LIST OF FIGURES

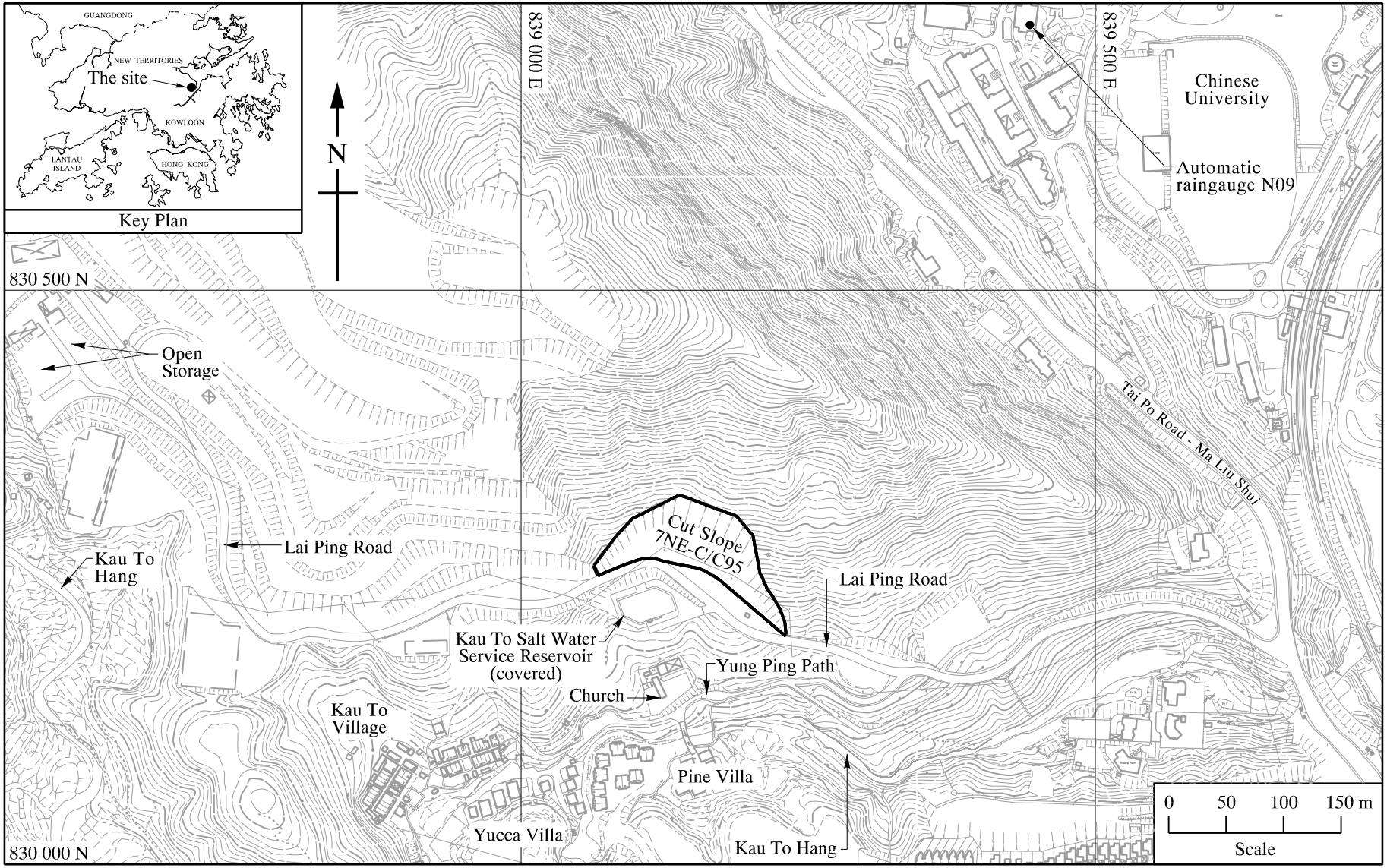


Figure 1 - Site Plan

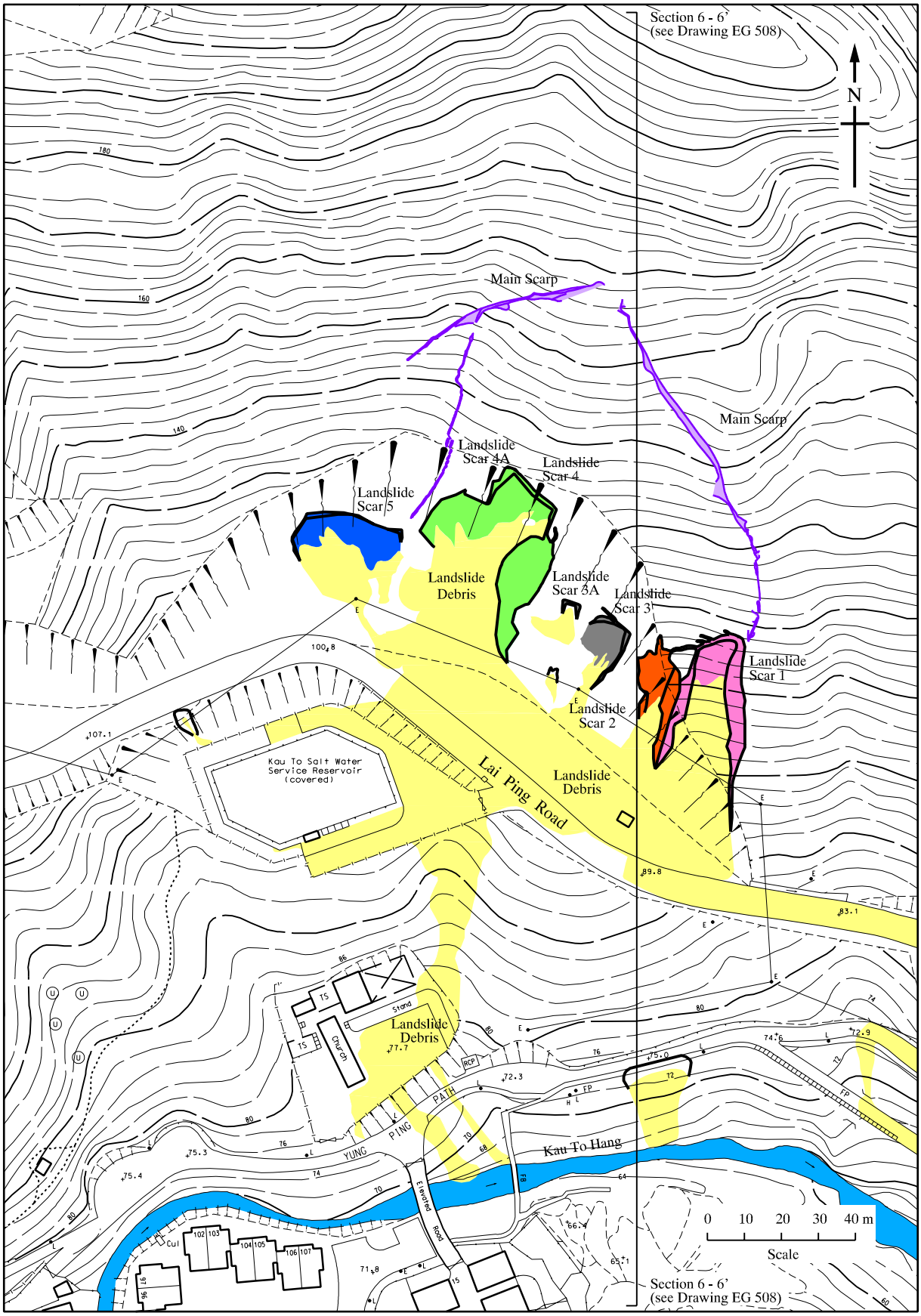
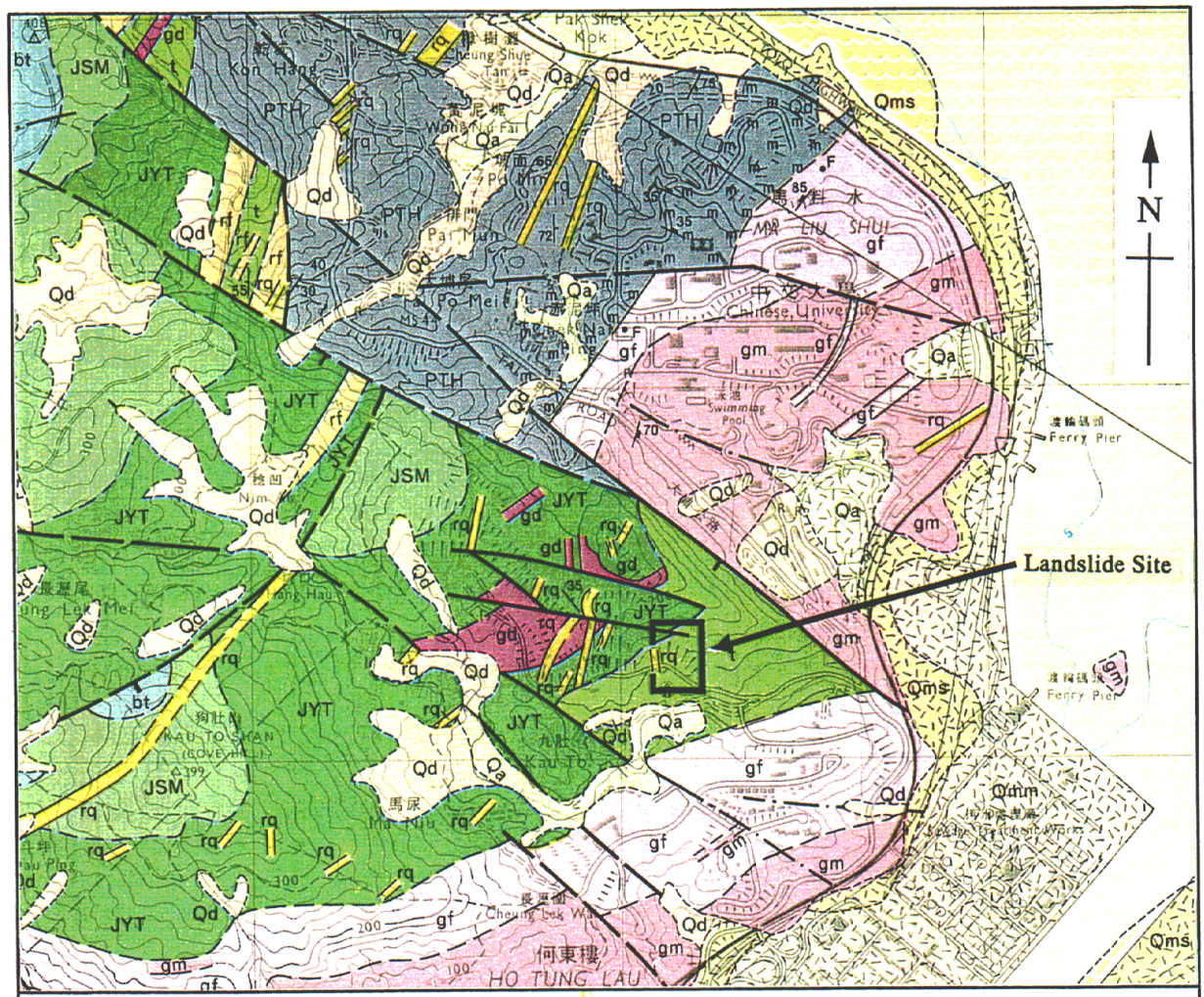


Figure 2 - Plan of the Landslide



Superficial Deposits

- Fill
- Qms — Marine sand
- Qmm — Marine mud
- Qa — Alluvium
- Qd — Debris flow deposits

Solid Geology

Extrusive igneous (Jurassic)

- JSM — Crystal and lithic tuff, tuff-breccia and tuffite
- JYT — Crystal tuff
- t — Tuff and tuffite,
- bt — Block-bearing tuff and tuffite

- PTH — Permian, mudstone, siltstone and sandstone

Intrusive igneous (Jurassic)

- gf — Fine-grained granite
- gm — Medium-grained granite
- gd — Granodiorite
- rq — Quartzphyric rhyolite
- rf — Feldsparphyric rhyolite

- Geological boundary, superficial
- Fill boundary
- Geological boundary, solid
- Fault (crossmark indicates downthrow side)
- Photogeological lineament
- 75 — Bedding, inclined
- 85 — Jointing, inclined

Figure 3 - Geology of the Landslide Site as Shown on Part of the Hong Kong Geological Survey Sheet 7 (Sha Tin, 1:20 000-scale; GCO, 1986)

