SK	4/6 (am)	Soil cut slope	Minor (10-15)	5	5		Building lot		
ME97/6/24	Junction of Pik Uk Tsuen Road and Clear Water Bay Road, Sai Kung. (11NE-B/C804)	5/6	HyD/NT	4/6	Soil cut slope	Minor (3)	4	4	32	Pedestrian pavement		
ME97/6/25	Road to Ma On Shan Tsuen, Ma On Shan.	26/6	BD	20/6 (14:30)	Soil cut slope	Minor (10)	3			Road		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 7 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/6/26	House No. 117, Luk Mei Tsuen, Sai Kung.	23/6	Public	Early June	Natural slope	Minor (10)						The incident no. was not used.
ME97/6/27												
ME97/6/28	Junction of Pan Long Wan Road and Clear Water Bay Road, Sai Kung. (12NW-C/F114)	27/6	DO/SK	24/6	Fill slope	Minor (10)	4	3		Stream		
ME97/6/29	Hut Nos. RWLH/B/73 and 74, Wo Liu Hang Village, Fo Tan.	27/6	DO/ST	6/6	Soil cut slope	Minor (~15)	4			Squatter area	2 huts permanently evacuated.	
ME97/6/30	Opposite King Lam Estate, Po Lam Road, Tseung Kwan O.	6/6	DO/SK	4/6	Surface Erosion	N/A				Footpath		Surface Erosion.
ME97/7/1	Lai Ping Road, Kau To Shan, Sha Tin. (7NE-C/C95)	2/7	HyD/NT, FSD	2/7 (20:00)+	Soil cut slope	Major (100 000)+				Road	Totally blocked Lai Ping Road and trapped a truck driver.	
ME97/7/2	Hut No. 65, Pai Tau Tsuen, Sha Tin. (7SW-B/C359)	2/7	Public	2/7	Retaining wall	Minor (16)				Footpath		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 8 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/3	Behind Kun Yam Din, Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/C116)	2/7	FSD	2/7 (6:15)*	Soil cut slope	Major (1 500)*		25*	32*	Building lot, access road, open area	1 person killed, 1 person injured, 1 building damaged and an annex building was buried.	
ME97/7/4	Near Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/CR114)	2/7	FSD	2/7	Fill slope	Major (200)	5	20		Building lot, footpath	Whole monastery evacuated.	
ME97/7/5	Tao Fung Shan Christian Cemetery, Sha Tin. (7SW-B/R50 and R51)	2/7	FSD	2/7 (6:30)*	Retaining wall	Major (400)*	22*	28*	35*	Squatter area, footpath, cemetery	4 huts permanently evacuated, 1 hut temporarily evacuated. Closure of the cemetery.	
ME97/7/6	Hong Tsuen Road, Sai Kung. (8SW-C/C3)	3/7	Police	3/7 (0:23)*	Soil cut slope	Major (250)*	15	25*	25*	Road, pedestrian pavement	2 roads blocked.	
ME97/7/7	House No. 21A, Sun King Terrace, Po Lo Che, Sai Kung. (8SW-C/CR145)	2/7	Police	2/7	Soil cut slope	Minor (30)	10	5		Building lot	1 house evacuated.	Broken surface drains on the slope crest.

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 9 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/8	Luk Mei Tsuen, Sai Kung.	3/7	HyD/NT	2/7	Soil cut slope	Minor (10)	8			Building lot		
ME97/7/9	Tai Mong Tsai Road, Sai Kung. (8SW-A/C10)	3/7	HyD/NT	2/7	Soil cut slope	Major (50)	10		30	Road	2 roads closed.	
ME97/7/10	House No. 13, Tui Min Hoi Tsuen, Sai Kung.	3/7	HyD/NT	2/7	Soil cut slope	Minor (1)	3		50	Open area		
ME97/7/11	House 4E, Pak Kong Au Tsuen, Sai Kung. (8SW-C/C197)	3/7	HyD/NT	2/7	Soil cut slope	Minor (10)	5		45	Open area		
ME97/7/12	House Nos. 20-21, Wai Sum Village, Mang Kung Uk, Sai Kung.	3/7	Police	2/7	Retaining wall	Minor (2)	2			Open area		
ME97/7/13	Near House No. 21, Sau Liu Ho Road, Sai Kung. (8SW-A/F67)	3/7	Public	Unknown	Fill slope	Minor (<10)				Carpark		
ME97/7/14	Hut No. 366, Pai Tau, Sha Tin.	3/7	DLO/ST	2/7 (17:00)	Soil cut slope	Major (150)		15		Squatter area	5 huts permanently evacuated.	
ME97/7/15	Pak Kong Water Treatment Plant, Sai Kung. (8SW-C/C175)	4/7	WSD	4/7 (8:30)	Retaining wall	Major (100)				Treatment works		
ME97/7/16	House No. 1B, Wo Tong Kong, Mang Kung Uk, Sai Kung.	4/7	HyD/NT	4/7 (am)	Natural slope	Minor (1)				Open area		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 10 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/17	Opposite Pumping Station, Sui Wo Road, Fo Tan. (7SE-A/C2)	4/7	Police	4/7 (7:45)	Soil cut slope	Minor (44)				Road	1 road closed.	
ME97/7/18	Near Pine Villa, Yung Ping Path, Sha Tin.	4/7	GEO	4/7	Fill slope	Minor (20)				Road		
ME97/7/19	House No. 28, Nam Hang, Tai Po. (7NW-B/R16)	4/7	Police	4/7 (6:00)	Retaining wall	Minor (45.5)	7	13		Building lot		
ME97/7/20	Hut Nos. 52-53, Shan Tong Village, Tai Po. (7NW-B/C207)	4/7	HyD/NT	2/7 (am)	Soil cut slope	Minor (5)	4	3		Squatter area		
ME97/7/21	Hut No. 54, Shan Tong Village, Tai Po. (7NW-B/C208)	4/7	HyD/NT	Unknown	Soil cut slope	Minor (6)	6	2		Squatter area		
ME97/7/22	Near Lamp Post EB09761, Chung Pui, Bride's Pool Road, Tai Po.	4/7	HyD/NT	4/7 (am)	Soil cut slope	Minor (6)	8	4	53	Pedestrian pavement		
ME97/7/23	Near Lamp Post N88788, Ting Kok Road, Tai Po. (7NE-A/C8)	4/7	HyD/NT	4/7 (am)	Soil cut slope	Major (>200)	30	25	30	Pedestrian pavement		
ME97/7/24	Near Lamp Post EB27437, Ting Kok Road, Tai Po.	4/7	HyD/NT	Unknown	Soil cut slope	Minor (15)	4	7	32	Pedestrian pavement		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 11 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/25	Tai Po Road, Tai Po Kau, Tai Po. (7NW-D/C1)	2/7	HyD/ ECC	2/7	Soil cut slope	Minor (5)	5.5			Road	1 road blocked.	
ME97/7/26	Junction of Nam Wan Road and Kwong Fuk Road, Tai Po.	5/7	HyD/NT	5/7	Natural slope	Minor (20)	8			Open area, carpark		
ME97/7/27	Lamp Post 6722-5, Fo Tan Road, Fo Tan. (7SE-A/C353)	5/7	HyD/NT	4/7 (16:00)	Soil cut slope	Minor (40)	14		28	Pedestrian pavement, bus stop	Pedestrian pavement closed.	
ME97/7/28	Hon Ka Road, Kam Shan, Tai Po. (7NW-B/C372)	3/7	DO/TP	3/7 (9:05)	Soil cut slope	Minor (9)	3	3	48	Road	1 road blocked.	
ME97/7/29	North-bound Track about 50m from University Station, KCRC, Sha Tin. (7NE-C/C106)	2/7	HyD/NT	2/7 (6:08)*	Soil/rock cut slope*	Minor (30)*	25*	7*	38*	Railway track	1 railway track blocked.	
ME97/7/30	North-bound Track about 250m from Fo Tan Station, KCRC, Sha Tin.	2/7	HyD/NT	2/7 (0:40-5:54)*	Natural slope*	Major (100)*		8*	30-38*	Railway track	Obstructed the northbound KCRC rail track.	
ME97/7/31	House No. 81H, Kam Shan Village, Tai Po. (7NW-B/C374)	3/7	DO/TP	3/7 (9:05)	Retaining wall	Minor (<1)				Footpath, village house		No failure, only dislodgement of rubble wall surface.

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 12 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/32	Near House No. 81D, Kam Shan Village, Tai Po.	3/7	DO/TP	3/7 (9:05)	Soil cut slope	Minor (7)	2.5	8	42	Village house	1 house evacuated.	Flooding damage. Flood damaged wall of squatter hut and also overloaded part of the structure causing collapse.
ME97/7/33	Kwun Ping Road, Kwun Yam Shan Tsuen, Tze Wan Shan. (7SE-C/C433)	2/7	HyD/ ECC	2/7 (before 7:00)	Soil cut slope	Minor (15)	3			Road	1 road blocked.	
ME97/7/34	Hut Nos. X/TPT/A124 and RTP/TPT/A571-573, Ying Pun Ha, Tai Po. (7NW-B/C136)	4/7	Police	3/7	Soil cut slope	Minor (7.2)	4			Squatter area	4 huts temporarily evacuated.	
ME97/7/35	No.239 Ha Wo Che, Sha Tin.	5/7	HD	2/7	Flooding damage	N/A				Squatter area	1 hut permanently evacuated.	
ME97/7/36	Behind House No. 54, Kam Shan Village, Tai Po.	8/7	DO/TP	7/7 (11:30)	Retaining wall	Minor (<1)						
ME97/7/37	Behind Hut No. RTP/KS/B/450, Kam Shan Village, Tai Po.	4/7	Public	3/7	Soil cut slope	Minor (2)	25			Footpath		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 13 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/38	Luen Yick San Tsuen, Tai Po. (7NE-A/C11)	3/7	GEO	3/7 (am)		Minor (1)	7					Washout.
ME97/7/39	House No. 50, Luen Yick San Tsuen, Tai Po.	7/7	DO/TP	7/7 (pm)	Natural slope	Minor (2)						
ME97/7/40	Behind House No. 51, Shuen Wan Lei Uk, Tai Po.	4/7	DO/TP	4/7 (pm)	Natural slope	Minor (2)	4	5	38	Open area		
ME97/7/41	Opposite House No. H10, Government Quarters, Tai Mei Tuk, Tai Po.	2/7	Police	2/7 (12:15)	Soil cut slope	Minor (1)	3.5					
ME97/7/42	Behind Village De Cascade, Sui Wo Road, Fo Tan. (7SW-B/C123)	3/7	DO/ST	3/7 (12:00)	Soil cut slope	Minor (15)*		5*		Carpark		No failure.
ME97/7/43	House No. 93, Pai Tau, Sha Tin. (7SW-B/C360)	4/7	Public	4/7	Soil cut slope	Minor (25)				Building lot		
ME97/7/44	House No. 125, Pai Tau, Sha Tin.	3/7	DO/ST	Unknown		Minor (1)						
ME97/7/45	House No. 391, Pai Tau, Sha Tin.	7/7	DO/ST	Unknown	Soil cut slope	Minor (10)				Footpath		
ME97/7/46	House No. 203, Pai Tau, Sha Tin.	7/7	DO/ST	Unknown	Natural slope	Minor (40)	10	5		Staircase		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 14 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/47	House No.97, Pai Tau, Sha Tin. (7SW-B/CR396)	7/7	DO/ST	7/7	Soil cut slope	Minor (10)				Footpath		
ME97/7/48	Leung Man Road, Ma On Shan Village, Ma On Shan.	3/7	DO/ST	3/7 (am)	Soil cut slope	Minor (48)	6	8	37	Road	1 road blocked.	
ME97/7/49	Opposite House No.13, Ha Pun Shan, Ma On Shan Village, Ma On Shan.	9/7	DO/ST	3/7 (am)	Soil cut slope	Minor (25)	6	8	59	Drainage channel		
ME97/7/50	Access Road to Ma On Shan Village, Ma On Shan.	9/7	DO/ST	3/7 (am)	Soil cut slope	Minor (13)	5.5	5	47	Drainage channel		
ME97/7/51	Opposite to Shing On Temporary Housing Area, Ma On Shan Road, Ma On Shan.	9/7	HyD/NT	2/7(am) - 3/7 (16:00)*	Natural slope	Major (3 000)*		10~20*	26*	Pedestrian pavement, bicycle track, country park		
ME97/7/52	Sai Sha Road, Sai Keng, Sai Kung. (8NW-C/C22)	10/7	HyD/NT	Unknown	Soil cut slope	Minor (20)	6	20	45	Road, pedestrian pavement	1 road closed.	No failure, however signs of distress and dislodgement of slope surface protection were observed.
ME97/7/53	Pik Uk, Clear Water Bay Road, Sai Kung.	10/7	HyD/NT	Unknown	Natural slope	Unknown						

