

Before a Board of Inquiry
Transmission Gully
Notices of Requirement and Consents

under: the Resource Management Act 1991

in the matter of: Notices of requirement for designations and resource consent applications by the NZ Transport Agency, Porirua City Council and Transpower New Zealand Limited for the Transmission Gully Proposal

between: **NZ Transport Agency**
Requiring Authority and Applicant

and: **Porirua City Council**
Local Authority and Applicant

and: **Transpower New Zealand Limited**
Applicant

Statement of rebuttal evidence of Andrew Gough (Erosion and Sediment Control) for the NZ Transport Agency and Porirua City Council

Dated: 20 January 2012

REFERENCE: John Hassan (john.hassan@chapmantripp.com)
Nicky McIndoe (nicky.mcindoe@chapmantripp.com)

**STATEMENT OF REBUTTAL EVIDENCE OF ANDREW GOUGH
FOR THE NZ TRANSPORT AGENCY AND THE PORIRUA CITY
COUNCIL.**

INTRODUCTION

- 1 My full name is Andrew Gough.
- 2 I have the qualifications and experience set out at paragraphs 2 to 5 of my statement of evidence in chief, dated 18 November 2011 (*EIC*).
- 3 I repeat the confirmation given in my *EIC* that I have read, and agree to comply with, the Code of Conduct for Expert Witnesses (Consolidated Practice Note 2011).
- 4 In this statement of rebuttal evidence, I respond to the evidence of:
 - 4.1 Mr Brian Handyside on behalf of the Director General of Conservation; and
 - 4.2 Ms Tracey Grant on behalf of the Wellington Regional Council.
- 5 I have also considered the evidence of David Yorke on behalf of the Kapiti Coast District Council, but have no specific comments on this evidence.
- 6 The fact that this rebuttal statement does not respond to every matter raised in the evidence of submitter witnesses within my area of expertise should not be taken as acceptance of the matters raised. Rather, I rely on my *EIC* and this rebuttal statement to set out my opinion on what I consider to be the key Erosion and Sediment Control matters for this hearing.
- 7 I will refer to the NZTA Project and the PCC Project collectively as the "Transmission Gully Project" (and hereafter, *the TGP* or *the Project*).

SUMMARY OF EVIDENCE

- 8 I have read all of the statements of evidence provided by submitters in relation to my area of expertise. The evidence prepared by the submitters has not caused me to depart substantially from the opinions expressed in my *EIC*. I re-confirm the conclusions reached in my *EIC*, subject to some changes to conditions which I have noted below.

EVIDENCE OF SUBMITTERS

Evidence of Mr Brian Handyside

- 9 In his paragraph 9, Mr Handyside notes that it will be necessary to use sediment control measures other than ponds (such as decanting earth bunds, silt fences and biofilter “socks”) and that these measures are less efficient than chemically treated ponds. Therefore, he considers that the overall treatment efficiency of 70% used in the sediment modelling may be optimistic.
- 10 I agree that sediment control measures other than ponds will be required in circumstances that preclude pond construction. Some of these devices have efficiencies less than 70%. However, such measures will be incorporated in a treatment train approach, with combinations of measures giving an overall higher efficiency than any individual measure.
- 11 In his paragraph 16, Mr Handyside notes that not all sediment control measures are suitable for chemical dosing.
- 12 While I do not expect that all control measures will be dosed, I note that chemical dosing can be applied to most forms of sediment control, for example by installing blocks of suitable chemicals in the channel leading to a decanting earth bund or grit trap. Another option is to include chemicals in the filter mix used in a bio-filter “sock”. This promotes sediment retention in a second filter or in front of a silt fence installed downstream of the bio-filter sock.
- 13 In his paragraph 33, Mr Handyside notes that site access and haul roads can become sources of sediment discharge, particularly under heavy use and in adverse weather conditions. I concur with his concern. However, I understand that for this Project the majority of the haul roads will be within the Project earthworks footprint (along the alignment of the new road) and the erosion and sediment controls installed for the earthworks will also apply to the haul route. This is discussed in the rebuttal evidence of **Mr Edwards**. Where haul routes are outside the footprint, then appropriate erosion and sediment controls will be installed along the route. I also understand **Ms Rickard** has suggested a new condition which requires regular weekly checks and maintenance of haul roads and their sediment control measures. I support this.
- 14 In his paragraph 42, Mr Handyside notes that he reviewed the SSEMP for the Te Puka area to see “how effective erosion and sediment control can be achieved in practice” in the “technically challenging section of works”. I note that the work undertaken for the Te Puka section of works was a high level overview of the potential staging options for the works and did not attempt to present a design for comprehensive erosion and sediment controls

