

IN THE MATTER of the Resource
Management Act 1991

AND

IN THE MATTER of a submission in respect
of the **PROPOSED
WAIKATO DISTRICT
PLAN** by **AMBURY
PROPERTIES LIMITED**
pursuant to Clause 6 of
Schedule 1 of the Act to
rezone 178ha of land at
Ohinewai

STATEMENT OF REBUTTAL EVIDENCE OF DAVID STAFFORD

1. INTRODUCTION

- 1.1 My name is David Stafford. I am a Senior Hydrogeologist at the consulting firm Pattle Delamore Partners Ltd, specialists in water resources and environmental engineering.
- 1.2 I have outlined my qualifications, experience and commitment to comply with the Environment Court Expert Witness Code of Conduct in my evidence in chief ("EIC").
- 1.3 I have read the statements of evidence of all the following witnesses:
 - (a) Mr Dean Fergusson; and
 - (b) Mr Gary Gray.

Purpose and scope of rebuttal evidence

- 1.4 This statement of rebuttal evidence does not restate matters addressed in my EIC but rather addresses one new issue raised in the evidence of Mr Fergusson and Mr Gray concerning the potential for an open cast coal mine to be located at Ohinewai.

- 1.5 This statement addresses the potential environmental implications of major dewatering associated with open pit extraction of the Ohinewai coal resource. Specifically, I address the following:
- (a) The environmental impact for major dewatering around the proposed pit including the potential impact of lakes Rotokawau and Ohinewai (Section 2); and
 - (b) A brief conclusion (Section 3).
- 1.6 My evidence should be read alongside the evidence of:
- (a) Mr Nicholas Speight, who addresses engineering issues relevant to the potential for extracting coal at Ohinewai as well as consolidation induced settlement as a result of pit dewatering; and
 - (b) Mr Cameron Lines, who addresses pit wall stability issues associated with dewatering and coal resource demand.

2. **GROUNDWATER DEWATERING**

- 2.1 Mr Fergusson's evidence provides details of a mining scenario prepared by Solid Energy New Zealand ("SENZ") in 2015.
- 2.2 That mining proposal requires excavation of a large portion of the APL site to develop pit slopes to access coal seams within the Te Kuiti Group south of Tahuna Road.
- 2.3 Key design considerations include very gentle (10-12°) pit slope angles in overlying Tauranga Group sediments and a significant dewatering programme by way of perimeter and in-pit sacrificial wells¹
- 2.4 Mining the coal resource within the Te Kuiti Group would require the full thickness (approximately 80m) of the overlying Tauranga Group to be dewatered.
- 2.5 The required groundwater drawdown would therefore result in a widespread cone of depression in groundwater levels around the mine which would have significant implications for ground consolidation and

¹ Statement of evidence of Dean Fergusson, paragraphs 11.17-18.

surface water features hydraulically connected to shallow groundwater.

- 2.6 In order to demonstrate the likely cone of depression I have estimated the drawdown radius of influence from dewatering the Tauranga Group Aquifer require to enable opencast mining.
- 2.7 The predicted extent of this cone of depression is shown in Figure 1. This estimated distance/drawdown profile has been developed using a basic 2D numerical model (GeoStudio SEEP.W) and analytically using the Sichardts method. The prediction uses available permeability data and a simplification of the geological framework outlined in my original Hydrogeological Assessment.
- 2.8 The presented drawdown profile is an estimate of total dewatering within the Tauranga Group and does not account for perched groundwater lenses (a layer of groundwater isolated from the effects of dewatering by low permeability clay layers) which will likely persist within the shallow Rotokawau peat beds.
- 2.9 I consider the drawdown prediction to be a conservative estimate of the likely drawdown extent arising from this mining scenario.