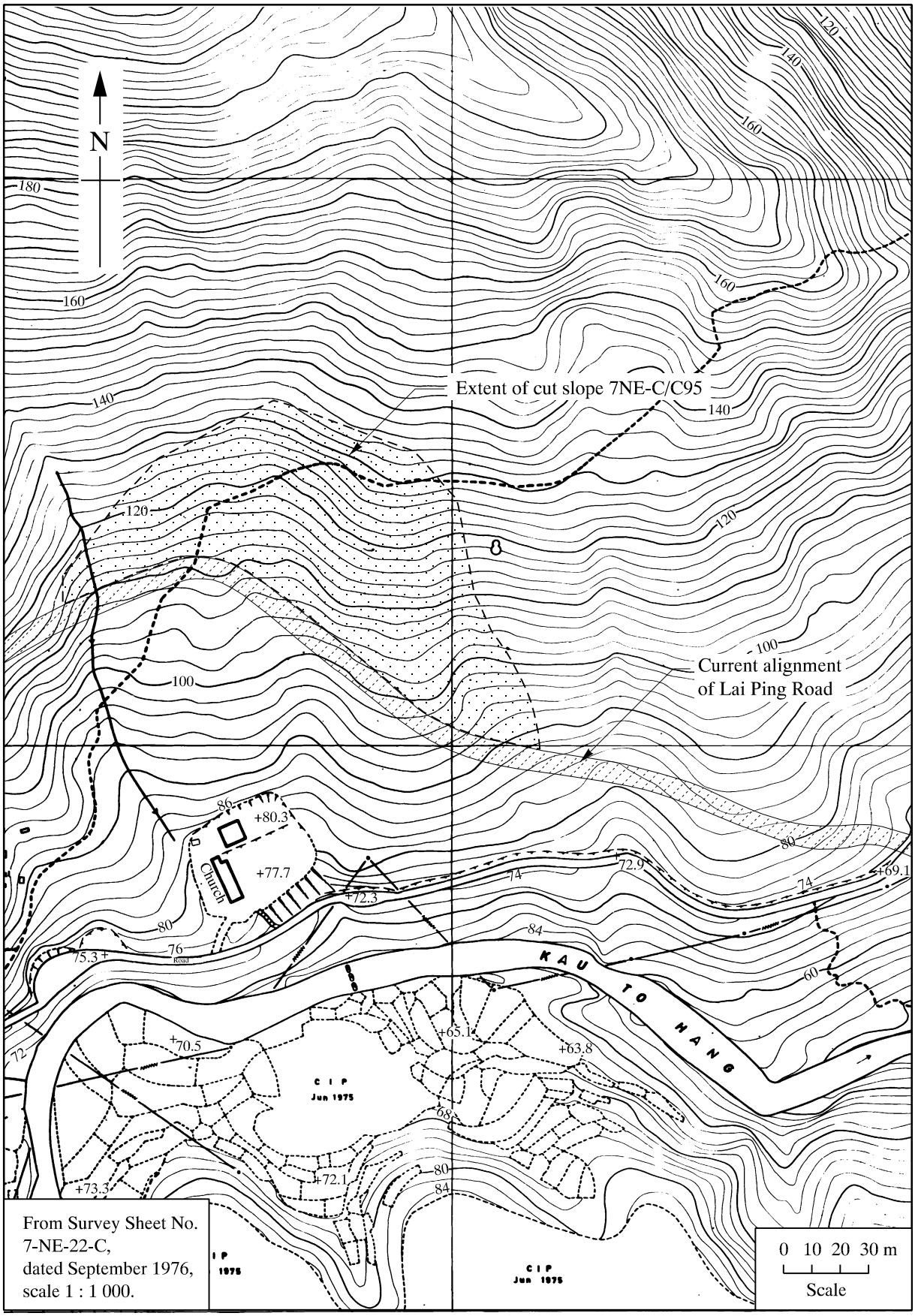
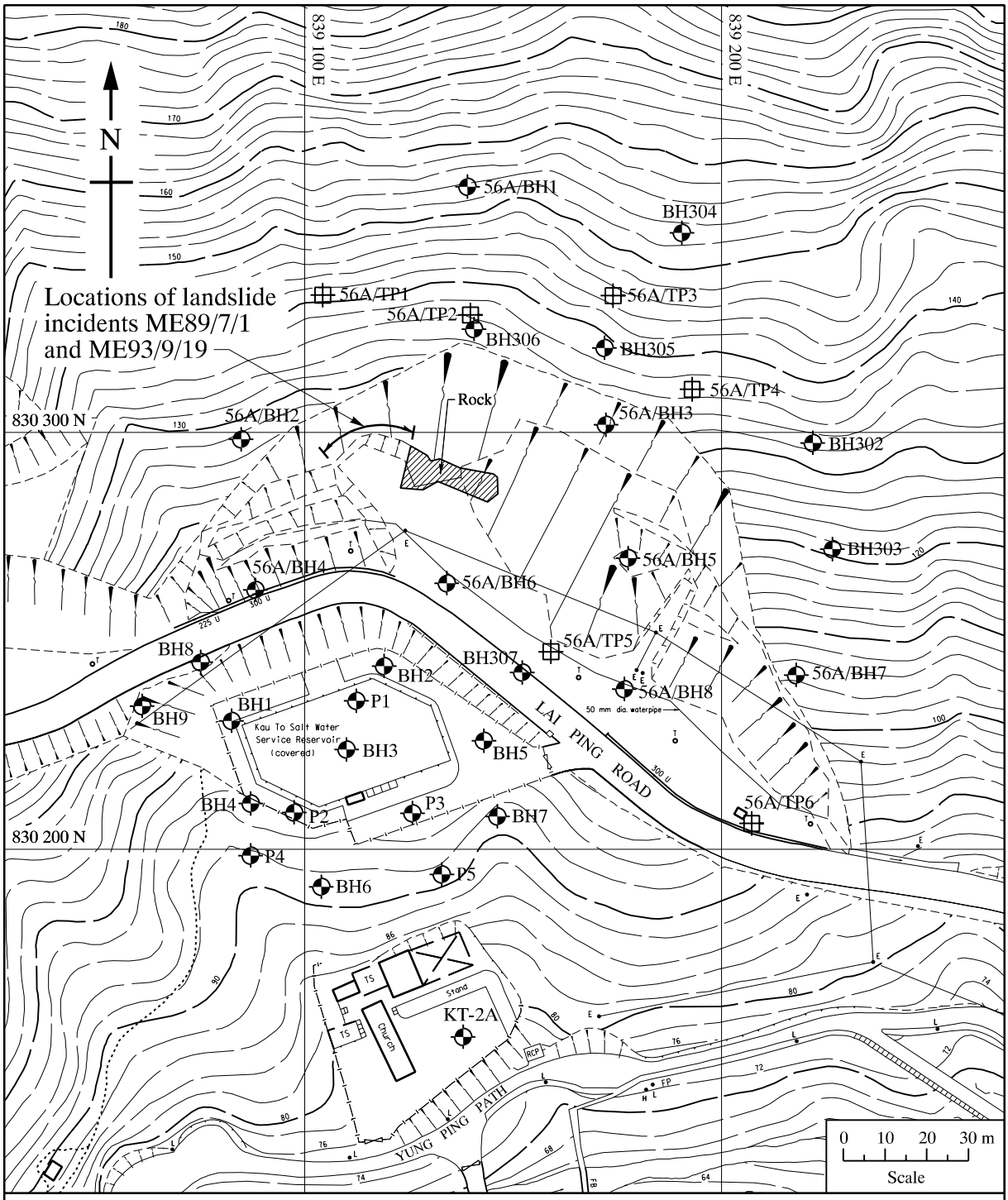


Figure 4 - Topographic Map (September 1976)

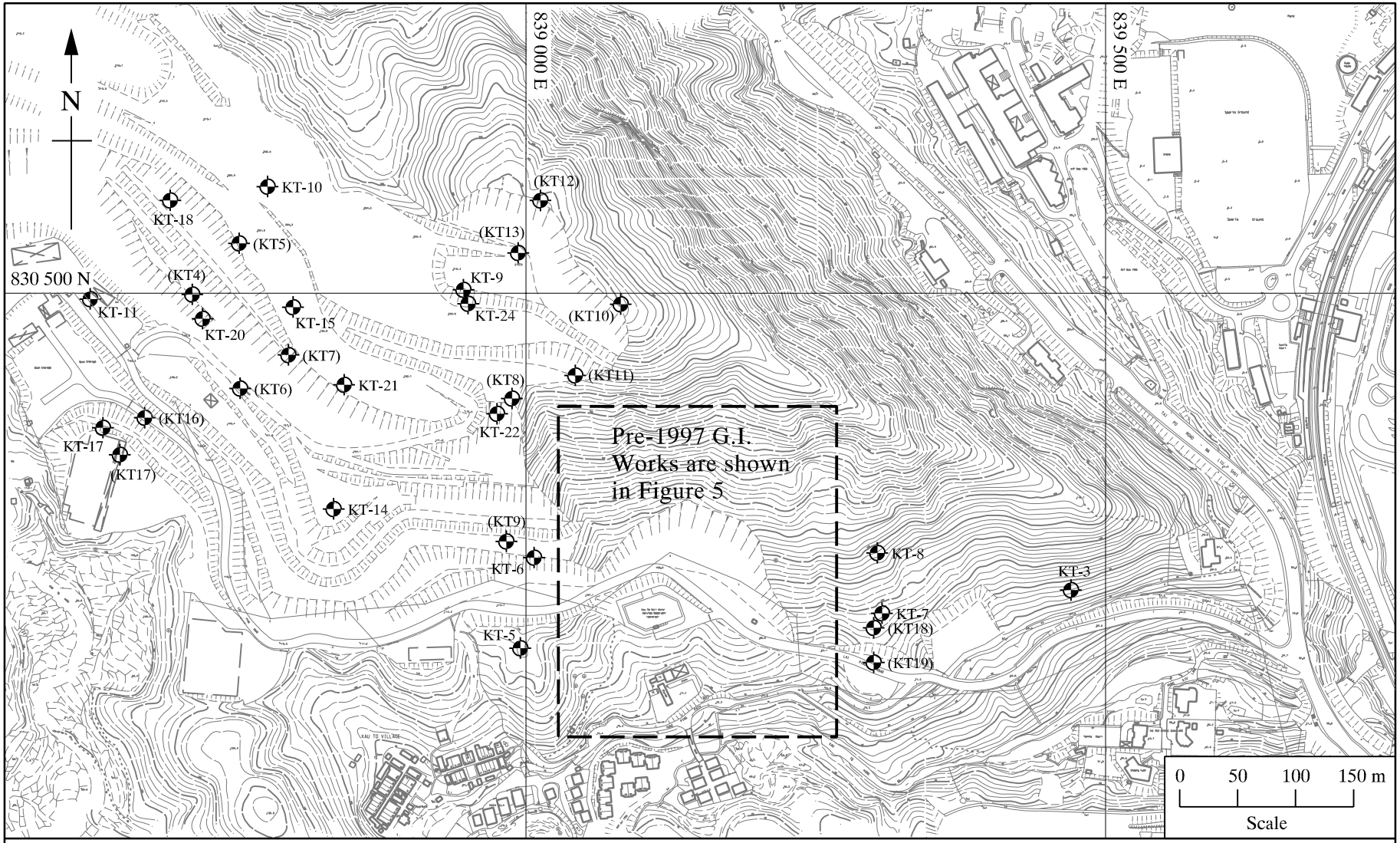


Legend :

KT-2A	Drillhole in 1973 to 1976 ground investigation for borrow area	BH1	Drillhole in 1992 ground investigation for salt water service reservoir
BH302	Drillhole in 1979 ground investigation for slope stabilisation work	56A/BH1/ 56A/TP1	Drillhole/trial pit in 1995 ground investigation for slope stabilisation
P1	Drillhole in 1980 ground investigation for salt water service reservoir		

Note : Pre 1997 G.I. locations base plan from 1995 topographic survey by Maunsell and 1:1000 digital survey plan.

Figure 5 - Locations of Pre-1997 Ground Investigation Works and Landslide Incidents



Note : For legend see Figure 5.

Figure 6 - Pre-1997 Ground Investigation Works in the Adjacent Areas

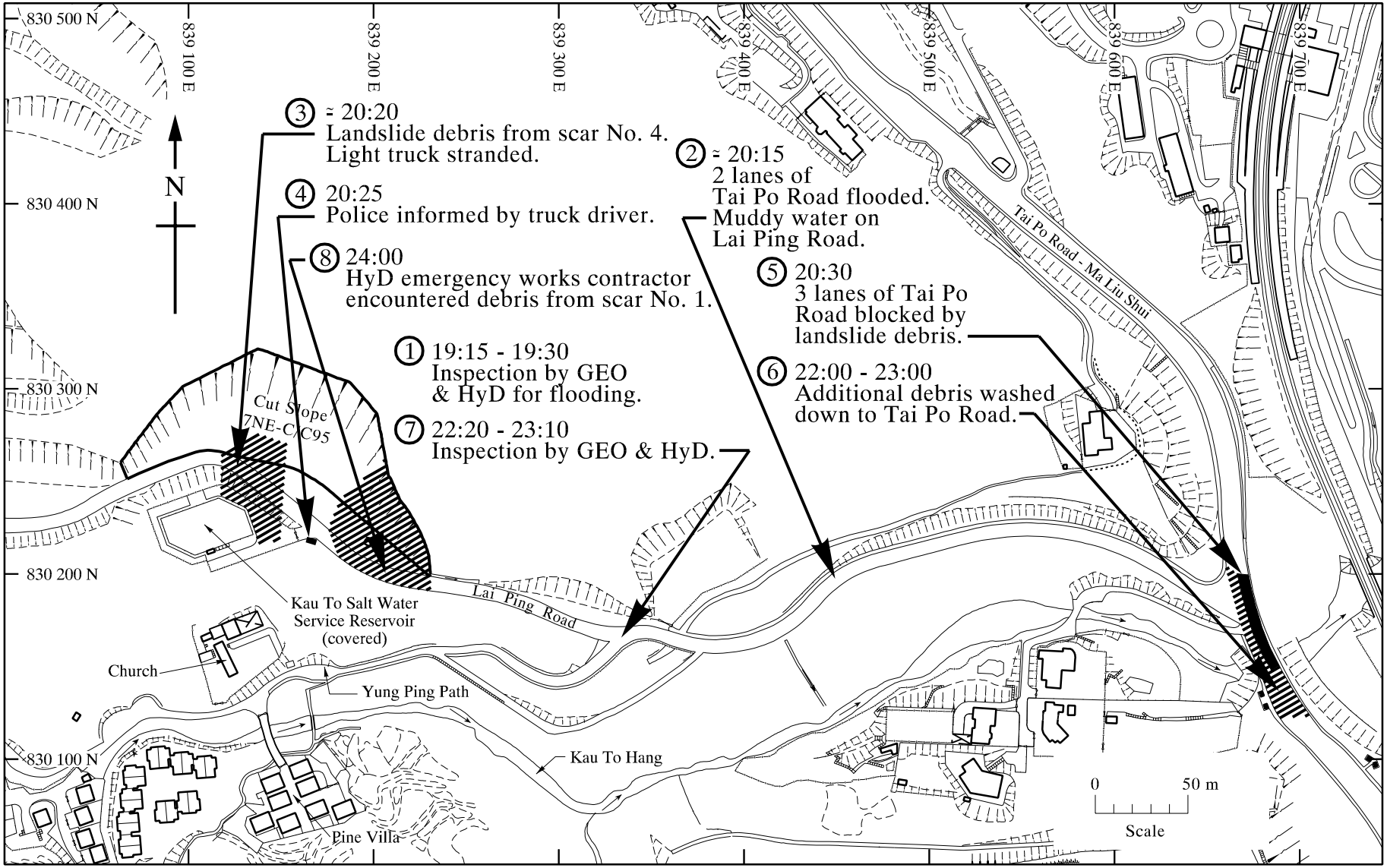
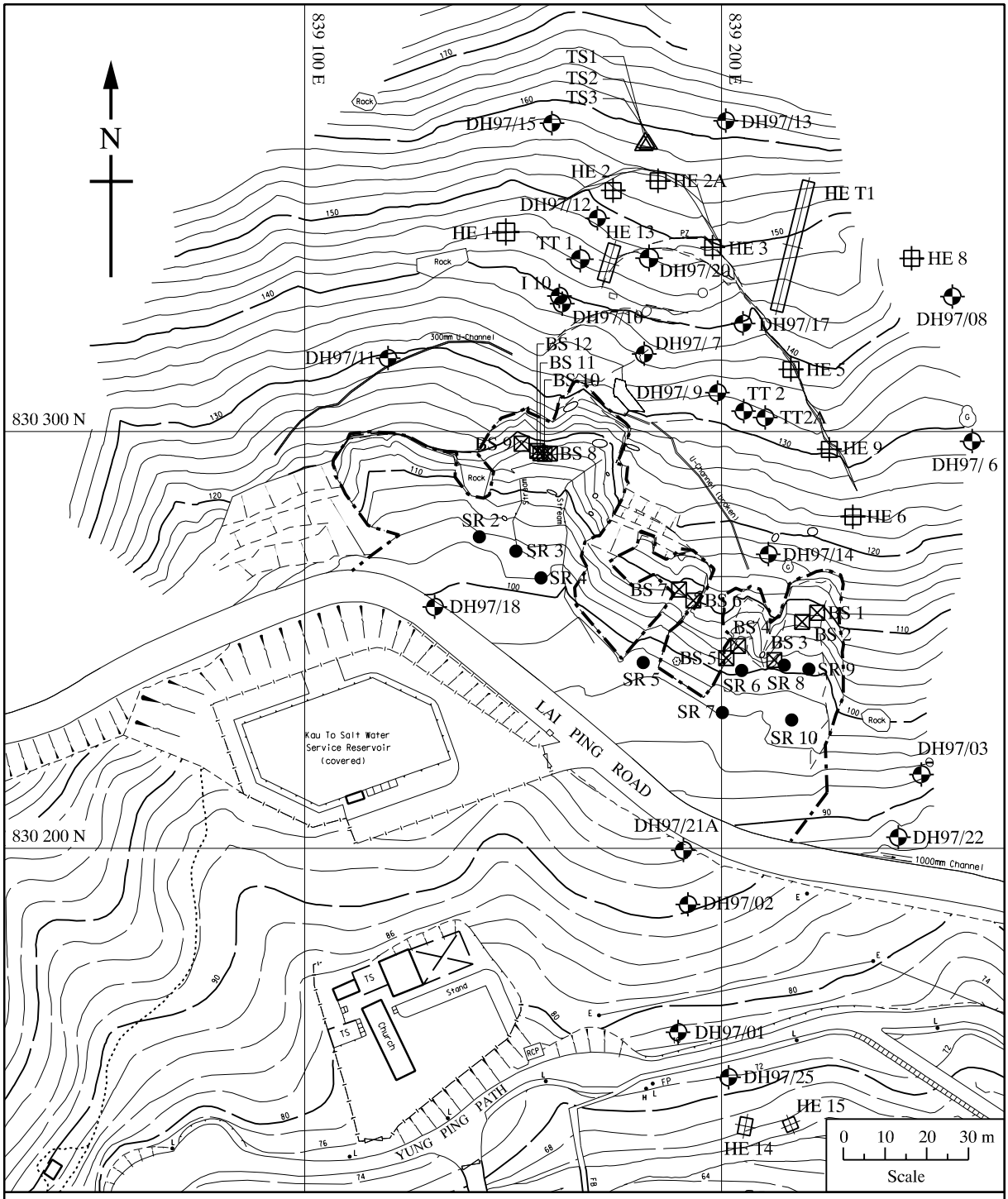


Figure 7 - Sequence of Events on 2 July 1997



Legend :

⊠ BS 1	Block sample location	△ TS1	Tensiometer installed in 1997 ground investigation for Lai Ping Road landslide investigation/permanent stabilisation work
● SR 2	Sand replacement test location		
DH97/ 6 TT 1 HE 1	Drillhole/trial pit in 1997 ground investigation for Lai Ping Road landslide investigation/permanent stabilisation work	HE T1	Trial trench in 1997 ground investigation for Lai Ping Road landslide investigation/ permanent stabilisation work

Note : Base plan from 1997 topographic survey by CED and 1:1000 digital survey plan.