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 15 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/54	Lot 1035, Nam Shan Village, Sai Kung.	3/7	DO/SK	2/7		Minor (<1)				Open area		Surface erosion.
ME97/7/55	House No. 304, Fo Tan Valley New Village, Fo Tan. (7SW-B/C324)	3/7	DO/ST	Unknown		Minor (0.5-1.0)	3			Building lot		No failure, only tree fallen and dislodgement of slope surface protection.
ME97/7/56	Wong Chuk Yeung Tsuen Path, Fo Tan. (7SW-B/C141)	3/7	DO/ST	Unknown	Soil cut slope	Major (50)	7			Road		
ME97/7/57	Wong Chuk Yeung Tsuen Path, Fo Tan.	10/7	DO/ST	Unknown	Soil cut slope	Minor (2)	2			Open area		
ME97/7/58	House No. 95, Fo Tan Village. (7SE-A/C352)	10/7	DO/ST	Unknown		Minor (<10)				Open area		No failure, only erosion of slope surface.
ME97/7/59	Ma On Shan Treatment Work Area, Ma On Shan.	9/7	Public	2/7 (am)	Soil cut slope	Minor (35)	10	5	32	Country park		
ME97/7/60	Bride's Pool Road, Tai Po. (3SE-B/C21)	10/7	Public	10/7 (13:15)	Soil cut slope	Minor (5)	4		38	Road	1 road closed.	
ME97/7/61	Belair Gardens, Sha Tin.	10/7	Police	1/7		N/A				Carpark		No failure, only tree fallen and erosion of slope surface.

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 16 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/62	5-13 Shan Mei Street, Sai Fai Factory Estate, Sha Tin.	3/7	HD	2/7	Natural slope	Minor (5)	4			Carpark, toe drain blocked		
ME97/7/63	Slope near house No.2 Wo Liu Hang, Fo Tan. (7SE-A/C116)	3/7	DO/ST	2/7	Soil/rock cut slope	Major (100)	15			Squatter area	1 hut temporarily evacuated.	
ME97/7/64	Behind hut No. 205B1, Ho Tung Lau, Fo Tan. (7SE-A/C221)	2/7	HyD/NT	2/7	Soil cut slope	Minor (6)				Squatter area	1 hut permanently evacuated.	
ME97/7/65	Slope behind house No. 8, Wo Liu Hang, Fo Tan.	2/7	HyD	2/7	Erosion/ washout of upstream	Minor (6)				Open area, main culvert and access to village	Main culvert blocked, access to village covered by 0.5m thick debris.	Erosion/ washout of upstream.
ME97/7/66	House No. 217, Pai Tau, Sha Tin.	10/7	GEO	2/7 (am)	Retaining wall	N/A				Squatter area, footpath, village house	1 house evacuated, footpath closed.	Signs of distress were observed, with no detached mass.
ME97/7/67	Behind Yuk Wong Din, Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/C113)	2/7	FSD	2/7 (4:00-5:00)	Natural slope	Major (750)	16	15		Building lot	1 house evacuated, temple damaged, whole monastery evacuated.	

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 17 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/68	Near Ten Thousand Buddhas' Monastery, Pai Tau, Sha Tin. (7SW-B/FR7 and F9)	2/7	FSD	2/7 (7:00)	Natural slope	Major (500)		20		Building lot	1 house evacuated, monastery structure damaged, whole monastery evacuated.	
ME97/7/69	Tao Fung Shan Christian Cemetery, Sha Tin. (7SW-B/C425 and C426)	2/7	Public	2/7 (6:30)*	Fill slope*	Major (600)*		52*	30*	Squatter area, Cemetery	Closure of the cemetery.	
ME97/7/70	Hut No. 210, Pai Tau, Sha Tin.	10/7	GEO	2/7 (am)	Soil cut slope	Minor (5)	2.5	3	30	Squatter area, footpath	3 huts permanently evacuated.	
ME97/7/71	Near House No. 17, Shek Kwu Lung Village, Sha Tin.	3/7	DO/ST	Unknown	Fill slope	Minor (3)	1.5			Footpath		
ME97/7/72	House No. 105, Sha Tin Wai, Sha Tin. (7SE-C/C195)	2/7	Public	Unknown		Minor (0.5)						No failure, only dislodgement of slope surface protection.
ME97/7/73	Near House No. 103, Shek Kwu Lung, Tai Po. (7NW-B/C346)	8/7	DO/TP	8/7 (pm)	Soil cut slope	Minor (5)	6	3	39	Private or building access		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 18 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/74	Behind House No. 168, Pai Tau, Sha Tin.	9/7	HD	2/7 (am)	Soil cut slope	Minor (30)	6.5	5		Squatter area	3 huts permanently evacuated.	No failure.
ME97/7/75	House No. 12E, Tai Wan, Sai Kung.	15/7	DO/SK	Unknown	Retaining wall	Minor (~1)	1.8			Open area		
ME97/7/76	House No. 300, Pai Tau, Sha Tin.	2/7	DLO/ST	Unknown		Minor (1)						
ME97/7/77	Near Hut No. 244, Ha Wo Che Village, Sha Tin.	17/7	DO/ST	Unknown	Soil cut slope	Minor (10)	5	5		Squatter area, stream course		
ME97/7/78	Lot 255B, DD185, Ha Wo Che Village, Sha Tin.			Unknown		Minor (1)				Footpath	No failure, only erosion of temporarily cut surface.	
ME97/7/79	103 Sheung Wo Che Village, Fo Tan, Sha Tin	17/7	DO/ST	Unknown		Minor (0.5)				Open area	Surface erosion.	
ME97/7/80	House No. 102, Sheung Wo Che Village, Sha Tin.	17/7	Public	Unknown	Fill slope	Minor (<5)				Building lot		
ME97/7/81	Chinese University of Hong Kong, Sha Tin. (7NE-C/C53)	4/7	Public	3/7 (pm)	Soil cut slope	Major (80)				Pedestrian pavement		
ME97/7/82	685-692 Sheung Sze Wan Road, Sai Kung.	14/7	HyD/NT	4/6	Soil cut slope	Minor (1)				Surface drain	Surface drain blocked.	

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 19 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/83	Behind Hong Kong Japanese Inational School, Tai Po Road, Tai Po Kau, Tai Po.	17/7	DO/TP	10/7	Retaining wall, Subsidence	N/A				Pedestrian pavement, footpath	Pedestrian pavement closed, footpath closed.	Subsidence, pavement subsidence due to tilting of retaining wall.
ME97/7/84	22 Ma Niu Village, Kau To Shan, Sha Tin.	2/7	Police	2/7 (6:00)	Natural slope	Major (150)		20		Building lot, access road		
ME97/7/85	Lot 54, Ma Liu Shui, Sha Tin.	4/7	Public	Unknown	Soil cut slope	Minor (3)	5			Open area		
ME97/7/86	Lot 590, DD256, Outward Bound School, Tai Mong Tsai, Sai Kung.	17/7	DO/SK	17/7	Rock fall	Minor (1)	2.5		52	Open area		
ME97/7/87	Near Yue Kok, Ting Kok Road, Tai Po. (7NW-B/C3)	21/7	HyD/NT	19/7	Soil/rock cut slope	Minor (2)						2 roads closed.
ME97/7/88	Near L/P Nos. EB08142 & EB08121, Bride's Pool Road, Tai Po. (3NE-D/C3)	19/7	HyD/NT	19/7 (morning)	Soil/rock cut slope	Major (180)	30	15		Road		
ME97/7/89	House No. 15, Kwai Tei Village, Fo Tan.	4/7	Public			N/A						
												Housing Department had taken up repair works and no GEO input.

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 20 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/90	Wu Kau Tang Road, Tai Po. (3SE-B/C11)	21/7	HyD/NT	19/7	Soil cut slope	Minor (3)	7		44			
ME97/7/91	Near Wu Kau Tang, Bride's Pool Road, Tai Po. (3SE-B/C15 and C79)	21/7	HyD/NT	19/7	Soil cut slope	Minor (1)	5		45			
ME97/7/92	Near Ham Hang Mei, Bride's Pool Road, Tai Po. (3NE-C/C1)	21/7	HyD/NT	19/7	Soil cut slope	Minor (2)	10					
ME97/7/93	Luk Keng Road, Luk Keng. (3NE-C/C134)	21/7	HyD/NT	19/7	Soil cut slope	Minor (2)	7.5		43	Pedestrian pavement		
ME97/7/94	Luk Keng Road, Luk Keng. (3NE-C/C133)	21/7	HyD/NT	19/7	Soil cut slope	Minor (2)	8		42	Road		
ME97/7/95	Luk Keng Road, Luk Keng. (3NE-C/C138)	21/7	HyD/NT	19/7	Soil cut slope	Minor (3)	5		40	Road		
ME97/7/96	Lamp Post No. EB25, Near Nam Chung, Luk Keng Road, Luk Keng.	21/7	HyD/NT	19/7	Natural slope	Minor (3)	7		41	Pedestrian pavement		
ME97/7/97	3 Tin Cheung Terrace, Sha Tin.	15/7	Public	15/7 (am)	Soil cut slope	Minor (1.2)	12			Footpath		
ME97/7/98	Ha Wo Che, Sha Tin.	16/7	Public	2/7	Natural slope	Minor (2)	8					

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 21 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/99	3 Tin Cheung Terrace, Sha Tin.	16/7	Public	2/7	Fill slope	Minor (3)	6		33			
ME97/7/100	Shung Him Tong Village, Fanling. (3SW-A/C202)	18/7	DLO/ North	18/7 (10:30)	Soil cut slope	Minor (2)				Access road	Access road blocked.	
ME97/7/101	Lamp Post No. 15, Zone 266, Lin Ma Hang Road, Sha Tau Kok.	21/7	HyD/NT	19/7	Soil cut slope	Minor (20)	10			Open area		
ME97/7/102	Lamp Post No. 60, Zone 256, Lin Ma Hang Road, Sha Tau Kok. (3NE-A/F28)	21/7	HyD/NT	19/7	Natural slope	Minor (~20)	2			Road		
ME97/7/103	Lamp Post No. 177, Zone 224/225, Lin Ma Hang Road, Sha Tau Kok.	21/7	HyD/NT	19/7		N/A				Road		No geotechnical concern, only collapse of river bank.
ME97/7/104	House No.12, Sam Long Village, Sai Kung. (11NE-B/C501)	21/7	DO/SK	14/6 (am)	Soil cut slope	Minor (~5)				Squatter area, footpath	7 huts temporarily evacuated, footpath closed.	
ME97/7/105	House No.161, Pau Tau Village, Sha Tin.	7/7	Public	2/7 (am)	Natural slope	Minor (10)						

