



Division of Mines and Mineral Resources — Report 1991/34

Slope stability of land near Rosevears Drive

by W. L. Matthews

A brief inspection two house sites on proposed lots on land between Rosevears Drive and the West Tamar Highway was made in early 1990. The land slopes towards the River Tamar at varying angles. Much of it is in a Class 4 zone on the landslide zone map with an area of more gentle sloping land in Class 2. A small area of Class 1 is marked nearby.

The house sites have been located on localised flattish land. These benches may represent old landslides but there is no sign of recent movement.

It was recommended that test pits be dug in the vicinity of the proposed house sites to examine subsurface conditions, with the nature of the material to about three metres depth in two to three pits at each site being examined.

Test pits

Eight test pits were excavated on the property in January 1991 to examine subsurface conditions. The approximate positions of the pits are shown on Figure 1, with brief descriptions given in Appendix 1.

The land is largely in classes 2 and 4 on the landslide risk map of the Tamar Valley. There are signs of old landslide movements as shown by the hummocky nature at some locations. In general such land is not suitable for closely spaced housing but sparse development on specially selected sites is sometimes possible, particularly if some added precautions are taken in establishing houses.

Two test pits (7 and 8) were dug on lot 1. Pit 7 was sited on a broad flat area adjacent to an existing house while pit 8 was dug on lower land, again on a flattish area a few metres above road level. These flat areas may represent old landslide features or they may be erosion terraces in part. Each pit encountered hard clayey sediments below about one metre from the surface. Soil and plastic clay overlies the harder clay.

Either area appears reasonably safe for house development. Any house should not be sited any closer than about 10 m from the steep slopes to lower

levels, any excavations should be supported by strong drained retaining structures and disturbance of the slopes (particularly downslope) should be avoided. Excellent drainage should be maintained around the house site and water should not be allowed to accumulate on the surface. Sullage, septic tank and stormwater should not be discharged directly downslope of the house but conveyed around the contour and discharged.

One pit (6) was dug on lot 2. Again hard clay was struck at about one metre below the surface. The site is again on a gently sloping bench and house placement and development recommendations as outlined for lot 1 are recommended.

Two pits (1 and 2) were dug on lot 3. The land in the vicinity of pit 1 is a little hummocky and although fairly hard clay was exposed, the area around pit 2 may be more favourable for a house site (just east of the fence and in the old orchard). The house should be sited on the flatter land away from the slopes to the shallow valley. Drainage and excavations should be dealt with as outlined above.

Lot 4 had two pits excavated (3 and 4) and each encountered fairly soft clay at depths of up to 1.2-2 metres. Below these depths the clay became harder. A minor seepage entered pit 4 at shallow depth. A house site near pit 4 is favoured as it is a little more distant from steeper slopes.

Only one pit was excavated on lot 5 and this was sited below the suggested building site. Soil and fairly soft plastic clay overlies harder clay at about 1.5 metres. The proposed house site is on the middle of a ridge and comprises relatively flat land. Deep excavations around the side of the ridge near the house site should be avoided and good drainage should be maintained.

Soil testing

Properties and composition of the clay from some of the pits have been examined (Table 1).

Table 1
Soil testing results

Pit No.	Depth (m)	LL	PL	LS	Mont	Kaol	Goeth	Gibb	Halloy
2	1.2	134	30	26	25	60	15	(Tr)	-
4	0.7	7	141	29	27	35	55	10	(Tr)
4	2.2	93	27	23	45	45	10	(Tr)	-
8	0.7	112	31	23	30	55	10	5	(Tr)
8	2.0	101	32	22	20	60	10	5	5

LL - liquid limit, PL - plastic limit, LS - linear shrinkage
Mont - montmorillonite, Kaol - kaolinite, Goeth - goethite, Gibbs - gibbsite, Halloy - halloysite
Analyses and determinations by R. N. Woolley.

These results show that the clay samples tested have the potential to display significant expansive properties and foundations should be designed to take this into account. They are also likely to have low strength when wet and this reinforces the advice to maintain areas around house sites as dry as possible.

Conclusions

There appears to be a suitable house site on each lot. Particular attention should be given to ensuring good

drainage around the house sites and stormwater should not be allowed to percolate underground. Houses should not be sited near the edge of any steep slopes and deep excavations near any of the house sites should be avoided if possible. Any significant excavations should be supported by strong drained retaining structures.

[14 January 1991]

