

**TASMANIA DEPARTMENT OF MINES
UNPUBLISHED REPORT 1987/77**

Inspection of house sites near Danbury Park, Legana

by W. R. Moore and W. L. Matthews

A brief inspection was made of two proposed house sites in the area between the West Tamar Highway and River Tamar opposite Danbury Drive, south of Legana (fig. 1).

The property is generally relatively flat except for a steep slope around the margin of some parts of the Tamar Estuary flats. The whole area is underlain by sediments of Tertiary and Quaternary age.

The two proposed house sites (fig. 1) are on top of the steep slopes mentioned above. There are signs of probable old landslips on these slopes near each house site and because of this, it is recommended that houses be sited away from the top of the slope on the more gently sloping land. For the cottage, a site 16–18 m (or no part of the house closer than the post with a board on the side) is suggested and for the main house a site no closer than about 20 m from the top of the slope (a few metres further than the log of wood) is recommended. The latter site is a little more elevated.

These sites are regarded as reasonably safe from any future landslips provided some precautions are taken in developing them. Drainage from stormwater, sullage and septic tank water should be piped away from the steep slope and dispersed to the north or northwest of each site. Trees should be left on the steep slopes or more should be planted, and excavations and disturbance of the steep land should be avoided as far as possible. If a landslide occurs on the steep slopes, particularly near the house sites, remedial measures should be taken as soon as possible afterwards so that wider development of the slip is prevented.

Further investigations

Three trenches were dug on the proposed house site on 7 September (fig. 2, 3). Lithological logs of these trenches are attached (Appendix 2). The soil laboratory testing results from clay samples collected from trenches 1 and 2 are shown in Appendix I.

These laboratory results confirm the field observations that the clay exposed in all three trenches is highly plastic and expansive. All the samples tested have high liquid limits, some exceptionally high with liquid limits of 125 to 150. The range of the plasticity indices is from 60 to 122, with linear shrinkage values of 21–27%. The highest liquid limit and linear shrinkage values are from samples collected from the grey sheared clay in trench 1 (fig. 3). When slow shear box tested this clay gave a very low angle of internal friction of 10 and effective cohesion of 5 kPa.

These laboratory results confirm the field evidence from the site investigation that the clay is highly plastic, closely sheared with polish and would be prone to slope failure (see logs). The clay would also be expansive.

At the proposed site (fig. 2) it would appear prudent to place the house as far away from the steep bank as is practicable, particularly as slope failures have occurred on this bank as shown by the old landslide some 35 m south of trench 1. From the three trenches dug it appears that the clay thins to the north, with the hard sandy clay occurring at shallower depths to the north (fig. 4). This layer, as well as become more shallow, becomes sandier to change from a sandy clay to a clayey sand.

In trench 1 the thickness of the clay, including the soil, is 2.6 m; it is 1.7 m in trench 2, and 1.5 m in trench 3.

In view of all this evidence it is recommended that no building should occur until 20 m back from the edge of the steep bank and with the house preferably sited between trenches 2 and 3 on the flattest area of the low promontory. In addition with such expansive clay, seasonal vertical movements can be anticipated at this site and the foundations should be designed to compensate or withstand these seasonal movements. With such sensitive clays occurring at this site, adequate drainage is essential. The planting of trees and shrubs is also recommended.

[19 October 1987]

