

# Site Report

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Address: Northern Beaches Council Depot  
55 Middleton Road  
CROMER NSW 2099

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## GEOTECHNICAL INSPECTION

### SLOPE INSTABILITY FOLLOWING STORM EVENT ON 8 MARCH 2022 65-67 HILLTOP ROAD, AVALON BEACH, NSW

#### 1 Introduction

As requested, our Associate Geotechnical Engineer, Mr Jarett Mones, visited the above site with Mr Thomas Lawler on 9 March 2022 to inspect two landslides. The purpose of our inspection was to provide preliminary advice regarding stability of the site and advise on 'make safe' measures that can be initially implemented following two landslides below 65-67 Hilltop Road. Once the site has been made safe, advice will be required on potential remedial measures that may be adopted in the long term. This site report confirms our discussions on site.

#### 2 Brief Site Description and General Observations

A site location plan is included as Plate 1. The site is positioned on a hillside that slopes down to the west towards Pittwater. The site includes a steep embankment that runs from the concrete driveway providing access to 65 and 67 Hilltop Road down to Hilltop Road. The embankment is about 6m to 8m high, is vegetated with shrubs and trees and slope down at about 40° to 45°. At the toe of embankment is a level verge that is about 3m wide.



## Plate 1: Site Location Plan



Two landslides or debris flows have occurred in this embankment. The backscarp of these slides extend below the concrete driveway slabs with the debris slides or flows extending to Hilltop Road and running out approximately 3m to 4m onto the road itself. These are described as the northern and southern landslides below.

Below is a brief description observed at the northern landslide as shown on Plate 2:

- The landslide or debris flow had a width of about 5m and a total length of about 17m to 19m, which extends from the backscarp to the foot or zone of accumulation of the slide.
- The backscarp extends up to about 0.5m below the concrete driveway and exposed a pier, suggesting that the driveway has been designed as a suspended driveway. It was unclear the depth or materials the pier was supported on. The driveway appeared to be in good condition. There was no kerb on the northern side or downslope of the driveway and it appears stormwater flows from the driveway and then onto the embankment as shown on Plate 2.
- The materials exposed at the surface appeared to be a mixture of clay and cobbles.

Plate 2: Northern Landslide





Below is a brief description observed at the southern landslide as shown on Plate 3:

- The landslide had a width of about 6m and a total length of about 14m to 16m, which extends from the backscarp to the foot or zone of accumulation of the slide.
- The concrete driveway appears to be in poor condition, showing signs of distress in the form of cracking. It also appears that the driveway is not suspended but has been constructed as a slab on grade, although this should be confirmed by a structural engineer. The backscarp of the landslide has undercut the slab to a depth of about 1m. There was no kerb on the edge of the driveway and it appears stormwater flows from the driveway directly onto the embankment, as shown on Plate 3.
- At its narrowest the driveway has a width of about 4.6m.
- The materials exposed at the surface appeared to be a mixture of clay and cobbles.
- Stormwater and sewer PVC pipes were broken prior to or during the landslide and water was flowing from the services on our arrival on site. These services were repaired whilst we were on site as shown on Plate 3.

Plate 2: Southern Landslide





### 3 Comments and Recommendations

We consider the main hazards to be further slope instability and debris flows along the embankment that extend below the driveway and potentially destabilise it or potentially impact users of Hilltop Road.

### 3.1 Short Term Recommendations

For the short term we recommend the following:

- Maintain an exclusion zone as follows:
  - Close the full width of the driveway for a minimum of 5m to both the north and south of the landslide areas. Prior to our arrival an exclusion zone had already been installed using temporary fencing.
  - Below the slide extending a minimum of 5m to both the north and south of the landslide areas and extending a minimum 3m out from the kerb and gutter of Hillside Road.
- Following removal of the landslide debris in the road reserve and verge, place filled bulka bags along the length of the landslide that extends a minimum of 2m beyond in width of the landslide in each direction. Based on discussions with Thomas Lawler this was carried out on 10 March 2022.
- Check potable water, stormwater and sewer pipes for cracks/breakages and replace as required.
- Engage a structural engineer to assess the suitability of the existing driveway to perform adequately in the current condition and should further undermining of the driveway occur. This may require further investigation of the depth and materials on which any piles are supported.
- Sand bag the edge of the driveway to minimise stormwater flows from the driveway on to the embankment.
- Place tarpaulins over the surface of the embankment where the landslips have occurred.
- Undertake a survey of the landslide and adjoining properties.
- Undertake a slope stability assessment in accordance with the Australian Geomechanics Society (AGS) be carried out by a geotechnical engineer for the slope instability hazard on risk to property and life. This will include subsurface investigation to both identify the soils present and the depth to and quality of the underlying sandstone bedrock.
- A civil engineer should review the stormwater design.

### 3.2 Long Term Recommendations

Long term recommendations will be reviewed following the outcomes of the stability assessment. Recommendations are likely to consider the following for the long term support of the landslide:

- Appropriate long term support measures which may comprise support using soil nails or the placement of a catch fence at the toe of the slope.
- Appropriate subsurface and surface drainage, in particular the construction of kerb and gutter along the full length of the downslope side of the driveway.
- Development of a monitoring plan for the site, if required.



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Regards  
For and on behalf of  
JK GEOTECHNICS

A handwritten signature in black ink, appearing to read 'Jarett Mones'.

**Jarett Mones**  
Associate | Geotechnical Engineer

Review by:

A handwritten signature in black ink, appearing to read 'Woodie Theunissen'.

**Woodie Theunissen**  
Principal Associate | Geotechnical Engineer