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INTERNAL MEMORANDUM

TO: FILE

FROM P. PELLS

OUR REF: P053.M4

DATE: 10 December 2011

ADDENDUM TO THIRLMERE REPORT 10 DECEMBER 2011

1.0 INTRODUCTION

Since completion of the report titled "Report on the Water Levels of Thirlmere Lakes" on 19 October 2011, further work has been completed to fill in some of the gaps, or uncertainties, in the published study. These studies have, to date, covered the following:

i) Collection of further historical data on the T.B. Village at Thirlmere so as to obtain a better estimation of water pumped from Lake Couridjah.

ii) Collection of further data in respect to pumping of water by the Railways Department to replenish steam engines at Picton Lakes (Couridjah).

iii) Collection of further documents and photographs germane to assessing historical lake levels.

iv) Additional GPS survey at Lake Couridjah to improve the contours in that area.

v) Transient groundwater modelling of the possible impacts of longwall mining at the Tahmoor Colliery.

vi) Re-run of the hydrology model with revised pumping from Lake Couridjah.

2.0 THE T.B. VILLAGE

Substantial documentation has been obtained in respect to the T.B. Village that drew water from Lake Couridjah from about 1929 to 1963, when it was connected to town water. The information on the number of houses, occupants, and the irrigation of crops, has allowed a reasonable estimate to be made of the amount of water pumped from Lake Couridjah. We have also obtained confirmation of which of the pipeline inlets, still visible today, supplied the T.B. Village.

3.0 WATER SUPPLY TO THE RAILWAYS

We have obtained data on the pumping capacity installed at the Couridjah pump house. In addition we have, by means of the railway timetables and knowledge of the steam engines, been able to estimate the amount of water supplied at Picton Lakes (Couridjah) Station. We have also found, and measured the in-ground tanks that stored water on the ridge between the pump house at Lake Couridjah and Couridjah Station. These tanks had a remarkably large capacity of about half million litres.

Two photographs from 1884 have been found, on showing Lake Couridjah and the pumping inlet for the Railways, the other of a passenger train at Picton Lakes (Couridjah) Station (see Figures 1 and 2).

Figure 1: 1884 photograph of Lake Couridjah. Note inlet to Railways pump next to boat in lower centre of photograph.

Figure 2: Train at Picton Lakes, 1884

4.0 HISTORICAL LAKE LEVELS

The photograph reproduced as Figure 1, above, allows an accurate estimate to be made of the level of Lake Couridjah in 1884. In addition, we have obtained a document that records the lake levels as being low in 1926.

We have instituted further searches for aerial photographs taken in the 1930's.

5.0 GPS SURVEY

The present low level of Lake Couridjah has provided the opportunity for further detailed survey up to the 305 contour.

In addition, following 188mm of rain recorded in Thirlmere (D.Hunt) in November, there have been small rises in the levels of Couridjah and Werri Berri. The Lake Couridjah level was measured on 1 December 2011.

6.0 TRANSIENT GROUNDWATER ANALYSES

The groundwater modelling given in the report of 19 October 2011 was 2D steady state finite element analyses.

The analyses have now been extended using different software to cover transient conditions and to consider partially saturated permeability characteristics.

Figure 3 shows the 2D model and Figures 4 to 6 give some snapshots of depressurisation growth from the area of longwall mining.

The output in Figures 4 to 6 represents one of several analyses undertaken to assess the sensitivity of the results to the adopted relationships of hydraulic conductivity versus matric suction.