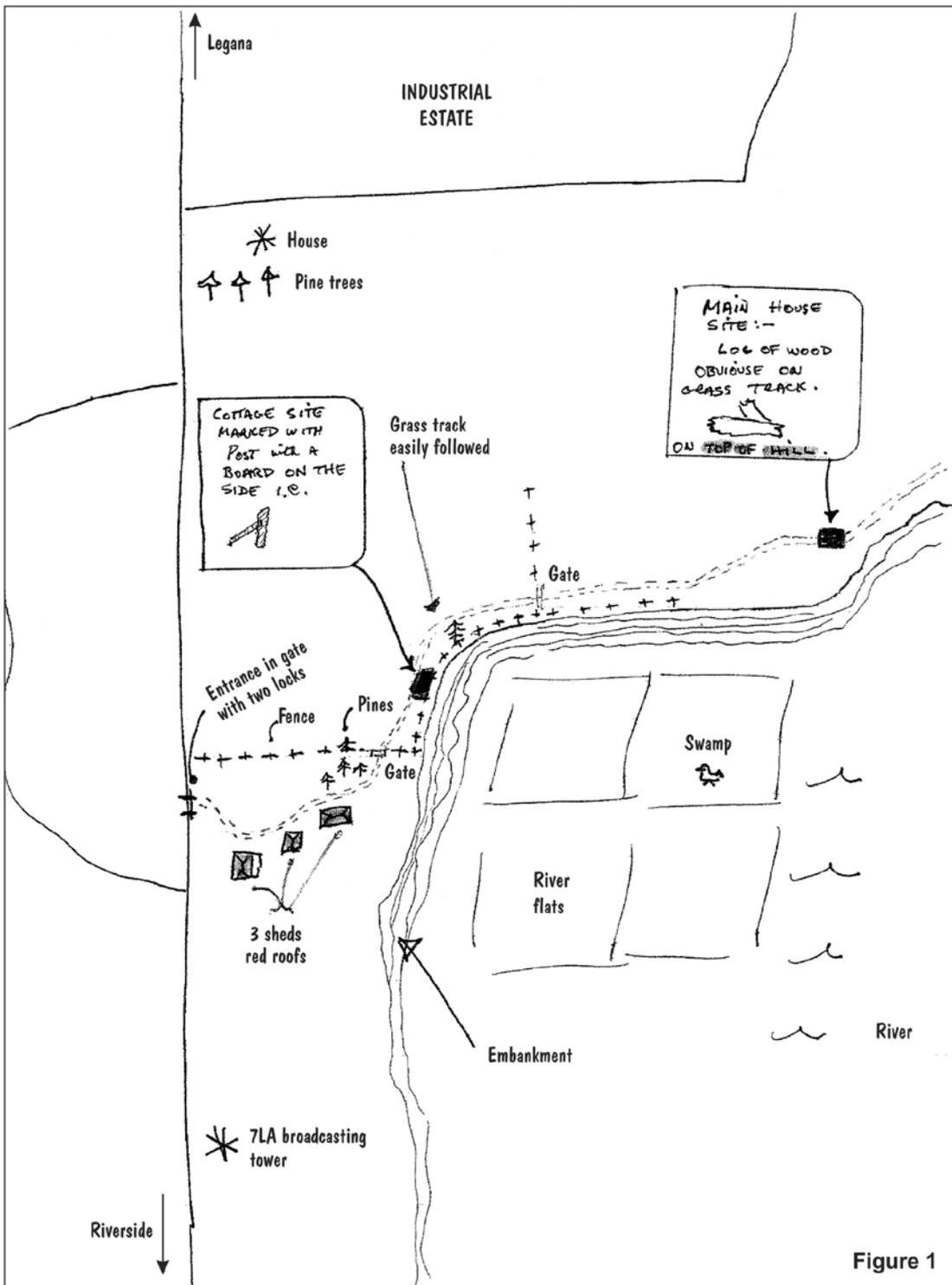


Figure 1

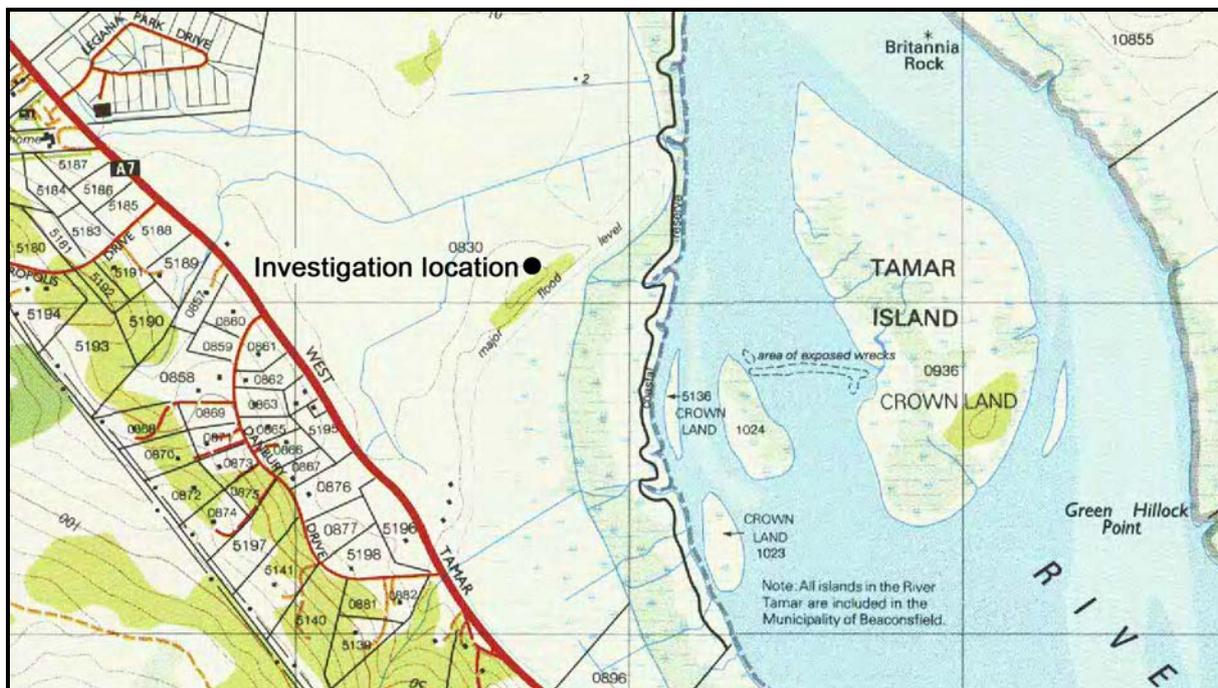


Figure 2

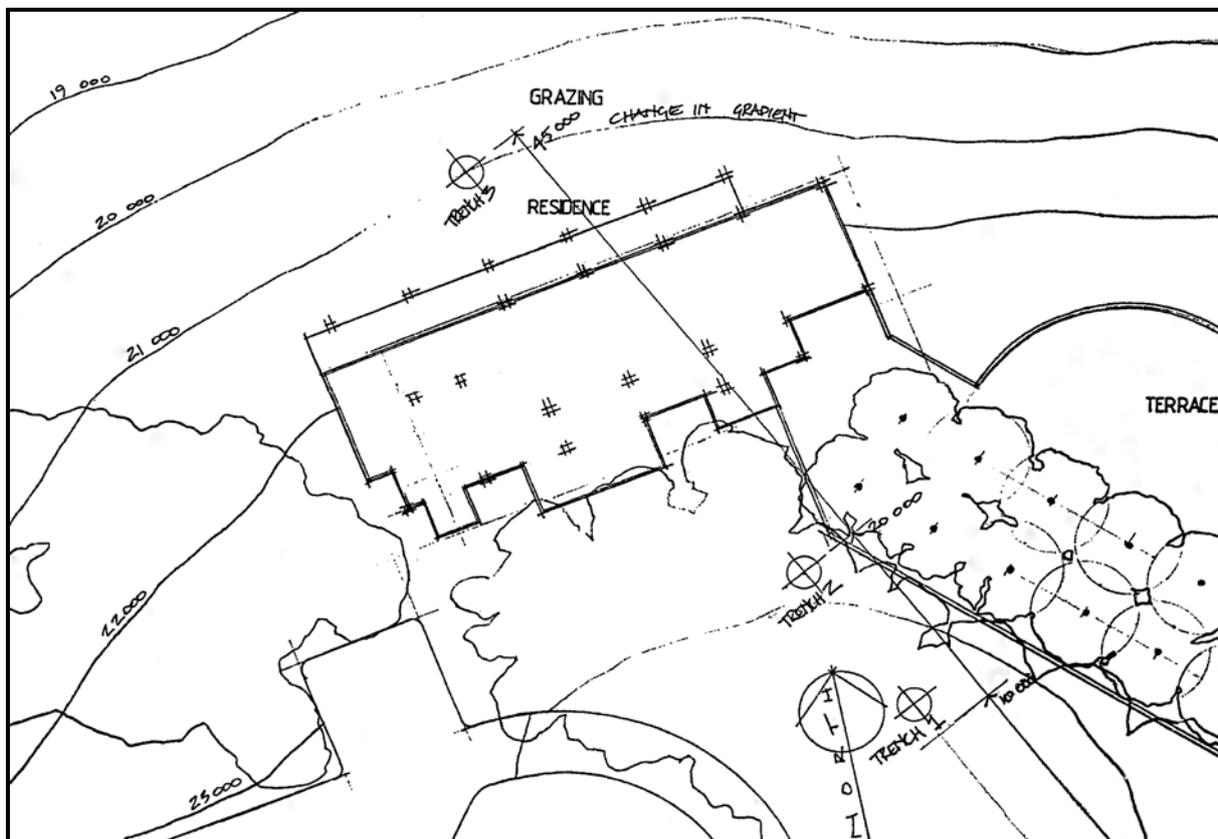


Figure 3

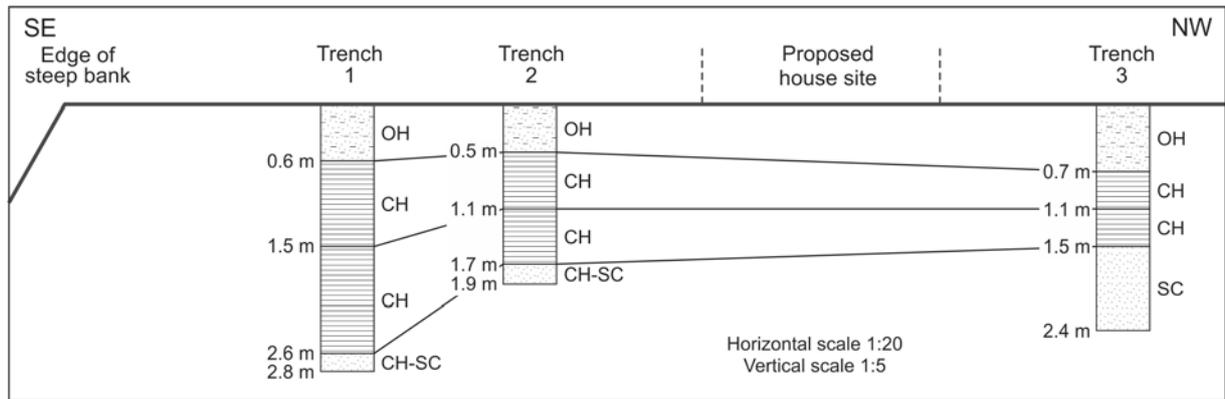


Figure 4

APPENDIX 1
Soil laboratory results, Whitehorse house site investigation, Legana

Soil properties

Location	Depth (m)	Moisture content	Plastic limit	Liquid limit (%)	Plasticity index	Linear shrinkage (%)
Trench 1	0.5	30	24	85	69	23
	1.0	34	26	130	104	24
	1.5	39	31	153	122	27
	2.6	31	20	82	60	21
Trench 2	1.2	27	26	125	99	22

XRD clay fraction results

Location	Depth (m)	Kaolinite (%)	Montmorillonite (%)	Goethite (%)	Lepidocrocoite (%)
Trench 1	0.5	75	5	15	5
	1.0	80	10	10	-
	1.5	90	10	-	-
	2.6	80	20	-	-
Trench 2	1.2	85	15		