Figure 8 - 1997 Topographic Survey and Locations of Ground Investigation Works

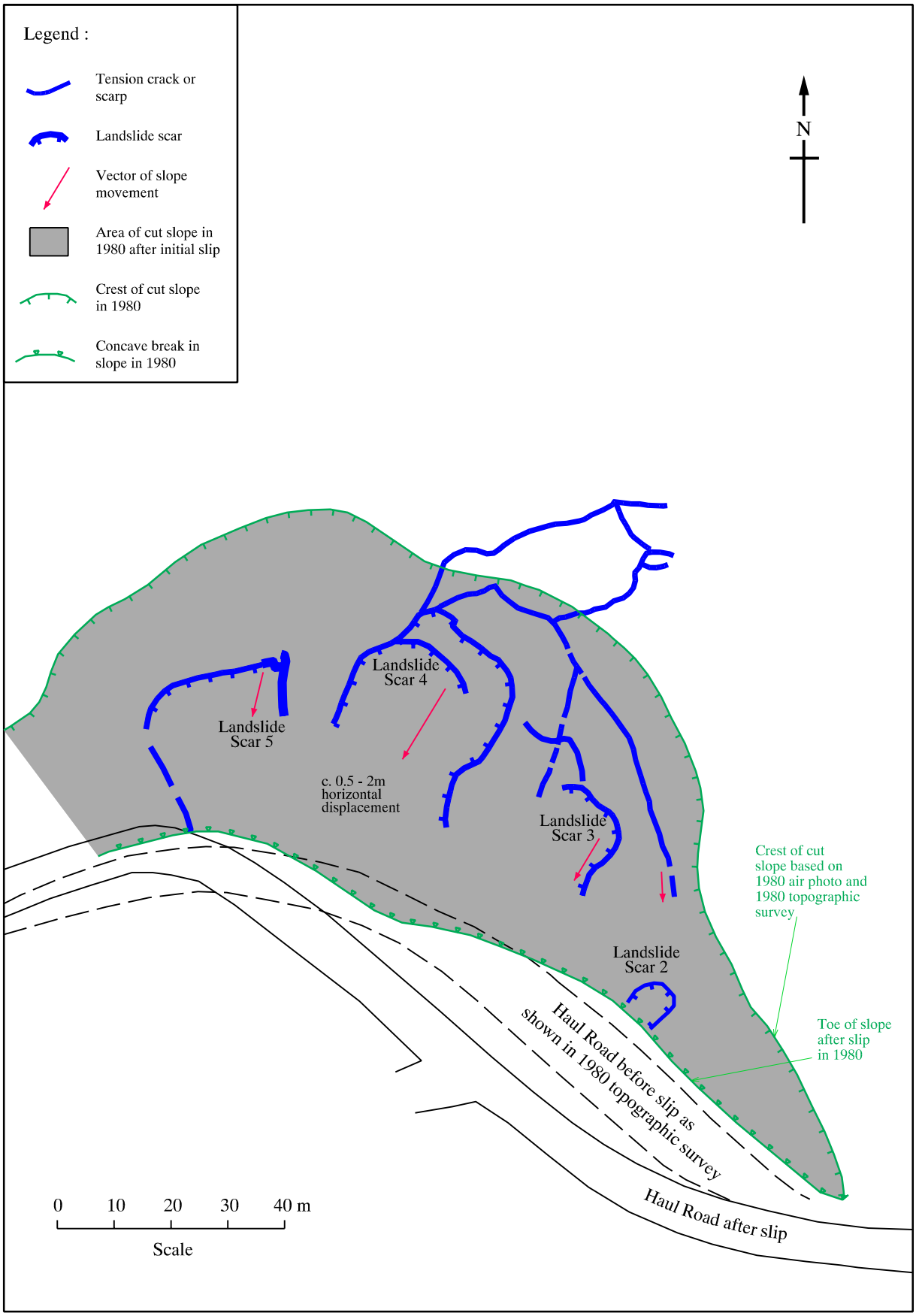


Figure 9 - Development of the Landslide (1978-1980)

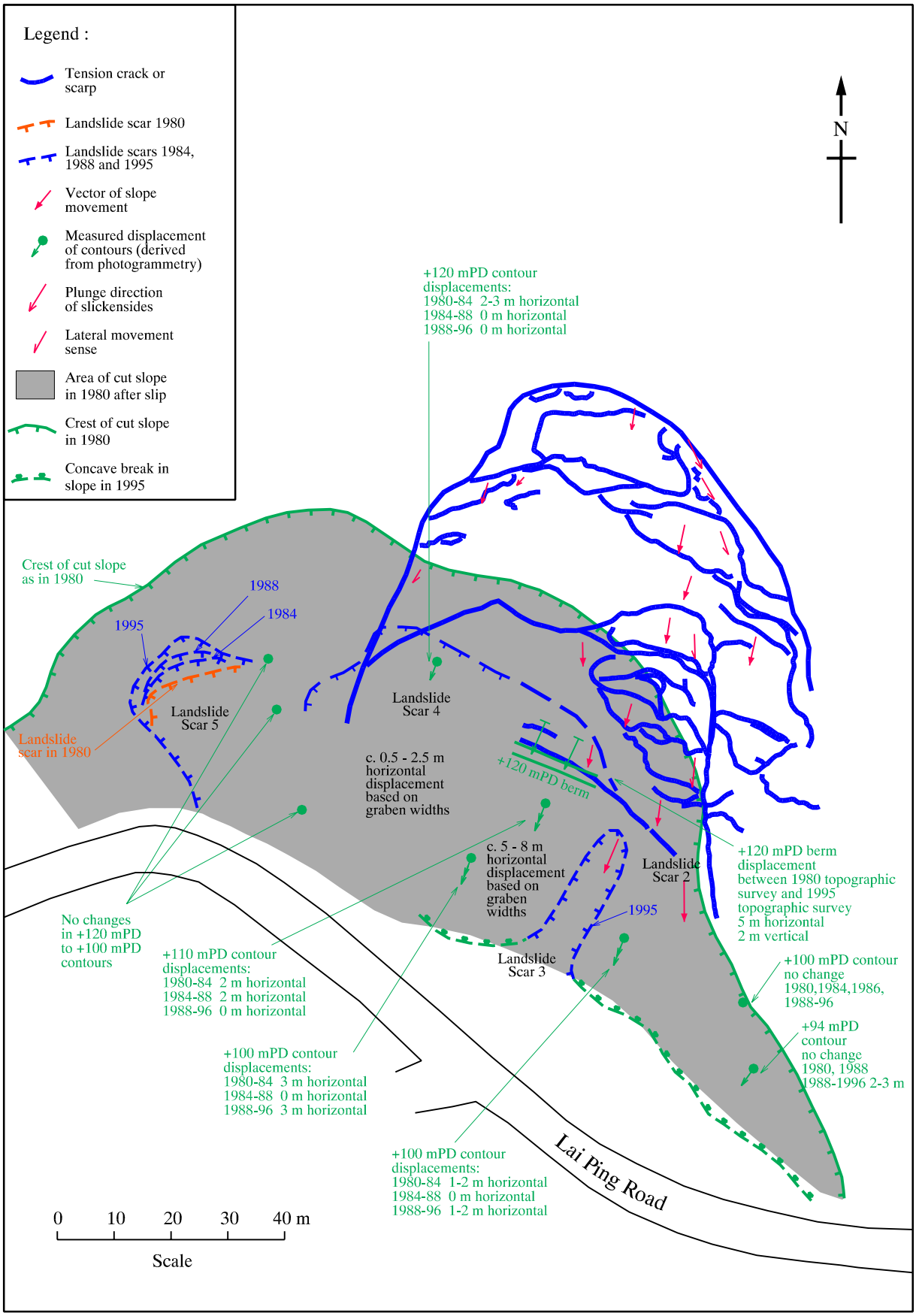


Figure 10 - Development of the Landslide (1980-1996)

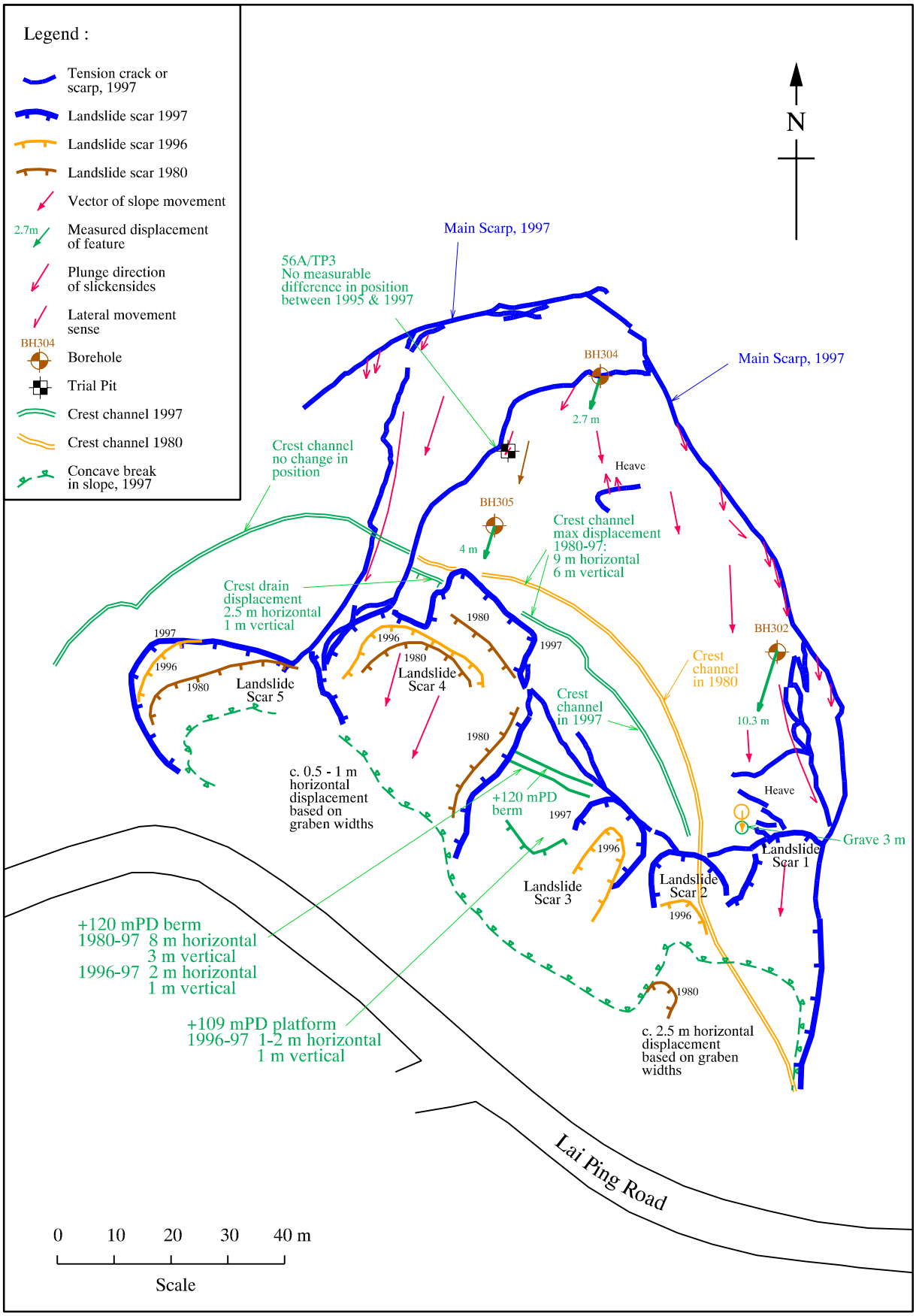


Figure 11 - Development of the Landslide (1980-1997 and 1996-1997)

