

1. Introduction

Parsons Brinckerhoff (PB) was commissioned by the Department of Sustainability & Environment (DSE) for inspection, ongoing monitoring, analysis and risk assessment of a landslip and the immediate area at Wade Street, Portland. The scope of work was proposed by PB in an email to DSE dated 14 March 2008 which was subsequently approved by DSE in an email dated the 29th April 2008.

1.1 Project history

The landslip was initially reported to Glenelg Shire Council (GSC) during August 2007. The site was inspected by both GSC and DSE officers on Monday 20th August 2007 following vertical movement in the order of 300mm. Further movement occurred on Wednesday 22nd August 2007, where the vertical movement was in the order of 6.0 m. On the 3rd September 2007, the vertical movement at the landslip head scarp was in the order of 8.0 m.

GSC sent a brief to PB early September 2007 and the landslip area was inspected by PB late September 2007. PB subsequently submitted a report to Glenelg Shire Council (GSC) entitled 'Wade Street Landslip, Portland Inspection and Assessment Report' which described the nature of the landslip and recommended a number of short-term management measures, all of which were adopted, and included:

- Implementation of an exclusion zone (fenced area preventing public access)
- Precise weekly line and level survey work along the top of the cliffs
- Continuation of a public awareness program.

After an initial interim period of management by GSC, DSE assumed responsibility for management of the landslip and PB received approval to proceed from DSE via a signed project contract during late May 2008.

PB, as part of its commission with DSE, conducted a ground investigation program during June 2008 which involved drilling eight boreholes along the crest of the slope. During the ground investigation, inclinometers were installed to monitor sub surface movement and a series of vibrating wire piezometers were also installed to monitor ground water pressures.

PB began conducting monthly monitoring surveys of the landslip during mid-June 2008 and submitted to DSE during September 2008 an interim report titled 'Portland Wade Street Landslip Interim Monitoring Report: August 2008' (Final issued 19 September 2008).

The above report provided a summary of site monitoring results up until August 2008 (three monitoring rounds) and updated a number of the initial recommended site management measures provided to GSC. DSE has again addressed all of the short-term measures recommended.

At the time of producing this report we have performed five monthly monitoring events for the on-site instrumentation up to and including November 2008. The data collected to date has been assessed to be sufficient in detail to present the initial findings and to provide potential remedial options.

Our scope of commission, as agreed with DSE during April/May 2008, is presented in the sub-section below and this report provides details on all related topics.

1.2 Scope of Commission

As mentioned, the purpose of this report is to document in detail the works conducted by PB in accordance with our agreed commission with DSE. The following list summarises the scope of works conducted by PB:

- Review of site emergency management plan
- Survey of the area as a baseline for future works
- Geotechnical investigations
- Slope stability analysis
- Installation of instrumentation and monitoring site station
- Monitoring instrumentation surveys and site observations
- Risk assessment considerations for key site infrastructure including
 - initial preliminary slope stability analyses, followed by
 - risk assessment of the landslip in relation to key infrastructure, human elements and environment.
- Indicative costings and sketches for a number of conceptual remedial options

It should be noted that, following discussions with DSE, PB has not conducted a full risk assessment for the site as the level of risk associated with ongoing failures under adverse conditions was quickly assessed as being *unacceptable* for the site.

The preliminary slope stability analyses used data gained from the ground investigation works and interpretation of monitoring results to best estimate the existing conditions of the Wade Street landslip. Results highlight potential for ongoing failure within the upper basalts and also for deeper failures under adverse groundwater conditions.

The results from the slope stability analyses were then used in formulating the types of remedial design options available. In developing various remedial options, it was also decided to adopt and utilise a DSE philosophy for remedial works as part of an overall risk management approach at the site. This strategy fundamentally addresses the hazard and its treatment and/or mitigation in terms of three approaches: adaption, retreat and/or protection.

Conceptual options for retention and stabilisation works (i.e. protection technique) have been provided in Section 9. The conceptual remedial options presented have been prepared primarily for discussion and assessment of potential options and final detailed options will depend on the amount of cliff top land that DSE and GSC wish to keep and how much land is willing to be given over to the slide.