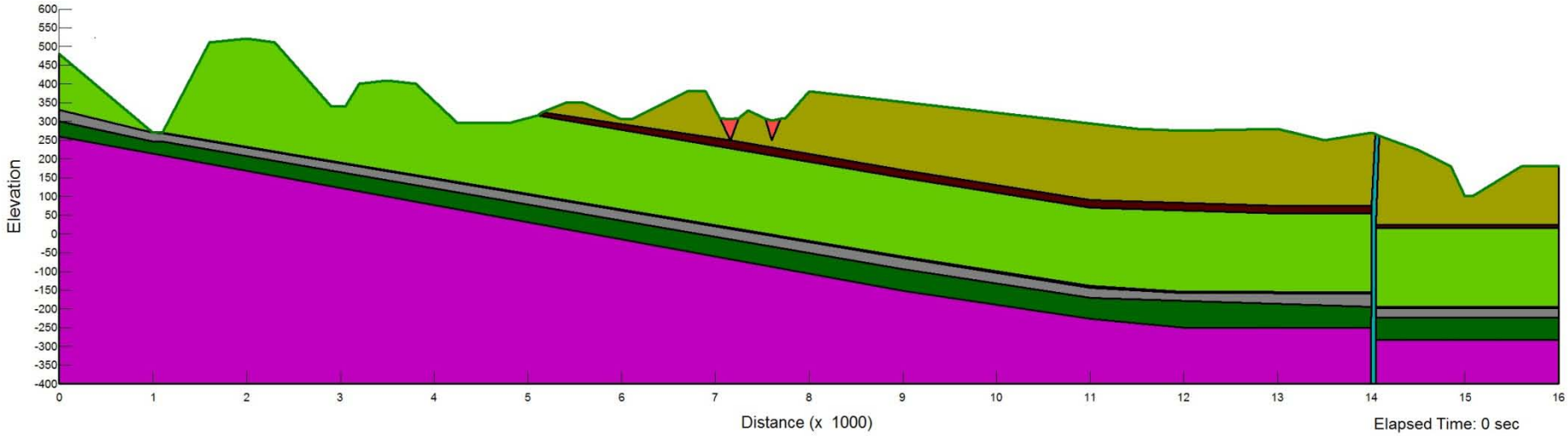

Figure 3: 2D transient model.

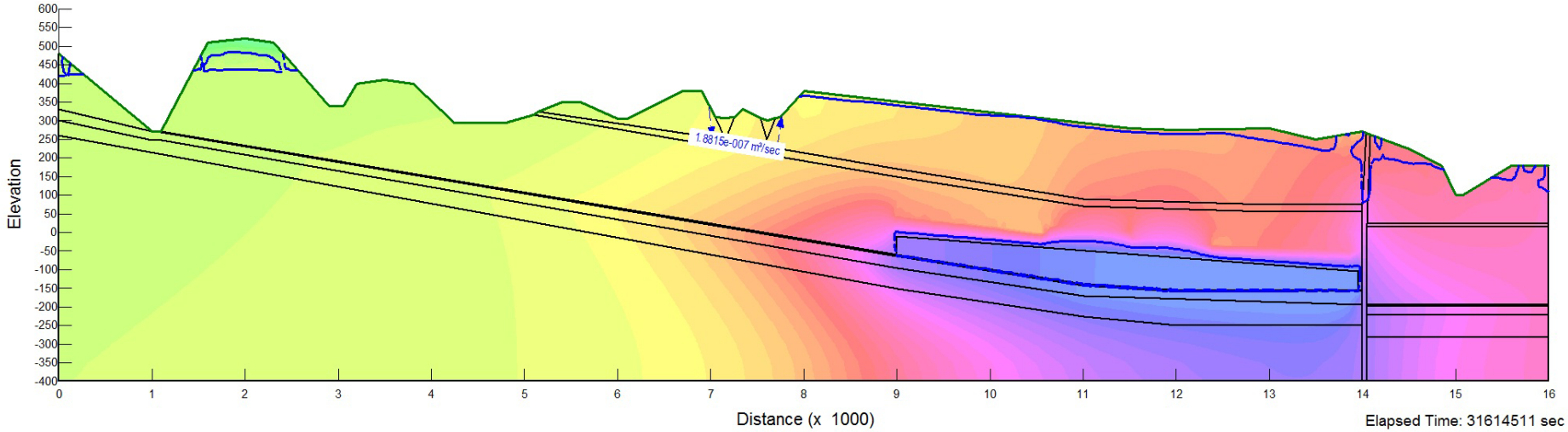

Figure 4: Depressurisation after 1 year.