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 22 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/7/106	Hut Nos.RHTL/153-154, Ho Tung Lau, Sha Tin.	24/7	DO/ST	2/7		N/A				Squatter area	2 huts permanently evacuated.	No failure, only dislodgement of slope surface protection.
ME97/7/107	House No. 6C, Lok Lo Ha, Sha Tin.	28/7	Public	2/7	Natural slope	Minor (24)	4	6		Building lot, sitting out area		
ME97/7/108	House No. 71, Lok Lo Ha, Sha Tin.	28/7	DO/ST	2/7 (am)	Retaining wall	Minor (2)				Building lot		
ME97/7/109	House No. 188, To Fung Shan, Sha Tin.	3/7	GEO	2/7 (am)	Natural slope	Minor (24)						
ME97/7/110	Railway Near Fo Tan Station, Wo Che, Sha Tin.	23/7	HyD/NT	Unknown	Natural slope	Minor (2)						
ME97/7/111	Hut No. 51, Sheung Ma Tseuk Leng, Sha Tau Kok. (3NE-C/C68)	29/7	DO/N	19/7	Natural slope	Minor (2)	3		37	Squatter area	1 hut temporarily evacuated.	
ME97/7/112	House No. 8, Kai Kuk Shue Ha, Luk Keng. (3NE-C/N3)	29/7	DO/N	19/7	Natural slope	Minor (2)	3					
ME97/7/113	57-58 Ting Kok Road, Yue Kok, Tai Po.	21/7	Public	21/7	Natural slope	Minor (11)	3			Open area		
ME97/8/1	House 46A, Ha Hang, Tai Po.	6/8	DO/TP	3/8	Natural slope	Minor (5)	6			Kitchen affected		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 23 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/8/2	Lung Ha Wan Road, Sai Kung.	7/8	DO/SK	3/8 (am)	Soil cut slope	Minor (5)	4		53	Road	1/2 road blocked.	
ME97/8/3	House No. 11, Kam Shan Terrace, Tai Po. (7NW-B/C372)	7/8	DO/TP	3/8	Soil cut slope	Minor (2)	7			Footpath, open area	Footpath closed.	
ME97/8/4	House Nos. 30-31, Kam Shan Terrace, Tai Po. (7NW-B/CR366)	7/8	DO/TP	3/8	Soil cut slope	Minor (-2)	7		51	Footpath, open area		
ME97/8/5	House No. 24, Kwun Ping Road, Kwun Yam Shan, Sha Tin. (7SE-C/C423)	8/8	DO/ST	2/8 (pm)	Soil cut slope	Minor (2)	6		45	Road		
ME97/8/6	House No. 5C, Tai Wan Village, Sai Kung.	13/8	Public	13/8	Retaining wall	Minor (10)				Building lot		
ME97/8/7	Hut No. 1, San Wai Tsai, Tai Po.	12/8	GEO	12/8 (pm)	Natural slope	Minor (15)	7	7		Squatter arca, open area		
ME97/8/8	House 204A, Pan Chung, Tai Po. (7NW-B/CR418)	13/8	DO/TP	12/8	Soil cut slope	Minor (3)	1.5			Access road		
ME97/8/9	Road to Sha Lo Tung Village, Tai Po. (3SW-D/C153, C154 and C183)	13/8	DO/TP	13/8 (am)	Soil cut slope	Minor (35)	8		32	Road		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 24 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/8/10	Bride's Pool Road, Chung Mui, Tai Po. (3SE-B/C3)	13/8	HyD/NT	12/8	Soil/rock cut slope	Minor (-6)	6			Road		
ME97/8/11	Wu Kau Tang Road, Tai Po. (3SE-B/C10)	13/8	HyD/NT	12/8	Soil cut slope	Minor (6)	6	4		Road		
ME97/8/12	Bride's Pool Road, Tai Po. (3SE-D/F8)	13/8	HyD/NT	12/8	Soil cut slope	Minor (45)	4			Road	1 road closed.	
ME97/8/13	Junction of Razor Hill Road and Clear Water Bay Road, Sai Kung. (11NE-B/C804)	14/8	HyD/NT	13/8 (am)	Fill slope	Minor (15.8)	5	6		Pedestrian pavement	Pedestrian pavement closed.	
ME97/8/14	House Nos. 43-45, Kam Shan Terrace, Tai Po. (7NW-B/C368)	12/8	Public	12/8		Minor (<1)				Access road, open area		No failure, but with sign of distress on chunam.
ME97/8/15	Opposite Lamp Post No. LPN72387, Clear Water Bay Road, Sai Kung. (12NW-C/C96)	14/8	HyD/NT	13/8	Soil/rock cut slope	Minor (15)	5	6	45	channel	channel blocked.	
ME97/8/16	Li Po Chun United World College, Wu Kai, Sha Tin.	13/8	DO/ST	2/7* (4:00-8:00)*	Fill slope	Minor (25)*		25*		Open area		
ME97/8/17	House No. 163, Shuen Wan Lei Uk, Tai Po. (7NE-A/C107)	21/8	DO/TP	12/8	Soil cut slope	Minor (-2)	1.5			Open area		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 25 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/8/18	Near House No. 166, Shuen Wan Chau Uk, Tai Po. (7NE-A/C90)	21/8	DO/TP	12/8	Natural slope	Minor (~4)	5			Open area		
ME97/8/19	Near House No. 177, Sha Lan Village, Sam Mun Tsai, Tai Po. (7NE-A/C17)	14/8	DO/TP	12/8	Soil/rock cut slope	Minor (~1)	3			Access road		
ME97/8/20	House No. 161, Sha Lan Village, Tai Po. (7NE-A/C104 and C115)	14/8	DO/TP	12/8	Natural slope	Minor (~15)	6		49	Open area		
ME97/8/21	Access Road to Tai Mei Tuk Dam, Tai Po.	21/8	HyD/NT	12/8	Natural slope	Minor (6)	8		38	Access road, pedestrian pavement		
ME97/8/22	Near Yue Kok, Ting Kok Road, Tai Po.	21/8	HyD/NT	12/8	Natural slope	Minor (~10)	8		41	Pedestrian pavement		
ME97/8/23	Lamp Post No. 8876, Ting Kok Road, Tai Po. (7NE-A/C8)	21/8	HyD/NT	12/8	Soil cut slope	Minor (~25)	20		37	Pedestrian pavement		
ME97/8/24	House No. 47B, Sheung Tam Shui Hang, North.	21/8	DO/ North	Unknown	Soil cut slope	Minor (2)	3	1	37	Access road		
ME97/8/25	Kuk Po, Sha Tau Kok. (3NE-D/C75)	21/8	DO/ North	12/8	Natural slope	Minor (15)	6	6		Squatter area, open area	1 hut temporarily evacuated.	

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 26 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degrec)			
ME97/8/26	House No. 167, Shuen Wan Chau Uk, Tai Po. (7NE-A/C90)	25/8	DO/TP	23/8	Soil cut slope	Minor (4)	3	2	42	Open area		
ME97/8/27	Near House Nos. 3 and 8-9, Pinehill Village, Tai Po. (7NW-B/C111)	21/8	Arch SD	12/8	Soil cut slope	Minor (20)	11.5	5	45	Squatter area, open area	3 huts temporarily evacuated.	
ME97/8/28												Same as Incident No. ME97/8/34.
ME97/8/29	Luk Keng Chau Uk, Luk Keng.	21/8	DO/ North	12/8	Natural slope	Minor (20)		5		Open area		
ME97/8/30	House No.3, Kau Sau Chau, Sai Kung.	15/8	DO/SK	3/8	Retaining wall	Minor (0.5)	3			Building lot		
ME97/8/31	House No. 5, Kau Sau Chau, Sai Kung.	15/8	DO/SK	3/8		Minor (0.03)				Open area		No failure, dislodgment of rubble wall blocks.
ME97/8/32	Access Road to Chong Hing Water Sport Center, Sai Kung.	21/8	DO/SK	2/8	Soil/rock cut slope	Minor (1)	4					
ME97/8/33	Hut No. 8, Tso Mau Uk Village, Nam Hang, Tai Po.	25/8	DO/TP	22/8	Natural slope	Minor (20)	4.5	10		Village house		
ME97/8/34	Luk Keng Wong Uk, Luk Keng.	21/8	DO/ North	12/8	Natural slope	Minor (6)	24	3		Open area		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 27 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/8/35	Lot 8A787 & 8B787, DD215, Po Tung Road, Sai Kung. (8SW-C/CR5)	21/8	DO/SK	21/8	Soil cut slope	Minor (5 - 10)				Open area		
ME97/9/1	Below Bungalow B4, Police Cadet School Staff Quarters, Tung Tsc, Tai Po. (3SE-C/C11)	27/8	Arch SD	12/8	Soil cut slope	Minor (10)	5.5	4	45	Access road		
ME97/9/2	Hon Ka Road, Kam Shan, Tai Po. (7NW-B/C361)	17/8	HyD/NT	16/8	Soil cut slope	Minor (1)				Access road	1/2 road closed.	
ME97/9/3	Hut Nos. RTP/9C/28 & 30, Pan Chung, Tai Po. (7NW-B/C427)	29/8	Public	Unknown	Soil cut slope	Unknown	2		41	Access road		
ME97/9/4	Sha Tau Kok Government Secondary School, Sha Tau Kok.	4/9	DO/ North	22/8	Natural slope	Minor (10)	30	5		Open area		
ME97/9/5	Lai Chi Wo Tsuen, North.	4/9	DO/ North	12/8	Natural slope	Minor (15)	5	28	39	Squatter area		
ME97/9/6	House No. 7, Wo Liu Hang, Sha Tin.	31/8	Public	Unknown		N/A				Footpath		No geotechnical concern, only erosion of river bank.

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 28 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/9/7	Shan Liu Lower Road, Sai Kung.	4/9	DO/SK	August, 1997	Boulder fall	Minor (<1)				Road		
ME97/9/8	Luk Mei Tsuen Road, Sai Kung. (7SE-D/C28)	20/9	Police	Unknown	Soil cut slope	Minor (~20)	3			Road		
ME97/9/9	Shan Liu Lower Road, Sai Kung.	22/9	DO/SK	Unknown	Soil cut slope	Minor (3-5)	2.5			Road		
ME97/10/1	Between On Shan Lane and Kam Ying Court, Ma On Shan.	26/9	DO/ST	July, 1997	Natural slope	Minor (40)	10	17	27	Open area		
ME97/10/2	Tai Po Mei Village, Tai Po. (7NE-C/C323)	8/10	DO/TP	August, 1997	Soil cut slope	Minor (5)	4	5	40	Open area		
ME97/10/3	Tai Po Village, Tai Po.	8/10	DO/TP	August, 1997	Soil cut slope	Minor (1)	2.7		50	Road		
ME97/10/4	Hut No. X/TPK/216, Tai Po Kau Sau Wai, Tai Po. (7NE-C/CR345)	20/10	DO/TP	July, 1997		Minor (<1)	1.5			Open area		Surface erosion.
ME97/10/5	Lung Ha Wan Road, Sai Kung. (12NW-C/FR104 and FR105)	24/10	DO/SK	23/10	Fill slope	Minor (15)						
ME97/11/1	House No. 33, Tseng Lan Shue Upper Village, Sai Kung. (11NE-B/R257)	7/11	DO/SK	Unknown	Soil cut slope	Minor (1.5)				Building lot, footpath		

Table A4 - List of Incidents in Eastern New Territories Reported to GEO in 1997 (Sheet 29 of 29)

Incident No.	Location (Slope No.)	call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
ME97/11/2	House Nos. 16-18, Hung Uk, Mang Kung Uk, Sai Kung.	17/11	DO/SK	Unknown	Retaining wall	Minor (1)				Footpath		
ME97/12/1	Hoi Ha Road, Sai Kung. (8NW-B/C2)	15/12	HyD/NT	November 1997	Soil cut slope	N/A	2	3	42	Pedestrian pavement		
ME97/12/2	Sha Lo Tung, Tai Po. (3SW-D/C149 and FR23)	12/12	DO/TP	Unknown	Soil cut slope	N/A	10	5		Footpath		
ME97/12/3	House No. 193, Tong Hang, Tai Po.	13/11	DO/ North	August, 1997	Soil cut slope	N/A	2.5	3		Open area		
No incident number was assigned	Near University Station, KCRC, Tai Po Road, Ma Liu Shui.			Before 4/7	Natural slope	Major (100)				Road, railway track	2 roads blocked.	
Legend : + Information from GEO Detailed Investigation. * Information from GEO's 1997 Landslide Investigation Consultants. (1) Height of Landslide is the difference in elevation measured from the crest of failure to the distal end of the main body of the landslide debris. (2) Width of landslide is the maximum width of landslide scar. (3) Estimated travel angle of landslide is the angle between the crest of failure to the distal end of the main body of landslide debris and the horizontal ground.												

