

1984/23. Stability assessment of a proposed subdivision at Beverley Hills Road, Punchbowl, Launceston.

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Abstract

A stability assessment of a proposed housing subdivision at Beverley Hills Road, Launceston confirmed areas where building should be avoided. High shrinkage soils occur over much of the area and foundations should be designed accordingly.

INTRODUCTION

The work was done at the request of J.W. Cohen & Associates, of Canning Street, Launceston, and carried out on 2-3 February 1982. The work parallels that done on an adjoining subdivision and will be supplemented by a deep-cored diamond borehole, which will be reported on elsewhere.

The area of about 3.3 ha lies between Ellison Street and Punchbowl Road. Easy access is provided by Beverley Hills Road [EQ139109]. It is covered by light woodland and gorse and is at present used for grazing horses.

The area of the proposed subdivision lies on clays, sands, soft sandstones and thin bedded ironstones of the Launceston Beds of Tertiary age. These materials are known to cause landsliding in the Tamar Valley and the aim of the work was to provide a morphological and stability assessment of the area. The subdivision may then be designed so as to reduce the risk of landslide damage as far as possible and to enable the best use to be made of the land.

PROGRAM OF WORK

The work consisted of two parts, the preparation of a morphological map and the excavation and logging of trial pits.

The first aims to locate and map angles and changes of slope. Contours do not normally reveal these unambiguously and slope segments must be identified, measured and located in the field. This having been done, the origin of changes of slope is then examined in the second part of the assessment, the excavation and logging of trial pits.

The pits are placed in positions that will most readily and economically reveal the subsurface nature of the land, and each is placed to answer a particular problem.

<i>Trial Pit No.</i>	<i>Purpose</i>
1	placed above a change of slope, probably artificial.
2	placed in a slope segment of 8-10° and in an area of apparent high soil shrinkage.
3	placed in a slope segment of 9-10° and in an area of apparent high soil shrinkage.
4	placed above a strong change in slope.
5	placed on a slight change in slope.
6	placed in a 10° slope segment.
7	placed above an anomalous local change of slope suspected of being an old soil flow.

DETAILED COMMENTS ON TRIAL PITS

Logs of the trial pits are included as Appendix 1.

<i>Trial Pit No.</i>	<i>Comments</i>
1	This pit confirms the presence of high shrinkage highly plastic clay, and the change at 2.80 m to a conglomerate band accounts for the change of slope.
2	This pit confirms the presence of a deep section of high shrinkage high plasticity clay. The slope angle is typical for this material.
3	This pit confirms the presence of a deep section of plastic clay. The slope angle is typical for this material.
4	This pit indicates the presence of a thin, strong ironstone band and accounts for the change of slope. Weak sandstone is present below 1.50 m.
5	This pit indicates the presence of a thin ironstone band and accounts for the slight change of slope. Plastic fissured clay is present at 1.70 m.
6	This pit shows a deep section of high plasticity clay. The mottling indicates a tendency to shrinkage.
7	This pit shows an abrupt change in soil type at 1.1 m and disturbance above this level. It confirms the supposition of an old earth flow.