that will be required for the proposed work. I make the following comments in response to the specific issues raised by Mr Handyside:

- 14.1 Mr Handyside notes that calculations have not been presented to demonstrate that the indicative flume channel proposed can carry the required flow; or that it can be constructed; or that it will be effective. As I have advised him, these matters were not considered in any detail during the preparation of the staging plans.
 - 14.2 Mr Handyside notes that a gully enters the middle of the construction site shown on the drawings included with the SSEMP and that runoff from the gully would increase site flows, scour and sediment levels and could adversely affect the efficiency of the sediment retention pond. Consideration of sediment controls did not reach the level of considering the effect of gullies entering the site from the east. However, I am confident that when the erosion and sediment control plan for this area of work is prepared, it will include provisions to divert the gully runoff flows away from worksite areas, thus avoiding the adverse effects noted by Mr Handyside. Such consideration will be necessary in order to be confident that erosion and sediment controls will comply with the performance criteria specified in conditions.
 - 14.3 Mr Handyside notes that the staging plan describes a method of construction for culverts crossing the highway alignment, often at a significant height above the base of the fill. He notes that the provision of erosion and sediment controls for high runoff flows from side gullies do not appear to have been addressed in the SSEMP. I note that the drawings included with the SSEMP show the construction of a cascade discharge structure on the face of the fill, which will be carried out in stages, as sufficient fill is placed for the next unit to be installed. Detail 1 on drawing A9 shows a design for a temporary channel that can be constructed if heavy rain is forecast. This will carry excess flows from the gully across the fill platform, to discharge to the stream via the completed sections of the cascade structure. This is described in section 8.3.6 of the SSEMP.
- 15 In paragraph 56, Mr Handyside notes his concern that the Adaptive Management Approach may not be effective for sediment control measures other than ponds. I disagree. A range of monitoring activities are proposed to provide ongoing advice, direction and feedback on all aspects of erosion and sediment control and draft details of these activities are set out in Appendix L of Technical Report 15. I consider that all of the monitoring activities shall be part of the Adaptive Management Approach.

- 16 In paragraph 60, Mr Handyside suggests that stream diversion channels installed during the Project should provide sufficient capacity for the Q100 ARI flows. I would support this condition for diversions that are in place for 1 year or more, with the criteria for short term diversions (in place for less than 1 year) being the Q20 ARI, in accordance with the GWRC standards.¹
- 17 In his paragraphs 66 and 19, Mr Handyside considers that insufficient detail is provided to allow verification that the proposed erosion and sediment control measures and practices will be effective in addressing sediment risk to the environment.
- 18 The information provided with the SSEMPs was prepared as a high level overview of the potential staging options (in the case of Te Puka), and to present specific erosion and sediment control plans at work sites along the route (for example at Kenepuru). The use of SSEMPs to integrate the detailed highway alignment design with the detailed design of the environmental management measures was an option chosen to provide for an additional "signoff" process for the Regional Council. I understand that **Ms Rickard** has added an additional statement to the SSEMP conditions to clarify this purpose.
- 19 The current status of the highway alignment design is conceptual and a number of amendments to the design are likely as the design is further developed, initially as a Specimen or Preliminary Design and then followed by Detailed Design. My experience with large earthworks projects is that detailed environmental management plans or methodologies that are based on the conceptual design are often made redundant through the design process. An appointed contractor will commonly redesign environmental management methods within the guidelines set by conditions and the parameters set by the Detailed Design. I understand that this is also consistent with **Ms Rickard's** and Mr Handyside's practical experience on roading projects as referred to in the evidence. I therefore consider that the broad approach taken by **Ms Rickard** in the drafting of the conditions for the SSEMPs is sensible.
- 20 **Ms Rickard** has rearranged the conditions to require the overall Staging Plan for the Project to be submitted and certified by the Manager before the ESCP is submitted. The appropriate time for preparing the draft ESCPs is, in my view, during the development of detailed design and staging and construction methodologies by the contractor(s). The submission of the draft ESCPs will allow the Regional Council to program and focus its inputs and work on each area, in order to achieve the best outcomes for erosion and sediment management for the Project.