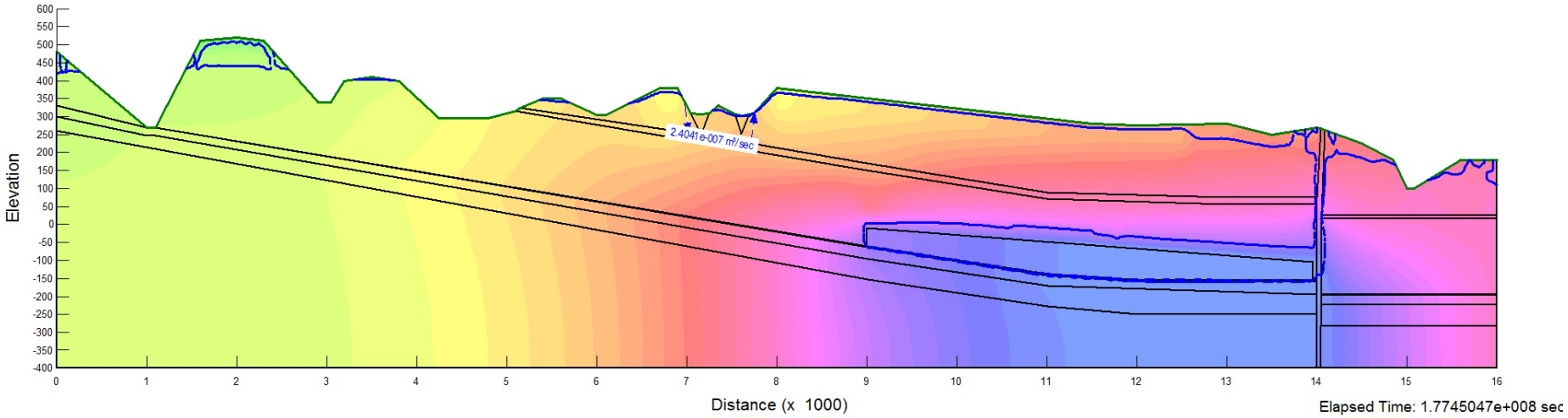

Figure 5: Depressurisation after 5 years.

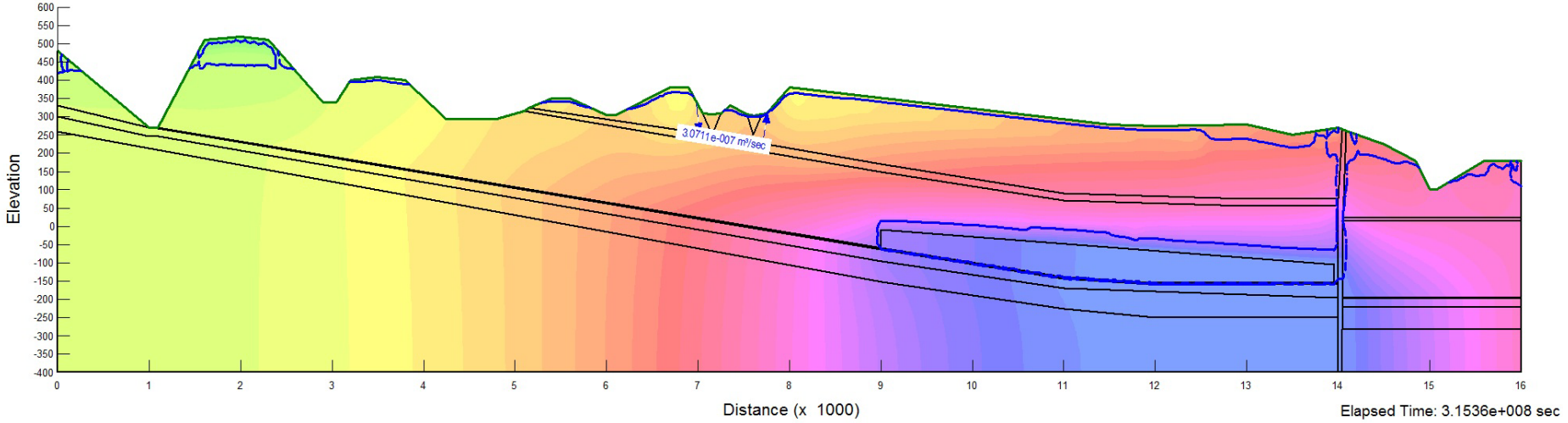

Figure 6: Depressurisation after 10 years.

7.0 FURTHER RUNS OF THE HYDROLOGY MODEL

The pumping regime included in the model has been revised to reflect the new data referred to in Sections 2 and 3, above. Figure 7 summarises the output. There is now a slightly improved fit with the proxy historical lake level data, but not substantially different from that given in the report of 19 October 2011.

Figure 7: Re-run of hydrology model.

PHILIP PELLS