

our ref: BB2798

25th February 2008

Mr David Brewer
648 The Ridge Road
Malua Bay 2536

Dear David,

Re: **Proposed Subdivision of Lot 2 DP250984 Grandfathers Gully Lilli Pili**
Slope Stability

Introduction

We inspected the site on Monday 18th February 2008 to assess slope stability at each development envelope as required in Condition 9 of the DoP document.

Site Description Topography and Geology

The site is located over two ridge lines both pointing to the North. The topography includes gently sloping ridge tops with steeper slopes to the sides of the ridges. There is an intermittent drainage gully line flowing in a northerly direction across Lots 6, 5 and 4. There are smaller intermittent drainage lines flowing to the West down Lot 12 and the NW across Lot 1.

The geology of this site is the Wagonga Formation with cherts, conglomerates, shale, siltstone, sandstone, basic volcanics and phosphorite. Shales were present in the soil profile at the surface, across the upper slopes of the ridge sides. The soil profile generally showed a varying layer of topsoil overlying red brown clays with significant presence of coarse fragments, predominantly shale.

Proposed Development

The proposed development is for a single residence on each Lot, with building envelopes shown on plans by Conway Burrows & Hancock.

Comments on Each Building Site

The sites have been grouped topographically in this description.

Building sites on **Lots 11, 10 and 9** are at the top of the main eastern ridge and the sites are not subject to any risk of slope instability.

Sites on **Lots 8 and 7** are further down the ridge line towards the NW. Site 8 slopes down to the NW at 18% to 25%. There is a high percentage of shale rock chips in the soil profile at the surface. There is very low risk of slope instability at site 8. The same applies for site 7.

Sites 12 and 13 are located on the western side of the ridge and are similar to sites 7 and 8 with regard to topography and geology and also have a very low risk of slope instability.



Looking SE from site 13 - typical of the landform of the higher ridge sites.

Site 3 is further to the NW down the ridge line from Lot 13. It has the same shaley subsoil with a high percentage of gravel. Site 3 also has a very low risk of slope instability.

Lots 4, 5 and 6 are on the North facing rounded ridge at the SW part of the site. The ground slopes on Lots 4 and 6 are less than 18% while Lot 5 has 18% - 25%. **Site 4** is flatter and covered with thick grass. It is clear of the flow path through the dam. It has a very low risk of slope instability.

Sites 5 and 6 have similar characteristics to Sites 7 and 8 but are less steep. They also have a very low risk of slope instability.

Sites 1 and 2 are on the lower part of the site, where a secondary drainage line forms down the ridge, flowing to the NW. Sites 1 and 2 are to the West of this drainage line. There is a small dam on Lot 7, at the head of this drainage line.

Site 2 was higher up the ridge than Site 1, situated in the grassed area above the line of trees. Site 2 is just around the contour from Site 3. It slopes down to the NW and has similar landform and geology to Site 3 and also has a very low risk of slope instability.

Site 1 is further North, down the ridge, in the thick bush area. It slopes at 18% – 25% with steeper 25% – 32% at the NE edge of the site. There is a thicker topsoil layer at Site 1 with leaf litter and organic matter. There were extensive local ground undulations, with humps and depressions up to 1m as shown in the photo below. These are most likely the natural ground conditions. The topsoil at this site was friable pale grey sandy loam to about 0.3m. The subsurface was pale orange clay with a high content of laminated shale chips. Most of the vegetation at this site will be cleared as part of the APZ. Measures for stabilizing sloping ground and revegetating after clearing have been dealt with in reports by others.



Looking East across Site 1 from the existing access track.

We have assessed Site 1 to have a very low risk of slope instability, mainly due to the soil profile.

Erosion Control

Erosion control measures will be required at each site. Depending on the type of building construction chosen, there could be extensive excavation at some of the sites. Before any excavation is carried out, earthworks designs and erosion control measures will need to be designed specifically for each site.

The ongoing stability depends on the initial effective erosion control.

Preliminary Risk Assessment

Our site assessment indicated that there was no evidence of current, overall slope instability on the site.

Excavation Conditions

We would expect any bulk excavations to be in clay with shale chips with a possibility of finding shale bands below 1m depth. Disposal of excavated material in fill batters will need to be carefully considered when designing earthworks around building sites.

Stability of fill embankments and retaining wall designs must be addressed.

Footings

Buildings with column supports to the ground floor are preferable on the steeper sites to minimize excavation.

Yours faithfully

Geoff Metzler & Associates

Geoff Metzler

Director