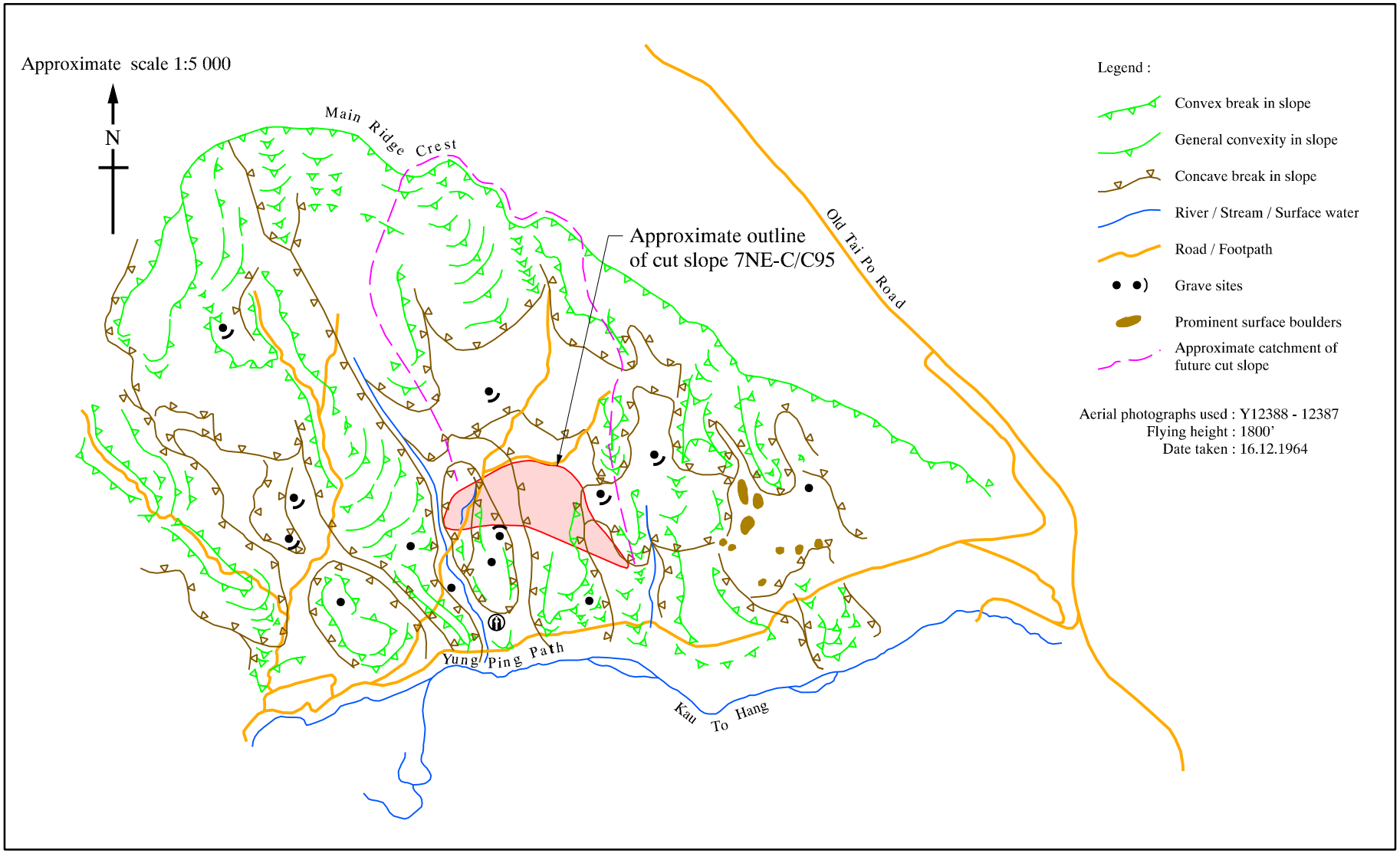
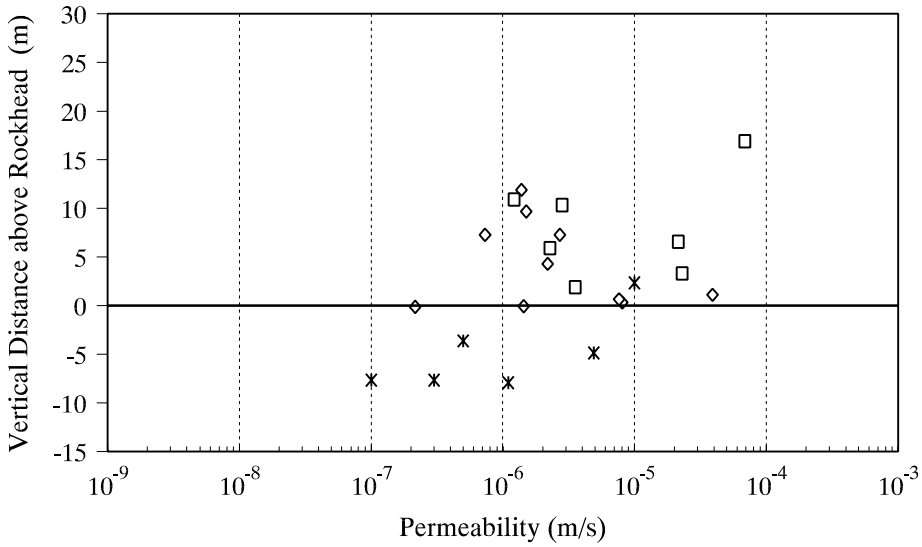
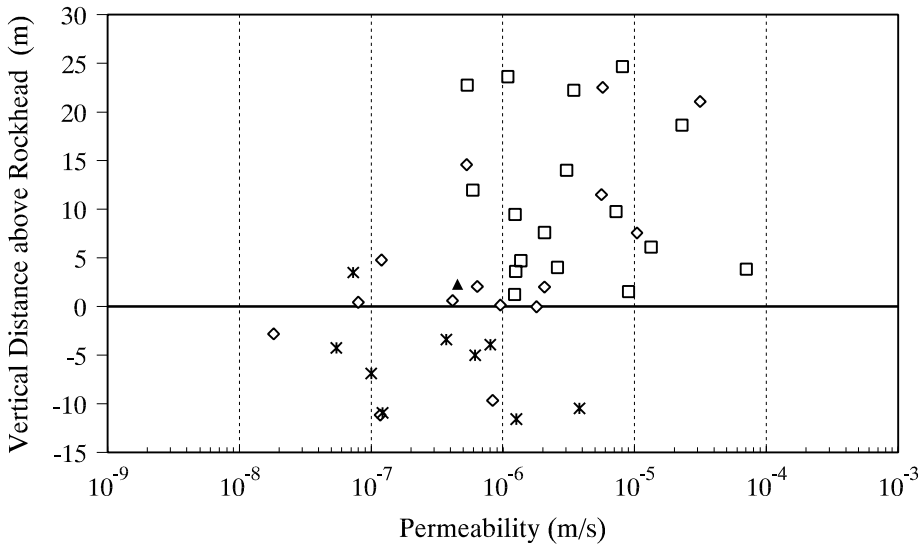


Figure 12 - Aerial Photograph Interpretation of Area Surrounding Lai Ping Road Landslide Site Prior to Its Development Based on Aerial Photographs Dated 16 December 1964



(a) Tests within the Slip Area



(b) Tests outside the Slip Area

Legend :

◇ Response test

□ Constant head test

▲ Falling head test

⁎ Packer test

Note : Rockhead is the top surface of the continuous or near-continuous moderately to slightly decomposed tuff in the PW 90/100 rock mass.