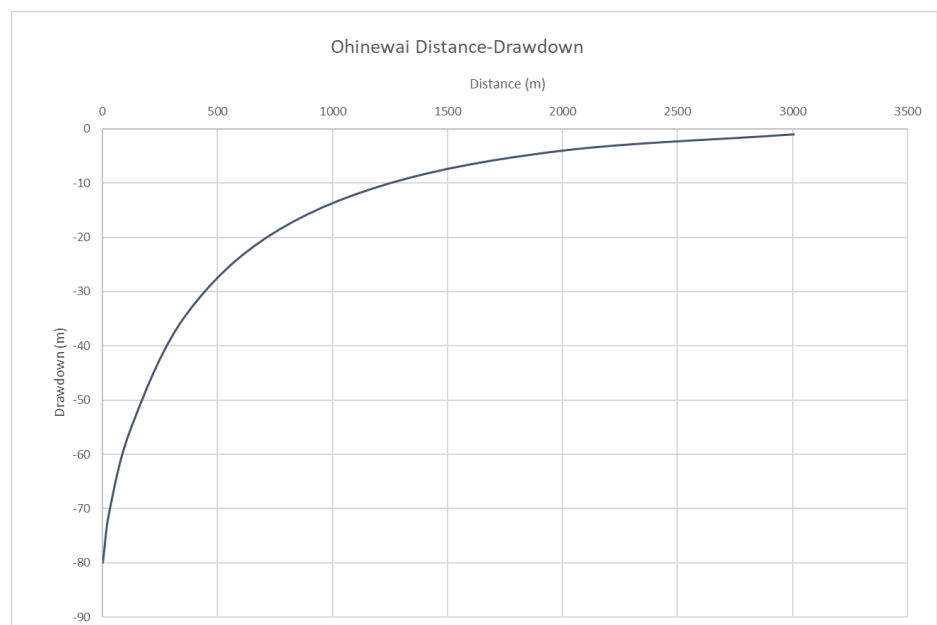


Figure 1: Estimated Distance/Drawdown Radius of Influence

- 2.10 The anticipated depth of drawdown required would result in widespread surface settlement related to consolidation of the

Tauranga Group. This is addressed in the rebuttal evidence of Mr Speight.

Potential impact on Lakes Rotokawau and Ohinewai

- 2.11 Lakes Rotokawau and Ohinewai are hydraulically connected to shallow groundwater within the surrounding peat dominant upper Rotokawau Formation. Dewatering of the Rotokawau formation may therefore result in depletion of these lakes.
- 2.12 Mr Fergusson makes reference to the Weavers Opencast pit which was excavated through similar Tauranga Group soils in close proximity to the Lake Waahi, as a reassuring example of what could be expected at Lakes Rotokawau and Ohinewai. I acknowledge that in the case of the Weavers Pit, Lake Waahi was minimally impacted as it was well sealed by a thick lakebed mud layer. PDP was historically involved in the hydrogeological assessment of effects of Weaver Pit on Lake Waahi.
- 2.13 However, Lakes Rotokawau and Ohinewai are significantly 'cleaner' lakes, recharged predominantly through shallow groundwater connection to the surrounding peat. As a result, Lakes Rotokawau and Ohinewai receive a reduced sediment load and therefore a sealing layer of lakebed mud cannot be assumed. Given the hydraulic connection between the Rotokawau peat beds and Lakes Rotokawau and Ohinewai, it is my opinion that dewatering of the peat would impact lake levels to some extent depending on the efficacy of the mitigation measures.
- 2.14 Dewatering of the underlying Tauranga Group Aquifer would be likely to have less of an impact on lake levels due to the confining, clay dominant (low permeability) lower Rotokawau formation. However, the extent and thickness of this confining layer is not completely understood. It would not be easy to mitigate the downwards leakage that dewatering of the underlying Tauranga Group would induce.
- 2.15 The intended size of the pit is also unclear from Mr Fergusson's evidence. Fergusson's evidence states that a 19 Mtonne pit was selected on the basis of further assessment (undertaken by Solid Energy in 2010) to mitigate geotechnical risk associated with pit wall

stability and to avoid Lakes Rotokawau and Ohinewai². However, Figure 4 of Mt Fergusson's evidence shows Lake Ohinewai being removed by the pit crest which will result in complete drainage of the lake. This suggests that the environmental implication of a pit of this size has not been adequately considered in terms of the damage to surface water lakes and the associated consenting challenges this presents.

3. **CONCLUSION**

- 3.1 It is my view that the dewatering required for opencast mining at Ohinewai could have pronounced groundwater associated effects. This includes significant ground settlement and depletion of groundwater dependant lakes.

David Stafford

24 August 2020

² Statement of evidence of Dean Fergusson, paragraph 5.5.