Slow shear box test result

Sample — Trench 1, depth 1.5 m

Angle of Friction 10°
 Effective Cohesion 5 kPa

(R. N. Woolley)
 SOIL LABORATORY TECHNICIAN

APPENDIX 2

Logs of excavations, Whitehorse house site investigation, Legana

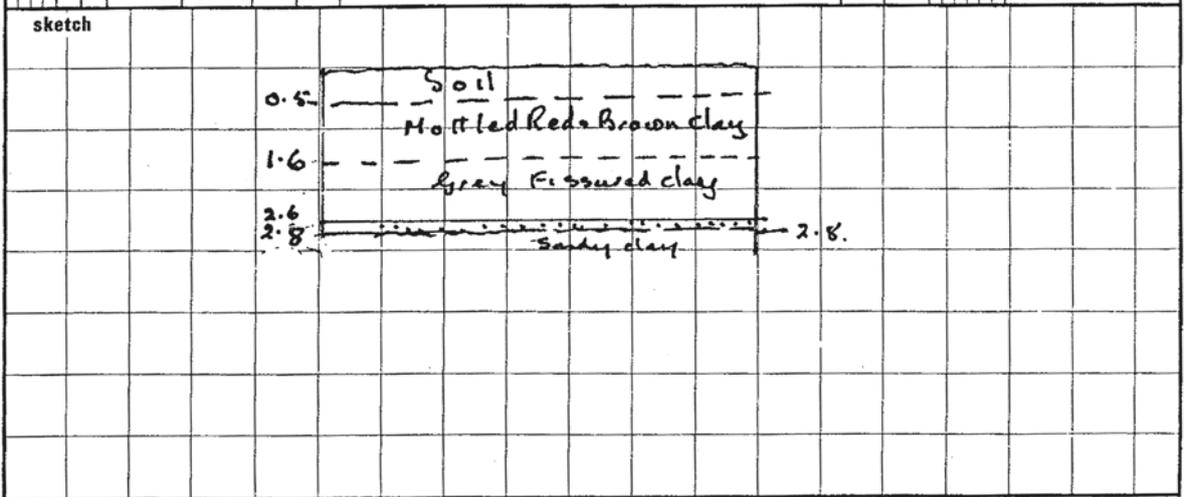
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ENGINEERING LOG - EXCAVATION

excavation no. 1
sheet 1 of 1

project	Whitehorse House. Site Investigation	location	Promontory on Triamar River Flats. Panbury Park Legana (see Rpt.) 10m from cliff edge
co-ordinates	5056/54191	exposure type	Trench.
R.L.	10m approx	equipment	Backhoe
excavation dimensions	1.5m x 2.8m	operator	
		pit commenced	5-9-87
		pit completed	5-9-87
		logged by	W.E.H.
		checked by	R.C.D.

penetration 1 2 3	support water	notes samples, tests	metres R.L. depth	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetr- ometer kPa	structure, geology
									25 50 100 400	
					OH 1 CH	Clay Dark Brown Highly plastic and organic	V	ST		Soil
			52 - 1.0			Clay - Red - Brown Mottled. Highly plastic Some roots. Some plant roots.	M			Sub Soil clay
			53 - 2.0		CH	Clay with Sand - Some Roots Clay - Grey - Highly plastic Shear polished & faceted Sand fine less than 15%.	V	ST		sheared clay
			54 - 3.0		CH Sc	Sandy clay Yellow. Clay - Highly plastic shear Polished and faceted less than about Sand fine Yellow 75%	H			Possible Hard Pan
						At 2.8 Depth. Backhoe Stopped. Trench Too deep To inspect except from surface [All samples undisturbed]				

