



Test pits on land at Kayena

by W. L. MATTHEWS

Three test pits have been dug on Lot 1, Camms Road, Kayena. Each hole encountered brown clay for most of its depth, with the material at about one metre depth in each pit being relatively soft with slightly stiffer material at deeper levels. Tests on two samples from pit 2 gave the following results:

Depth	1.0 m	1.8 m
Liquid limit	129	117
Plastic limit	32	30
Linear shrinkage	27	24
<i>X-ray analysis, clay size (%)</i>		
Lepidolite	5	—
Halloysite	—	15
Montmorillonite	5	15
Kaolinite	80	70
Goethite	10	—

Determinations by R. N. Woolley

Similar material occurs in each pit. These properties suggest that the clay has relatively high expansive properties and is likely to have relatively low strength when fully softened. This will need to be taken into consideration when designing foundations and siting the house.

It would be preferable not to site the house on the steep slope at the rear of the lot. If it is built at the foot of the slope, as proposed, care will need to be taken to ensure that the present stability is maintained on the slope. Good drainage should be maintained and water should not be allowed to accumulate at any point on the lot. Excavations on the slope should be avoided as far as possible and any cut greater than about 0.75 m depth should be retained with a drained structure. The planting of trees on the slope will also aid continued stability.

In summary, if the above precautions are taken, the lot is regarded as reasonably safe to develop from a stability aspect. Foundations should be designed to take the expansive properties of the clay into consideration.

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Test pit logs

Pit 1

- 0 – 0.4 m Dark brown to light brown clayey silty soil, damp, grass roots.
- 0.4 – 0.9 m Light brown silty clay, moist fragmental to plastic, iron oxide centres up to 50 mm.
- 0.9 – 2.1 m Reddish and grey mottled clay, some iron oxide centres, plastic to fragmental.

No free moisture.

Hand penetrometer unconfined strength measurement
1 to 2.1 m 2.5–3.4 kg/cm³.

Pit 2

- 0 – 0.2 m Dark brown grey silty clay soil, roots.
- 0.2 – 1.1 m Light brown and reddish plastic clay, occasional iron oxide centres, moist.
- 1.1 – 2.1 m Light grey and reddish plastic clay.

No free water in pit.

Hand penetrometer unconfined strength measurement
0.5 to 1.7 m 1.5–2 kg/cm³.

Pit 3

- 0 – 0.3 m Dark grey brown silty clay soil, friable, grass roots.
- 0.3 – 0.6 m Brown clay, friable, plastic, moist.
- 0.6 – 2.35 m Light brown, grey and reddish clay, plastic, moist.

No free water in pit.

Hand penetrometer unconfined strength measurements
0.9 m 0.5–1.5 kg/cm³
1.2 m 1.5 kg/cm³
1.2–2 m 1.5–2 kg/cm³