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 1 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/2/1	Tak Shek Wan Kui Tau, Pat Heung.	N/A	DO/ YL	end of May 1996	Rock slope	Minor (0.125)				Village access road		
MW97/4/1	Near 11 Sha Tin Heights Road, Sha Tin. (7SW-D/C123)	16/4	Public	16/4	Soil cut slope	Minor (1)	3.5	3	61	Access road		
MW97/4/2	Hut No. RK/19D/50A, Kau Wah Keng Upper Village, Kwai Chung.	25/4	FSD	24/4 (14:00)	Retaining wall	Minor (6)	1.5			Squatter area		
MW97/5/1	Opposite Block 3, Wonderland Villas, Kwai Chung.	8/5	Public	8/5 (10:00 - 10:30)	Natural slope	Major (80)*		8*	34*	Road	1 road closed.	
MW97/5/2	Junction of Lei Pui Street and Po Lei Street, Kwai Chung. (7SW-C/C181)	8/5	DLO/KT	8/5	Soil cut slope	Minor (5)	3	10	59	Pedestrian pavement	Pedestrian pavement closed.	
MW97/5/3	House No. 54, Chung Kwai Chung Village, Kwai Chung.	8/5	Public	8/5 (10:00)		N/A				Village resite		No failure, only crosion of slope surface.

