UR 1975_54

Assessment of slope stability along Rosevears Drive, West Tamar.

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The section of Rosevears Drive from its southern end [EQ026217] to a point one kilometre north of 'Oban' [DQ978260] was examined on 10 July 1975 (fig. 1).

The road passes over an area of plastic clay and minor sand and gravel of the Tertiary Launceston Beds where there are some slopes of up to 20°. Zones of landslip risk have been drawn on the Tamar Valley Landslip Zone Map, a portion of which is reproduced as Figure 1.

The road itself is mainly on Class III land where failure is possible, but the very presence of the road has in places disturbed the natural ground slope and caused instability. Class III land has in places become active landslip and is now locally Class IV or V.

The construction of the road has required the cutting of banks and some filling on the lower side. These artificial slopes have been supported in some cases by rubble or concrete walls or where active failure has taken place, by piling.

Two degrees of failure are apparent. The lesser consists of a slow advance of the oversteepened slope which if unsupported results in small failures as at Location 3 (see appendix 1) and the closing of the table drain as at Location 4. This movement is probably an accelerated soil creep and is a plastic deformation. This results in the bulging of retaining walls as at Location 12.

The greater degree of failure is characterised by a discrete failure surface and is represented by Location 1. The piled sections at Locations 6 and 10 were probably of this kind. The lesser type can probably pass into the greater if the movement continues for a sufficiently long time.

The remedial measures can be based on two obvious principles, that slope angles must be kept moderate, and that drainage must be maintained. Steep slopes fail back to a natural angle, but this angle can be increased by better-than-natural drainage. Similarly, the small rubble walls are capable of retaining steeper-than-natural slopes. Failure tends to be slow and in general does not risk life and limb, except where vehicles might strike slipped masses of soil or be deflected by road collapse. Vehicle movement at speed can itself cause failure of critically poised masses.

In each instance of failure, a flexible approach but using these obvious principles is likely to be the cheapest and most practicable solution. The failure of small banks as at Location 9 could be rectified by rebattering and the reconstruction of the rubble wall.

At Location 4 reduction of the slope angle again appears to be the best solution, possibly combined with stone counterfort drains running down the slope. The acceptable angle of slope in cases of this king can best be judged from that of the stable slopes in similar material nearby.

Detailed accounts of control measures that have been effective are given by Eckel (1958) and Záruba and Mencl (1969).

REFERENCES

ECKEL, E.B. (ed.). 1958. Landslides and engineering practice. *Spec.Rep. Highway Res.Bd*, Wash. 29.
ZÁRUBA, Q.; MENCL, V. 1969. *Landslides and their control.* Elsevier : Amsterdam.

APPENDIX 1

Locations indicated in Figure 1.

(1) Failure of the road base over a distance of some 30 m results in depression of the road surface and continuing cracking. Bore holes at the foot of and up McEwans Road show that a thick clay succession underlies the whole of this area and that pore pressures are very high. The area in general is Class III (fig. 1) but the small area where the road is in failure is Class V.

(2) The rubble wall on the upper side of the road is under considerable soil pressure and the closure of the table drain has aggravated the clay movement. Small buttresses below the road are damaged and the road in this area must be considered at risk. The steep slopes do not appear active at the moment but convex slopes near 'Bayswater' are thought to have a potential for failure.

(3) Over this section a bank 4 m high is showing small failures on the upper side of the road and rubble walls are under pressure. A wall below the road has collapsed.

(4) A 5 m high bank is here in active failure and has closed the table drain aggravating the condition by disturbing drainage and threatening the stability of the road.

(5) At this point a 2 m high bank is failing.

(6) This section is in Class IV and has been close timber-piled. The piles are not in good condition and may have already moved. Survey marks have been established on them but it is not known by whom.

(7) Rubble walls are here under pressure.

(8) Cuts here in gritty clay to form a space for a garage appear to be stable.

(9) A low rubble wall (one metre high) is under pressure.

(10) Timber piled section. The bitumen seal of the road is cracking at the north end and soil is leaving the piles on the down-slope side. Movement is probably occurring here.

(11) The road surface has failed at this point.

(12) The 5 m high rubble wall is in a dangerous condition over a length of about 20 m and its condition should be rectified urgently. The writer has followed the state of this wall for some years and although movement is slow, a critical condition will soon be reached. The exact origin of the failure is obscured and remedial measures can hardly be suggested without some investigation.

(13) At this point the dolerite bedrock emerges at the surface and is to be seen as very weathered but quite stable material. From here northwards the solid rock is close to surface and virtually no stability problems exist (Class 1).