Figure 13 - Field Measured Permeability

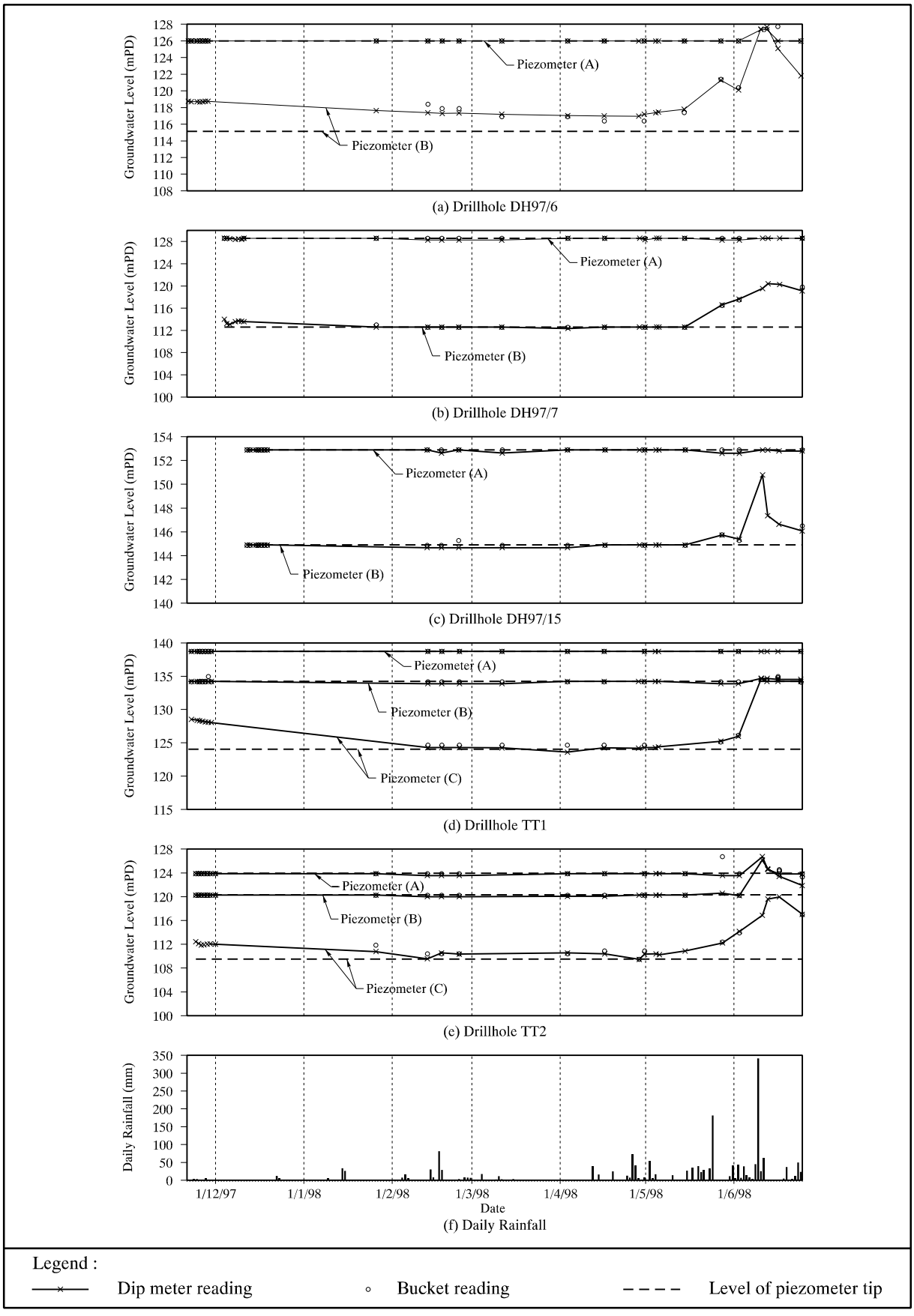


Figure 14 - Piezometer Reading Records

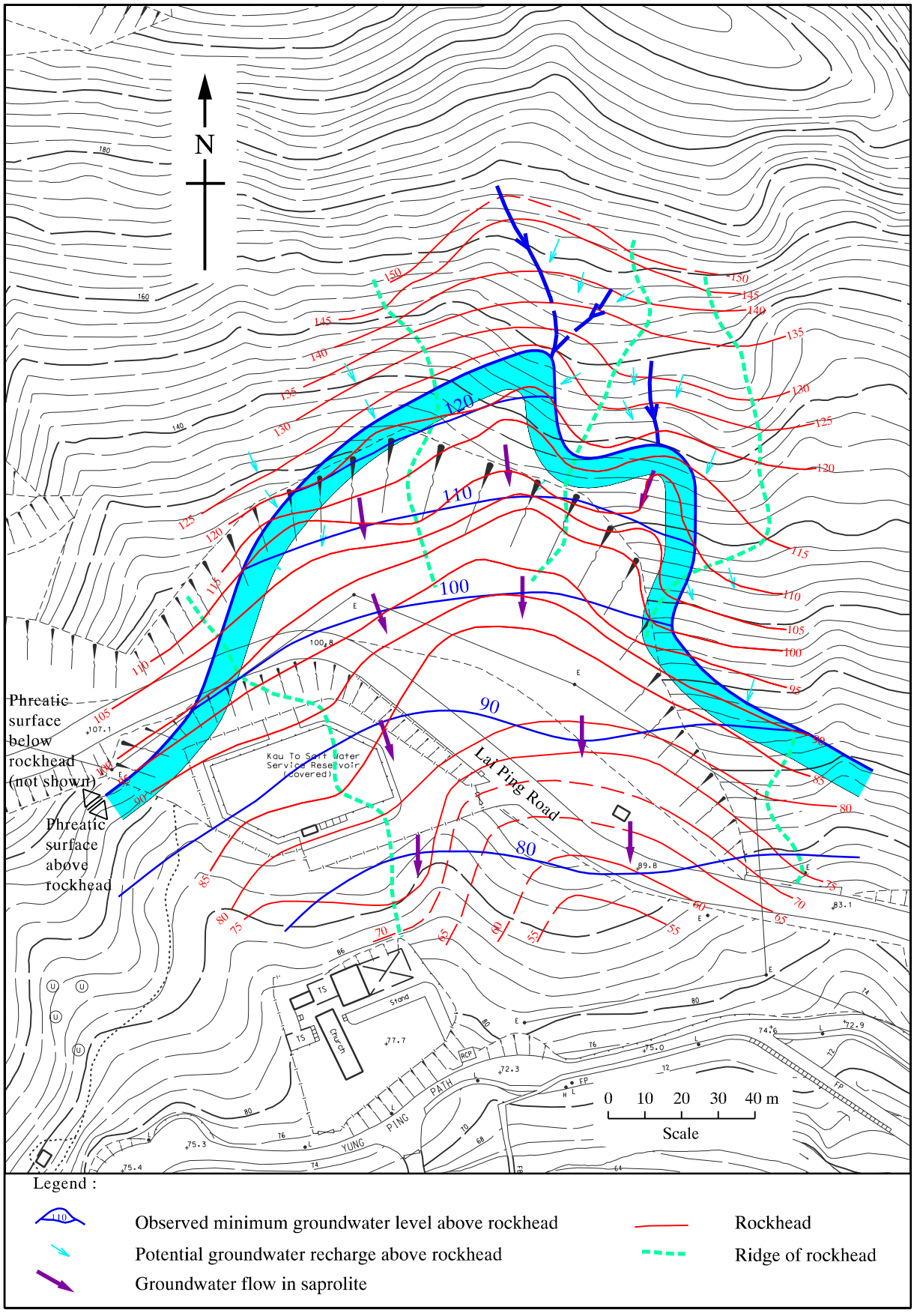


Figure 15 - Observed Minimum Groundwater Level in Saprolite

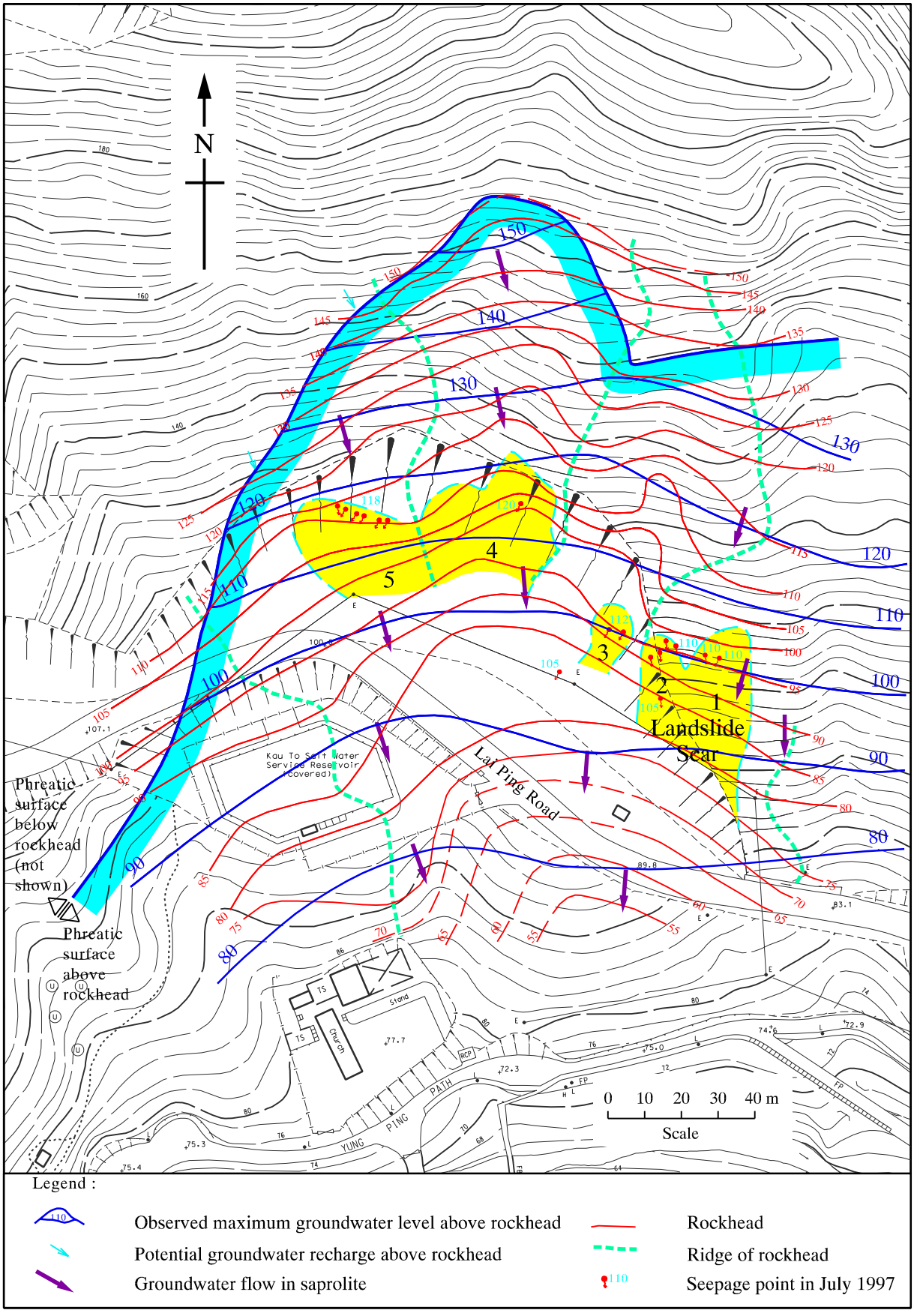
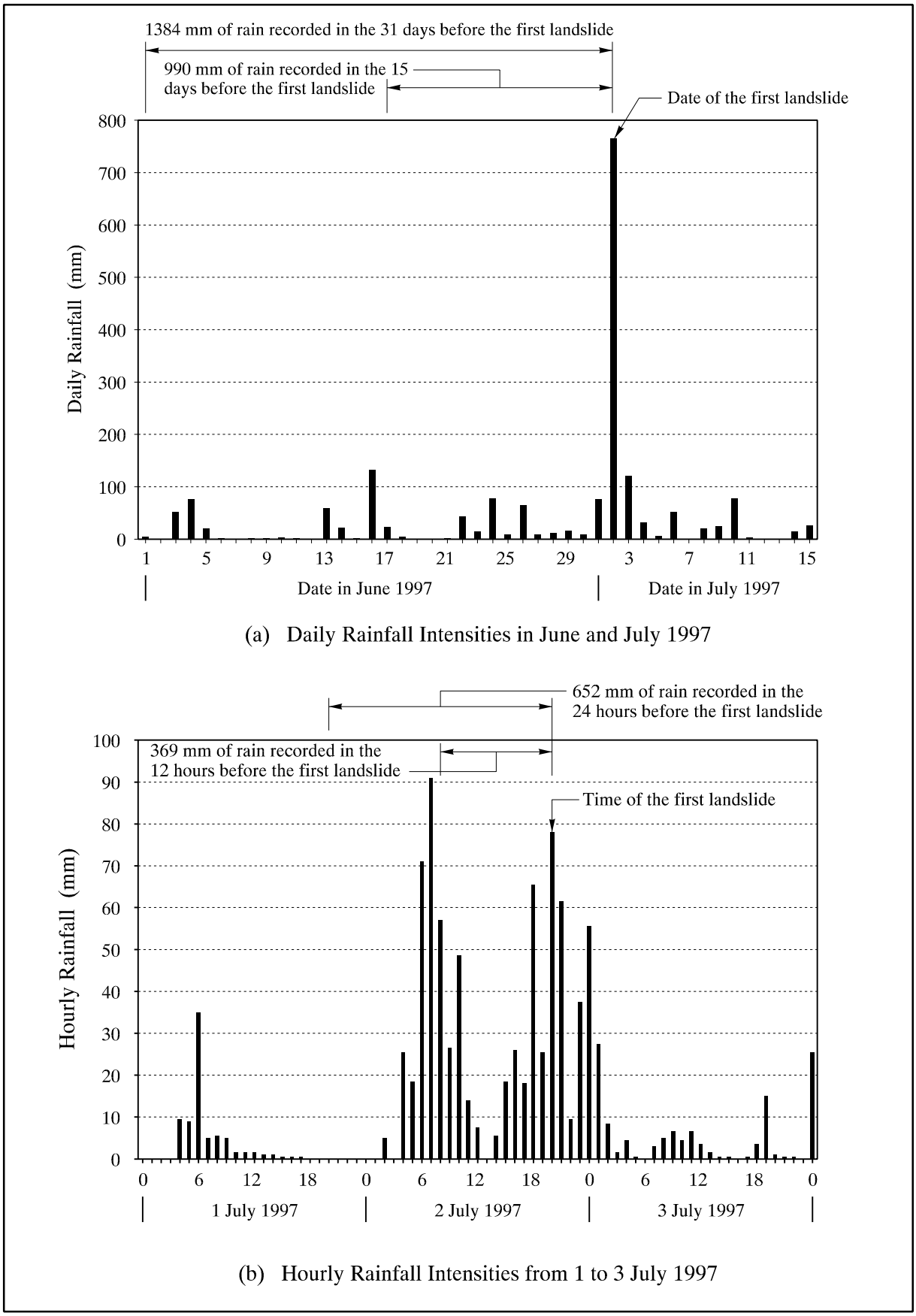


Figure 16 - Observed Maximum Groundwater Level in Saprolite



(a) Daily Rainfall Intensities in June and July 1997

(b) Hourly Rainfall Intensities from 1 to 3 July 1997

Figure 17 - Rainfall Records of GEO Raingauge No. N09 in June and July 1997

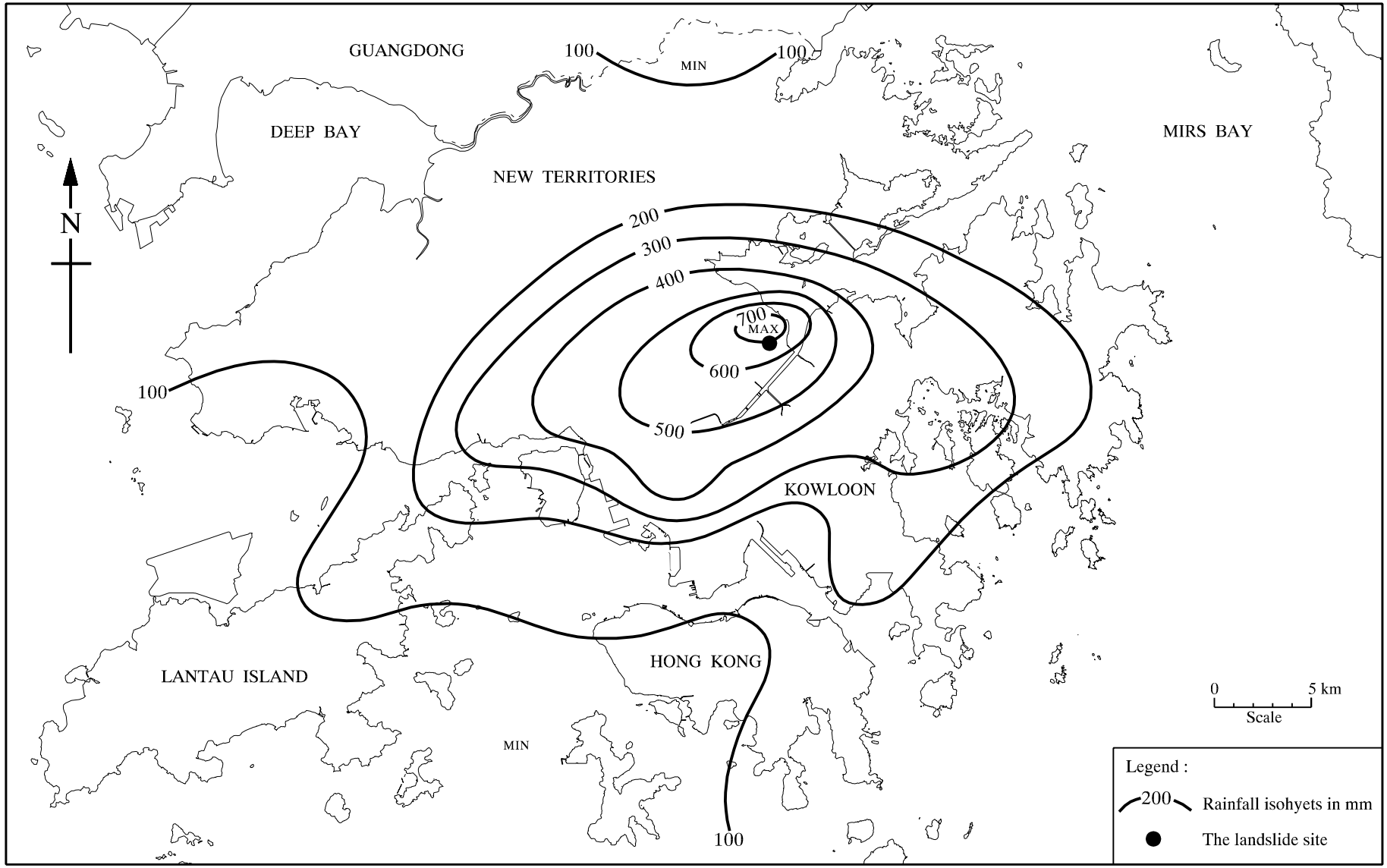


Figure 18 - Rainfall Isohyets for 24-hour Duration on 2 July 1997 (Ending 0:00 hours 3 July 1997)

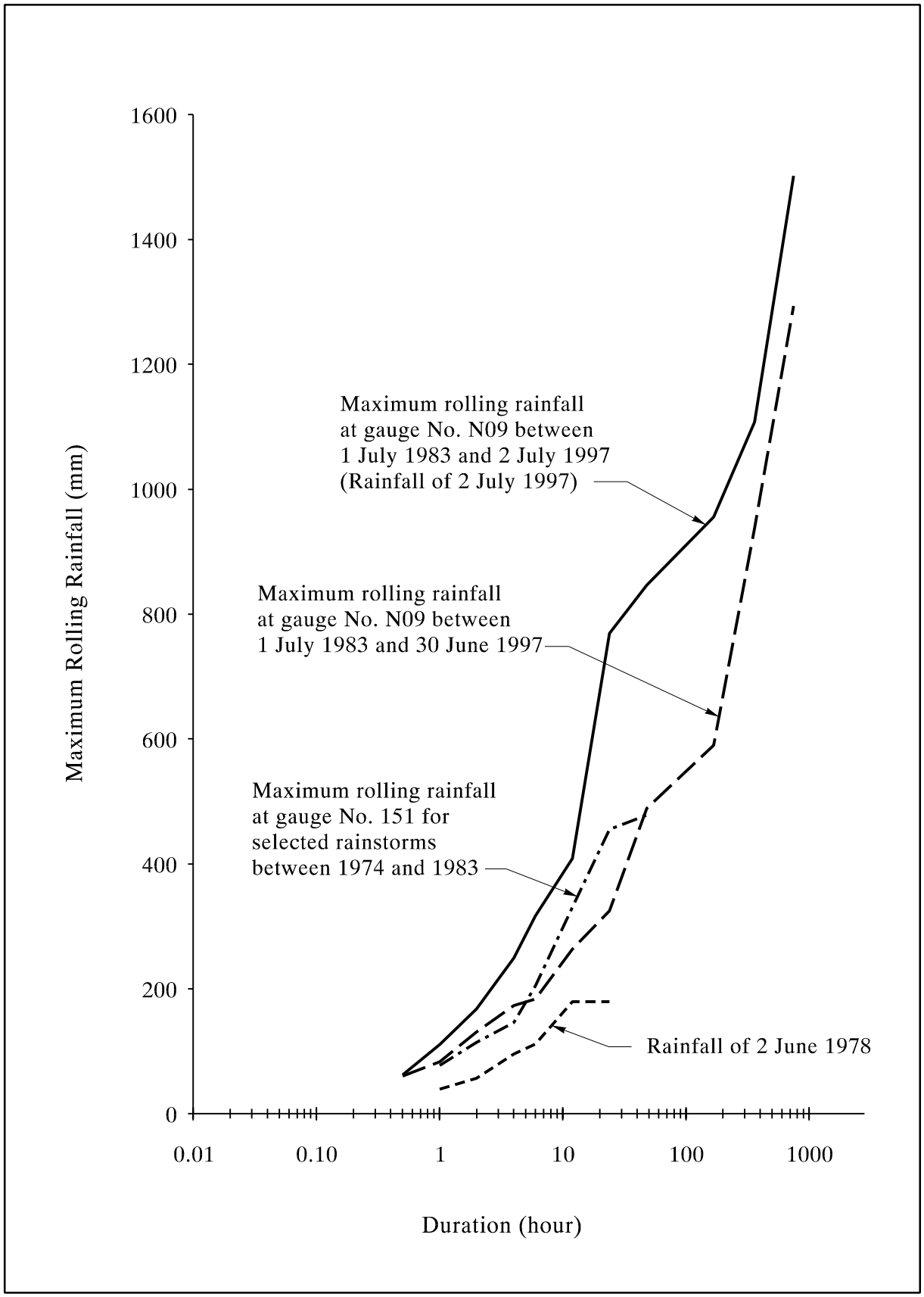


Figure 19 - Maximum Rolling Rainfall at Raingauge No. N09 and at the Autographic Raingauge No. 151 at the Chinese University