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 2 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/5/4	The Hong Kong Sze Yap Commercial and Industrial Association Chan Nam Chong Memorial College, King Cho Road, Cho Yiu Chuen, Kwai Chung. (11NW-A/C131)	8/5	Public	8/5 (10:00)		N/A				Open area		No failure, only erosion of slope surface.
MW97/5/5	House No. 19, Liu To Village, Tsing Yi.	8/5	Police	8/5 (11:00)	Soil cut slope	Minor (0.6)	3			Footpath		
MW97/5/6	Opposite Container Terminal 2, Kwai Chung Road, Kwai Chung. (11NW-A/C79)	8/5	HyD/NT	8/5 (11:00)	Rock cut slope	Minor (23)*		3*		Road	1 road closed.	
MW97/5/7	Hanley Village, Yau Kam Tau.	8/5	DO/ TW	8/5 (am)	Soil cut slope	Minor (27)	4	3		Carpark		
MW97/5/8	Hut No. 37A1, Heng Fan Liu, Sha Tin.	8/5	HD	8/5	Soil cut slope	Minor (2)	1.5	2		Squatter area	2 huts permanently evacuated.	
MW97/5/9	Route Twist, Tsuen Wan. (6SE-D/C48)	9/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (3)	2.5	3	56	Pedestrian pavement		
MW97/5/10	Route Twist, Tsuen Wan. (6SE-D/C48)	9/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (0.3)	2.5	2.2	56	Pedestrian pavement		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 3 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/5/11	Kwai Sing Water Supply Department Maintenance Depot, Kwai Luen Road, Kwai Chung.	8/5	WSD	8/5 (10:05)	Natural slope	Minor (32)	50			Constructi on site	Hut in WSD depot temporarily evacuated.	
MW97/5/12	Hut No. RTW/TE/330, Shek Li Hang Village, Kwai Chung.	9/5	DO/ KT	8/5 (10:30)	Natural slope	Minor (14)	6			Squatter area	2 huts permanently evacuated.	
MW97/5/13	Wu Oi Christian Centre, Lai Muk Shu Youth Hallway House, Wo Yi Hop Village, Tsuen Wan.	8/5	HyD/NT	8/5 (10:00)	Soil cut slope	Minor (45)	2.5	15	51	Building lot	1 flat evacuated.	
MW97/5/14	Hut No.69A, Kau Wah Keng San Tsuen, Kwai Chung .	8/5	HD	8/5 (11:00)	Soil/rock cut slope	Minor (5)*				Squatter area		
MW97/5/15	Hut No. RTW/9A/274, Chung Hang Village, Kwai Chung .	8/5	DO/ KT	8/5 (10:00)	Soil cut slope	Minor (12)	5	3		Squatter area	1 hut permanently evacuated.	
MW97/5/16	Pump Fong Sheung Chuen, Kwai Chung.	9/5	HD	9/5 (8:00)	Soil cut slope	Major (100)	12	10		Footpath		
MW97/5/17	Kwai Chung Public School, Kwok Shui Road, Kwai Chung. (7SW-C/C280)	9/5	Arch SD	8/5 (10:00)	Soil/rock cut slope	Minor (10)	8			Footpath		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 4 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (dcgrce)			
MW97/5/18	Glorious Praise Christian Centre, Kwok Shui Road. Tai Wo Hau, Tsuen Wan.	8/5	Public	8/5 (10:00)	Natural slope	Minor (20)*		4.9*		Building lot		
MW97/5/19	Kwai Shun Temporary Housing Area, Kwai Chung. (7SW-C/C25)	8/5	HD	8/5 (11:00)	Soil/rock cut slope	Minor (30)	12			Squatter area	16 huts temporarily evacuated.	
MW97/5/20	Below Block 7, Lai King Estate, Kwai Chung .	8/5	HyD/NT	8/5 (12:00)	Fill slope	Minor (3)	2	2		Footpath		
MW97/5/21	Kung Yip Street, Kwai Chung. (7SW-C/C208)	8/5	Public	8/5 (12:00)		Minor (3)				Open area		No geotechnical concern, only tree fallen.
MW97/5/22	Hut Nos. XTW/SC/5 and 6, Fu Yung Shan, Tai Wo Tsuen, Tsuen Wan.	12/5	DO/ TW	8/5	Retaining wall	Minor (6)	3			Footpath, private or building access	2 huts temporarily evacuated, footpath closed.	
MW97/5/23	Below Pope Paul VI College, Shek Pai Street, Kwai Chung. (7SW-C/C193)	8/5	HyD/NT	8/5		N/A				Building lot		No failure, only erosion of slope surface.
MW97/5/24	Wing Mau Yuen, Lo Wai, Tsuen Wan.	14/5	DO/ TW	8/5 (10:00)	Soil cut slope	Minor (2)	4	2.5	60	Building lot	1 house evacuated.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 5 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/5/25	Hut No. RTW/4C/347DD, Sam Dip Tam, Lo Wai, Tsuen Wan.	14/5	DO/ TW	8/5	Natural slope	Minor (2)	4	5	53	Squatter area	1 hut temporarily evacuated.	
MW97/5/26	Tze Chuk Lam, Sam Dip Tam, Lo Wai, Tsuen Wan.	14/5	DO/ TW	8/5 (am)	Natural slope	Minor (10)	5	7		Footpath	Footpath closed.	
MW97/5/27	Sheung Kwai Chung Government Secondary Technical School, Shek Pui Street, Kwai Chung. (7SW-C/C158)	9/5	Public	9/5	Soil/rock cut slope	Minor (23.2)				Open area		
MW97/5/28	Western Monastery, Lo Wai Road, Tsuen Wan.	9/5	GEO	8/5 (10:00)	Fill slope	Minor (40)	6	8	30	Road	1 road closed.	
MW97/5/29	Lo Wai Road, Tsuen Wan.	9/5	GEO	8/5 (10:00)	Subsidence	N/A				Road	1 road closed.	
MW97/5/30	The Society of Homes for the Handicapped, Shung Man Road, Tsuen Wan.	9/5	Public	9/5	Natural slope	Major (78)	10	12		Access road		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 6 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/5/31	Hut No. KT13/94/B/56, Cheung Hang Village, Kwai Chung.. (11NW-A/N5)	19/5	DLO/KT	9/5 (10:00)	Soil cut slope	Minor (4.5)	3.5	5	36	Squatter area		
MW97/5/32	Below Tuen Mun Road, Tin Kau.	19/5	HyD/NT	8/5	Natural slope	Minor (45)				Building lot		
MW97/5/33	Ha Fa Shan, Tsuen Wan.	15/5	DO/ TW	8/5 (am)	Soil/rock cut slope	Minor (3)	1.7		60	Footpath		
MW97/5/34	Fu Yung Shan Road, Tsuen Wan.	10/5	HyD/NT	8/5 (am)	Soil cut slope	Minor (35-40)		12		Road	1/2 road blocked.	
MW97/5/35	Daughters of Mary Help of Christians Siu Ming Catholic Secondary School, Kwai Yip Street, Kwai Chung. (7SW- C/C68)	26/5	Public	18/5	Soil cut slope	Minor (4)	2	3		Building lot		
MW97/5/36	Near 1 Sha Tin Heights Road, Sha Tin. (7SW-D/C127)	12/5	HyD/NT	Unknown	Soil cut slope	Minor (5.4)	4			Access road		
MW97/5/37	Behind Block M, Allway Gardens, Tsuen Wan. (6SE- D/CR87)	29/5	BD	8/5 (am)	Natural slope	Minor (15)	4.5			Catchpit		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 7 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/1	Sai Shan Village, Tsing Yi.	4/6	DO/ KT	4/6	Natural slope	Minor (13)	10			Squatter area	2 huts permanently evacuated.	No geotechnical concern, only tree fallen.
MW97/6/2	Mayfair Gardens, Tsing Yi.	4/6	DO/ KT	Unknown	Soil cut slope	Minor (1)	2		53	Footpath		
MW97/6/3	Liu To Village, Tsing Yi Road West, Tsing Yi.	4/6	DO/ KT	4/6	Natural slope	Minor (3)	3		40	Footpath		
MW97/6/4	Behind Sin To School, 9 Kwong Lee Road, Sham Shui Po. (11NW-B/C52)	4/6	Public	4/6 (10:30)		Minor (<2)	2			Open area		
MW97/6/5	Block 14, Shek Kip Mei Estate, Shek Kip Mei. (11NW-B/C400)	4/6	Public	4/6 (9:00)	Soil cut slope	Minor (10.8)	10	3		Open area		
MW97/6/6	Hut No.12, Second Street, Heung Fan Liu, Sha Tin.	4/6	FSD	4/6 (7:00)	Fill slope	Minor (19)				Squatter area	4 huts permanently evacuated.	
MW97/6/7	Hut No. 37A, Forth Street, Heung Fan Liu, Sha Tin.	4/6	HD	4/6 (am)	Soil cut slope	Minor (5)				Squatter area	1 hut permanently evacuated.	
MW97/6/8	Chi Hong Kindergarten, San Tin Village, Sha Tin.	4/6	DO/ST	4/6 (am)	Soil cut slope	Minor (1)	2.5		56	Building lot		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 8 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/9	Hut No. 2A, Area 2, Sha Tin Tau New Village, Sha Tin.	4/6	HyD/NT	4/6 (am)	Soil cut slope	Minor (1)	2			Squatter area	2 huts temporarily evacuated.	
MW97/6/10	Hut No. 17, Area 2, Sha Tin Tau New Village, Sha Tin.	4/6	Public	4/6 (am)	Soil cut slope	Minor (3)		3		Squatter area	4 huts permanently evacuated.	
MW97/6/11	Lok Hop Tsuen, Sha Tin Heights, Sha Tin.	4/6	DO/ST	4/6 (am)	Soil cut slope	Minor (36)	10			Access road		
MW97/6/12	19-23 Sha Tin Heights Road, Sha Tin.	4/6	Public	4/6 (7:00 - 8:41)*	Natural slope	Major (150)*	38*	15*	28*	Building lot		
MW97/6/13	Near Kowloon Reservoir, Tai Po Road, Sha Tin.	4/6	HyD/NT	Unknown	Soil cut slope	Minor (7)	6	5	30	Pedestrian pavement		
MW97/6/14	Hut No. 75, Area 6, Sha Tin Tau New Village, Sha Tin.	4/6	DO/ST, HD	4/6 (am)	Soil cut slope	Minor (1)	2		53	Footpath		
MW97/6/15	Chung Shan Terrace, Lai King Hill Road, Kwai Chung.	4/6	DO/ KT	4/6 (7:15)*	Fill slope	Major (450)*	23*	18*	18*	Building lot, road, pedestrian pavement	2 roads closed, pedestrian pavement closed.	
MW97/6/16	Hut No. 26, Kau Wah Keng Upper Village, Castle Peak Road, Kwai Chung. (11NW-A/C64)	4/6	FSD	4/6 (7:25)*	Soil cut slope	Major (360)*	15*	8-12*	30*	Squatter area, road, footpath	1 person killed, 1 hut permanently evacuated, 2 roads closed, footpath closed.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 9 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/17	Opposite Lamp Post No. FA7931, Shek Kong Observatory Tower, Route Twisk, Tai Mo Shan.	4/6	HyD/NT	4/6 (17:30)	Rock fall	Minor (0.5)				Road	1/2 road closed.	
MW97/6/18	Deep Bay Road, Sha Kiu Tsuen, Lau Fau Shan.	4/6	HyD/NT	4/6 (before 10:00)	Soil cut slope	Minor (11)	3	11		Road		
MW97/6/19	Roman Catholic Cemrtery, Wing Ming Street, Cheung Sha Wan. (11NW-A/C124)	4/6	FSD	3/6 (8:00)	Natural slope	Minor (45)	10	15	30	Pedestrian pavement, cemetery	Pedestrian pavement closed.	
MW97/6/20	House Nos. 4-5, Chung Shan Terrace, Kwai Chung. (11NW-A/R6)	4/6	Public	4/6 (8:30)*	Soil cut slope	Major (85)*	10	16		Building lot, carpark	3 flats evacuated.	
MW97/6/21	Below Block 6, Lai King Estate, Kwai Chung Road, Kwai Chung. (11NW-A/C78)	5/6	HyD/NT	4/6 (before 8:00)*	Rock fall	Minor (15)*		6*		Open area		
MW97/6/22	7 Keng Hau Road , Sha Tin. (7SW-D/C700)	5/6	Public	4/6* (am)	Fill slope	Major (150)*	28*	10-12*	19*	Building lot		
MW97/6/23	Woodcrest Hill, Sha Tin Heights, Sha Tin.	5/6	Public	4/6 (8:00)	Natural slope	Major (170)*	28*	11.5*	23*	Building lot		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 10 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degrec)			
MW97/6/24	Lai Chi Kok Hospital, Lai Chi Kok.	5/6	Arch SD	4/6 (7:00)	Soil cut slope	Minor (<20)	7.5	6		Access road		
MW97/6/25	Hut No. RTW/9D/369, Kwai Chung Au, Mile Stone 6-6.5, Castle Peak Road, Kwai Chung.	4/6	Police	4/6 (16:00)	Natural slope	Major (100)	15	15		Squatter area	1 hut permanently evacuated.	
MW97/6/26	Hut No. RTW/9A/271-272, Cheung Hang Village, Kwai Chung.	6/6	DO/ KT	4/6 (16:30)	Soil cut slope	Minor (14)	8	12		Squatter area	2 huts permanently evacuated.	
MW97/6/27	Hut No. 6, Kau Wa Keng San Tsuen, Kwai Chung. (11NW-A/C240)	4/6	FSD	4/6 (7:00)	Soil cut slope	Minor (20)	4			Squatter area	2 huts temporarily evacuated.	
MW97/6/28	Hut No. 23, Kau Wa Keng San Tsuen, Kwai Chung. (11NW-A/CR392)	4/6	DO/ KN	4/6 (6:30)	Soil cut slope	Minor (25)	4			Squatter area	2 huts temporarily evacuated.	
MW97/6/29	Hut No. XRTW/9B/20, Mui Kung Village, Kwai Chung.	5/6	HD	5/6 (5:00)	Soil cut slope	Minor (20)	6	5		Squatter area	1 hut permanently evacuated.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 11 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/30	Behind House Nos. 2-3, Chung Shan Terrace, Kwai Chung. (11NW-A/R6 and R12)	5/6	Police	4/6 (7:00)	Natural slope	Minor (10 – 12)		4		Access road		No failure, severe erosion of slope surface.
MW97/6/31	Kau Wah Keng Sau Tsuen, Lai King Hill Road, Kwai Chung. (11NW- A/C150)	5/6	HyD/NT	4/6		Minor (20)				Footpath		
MW97/6/32	Opposite 57 Tsing Yi Road, Tsing Yi.	6/6	Public	4/6	Rock fall	Unknown				Pedestrian pavement		
MW97/6/33	23-31 Kung Yip Street, Kwai Chung . (7SW-C/C208)	4/6	Police, FSD, Public	4/6 (7:00)	Soil cut slope	Minor (24.4)	5	3		Building lot		
MW97/6/34	Woaltry Industrial Building, 22-26 Wing Yip Street, Kwai Chung. (7SW-C/C234)	5/6	BD	4/6	Soil/rock cut slope	Minor (10)	2	2	30	Building lot		
MW97/6/35	Between Wah Yuen Chuen and Chung Shan Terrace, Castle Peak Road, Kwai Chung. (11NW-A/C58, C59, C60, C61, C62, C63 and C64)	5/6	HyD/NT	4/6	Soil cut slope	Minor (3.8)				Road	1 road blocked.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 12 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/36	Junction of Lai Cho Road and Joint Street, Ha Kwai Chung.	4/6	HyD/NT	4/6 (8:00)	Natural slope	Minor (14)				Road	2 roads blocked.	
MW97/6/37	Access Road to Mui Keng Village, Kwai Chung.	5/6	HyD/NT	Unknown	Natural slope	Minor (6)	3	3	49	Road		
MW97/6/38	Hut No. 8, Liu To Village, Tsing Yi.	14/6	Police	14/6	Soil cut slope	Minor (2)	2			Squatter area	1 hut permanently evacuated.	
MW97/6/39	Hut No. RTW/9D/299, Kwai Chung Au, Mile Stone 6-6.5, Castle Peak Road, Kwai Chung.	4/6	HD	4/6 (16:30)	Soil cut slope	Minor (8)	2.5	10		Squatter area	1 hut permanently evacuated.	
MW97/6/40	Hut No. RTW/9C/258, Pump Fong Sheung Tsuen, Kwai Chung.	6/6	HD	5/6 (15:00)	Soil cut slope	Minor (4.4)	2.5	8		Squatter area	1 hut permanently evacuated.	
MW97/6/41	Below Tung Wah Group of Hospital Ko Ho Ning Memorial Primary School, Lai Cho Road, Kwai Chung. (11NW-A/C7)	5/6	HyD/NT	4/6	Soil cut slope	Minor (33)*		6*	34*	Open area		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 13 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/42	Cheung Hang Road, Kwai Chung. (11NW-A/C109)	4/6	Police	4/6 (8:00)	Soil cut slope	Minor (45)	10	8	42	Road		
MW97/6/43	Cheung Hang Road, Kwai Chung. (11NW-A/C113)	4/6	Police	4/6 (8:00)	Natural slope	Major (100)	20			Road		
MW97/6/44	Cheung Hang Road, Kwai Chung. (11NW-A/C113)	4/6	Police	4/6 (8:00)	Natural slope	Major (200)	20	27		Road, pedestrian pavement		
MW97/6/45	Hut No.30A, Cheung Hang Village, Kwai Chung.	4/6	Public	4/6 (8:00)	Natural slope	Minor (10)		5		Footpath	Footpath closed.	
MW97/6/46	Hut No. 6, Kau Wa Keng Pump Station Village, Kwai Chung. (11NW-A/C302)	4/6	FSD	4/6 (10:00)	Natural slope	Minor (20)				Squatter area	1 hut temporarily evacuated.	
MW97/6/47	Hut No. RTW/9C/279, Pump Fong Sheung Chuen, Kwai Chung.	8/6	DO/ KT	4/6 (8:00)	Soil cut slope	Minor (20)	1			Squatter area	1 hut permanently evacuated.	
MW97/6/48	Hut Nos. RTW/4AA/41 and 42, Kau Wah Keng San Tsuen, Kwai Chung.	11/6	HD	4/6 (6:30)	Soil cut slope	Minor (10)	2.5	3		Squatter area	2 huts permanently evacuated.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 14 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/49	Behind Hut No. 85, Kau Wah Keng San Tsuen, Kwai Chung.	4/6	Police	4/6 (6:00)	Soil cut slope	Minor (15)*		9*	>30*	Squatter area	1 hut temporarily evacuated.	
MW97/6/50	Behind Hut No. 73, Kau Wah Keng San Tsuen, Kwai Chung.	4/6		4/6 (6:00)	Retaining wall	Major (60)*		9*	26*	Squatter area	1 hut temporarily evacuated.	
MW97/6/51	Opposite Lutheran School for the Deaf, Hing Shing Road, Kwai Chung.	11/6	HyD/NT	4/6	Natural slope	Minor (6)	25	10	37	Carpark		
MW97/6/52	Behind Mobile Petrol Station, Ching Cheung Road, Lai Chi Kok.	16/6	HyD/K	4/6	Soil cut slope	Minor (30)	6			Open drain	Open drain blocked.	
MW97/6/53	Near Mile Stone 10.5, Keung Shan Road, Lantau. (13NW-B/C135)	16/6	Police	16/6 (9:00)	Soil/rock cut slope	Minor (5)		4		Road	1 road blocked.	
MW97/6/54	Near Lamp Post No. FA0582, Wang Pui Road, Lantau.	18/6	HyD/NT	16/6 (9:00)	Soil/rock cut slope	Minor (10)	2.5	3	30	Road		
MW97/6/55	Behind Asbury Methodist Primary School, Lai King Hill Rd., Kwai Chung. (11NW-A/CR15)	16/6	HD	16/6 (8:00)	Soil/rock cut slope	Minor (<1)	2.2			Open area		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 15 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/56	Hut No. 139C, Kau Wah Keng San Tsuen, Kwai Chung.	19/6	Public	4/6 (7:00)	Natural slope	Major (500)*		11*	~30*	Squatter area	I hut permanently evacuated.	
MW97/6/57	16 Holy Family Road, Peng Chau.	23/6	HyD/NT	23/6 (before 7:00)	Soil cut slope	Minor (2)	6	2		Building lot		
MW97/6/58	Near Nam Shan Camping Site, Mile Stone 1.25, South Lantau Road, Lantau. (10SW-C/C187)	23/6	FSD	23/6 (8:00)	Soil/rock cut slope	Minor (30)	15	4		Road, pedestrian pavement	I road blocked.	
MW97/6/59	Junction of Hung Mui Kuk Road and Lion Rock Tunnel Road, Sha Tin.	23/6	HyD/NT	Unknown	Soil cut slope	Minor (5)	6	5	48	Open area		
MW97/6/60	Above Man Sam House, King Tin Court, Sha Tin. (7SW-D/C235)	19/6	Public	4/6	Soil cut slope	Minor (2)				Building lot		
MW97/6/61	Junction of Tonkin Street and Tung Chau Street, Lai Chi Kok.	21/6	HyD/K	21/6 (14:00)	Vertical soil cut	Minor (~1)				Constructi on site		No failure, only minor collapse of unsupported vertical soil cut .
MW97/6/62	Village Road to Yuen Yuen Hok Yuen, Tsuen Wan.	25/6	DO/ TW	8/5	Soil cut slope	Minor (2)	2		42	Open area		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 16 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/6/63	House No. 1, Tseng Tau San Tsuen, Lamtau.	26/6	DO/ Islands	23/6 (8:00)	Soil cut slope	Minor (2)	3	2		Footpath	Footpath closed.	
MW97/6/64	Hut No.93, Nam Shan Village, Lamtau.	25/6	DO/ Islands	23/6 (8:00)	Soil cut slope	Minor (2)	2.5	3		Squatter area	1 hut permanently evacuated.	
MW97/7/1	Hang Cheung Factory Building, 1 King Lam Street, Sham Shiu Po. (11NW-A/C189)	2/7	HyD/K	2/7 (9:00)	Soil/rock cut slope	Minor (5)				Building lot, backyard		
MW97/7/2	Yuet Lai Court, Lai King Hill Road, Kwai Chung. (11NW-A/C17)	2/7	Public	2/7	Rock slope	Minor (1)				Road		
MW97/7/3	Mile Stone 11, Route Twisk, Tsuen Wan.	2/7	HyD/NT	2/7	Soil cut slope	Minor (40-50)	8	10	47	Road, pedestrian pavement	1 road closed, pedestrian pavement closed.	
MW97/7/4	Near Kwong Pan Tin, Route Twisk, Tsuen Wan.	2/7	HyD/NT	2/7	Natural slope	Minor (10)	5	6	39	Road	1 road blocked.	
MW97/7/5	House No. 4, Tai Yuen New Village, Lamma Island.	3/7	DO/ Islands	3/7	Soil cut slope	Minor (1)	2		45	Backyard		
MW97/7/6	11 Sha Tin Heights Road, Sha Tin. (7SW-D/C123)	2/7	HyD/NT	2/7	Natural slope	Minor (5)				Road	1/2 road blocked.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 17 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/7	Mei Chung Court, Sha Tin. (7SW-D/C790, C791 and C801)	2/7	Public	2/7 (early morning)	Soil cut slope	Major (100)*				Building lot, pedestrian pavement, open area, carpark	Flood damage included severe erosion of slopes, undermining and erosion of paved areas. Pedestrian pavement closed.	Blockage of a natural stream channel caused stream overflow.
MW97/7/8	To Fung Shan Road, Sha Tin. (7SW-D/C294)	2/7	HyD/NT	Unknown	Rock slope	Minor (7)		4		Road	1 road blocked.	
MW97/7/9	Opposite Block 3, Bay View Gardens, Castle Peak Road, Tsuen Wan. (6SE-D/C24)	2/7 (9:45)	Police	2/7 (9:30)*	Fill slope	Major (70)*		11*	48*	Road, pedestrian pavement	2 roads closed.	
MW97/7/10	Tsuen Wan Police Station, Lido Beach, Castle Peak Road, Ting Kau.	2/7	Police	2/7 (11:45)	Natural slope	Major (750)*	20*	25*	20*	Building lot, road, pedestrian pavement	8 persons injured, 4 flats evacuated, 2 roads closed, pedestrian pavement closed.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 18 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/11	Near Ting Kau Bridge, Tuen Mun Highway, Ting Kau. (6SE-C/F10)	2/7	GEO	2/7 (9:30)	Fill slope	Major (200)*		25*	28*	Road	2 roads closed.	Discharge of surface water onto the slope from the blocked drainage channel, which contributing the failure.
MW97/7/12	Opposite Chung Shan Terrace, Castle Peak Road, Kwai Chung. (11NW-A/C409)	2/7	Public	2/7	Rock fall	Minor (10)				Road	1 road blocked.	
MW97/7/13	House No. 5, Tai Yuen New Village, Lamma Island.	3/7	DO/ Islands	3/7		N/A				Backyard		
MW97/7/14	Behind Wah Shun Court, Wah Yuen Chuen, Kwai Chung. (11NW-A/C35)	3/7	Police	3/7 (5:00)	Soil cut slope	Minor (40)		10		Open area		
MW97/7/15	Happy View House, 19 Sha Tin Height Road, Sha Tin.	2/7	Public	2/7 (before 7:00)	Natural slope	Major (2 000)				Building lot		
MW97/7/16	2 Sha Tin Height Road, Sha Tin. (7SW-D/C124)	2/7	HyD/NT	2/7	Retaining wall	Minor (25)				Road	1 road blocked.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 19 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/17	West of Sha Tin Water Treatment Work, Old Tai Po Road, Sha Tin. (7SW-D/C11)	2/7	HyD/ ECC	2/7 (9:00)	Rock fall	Minor (15)	5		39	Road	1 road blocked.	Surface water channel broken on top of the slip.
MW97/7/18	House Nos. 1A, 49 and 49A, Lung Tsai Tsuen Road, Lung Tsai Tsuen, Cheung Chau. (14NW-D/R206 and CR208)	4/7	Police	2/7 (23:05)	Soil/rock cut slope	Major (70)	8	15-20		Building lot, footpath, private or building access	3 houses evacuated, footpath closed.	
MW97/7/19	Lai King Training Centre, Wai Ta Road, Kwai Chung. (11NW-A/C171)	4/7	CSD	3/7 (2:00)	Soil cut slope	Minor (1)	0.7	3		Footpath		
MW97/7/20	Cheung Hang Road, Butterfly Valley.	2/7	HyD/NT	2/7	Natural slope	Minor (5)				Road		
MW97/7/21	Shek Li Hang Village, Kwai Chung. (7SW-C/C977)	3/7	DO/ KT	2/7	Soil cut slope	Minor (5-10)				Squatter area, footpath	8 huts permanently evacuated.	
MW97/7/22	Shing Mun Road Village, Kwai Chung.	3/7	DO/ KT	2/7	Retaining wall	Minor (1)				Squatter area		
MW97/7/23	Opposite 25 Keng Hau Road, Sha Tin Heights, Sha Tin. (7SW-D/N4)	3/7	HyD/NT	2/7	Fill slope	Minor (5)				Building lot, pedestrian pavement		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 20 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/24	Above Ka Tin Court, Sha Tin.	2/7	HD	2/7	Natural slope	Major (150)*		10*	30*	Stream course	Stream course blocked.	
MW97/7/25	Below 33 Sha Tin Heights Road, Sha Tin.	2/7	HyD/NT	2/7	Natural slope	Minor (10)				Building lot		
MW97/7/26	Behind House No. 44, Sheung Keng Hau Village, Tai Wai. (7SW-D/C732,C417)	2/7	FSD	2/7 (6:45)	Soil cut slope	Minor (1)	3			Footpath, private or building access	Footpath closed.	
MW97/7/27	Mile Stone 6-1/2, Tai Po Road, Sha Tin Heights, Sha Tin. (7SW-D/F158)	4/7	HD	4/7* (14:00)	Fill slope	Major (50)		10		Squatter area	6 huts permanently evacuated.	
MW97/7/28	Pak Shek, Sha Tin.	4/7	HD	Unknown	Soil cut slope	Minor (10)	5			Squatter area	5 huts permanently evacuated.	
MW97/7/29	Area 5, Pak Tin, Sha Tin.	4/7	HD	2/7 (6:15)	Soil cut slope	Minor (5)	2			Squatter area, staircase	4 huts permanently evacuated.	
MW97/7/30	Wu Oi Christian Centre, Lai Muk Shu Youth Halfway House, Wo Yi Hap Village, Tsuen Wan.	3/7	BD	2/7 (9:00)	Soil cut slope	Minor (6)	2.5		37	Building lot	1 house evacuated.	
MW97/7/31	Near Nam Fung Factory, On Yuk Road, Tsuen Wan.	2/7	GEO	2/7	Soil cut slope	Minor (40)	5		32	Pedestrian pavement	Pedestrian pavement closed.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 21 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/32	Hut No. RTW/1B/108, Pai Miu Kok Upper Village, Tsuen Wan.	3/7	GEO	2/7 (17:00)	Soil cut slope	Minor (0.5)	2			Squatter area		Broken part of the drainage system on top of slope.
MW97/7/33	Beacon Hill Road, Beacon Hill.	2/7	HyD/NT	2/7	Soil cut slope	Minor (8)				Road	1 road blocked.	
MW97/7/34	Beacon Hill Road, Beacon Hill. (11NW-B/C512)	2/7	HyD/NT	2/7	Soil cut slope	Minor (<5)	2			Road	1/2 road blocked.	
MW97/7/35	Hut No. 23, Fu Tei Chung Tsuen, Tuen Mun.	4/7	DO/ TM	4/7 (11:35)		Minor (15)					2 huts temporarily evacuated.	No failure, only land subsidence.
MW97/7/36	Near Chuk Lam Sim Yuen, Tai Wo Tsuen, Fa Yung Shan, Tsuen Wan.	4/7	HyD/NT	3/7 (9:00)	Soil cut slope	Minor (45)	11			Footpath		
MW97/7/37	Hut Nos 35-40, Hon Man Village, Tsuen Wan.	2/7	Police	2/7 (am)		N/A				Squatter area	15 huts temporarily evacuated.	
MW97/7/38	Behind 11-19 Wing Yip Street, Kwai Chung.	3/7	GEO	3/7	Soil cut slope	Minor (20)	5			Building lot		No geotechnical concern, only failure of squatter hut roof.
MW97/7/39	Tai Lin Pai Road, Kwai Chung. (7SW-C/C230)	4/7	GEO	4/7	Soil cut slope	Minor (25)				Pedestrian pavement		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 22 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/40	Po Tong Ha Village, Tuen Mun.	2/7	FSD	2/7 (15:00)		Minor (1)				Squatter area	1 hut temporarily evacuated.	Not a landslide, exposure of concrete pipe.
MW97/7/41	Near House No. 76, Fu Tei Shcung Tsuen, Tuen Mun.	4/7	Police	4/7 (4:00)	Natural slope	Minor (12)		4				
MW97/7/42	26 Ma Wan Rear Street, Ma Wan .	7/7	Police	Unknown	Soil cut slope	Minor (3)	4	1.5		Building lot		
MW97/7/43	Hut Nos. 33A-E, Forth STreet, Aera 8, Heung Fan Liu, Sha Tin.	2/7	HD	2/7 (6:30)	Fill slope	Minor (4)				Squatter area, footpath	4 huts permanently evacuated, footpath blocked.	
MW97/7/44	Hut Nos. 3 and 4, Forth Street, Heng Fan Liu, Sha Tin. (7SW-D/C368)	7/7	HD	2/7	Soil cut slope	Minor (15)				Squatter area	7 huts permanently evacuated.	
MW97/7/45	63 To Fung Shan Road, Sha Tin. (7SW-B/C211)	2/7	DO/ST	2/7	Soil cut slope	Minor (5)				Squatter area	10 huts permanently evacuated.	
MW97/7/46												
MW97/7/47	Behind House No.58, Wo Yi Hop Village, Tsuen Wan.	4/7	DO/ TW	Unknown	Soil cut slope	Minor (5)	2		42	Building lot	1 flat evacuated.	Same as Incident No. MW97/7/36.