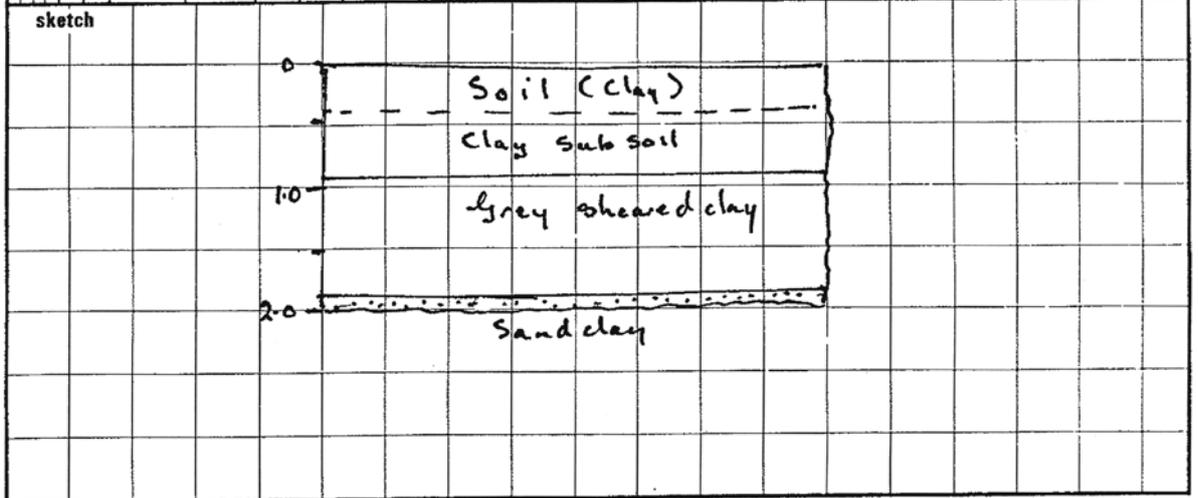


ENGINEERING LOG – EXCAVATION

excavation no. 2
sheet 1 of 1

project	White horse House Site Investigation		location	Promentary on W. Tamar River flats Danbury Park Legana. [See Report Plan]	
co-ordinates	5056/54891		exposure type	Trench.	
R.L.	10m approx		equipment	Backhoe	
excavation dimensions	1.5 x 1.5 x 1.9m		operator		
				pit commenced	5.9.87.
				pit completed	5.9.87.
				logged by	W. R. H.
				checked by	R. C. D.

penetration 1 2 3	support water	notes samples, tests	metres		graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetr- ometer kPa	structure, geology
			R.L.	depth							
						OH	Clay Dark Brown organic		st		Soil
							Clay Red Brown Mottled highly plastic		V st		Subsoil
	un supported	None	SI -	1.0		CH	Clay Grey Highly plastic shear faceted and polished		M st		Sheared clay
				2.0		CH	Sandy clay Sand +18% Fine clay Yellow highly plastic		H		sandy clay
<p>Sequence established Backhoe stopped at 1.9m. [Sample undisturbed]</p>											



ENGINEERING LOG - EXCAVATION

excavation no. 3
sheet 1 of 1

project	White horse House Site Investigation		location	Promontory on W. Tamar, River flats, Danbury Park legana See Site Plan.	
co-ordinates	50 5-6/54191		exposure type	Trench.	
R.L.	10m approx.		equipment	Backhoe	
excavation dimensions	1.5 x 1.0 x 2.4m		operator		
			pit commenced	5-9-87.	
			pit completed	5-9-87.	
			logged by	W. R. N.	
			checked by	R. C. O.	

penetration 1 2 3	support	water	notes samples, tests	metres R.L. depth	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour secondary and minor components	moisture condition	consistency density index	hand penetr- ometer kPa	structure, geology
				1.0		OH	Clay - Dark Brown - Organic becomes highly plastic				Soil
				1.0		CH	Clay Mottled Brown - Orange Highly plastic				Sub soil
				1.0		CH	Clay with Sand Clay Grey Highly plastic Sand Fine 10-15% Poorly graded.				Clay with Sand
				2.0		Sc	Clayey Sands. Brown clay 10%. Sand Fine Poorly graded 4mm Ironstone band at 2.2m				Sandy clay
							Hole stopped at 2.4m				