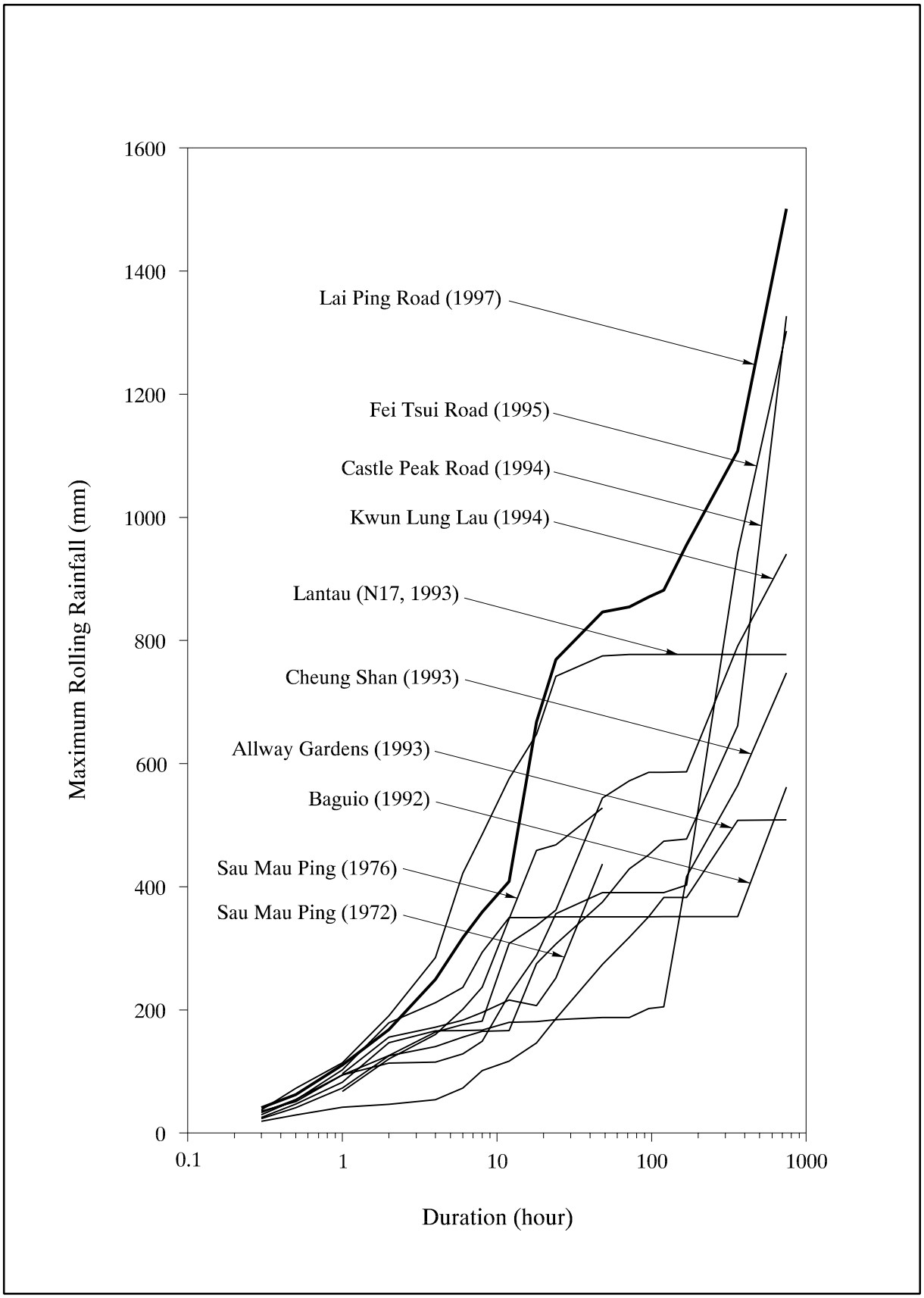


Figure 20 - Comparison of Rainfall Data Recorded at Raingauge No. N09 with Other Raingauges for Major Landslide Events

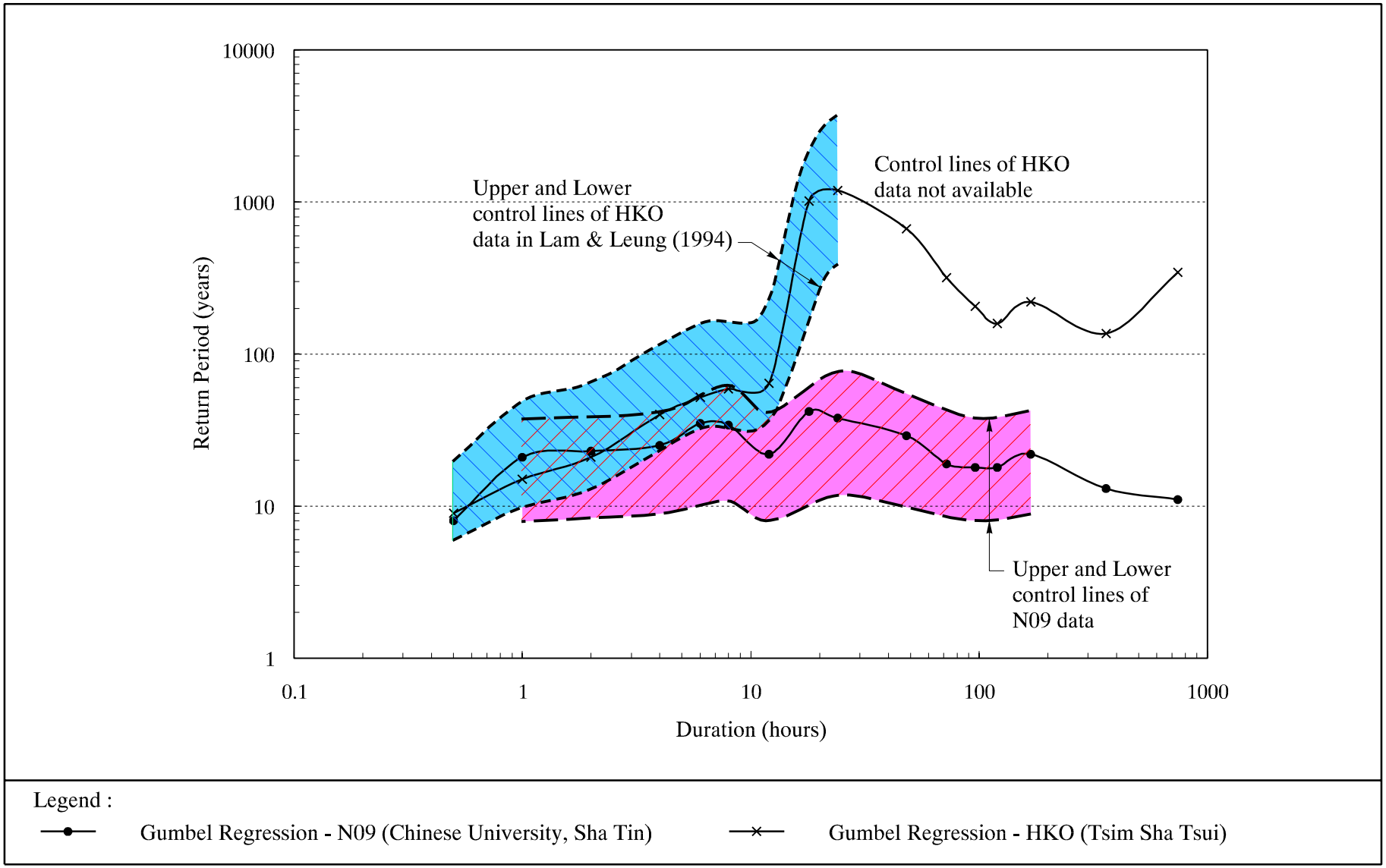
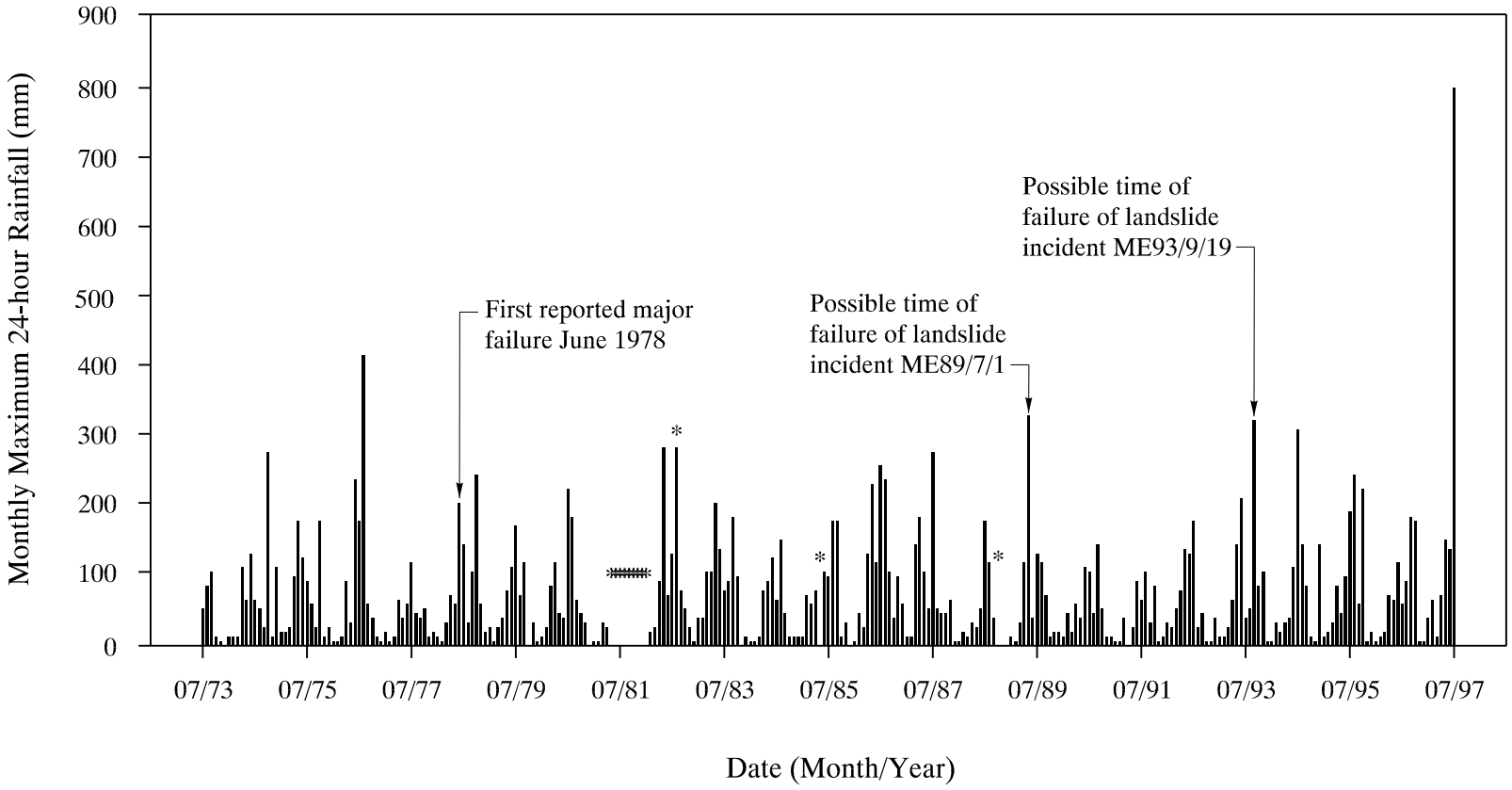


Figure 21 - Return Period of the Maximum Rainfall Recorded at Raingauge No. N09



Legend :

* Data incomplete

Note : July 73 - Dec 83 daily rainfall data of HKO Gauge No.151
Jan 84 - July 97 5-minute rainfall data of Gauge No.N09

Figure 22 - Monthly Maximum 24-hour Rainfall at the Chinese University Between July 1973 and July 1997

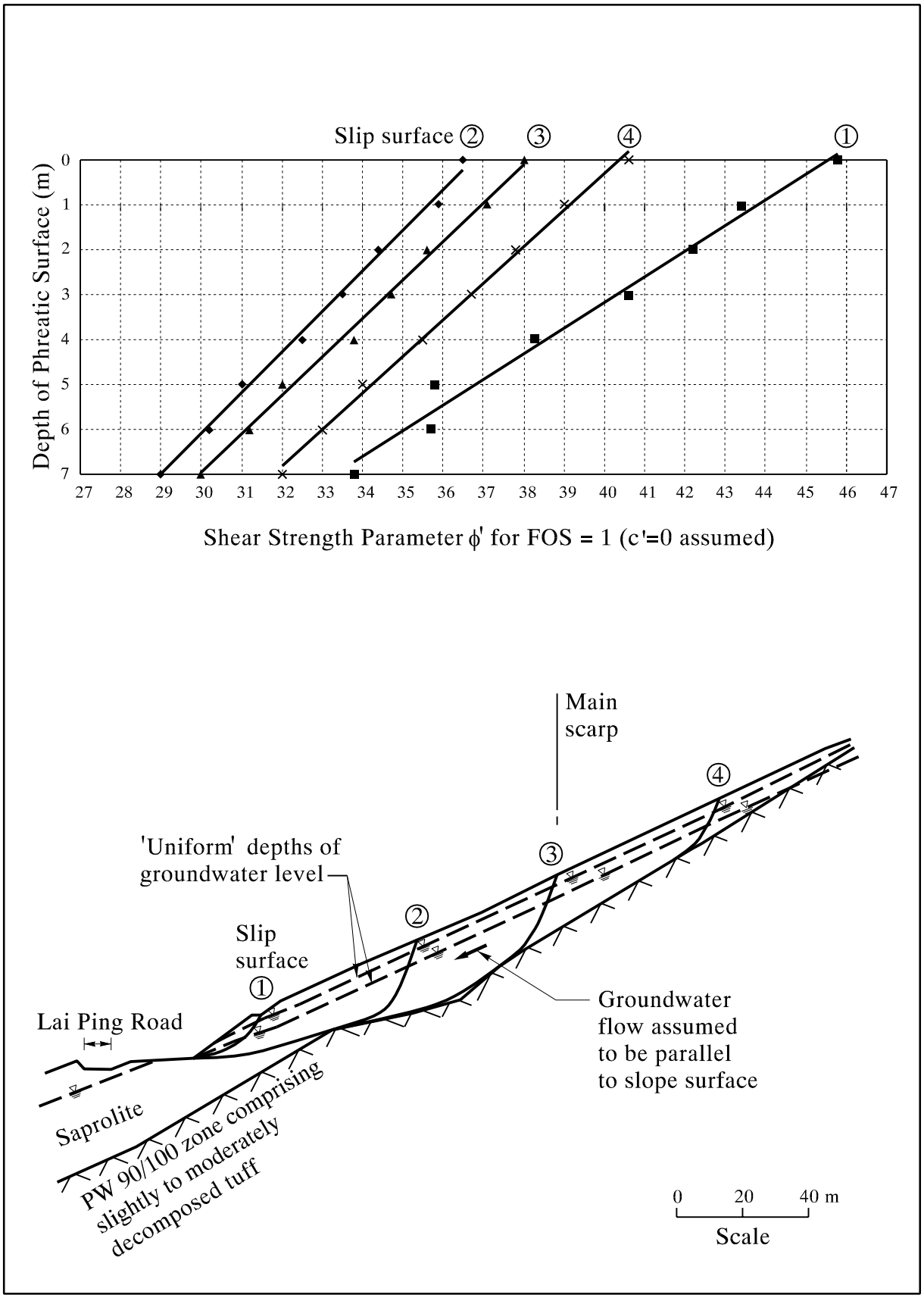
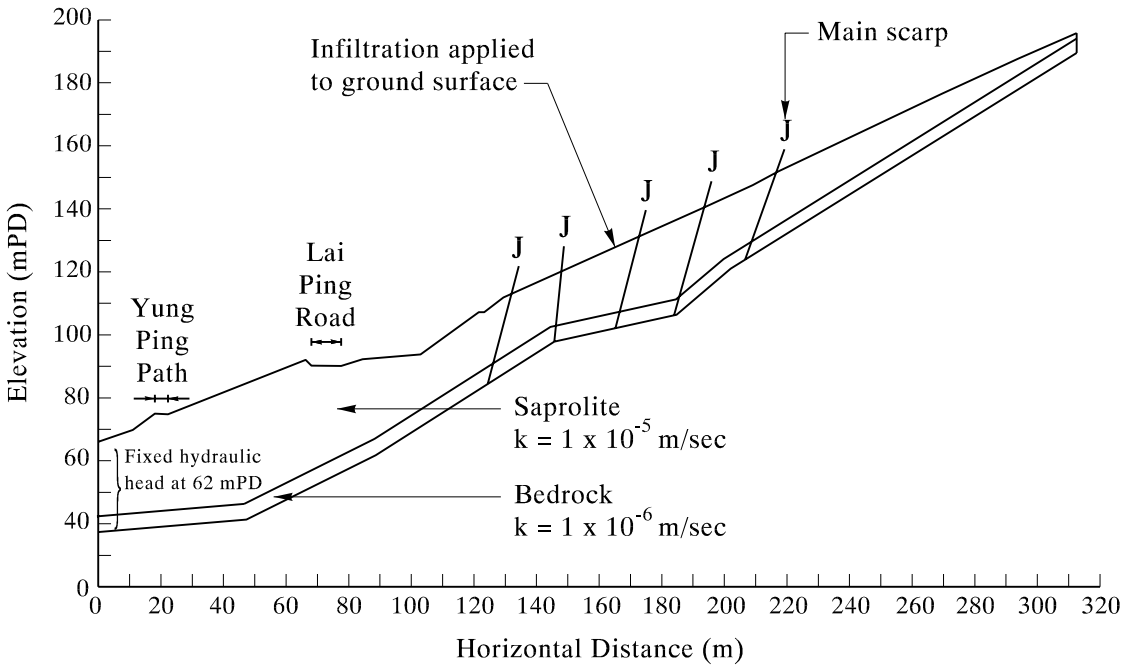
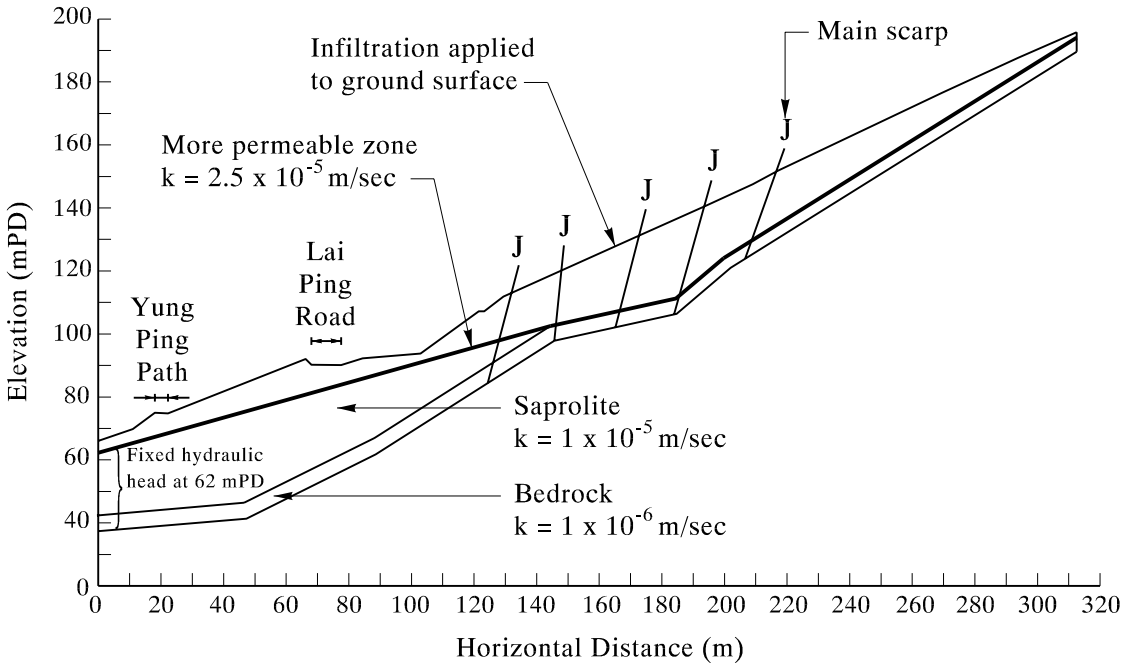