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 23 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/48	Below House No. 19A1, Area 4, Pik Tin, Sha Tin.	2/7		Unknown		Minor (~ 0.5)	3		49			Chunam damaged.
MW97/7/49	Liu To, Tsing Yi.	8/7	DO/ KT	4/7	Soil cut slope	Minor (10)	2		34	Footpath		
MW97/7/50	Golden Hill Road, Sha Tin.	7/7	HyD/NT	2/7	Natural slope	Minor (30)				Country park		
MW97/7/51	Lamp Post No. EA5458-9, Tao Fung Shan Road, Sha Tin.	4/7		4/7	Natural slope	Minor (20)		4				
MW97/7/52	Christian Centre, Pak Tin Tsuen, Tai Wai, Sha Tin. (7SW-B/C492 and C792)	2/7	Police	2/7 (16:11)	Soil cut slope	Minor (5)				Building lot, access road	Access road closed.	
MW97/7/53	Hut Nos. 103-104, Area 3, Pak Tin Tsuen, Sha Tin. (7SW-B/F68 and F67)	2/7	FSD	2/7	Fill slope	Major (>50)				Squatter area	3 huts permanently evacuated.	
MW97/7/54	Hut No. 584, Area 5, Pak Tin Tsuen, Sha Tin.	3/7	DO/ST	2/7	Soil cut slope	Minor (3)	5			Squatter area	1 hut permanently evacuated.	
MW97/7/55	King Tan Court, Hung Mui Kuk Road, Sha Tin. (7SW-D/C235)	5/7	Public	5/7 (20:50)	Soil cut slope	Major (>50)				Carpark		Erosion of slope surface caused by broken sewer.