CONCLUSIONS

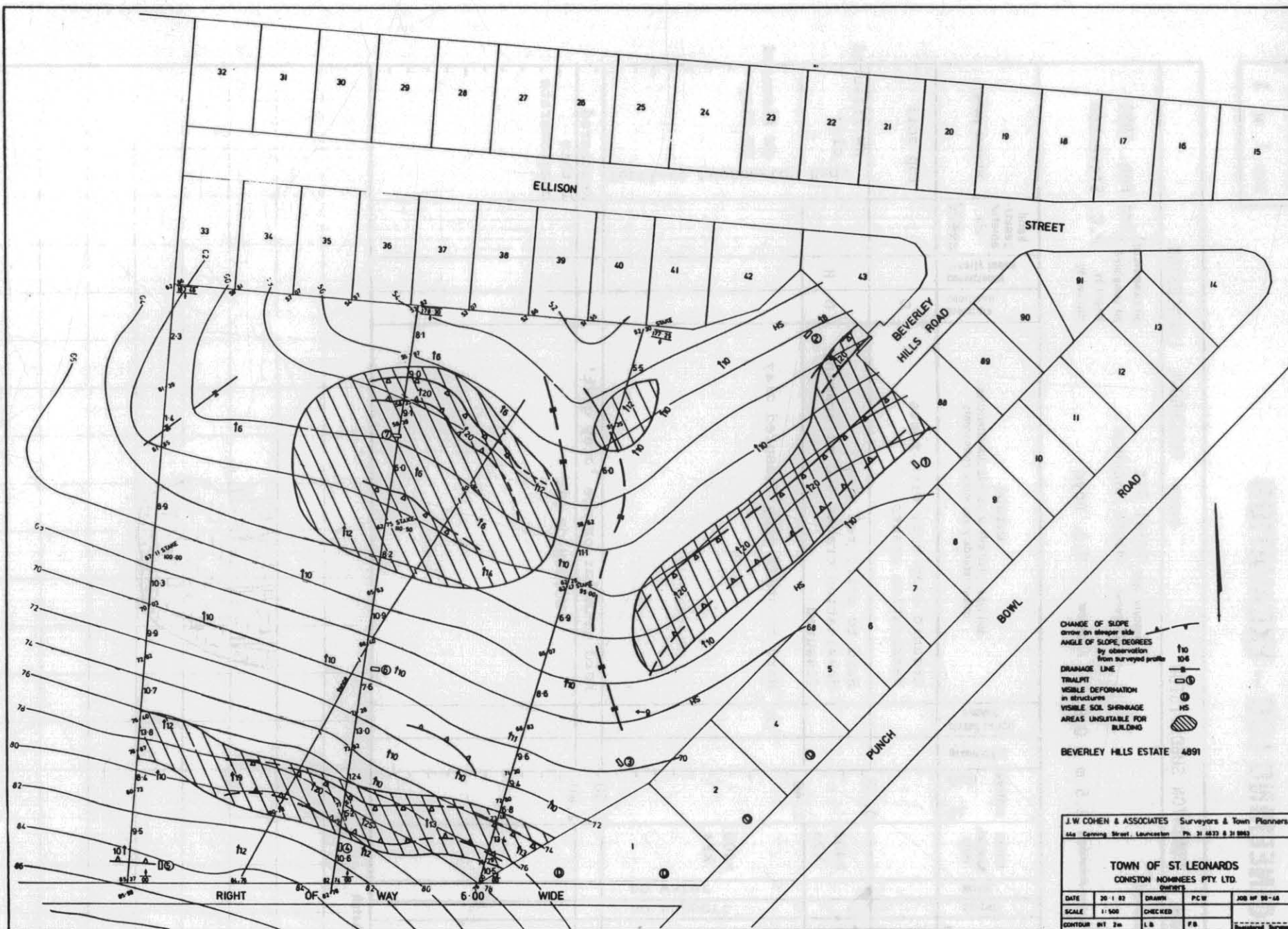
Most parts of the site show the presence of high shrinkage, highly plastic clay. This material requires that the design of foundations take cognisance of this property. House damage from soil shrinkage in Punchbowl and Ellison Roads is common and extensive and can be related to similar material. The steeper areas that have been outlined are confirmed and should be avoided for building purposes.

The avoidance of these areas is not absolute, but any building in them should require specialised investigation and design by a recognised geotechnical engineer and the issue of his certificate to the effect that building is safe.

SUMMARY

The avoidance of building in the outlined areas is confirmed. High shrinkage soils are present in most parts of the area and foundations should be designed accordingly.