Figure 23 - Sensitivity of Shear Strength on Slip Surfaces and Depth of Groundwater Table on Slope Stability



(a) Model 1



(b) Model 2

Legend :

J	Relict joint (subject to direct infiltration during intense rainstorm in Model 2)
k	Saturated permeability

Figure 24 - Finite Element Mesh for Seepage Analyses

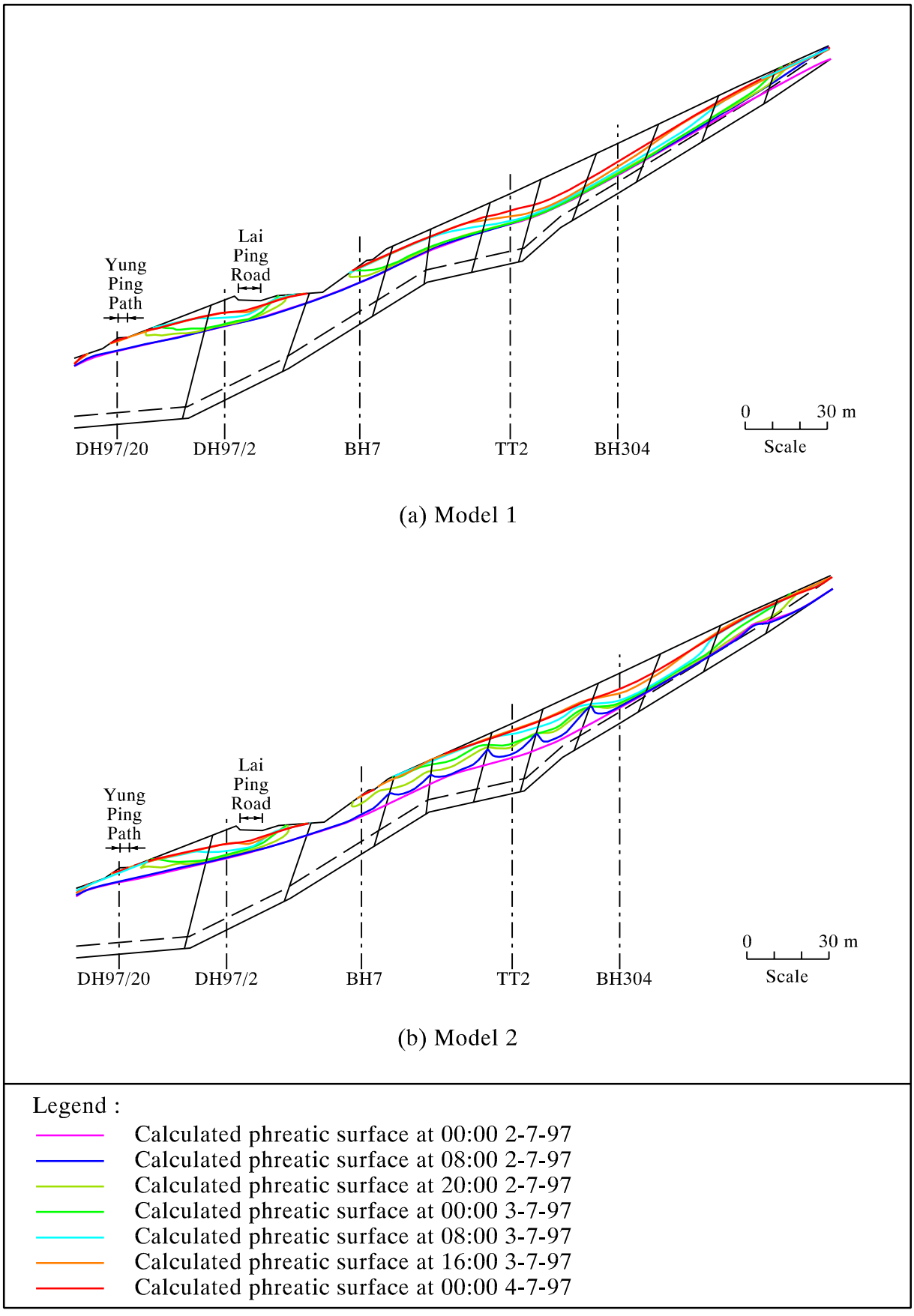


Figure 25 - Changes of Phreatic Surface Calculated by Seepage Analyses

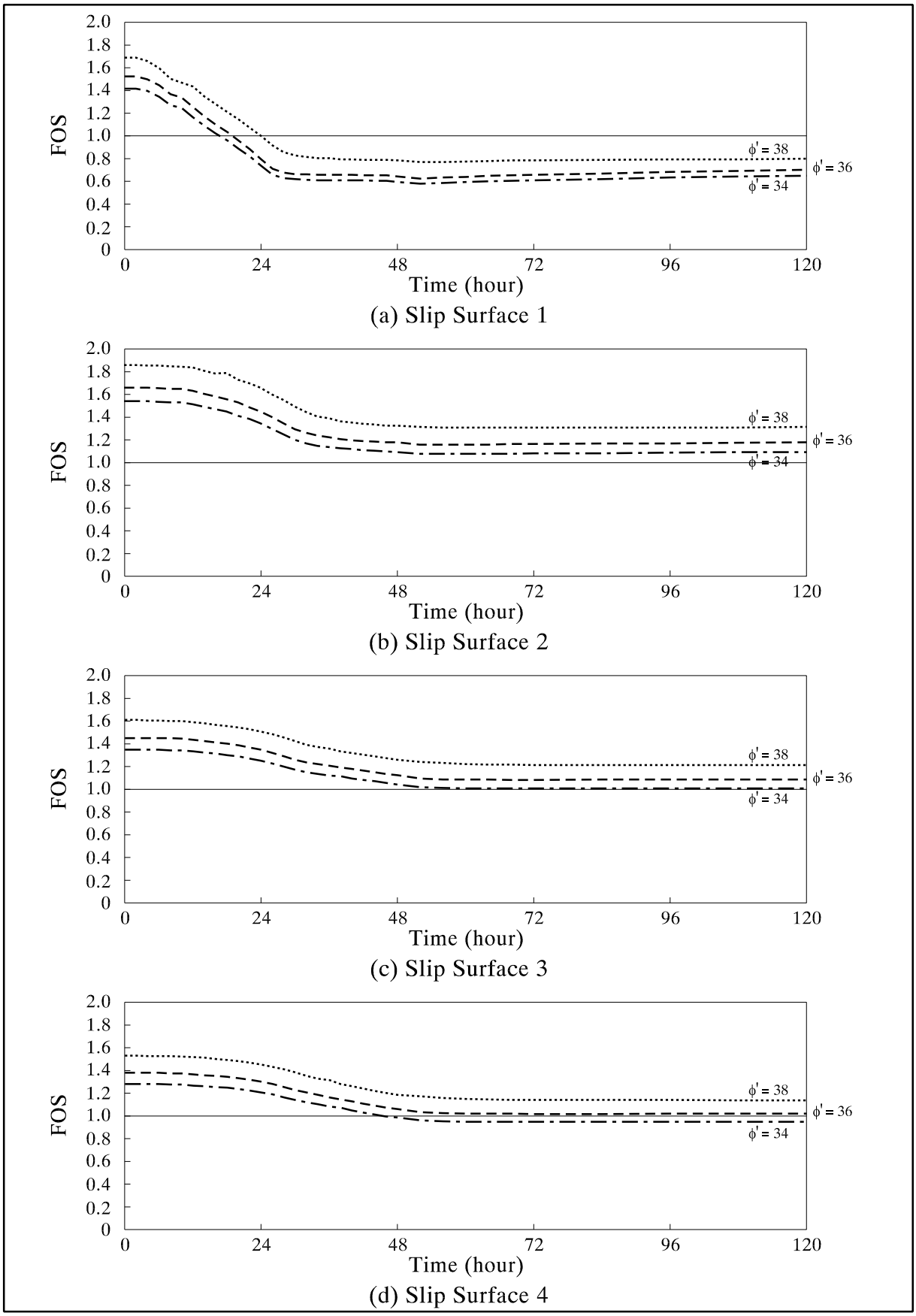


Figure 26 - Temporal Variation of Factor of Safety of Slip Surfaces 1 to 4 - Model 1

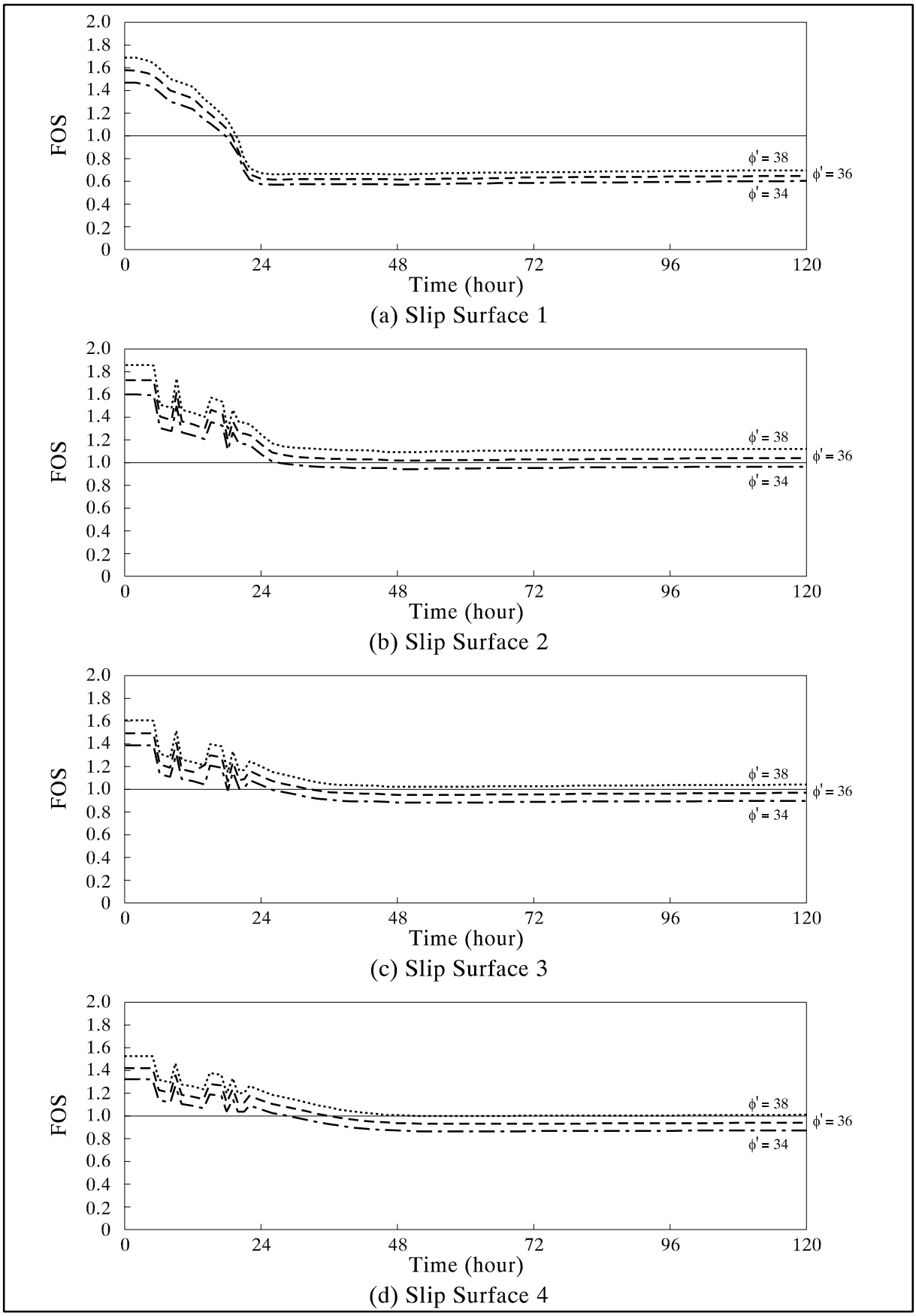


Figure 27 - Temporal Variation of Factor of Safety of Slip Surfaces 1 to 4 - Model 2