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 24 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/56	Yan Oi Village, To Fung Shan Road, Tai Wai. (7SW-B/C23)	2/7	Police	2/7 (14:03)	Soil cut slope	Minor (10)	2		40	Road		
MW97/7/57	Junction of Tai Po Road and Lung Cheung Road.	7/7	HyD/K	2/7 (12:00)	Natural slope	Minor (<30)	15	10	37	Open area		
MW97/7/58	Junction of Tai Po Road and Lung Cheung Road.	9/7	HyD/K	Before 3/7	Natural slope	Minor (10-20)	10		30	Open area		
MW97/7/59	Shek Tong Tsuen, Au Tau, Yuen Long.	6/7	Public	6/7 (morning)	Soil cut slope	Minor (6)	3	4		Building lot		
MW97/7/60	Electric Substation, Tong Yam Street, Tai Hang Tung.	4/7	Public	Unknown		Minor (<10)						No failure, only erosion of hillside.
MW97/7/61	Wong Chuk Yuen Sheung Tsuen, Kam Tin, Yuen Long. (6NE-D/C200)	5/7	Public	4/7 (8:00)	Soil cut slope	Minor (8)	6			Footpath		
MW97/7/62	House No. 85, Wo Yi Hop Village, Kwai Chung.	8/7	Police	8/7 (17:45)	Natural slope	Minor (3)				Squatter area	1 hut temporarily evacuated.	
MW97/7/63	Hut No. 46, Yau Oi Tsuen, Sha Tin.	3/7	DO/ST	2/7	Soil cut slope	Minor (5)	6			Squatter area		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 25 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/64	Near Water Supplies Department Pumping Station, Yau Oi Tsuen, Sha Tin.	9/7	DO/ST	Unknown	Natural slope	Minor (3)				Footpath		No geotechnical concern, only flooding.
MW97/7/65	Below Sha Tin North Service Reservoir, Yau Oi Tsuen, Sha Tin.	9/7	DO/ST	Unknown	Soil cut slope	Minor (10)				Footpath		
MW97/7/66	Shing Mun Tunnel Road, Tai Wai. (7SW-D/C292)	7/7	HyD/NT	2/7	Soil cut slope	Minor (10)				Road		
MW97/7/67	Hut No. 14B, Yau Oi Tsuen, Sha Tin.	9/7	HD	2/7 (am)		N/A				Squatter area		
MW97/7/68	Hut No. RTW/TE/322, Shek Lei Hang Village, Kwai Chung.	9/7	DO/ KT	2/7	Natural slope	Minor (5)	1	1		Squatter area	1 hut permanently evacuated.	
MW97/7/69	Hut No. RTW/TA/77, Sheung Yat Chuen, Kwai Chung.	9/7	DO/ KT	7/7 (5:30)	Soil cut slope	Minor (45)	6	10		Squatter area	1 hut permanently evacuated.	
MW97/7/70	Opposite Dragon Industrial Building, Ching Cheung Road, Kwai Chung. (11NW-A/C55)	9/7	HyD/NT	7/7 (9:00)	Soil cut slope	Major (500)*	10	50	30	Road, constructio n site	4 roads closed.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 26 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/71	Castle Peak Road, Sham Tseng.	9/7	HyD/NT	4/7	Natural slope	Minor (2)	9		60	Road		
MW97/7/72	Castle Peak Road, Tsing Lung Tau.	9/7	HyD/NT	4/7	Soil/rock cut slope	Minor (2)	3		49	Road		
MW97/7/73	Ta Shek Wu Kiu Tau, Fan Kam Road, Pat Heung, Yuen Long.	9/7	DO/ YL	6/7 (13:00)	Soil/rock cut slope	Minor (6)				Road		
MW97/7/74	Casam Beach, Castle Peak Road, Ting Kau.	20/7	Police	20/7 (morning)	Fill slope	Minor (<10)				Road, bus stop		
MW97/7/75	Near Tso King Tam Recreation Camp, Route Twisk, Tsuen Wan.	9/7	HyD/NT	4/7	Soil cut slope	Minor (2)	2.5		56	Pedestrian pavement		
MW97/7/76	Near Tsuen Lung, Route Twisk, Tsuen Wan. (6SE-B/C5)	9/7	HyD/NT	4/7	Soil cut slope	Major (70)	11			Open area		
MW97/7/77	Ha Fa Shan, Tsuen Wan.	8/7	DO/ TW	3/7 (18:00)	Soil cut slope	Minor (3)	3			Footpath		
MW97/7/78	Pai Min Kok Village, Sham Tseng.	3/7	DO/ TW	4/7 (2:00)	Retaining wall	Minor (15)	1.5			Footpath		
MW97/7/79	Near Ting Kau Bridge, Castle Peak Road, Ting Kau.	10/7	HyD/NT	10/7	Fill slope	Minor (5)	5		45	Lay-by		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 27 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/80	Hut No. 26, Lok Hop Tsuen, Sha Tin.	10/7	HD	2/7	Soil cut slope	Minor (5)				Squatter area	1 hut permanently evacuated.	No geotechnical concern, only flooding.
MW97/7/81	Hut No. 23, Lok Hop Tsuen, Sha Tin.	2/7	Police	2/7	Soil cut slope	Minor (2)	5			Squatter area	1 hut permanently evacuated.	
MW97/7/82	Hut No. 4, Area 2, Sha Tin Tau Sun Tsuen, Sha Tin.	2/7	Public	2/7 (8:00)	Soil cut slope	Minor (2)	3		42	Open area		
MW97/7/83	Hut No. 2A1, Area 2, Sha Tin Tau Sun Tsuen, Sha Tin.	9/7	Public	2/7	Soil cut slope	Minor (2)	4			Open area		
MW97/7/84	Behind House No. 5, Tsok Pok Hang Sun Tsuen, Sha Tin.	4/7	Public	Unknown	Soil cut slope	Minor (2)	1.5			Open area		
MW97/7/85	House No. 119A, Pak Tin Tsuen, Sha Tin.	15/7		Unknown		N/A						
MW97/7/86	House No. 118A, Pak Yin Tsuen, Sha Tin. (7SW-B/C513)	14/7	HD	2/7	Soil cut slope	Minor (3)				Open area		
MW97/7/87	Hut No.120, Dak Tin Tsuen, Sha Tin. (7SW-B/C545)	2/7	FSD	2/7	Soil cut slope	Minor (5)	8			Squatter area, open area		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 28 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/88	Hut No. 41B, Aera 6, Sha Tin Tau New Village, Sha Tin.	14/7	BD	2/7	Soil cut slope	Minor (5)	6			Squatter area	3 huts permanently evacuated.	
MW97/7/89	Near Fu Shan Columbarium, Lower Shing Mun Road, Sha Tin. (7SW-D/C23)	15/7	HyD/NT	Unknown	Soil cut slope	Minor (10)				Road	1 road blocked.	
MW97/7/90	11 Sha Tin Heights Road, Sha Tin.	16/7	Public	Unknown	Natural slope	Minor (30)				Building lot		
MW97/7/91	Lot 424, DD399, Ting Kau. (6SE-C/C477)	2/7	Police	2/7	Soil cut slope	Minor (8)	6		40	Building lot		
MW97/7/92	House No. 29, Hin Tin Tsuen, Sha Tin.	2/7	Public	2/7	Soil cut slope	Minor (<0.5)	1			Building lot		
MW97/7/93	Shan Tseng Tung Tsuen, Sham Tseng.	17/7	DO/ TW	Unknown	Soil cut slope	Minor (3)	1.6	1.8		Footpath		
MW97/7/94	House No.18A, Wai Tsai San Tsuen, Peng Chau.	7/7	DO/ Islands	2/7	Soil cut slope	Minor (1.5)	1.8	2		Building lot		
MW97/7/95	Sam Dip Tam, Lo Wai Tsuen, Tsuen Wan.	14/7	GEO	Unknown		N/A				Footpath		No failure, only dislodgement of slope surface protection.

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 29 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/96	Yung Yuen Road, Ping Shan, Yuen Long.	11/7	DO/ YL	2/7	Soil cut slope	Minor (2)	2.5		45	Passing bay		
MW97/7/97	Vista Del Mar, Castle Peak Road, Ting Kau.	19/7	Police	19/7 (8:30)	Soil cut slope	Minor (45)				Building lot, private or building access	3 houses evacuated.	
MW97/7/98	Fuk lok Tuen, Pak Tin, Sha Tin. (7SW-B/CR527)	10/7	DO/ST	2/7	Soil cut slope	Minor (10)	5			Footpath		
MW97/7/99	Upper Fuk Lok Tsuen, Sha Tin.	18/7	DO/ST	2/7	Soil cut slope	Minor (6)	5		39	Footpath		
MW97/7/100	Chuk Hang Tsai Tsuen, Tsiu Keng, Sheung Shui.	19/7	Police	19/7	Soil cut slope	Minor (2)				Squatter area		
MW97/7/101	Siu Sau Tsuen, Castle Peak Road, Tai Lam Chung.	19/7	GEO	19/7 (morning)	Soil/rock cut slope	Minor (~10)	3			Footpath	Footpath closed.	
MW97/7/102	Below Po Tei Yuen, Fu Yung Shan, Tsuen Wan.	22/7	GEO	Unknown	Soil cut slope	Minor (10)	10			Squatter area	2 huts permanently evacuated.	
MW97/7/103	Po Tei Yuen, Fu Yung Shan, Tseun Wan.	22/7	GEO	Unknown	Soil cut slope	Minor (4)	6			Squatter area, footpath	1 hut permanently evacuated.	
MW97/7/104	Ting Kau.	23/7	HyD/ LFC	Unknown	Soil cut slope	Minor (5)	6			Stream course		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 30 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/7/105	Near House No.10B, Ka Nam Village, Lamma Island.	21/7	DO/ Islands	Unknown	Natural slope	Minor (5)	5			Footpath		
MW97/7/106	Shing Mun Lane, Tsuen Wan.	29/7	HyD/NT	Unknown	Soil cut slope	Minor (2)	4		53	Road		
MW97/7/107	Hut No. 112, Area 2, Pak Tin Tsuen, Sha Tin.	30/7	Public	Unknown	Soil cut slope	Minor (3)	3		42	Squatter area		
MW97/7/108	Near Pristine Villa, To Fung Shan Road, Sha Tin.	1/8	HyD/NT	Unknown	Natural slope	Minor (30)				Building lot		
MW97/7/109	Adjacent China Light and Power Substation, Wo Tong Tsui Road, Kwai Chung. (7SW-C/CR103)	12/7	Public	3/7	Soil cut slope	Minor (15)				Open area		
MW97/8/1	Mile Stone 5.5, South Lantau Road, Cheung Sha, Lantau. (13NE-B/C6)	4/8	HyD/NT	2/8 (23:00)	Soil cut slope	Minor (30)	6	10	31	Road	1 road closed.	
MW97/8/2	Mile Stone 3.5, South Lantau Road, San Shek Wan, Lantau. (13NE-B/C58)	4/8	HyD/NT	3/8 (2:00)	Rock fall	Minor (<1)	8					