[11 April 1984]



excavation no. 1

sheet 1 of 1

23-4

5 cm

ENGINEERING LOG - EXCAVATION

excavation no. 2

sheet 1 of 1

project CONISTON SUBDIVISION location PUNCHBOWL LAUNCESTON

co-ordinates exposure type Trial Pit pit commenced) 3rd Feb. 1981
 equipment Moore Backhoe pit completed)
 R.L. logged by P.C. Stevenson
 excavation dimensions 3.5 m x 0.8 m operator M.J. Boyd checked by

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 25 50 100 200 400	structure, geology
			0.60		Organic clay soil with rootlets dessication cracks, (high shrinkage)	D			
			1.40	CH	Hard brown/grey mottled clay fissured	D		>400	Weathered clay
	support water		2.20		Hard grey fissured clay	D			
	no no		3.10		Stiff brown fissured clay	M		200- 300	Weathered clay
			3.40		Hard grey fissured clay				
					BOTTOM OF PIT				

sketch

ENGINEERING LOG – EXCAVATION

6/10
excavation no. 3
sheet 1 of 1

project	CONISTON SUBDIVISION		location	PUNCHBOWL LAUNCESTON	
co-ordinates			exposure type	Trial Pit	
R.L.			equipment	Moore Backhoe	
excavation dimensions	3.5 m x 0.8 m		operator	M.J. Boyd	
			pit commenced	3rd Feb. 1981	
			pit completed		
			logged by	P.C. Stevenson	
			checked by		

penetration	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 2 3									25 50 100 150 200 250 300 350 400	
				0.50		Pink/grey sandy soil				Organic
					CH	Strongly mottled red/grey moist clay with a few scattered ironstone fragments.	M	St -Vst	150- 350	Disturbed? weathered clay
	no support	no water		3.30						Tertiary Launceston Beds
						BOTTOM OF PIT				

sketch										

ENGINEERING LOG – EXCAVATION

7/10
excavation no. 4
sheet 1 of 1

project		CONISTON SUBDIVISION		location		PUNCHBOWL LAUNCESTON	
co-ordinates		exposure type		Trial Pit		pit commenced } 3rd Feb. 1981	
R.L.		equipment		Moore Backhoe		pit completed }	
excavation dimensions		operator		M.J. Boyd		logged by P.C. Stevenson	
checked by							

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 25 50 100 200 400	structure, geology
				CH	V. hard dry brown shrinking clay	D		>400	Tertiary Launceston Beds
			1.10		Med. strength banded sst, . 10-20 mm	D			
			1.50		strong ironstone band. Near refusal.				
					Low strength friable banded sandstone layers 2-20 mm plant remains	D		50	
			3.20		BOTTOM OF PIT				

sketch									
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8/10

TASMANIA DEPARTMENT OF MINES

excavation no. 5

ENGINEERING LOG - EXCAVATION

sheet 1 of 1

project		CONISTON SUBDIVISION		location		PUNCHBOWL LAUNCESTON	
co-ordinates		exposure type		Trial Pit		pit commenced) 3rd Feb. 1981	
R.L.		equipment		Moore Backhoe		pit completed)	
excavation dimensions		operator		M.J. Boyd		logged by P.C. Stevenson	
checked by							

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 25 50 100 200 400	structure, geology
			0.5		Shrinking brown clay soil	D			Soil
				CH	Sl. mottled red/grey fissured clay	D	VSt		
			1.60		Discontinuous ironstone cobbles 200-300 mm ϕ				
			1.70		Grey fissured clay	M			
			3.60		BOTTOM OF PIT				

sketch									

ENGINEERING LOG – EXCAVATION

excavation no. 6

sheet 1 of 1

project CONISTON SUBDIVISION				location PUNCHBOWL LAUNCESTON					
co-ordinates				exposure type Trial Pit		pit commenced			
R.L.				equipment Moore Backhoe		pit completed			
excavation dimensions 3.5 m x 0.8 m				operator M.J. Boyd		logged by P.C. Stevenson			
checked by									
penetration	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 2 3						Sandy brown soil	D		
				0.7		Strongly mottled red/grey hard clay	D	>300	
	no support	no water			CH				Tertiary Launceston Beds
				2.9		BOTTOM OF PIT			
sketch									

23-10

5 cm