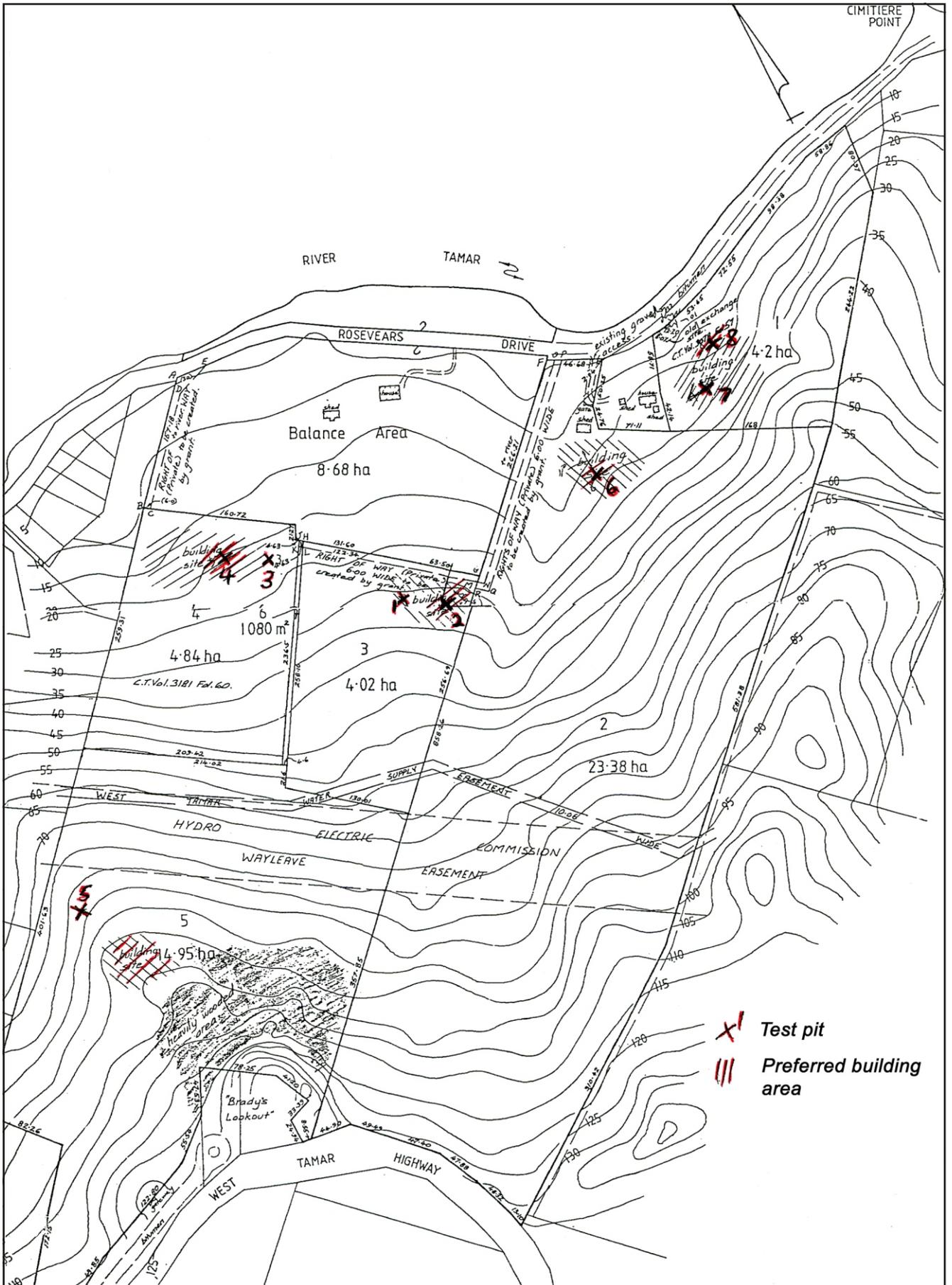


Figure 1
 Location of possible building sites and test pits.

APPENDIX 1

Logs of drill holes

Pit 1

- 0 - 0.25 m Dark brown loose silty soil, roots.
0.25- 1.3 m Mid-brown plastic clay, moderately hard.
1.3 - 1.7 m Mid-brown clay, iron oxide fragments.
1.7 - 2.3 m Brown and grey mottled clay, some grey plastic clay zones, moderately hard.
No water entering pit.

Pit 2

- 0 - 0.15 m Dark brown silty clay soil, roots.
0.15- 1.2 m Brown clay, fairly soft and moist.
1.2 - 1.7 m Brown and black iron oxide stained clay.
1.7 - 2.1 m Hard brown sandy clay, fragmental and dry, occasional basalt boulders.
Hole dry.

Pit 3

- 0 - 0.3 m Dark brown to black organic-rich silty clay, roots.
0.3 - 1.2 m Mid brown plastic clay, moderately soft. Thin seam of grey clay with slip surface on north end extends for 0.3 m+. All clay in this section shows minor slip surfaces.
1.2 - 3 m Harder silty clay, becoming harder with depth.
No seepage – hole dry even though pit is in low location.

Pit 4

- 0 - 0.3 m Dark brown to black organic rock, clayey silt soil.
0.3 - 0.9 m Mid brown plastic clay, soft, fissures and slickensides.
0.9 - 2.0 m Brown plastic clay, a little harder, large basalt boulders up to 0.4 m across.
2.0 - 2.25 m Mid-brown clay, becoming harder with depth.
Minor seepage entering pit at 0.9 m.

Pit 5

- 0 - 0.2 m Dark brown clayey silt.
0.2 - 1.0 m Brown plastic clay, moist, soft, small fissures.
1.0 - 1.5 m As above but becoming slightly harder.
1.5 - 2.0 m Grey and brown mottled clay, relatively hard. Mainly brown at base and very hard.
Centres of hard material in grey clay – probably calcium carbonate.
Dip on contact between grey and lower brown clay about 5°.
Hole dry.

Pit 6

- 0 - 0.25 m Dark brown clayey silt soil, roots, damp.
0.25- 0.6 m Brown plastic clay, fairly soft, moist.
0.6 - 1.2 m As above but becoming harder with depth.
1.2 - 1.7 m Brown and brownish grey mottled clay, silty clay, hard.
1.7 - 2.25 m Fractured clay, breaks into blocky fragments, very hard.

Pit 7

0 - 0.4 m Dark brown-black soil, silty clay, roots, damp.

0.4 - 1.0 m Brown plastic silty clay, soft but becoming harder towards base.

1.0 - 2.15 m Hard brown clay, some fracturing towards base, greyish brown at base.

Hole dry.

Pit 8

0 - 0.25 m Dark brown silty clay soil, roots, damp.

0.25 - 0.55 m Brown clay, plastic, soft.

Hole continued to at least 2.0 m, no log available.