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 31 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/8/3	Mile Stone 1, South Lantau Road, Nam Shan, Lantau. (10SW-C/C187)	4/8	HyD/NT	3/8 (2:00)	Rock fall	Minor (<1)	8					
MW97/8/4	Hut No. 8A, Area 2, Sha Tin Tau Village, Sha Tin.	5/8	HD	2/7	Soil cut slope	Minor (0.5)	2.5			Squatter area		Surface erosion.
MW97/8/5	Above Chik Wan Road, Tai Wai. (7SW-D/C247)	4/8	Public	2/7	Soil cut slope	Minor (5)	4			Plantation area		
MW97/8/6	Opposite Multi-storey Car Park of Wonderland Villas, Wah King Hill Road, Kwai Chung. (11NW-A/C76)	5/8	HyD/NT	2/8 (22:00)	Soil cut slope	Minor (30)	7	8		Road	1 road closed.	
MW97/8/7	Below Sitting-out Area, Tai Po Road, Tai Wai. (7SW-D/F161)	4/8	Public	2/7	Fill slope	Minor (8)				Plantation area		
MW97/8/8	House No. 41, Ting Kau Village, Ting Kau.	31/7	DO/ TW	3/7	Retaining wall	Minor (1)	2			Open area		
MW97/8/9	Near Ting Kau Bridge, Ting Kau. (6SE-C/C382)	4/8	Public	3/7	Soil cut slope	Minor (3)	2.5			Access road		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 32 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/8/10	Opposite Beach House No. 22 of Approach Beach, Castle Peak Road, Ting Kau. (6SE-D/C431)	7/8	HyD/NT	Unknown	Soil cut slope	Minor (3)	3		37	Access road		
MW97/8/11	Hong Fai Road, Siu Lam, Tuen Mun. (6SW-D/C9)	12/8	HyD/NT	Early August	Soil cut slope	Minor (20)	4	8		Pedestrian pavement		
MW97/8/12	Hut No. 74, Cheung Hang Village, Kwai Chung.	13/8	DO/ KT	1/8 (15:00)	Soil cut slope	Minor (8)	5	5		Squatter area	2 huts permanently evacuated.	
MW97/8/13	Opposite Lookout, Route Twisk, Tai Mo Shan.	22/8	FSD	22/8	Soil/rock cut slope	Minor (5)	7	5	40	Road	1/3 road blocked.	
MW97/8/14	Near Observation Deck, Route Twisk, Tai Mo Shan.	22/8	FSD	22/8	Natural slope	Major (400)	35	15		Road	2 roads closed.	
MW97/8/15	Near Kwong Pan Tin Tsuen, Rout Twisk, Muk Min Ha, Tsuen Wan. (6SE-D/C48)	22/8	HyD/NT	22/8 (15:30)	Soil cut slope	Minor (10)	7	10		Road, pedestrian pavement	1/2 road blocked, pedestrian pavement closed.	
MW97/8/16	Hut Nos. RK/19C/40-42, Butterfly Valley Village, Lai Chi Kok.	25/8	HD	23-25/8	Soil cut slope	Minor (~3)	4			Squatter area	3 huts permanently evacuated.	

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 33 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/8/17	San Uk Ling, Ta Kwu Ling.	11/8	DO/N	7/8	Soil cut slope	Minor (0.5)				Footpath		
MW97/8/18	Tai Wo Chuen, Fu Yung Shan, Tsuen Wan.	26/8	DO/ TW	21/8	Fill slope	Minor (4)		5		Footpath	Footpath closed.	
MW97/8/19	Access Road to Shing Mun Catchwater, Tsuen Wan. (7SW-A/F3)	25/8	WSD	Unknown	Fill slope	Minor (45)		10		Road		
MW97/8/20	Liu To, Tsing Yi.	26/8	DO/ KT	Unknown	Soil cut slope	Minor (10)	2.5			Footpath		
MW97/8/21	Yau Oi Tsuen, To Fung Shan Road, Sha Tin.	13/8	Public	3/7	Soil cut slope	Minor (3)	7		55	Road		
MW97/8/22	Above Sha Tin Water Treatment Works, Tai Po Road, Tai Wai.	26/8	HyD/NT	Unknown	Soil cut slope	Minor (30)				Open area		
MW97/8/23	West Bound Tube of the Tunnel Portal, Route 5, Shing Mun Tunnel, Tai Wai. (7SW-C/C1008)	26/8	HyD/NT	Unknown	Rock fall	Minor (1)				Road		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 34 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/8/24	Shek Tau Wai Sheung Tsuen, Pat Heung, Yuen Long.	25/8	DO/ YL	22/8 (14:00)		Minor (30)				Building lot		No geotechnical concern, only collapse of river bank.
MW97/8/25	Below Lot 446, Castle Peak Road, Ting Kau.	26/8	Public	25/8	Soil cut slope	Minor (10)	6		30	Open area		
MW97/8/26	Above Hoi Mei Beach, Castle Peak Road, Ting Kau. (6SE-C/C14)	29/8	HyD/NT	2/8	Soil/rock cut slope	Minor (1)	4		63	Road		
MW97/8/27	Route Twisk, Tsuen Wan. (6SE-B/C3)	29/8	HyD/NT	Unknown	Rock fall	Minor (<1)				Pedestrian pavement		
MW97/8/28	Lot 259, DD354, Castle Peak Road, Ting Kau. (6SE-D/C289)	29/8	HyD/NT	2/7	Soil cut slope	Minor (5)	4			Access road		
MW97/8/29	Pak Tin Tsuen, Sha Tin.	2/7		2/7	Soil cut slope	Minor (10)	18			Stream course		
MW97/9/1	Water Supplies Department Staff Quarters, Kwan Mun Hau Tsuen, Shing Mun Road, Tsuen Wan. (7SW-C/C863)	12/9	DO/ TW	Unknown	Soil cut slope	Minor (2)	7			Access road		

Table A5 - List of Incidents in Western New Territories Reported to GEO in 1997 (Sheet 35 of 35)

Incident No.	Location (Slope No.)	Call		Failure						Facility Affected	Consequence	Remarks
		Date	From	Date (Time)	Type	Scale (m ³)	Height ⁽¹⁾ (m)	Width ⁽²⁾ (m)	Estimated Travel Angle ⁽³⁾ (degree)			
MW97/10/1	Area 1, Pak Tin Tsuen, Sha Tin.	7/10	DO/ST	Unknown	Fill slope	Minor (3)				Road		
MW97/10/2	Open Car Park, Lei Uk Tsuen, Sha Tin. (7SW-D/C454)	20/10	DLO/ ST	Unknown	Soil cut slope	Minor (3)	4		40	Carpark		
MW97/11/1	Near House No. 58, Yau Oi Tsuen, To Fung Shan, Sha Tin.	31/10	BD	Unknown	Soil cut slope	Minor (3)	5		50	Road		
MW97/11/2	Access Road to Yau Oi Tsuen, To Fung Shan, Sha Tin. (7SW-B/C663)	31/10	BD	Unknown	Soil cut slope	Minor (3)	5		50	Road		
MW97/11/3	Below House No. 78, Pak She San Tsuen, Cheung Chau.	14/44	DO/ Islands	Unknown	Fill slope	N/A	3			Building lot		
MW97/12/1	Golden Hill Road, Kam Shan Country Park, Sha Tin.	12/12	WSD	June, 1997	Soil cut slope	N/A	2		50	Country park		
No incident number was assigned	Shing Mun Main (Upper) Dam, Tsuen Wan.			2/7	Rock cut slope	Major (3 000) ⁺	60 ⁺	45 ⁺	38-41 ⁺	Country Park		
Legend : ⁺ Information from GEO Detailed Investigation [*] Information from GEO's 1997 Landslide Investigation Consultants. (1) Height of Landslide is the difference in elevation measured from the crest of failure to the distal end of the main body of the landslide debris. (2) Width of landslide is the maximum width of landslide scar. (3) Estimated travel angle of landslide is the angle between the crest of failure to the distal end of the main body of landslide debris and the horizontal ground.												

APPENDIX B

DAILY RAINFALL AT THE HONG KONG OBSERVATORY IN 1997

LIST OF TABLES

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Table B1 - Summary of Daily Rainfall at the Hong Kong Observatory in 1997

Date	January	February	March	April	May	June	July	August	September	October	November	December
1	0.0	0.6	Trace	0.0	0.1	Trace	122.6	39.5	Trace	Trace	0.0	Trace
2	Trace	26.3	0.0	0.1	0.0	Trace	115.5	148.4	0.1	Trace	0.0	0.0
3	8.1	33.9	0.0	0.0	Trace	129.6	83.3	50.2	5.0	0.9	0.0	Trace
4	1.6	0.0	0.0	9.4	37.9	104.2	23.4	1.3	0.9	0.0	0.0	Trace
5	0.0	Trace	0.0	0.9	18.2	0.9	Trace	Trace	0.0	Trace	0.0	Trace
6	0.0	24.7	0.0	3.6	16.7	0.6	15.1	0.7	Trace	4.4	0.0	Trace
7	0.0	10.8	0.0	0.5	14.5	Trace	Trace	36.4	96.3	0.0	0.0	Trace
8	0.0	1.2	0.0	Trace	56.6	0.1	13.3	32.3	23.4	0.4	0.0	0.0
9	0.0	Trace	0.0	Trace	22.8	0.1	3.4	Trace	0.0	0.0	0.0	0.0
10	0.0	Trace	Trace	50.2	45.0	4.4	52.7	8.3	0.0	0.0	0.0	0.0
11	0.0	Trace	0.0	0.0	Trace	0.5	10.1	37.6	0.0	Trace	0.0	0.0
12	0.0	5.1	0.0	0.0	0.0	Trace	1.0	77.2	0.0	46.4	0.0	0.0
13	Trace	3.1	Trace	63.4	Trace	145.1	Trace	23.1	0.0	0.0	0.0	0.0
14	0.7	Trace	0.0	1.5	0.0	32.5	9.4	18.2	19.3	0.0	0.0	0.0
15	0.0	4.0	0.0	Trace	0.0	2.9	97.3	0.0	0.2	0.0	0.0	0.0
16	0.0	0.5	0.3	Trace	11.8	118.8	23.6	4.9	10.7	0.0	3.2	0.0
17	0.0	Trace	Trace	Trace	17.3	45.2	81.9	Trace	Trace	54.6	Trace	0.0
18	Trace	1.5	Trace	1.0	26.3	9.1	26.4	0.0	6.1	5.0	0.0	0.0
19	0.0	0.0	7.8	Trace	19.8	Trace	63.2	0.0	17.4	Trace	0.0	0.0
20	0.0	0.0	7.1	Trace	0.5	0.0	0.3	2.2	3.1	0.0	0.0	0.0
21	Trace	0.0	1.8	Trace	8.7	1.0	Trace	38.7	3.3	0.0	0.0	0.7
22	3.3	0.0	4.4	0.9	2.6	23.1	0.0	199.7	Trace	0.0	0.0	4.0
23	30.5	Trace	2.7	0.0	0.3	16.0	0.0	3.7	Trace	1.1	2.8	1.8
24	0.4	0.0	0.2	Trace	0.8	43.6	Trace	57.0	Trace	0.0	0.9	0.0
25	Trace	Trace	0.2	Trace	0.0	14.9	Trace	27.6	0.0	0.0	0.2	0.0
26	0.0	0.0	0.0	0.0	0.0	57.5	0.0	5.9	Trace	Trace	Trace	Trace
27	0.0	0.0	Trace	Trace	0.0	0.0	0.0	16.1	0.0	0.0	Trace	0.0
28	0.0	0.0	6.4	0.0	0.0	1.1	0.0	0.0	1.1	0.0	Trace	0.0
29	0.0		3.9	Trace	0.0	4.8	Trace	0.0	20.7	0.0	Trace	0.0
30	Trace		0.0	1.7	0.9	27.6	0.0	0.0	25.3	0.0	Trace	0.0
31	0.0		0.0		0.0		3.5	Trace		0.0		0.0
Total	44.6	111.7	34.8	133.2	300.8	783.6	746.0	829.0	232.9	112.8	7.1	6.5
Note : Annual Total of 1997 is 3,343.0 mm.												

LIST OF DRAWINGS

Drawing
No.

GCSP 8/19 Location Map of Reported Incidents in 1997