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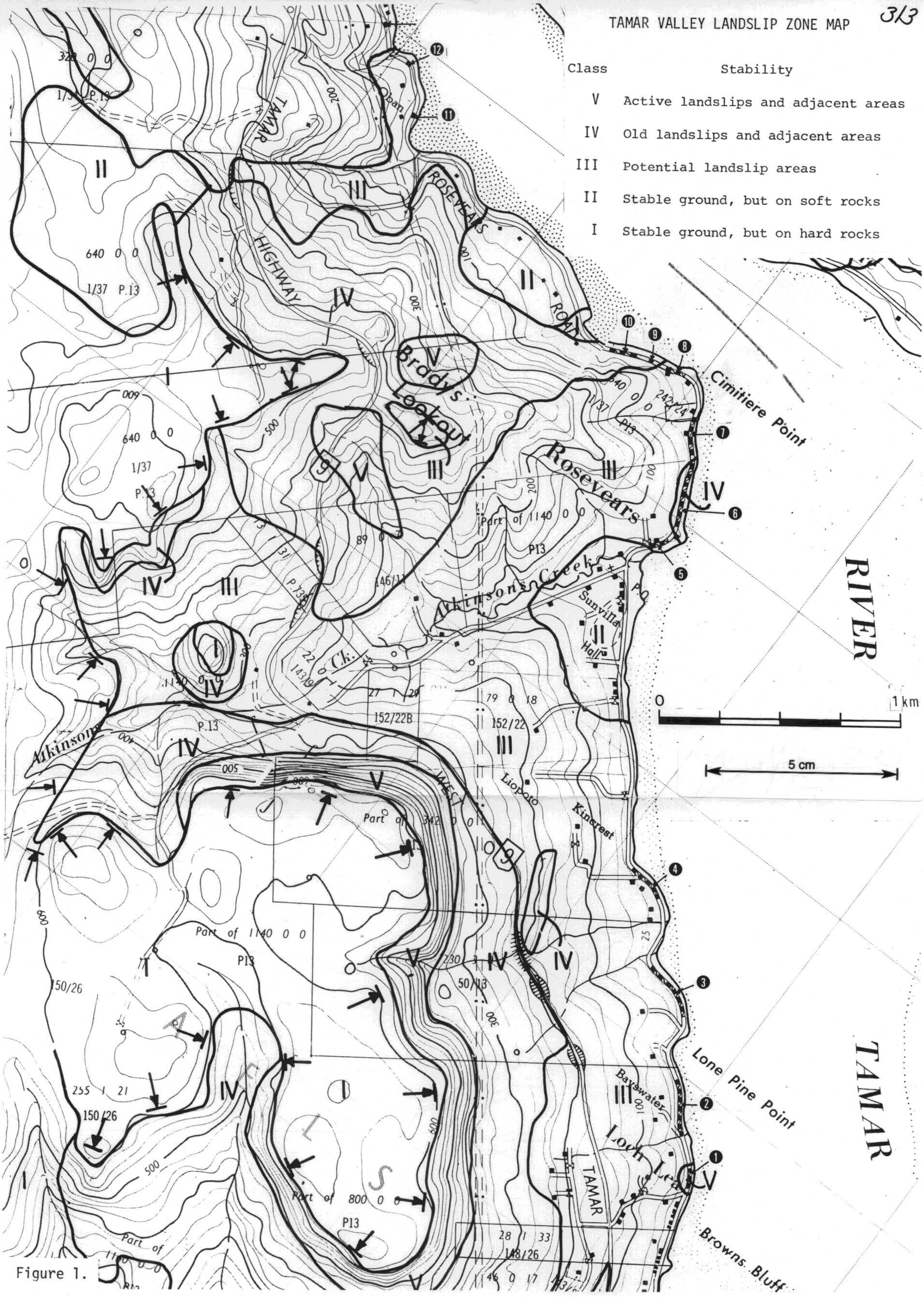
TAMAR VALLEY LANDSLIP ZONE MAP
Class
Stability
V
Active landslips and adjacent areas
IV
Old landslips and adjacent areas
III
Potential landslip areas
II
Stable ground, but on soft rocks
I
Stable ground, but on hard rocks
0
1 km
5 cm
RIVER
TAMAR
Cimitiere Point
Lone Pine Point
Browns Bluff
Bradys Lookout
Rosevears
ROSEVEARS ROAD
TAMAR HIGHWAY
Atkinsons Creek
Sunvilla Hall
Liopoto
Kincrest
Bayswater
Loch Lea
Oban
WEST

Figure 1.