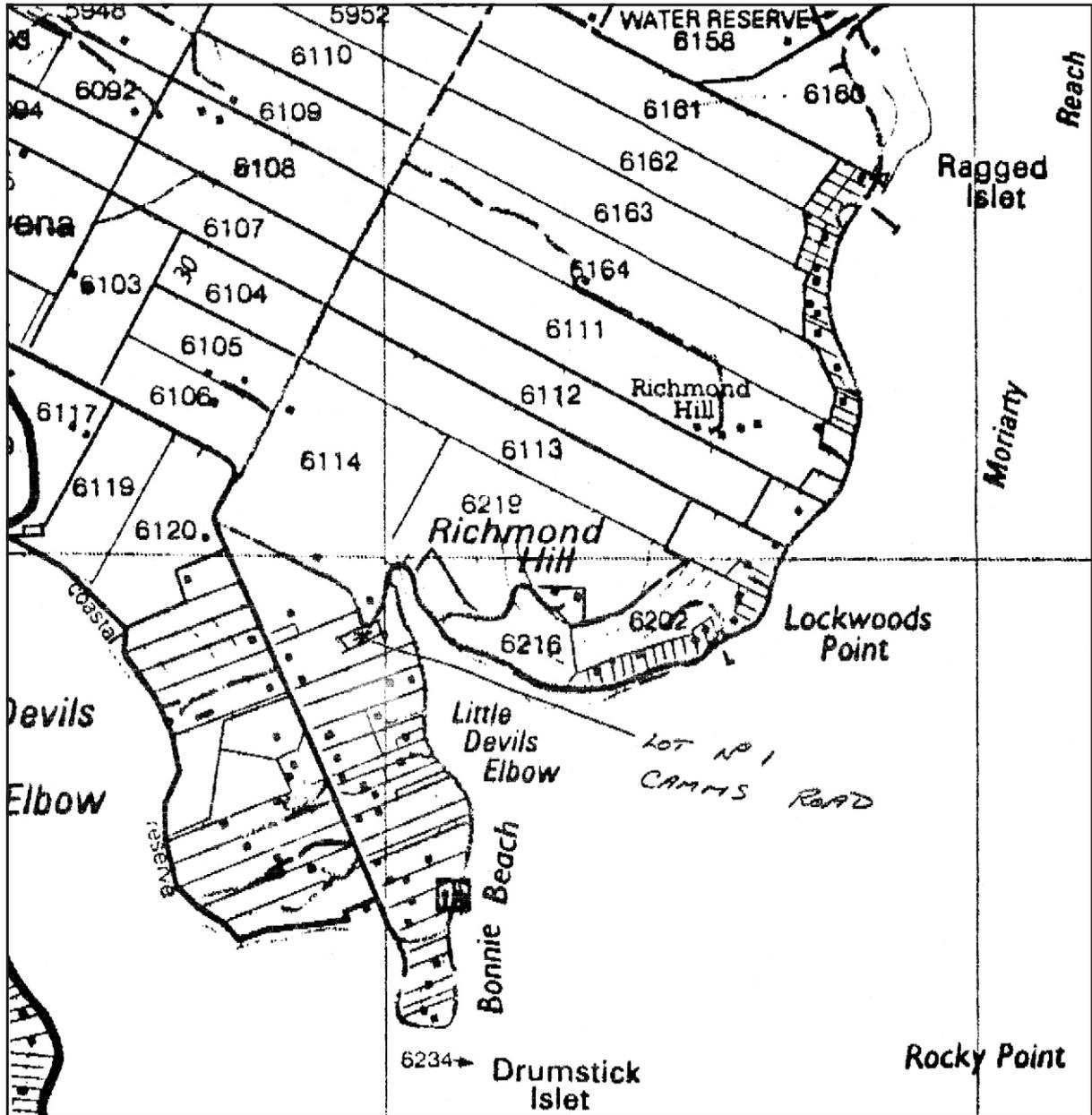


Figure 1
 Location of Lot 1, Camms Road.

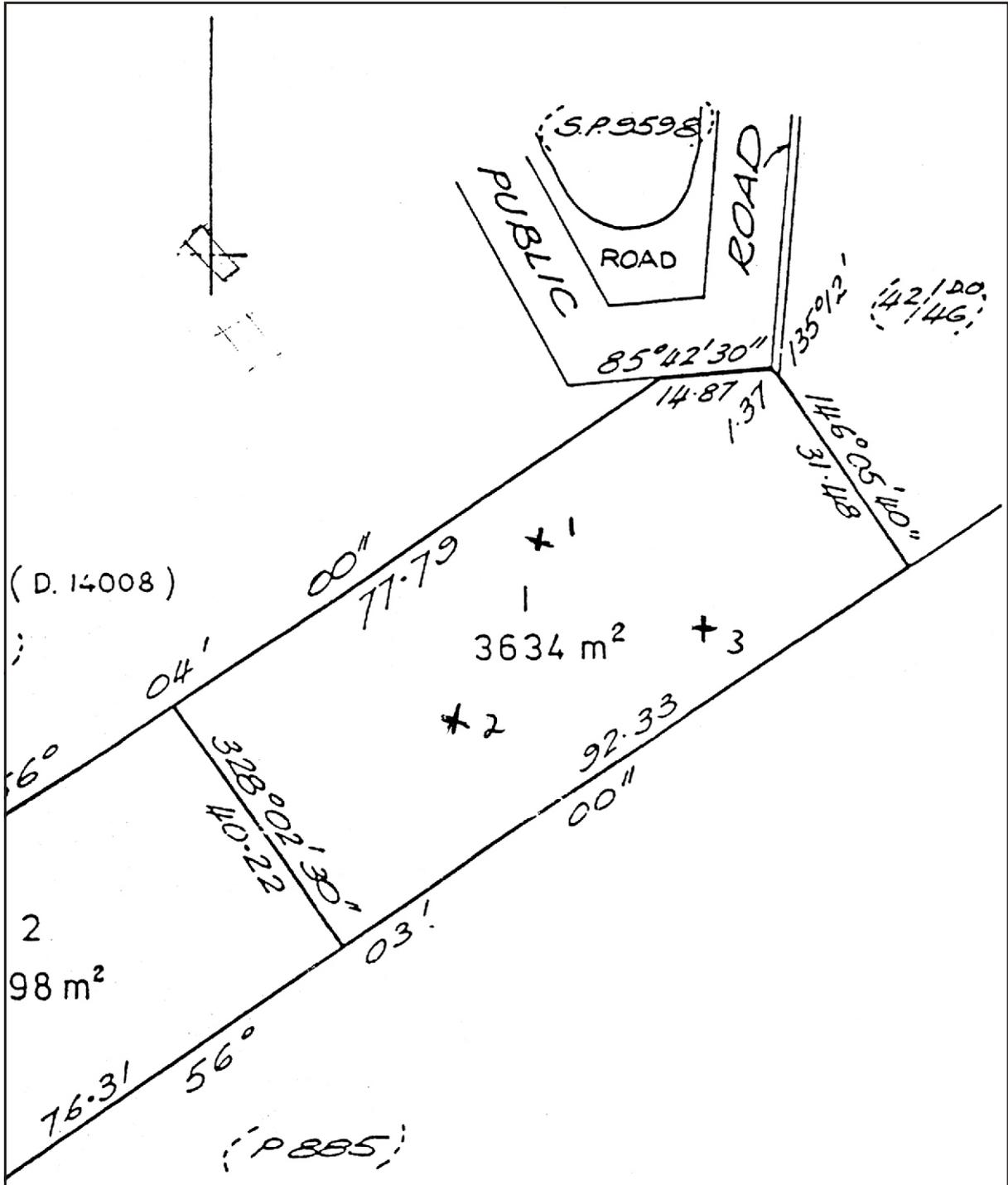


Figure 2

Approximate locations of test pits.