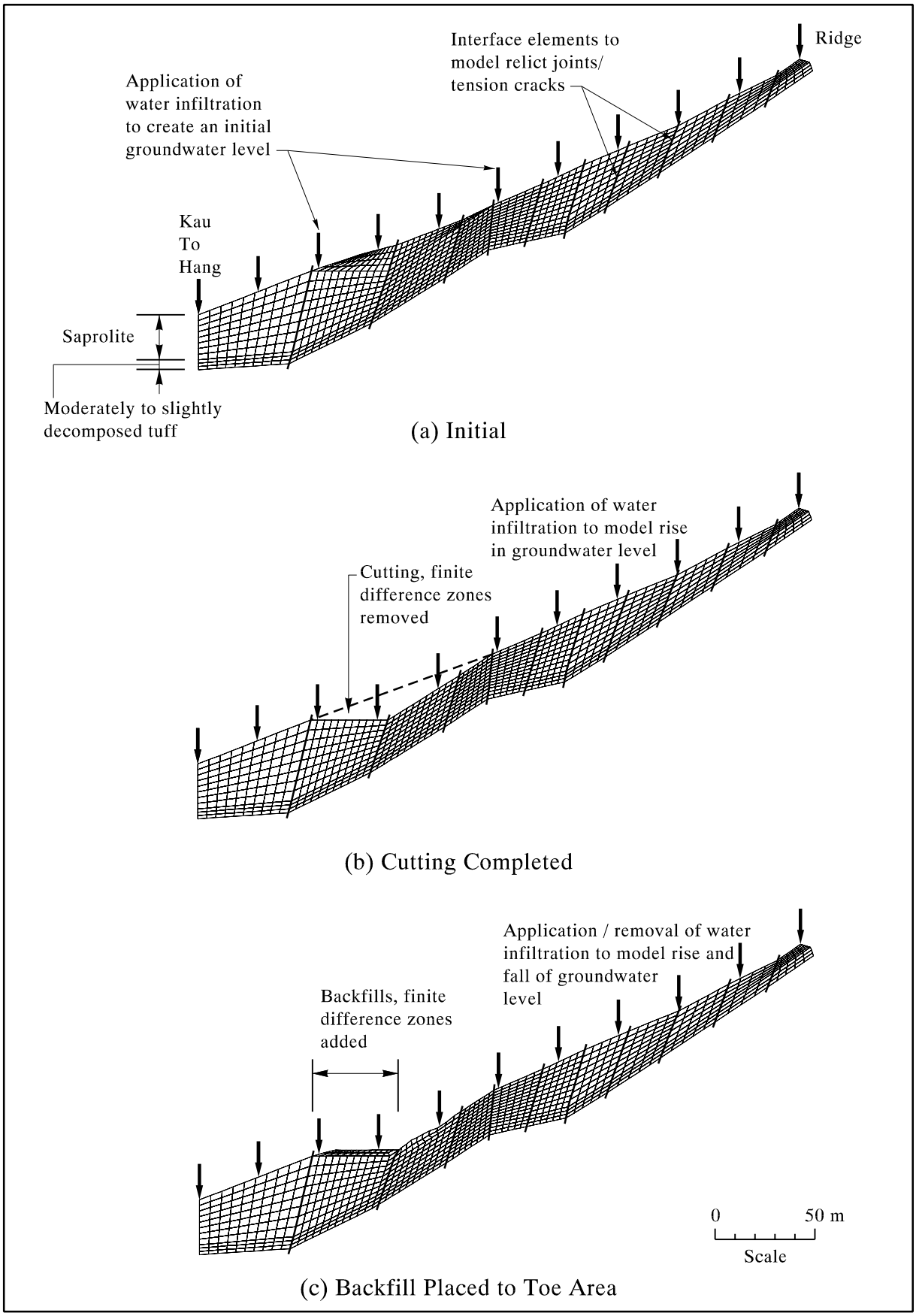


Figure 28 - Finite Difference Grid for Cross-Section 6-6'

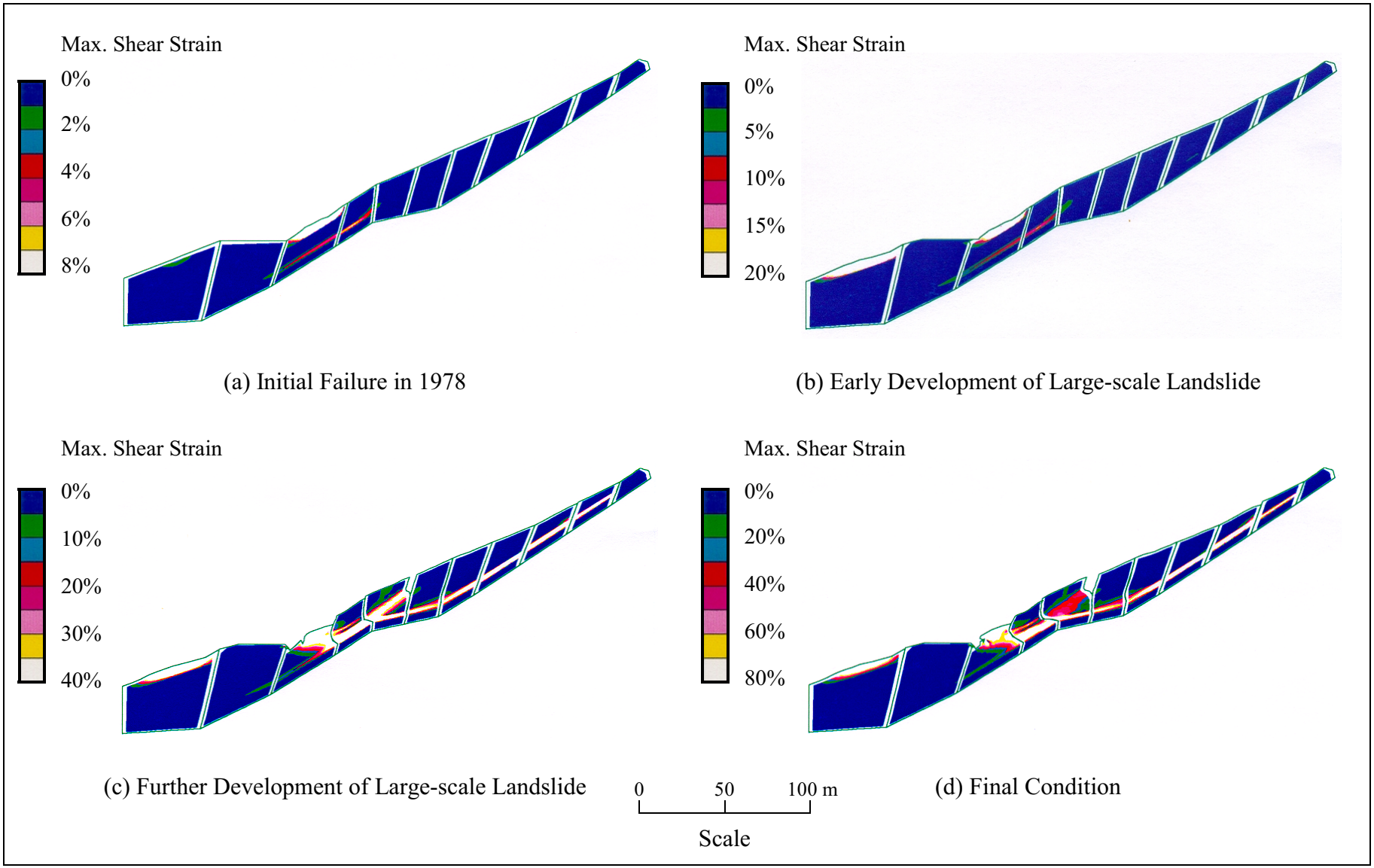


Figure 29 - Shear Strain Mobilisation During the Development of the Landslide Mechanism - Finite Difference Analysis

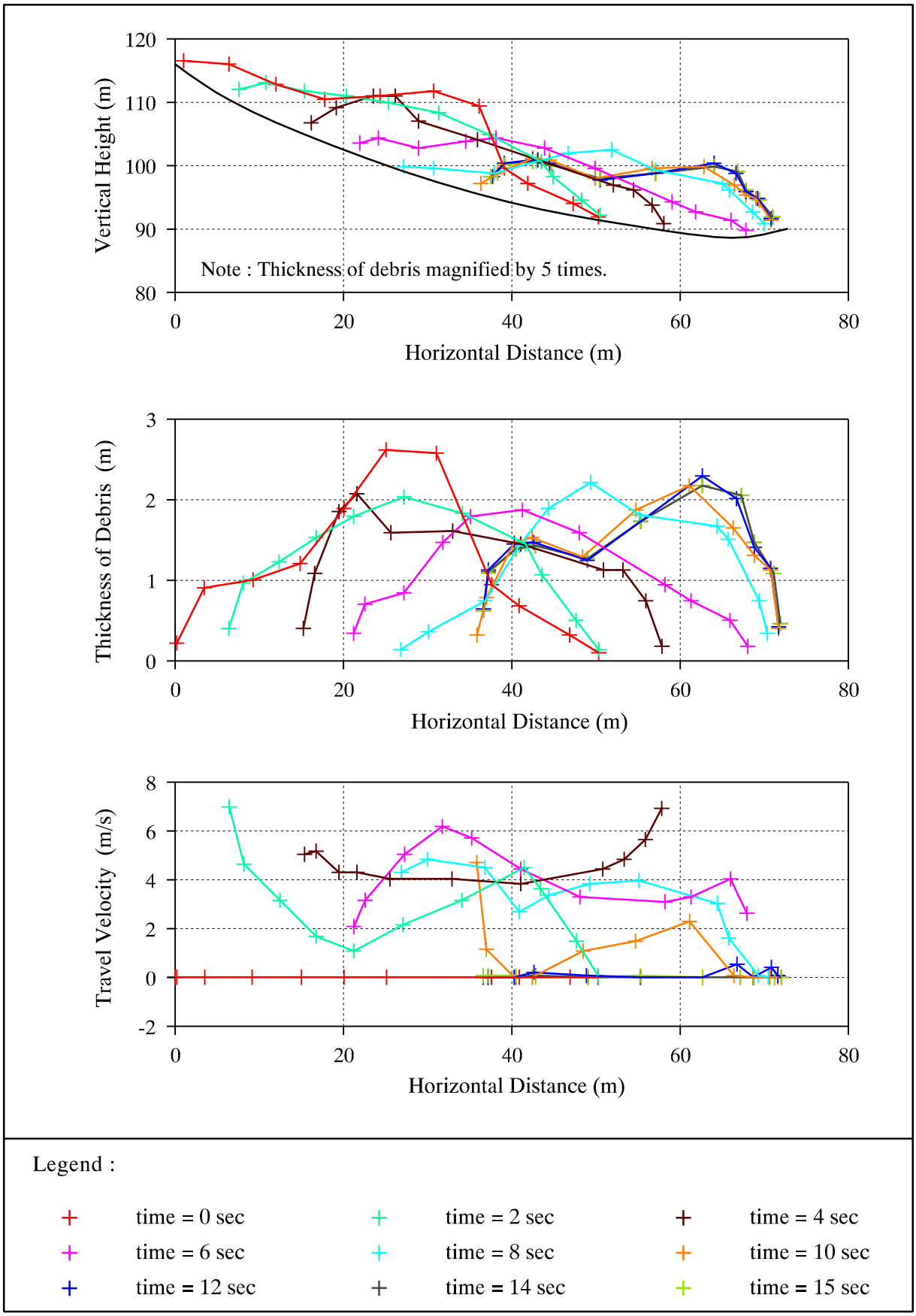


Figure 30 - Dynamic Analysis of Mobility of Landslide Debris from Scar No. 1

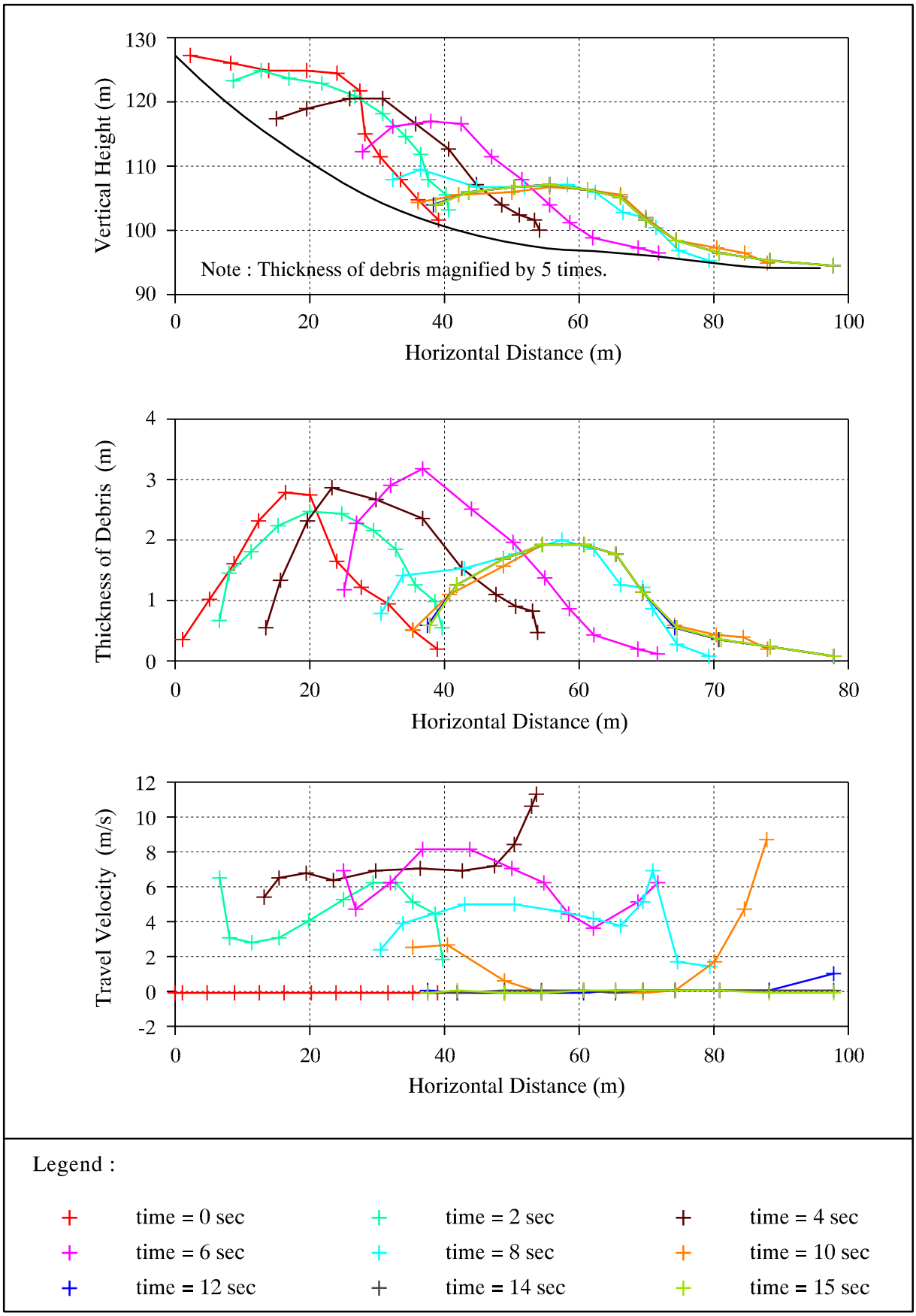


Figure 31 - Dynamic Analysis of Mobility of Landslide Debris from Scar No. 4