¹ I understand this is in new condition E.3A.

- 21 Consistent with this, my EIC supported an Adaptive Management Approach, defined by specific conditions of consent. These conditions will be robust and applicable to the Project as a whole, and establish a consistency of approach across the whole Project. The Adaptive Management Approach will include a monitoring and feedback loop for the construction works, so that adjustments to the practices and management of controls can be made to optimise performance. These may include reductions in the open areas being worked in a particular section of the works; changing the staging of works depending on soil types and physical conditions; and upscaling of either or both erosion and sediment controls.
- 22 There will be Project-wide monitoring and surveillance and this is outlined in Appendix L of Technical Report 15. It is proposed that during construction, adequate resources are maintained for use in implementing contingency plans, when adverse weather conditions are predicted. These are likely to include stockpiles of appropriate cover materials and specialist plant that can be used for rapid stabilisation of sites, in the event that a significant storm event is anticipated.

Evidence of Ms Tracey Grant

- 23 In paragraph 14 of her evidence Ms Grant suggests an amendment to the wording for the purpose of discharge consents RC2 and RC3. I support this amendment because it more accurately describes the consents.
- 24 In paragraphs 41 to 44 of her evidence, Ms Grant expresses concern that suspended solid removal efficiencies of 70% may not be able to be achieved for all parts of the Project, particularly in challenging areas of the site such as Te Puka Stream. Mr Handyside expresses a similar concern in paragraphs 9 and 19 of his evidence.
- 25 I am confident that 70% removal efficiency for chemically treated ponds can be achieved, for events up to a Q10. This is addressed in my EIC and is also supported by the following reasons:
- 25.1 Staged trigger levels are proposed for reviewing pond treatment efficiencies that are set at a higher level than the stated average. These will be set out in the Erosion and Sediment Control Plan(s);
- 25.2 As Mr Handyside notes at his paragraph 22, it was agreed during witness conferencing that 70% sediment retention efficiency should be achievable for most storms with 3% sized chemically treated ponds;
- 25.3 The key to erosion and sediment control is rigorous and responsive site management. The Adaptive Management Approach will provide for this; and

- 25.4 The consent conditions proposed will mean that the Project construction programme will be governed by sediment control requirements. If the Project needs to be built over a longer timeframe in order to ensure the conditions are met, then that is what the contractor will need to do.
- 26 In paragraph 46, Ms Grant requests clarification regarding the efficiencies of sediment control measures other than ponds. I understand the efficiencies of other measures are commonly considered to be of the following order:
- 26.1 Super silt fence: 30 - 50%
- 26.2 Biosock: 30% - 60%
- 26.3 Decanting Earth Bund: Various, depending on the particle micron size and the size of the device.²
- 27 I note that the efficiencies set out above are influenced by a number of factors including soil type (particle size, density) and by the intensity and duration of the rainstorm.
- 28 I understand that **Ms Malcolm** has adopted a conservative efficiency of 30% for all non-pond sediment control measures in her Sensitivity Analysis (presented in her rebuttal evidence). This figure is at the lower end of the range of published information on efficiencies of the proposed measures.
- 29 In paragraph 87.4 of her evidence, Ms Grant notes concerns with the wording of the condition requiring 70% efficiency of sediment ponds. In paragraph 87.3 she suggests the condition instead read:
- “During construction of the project (including enabling works), the consent holder shall achieve TSS efficiencies of at least 70% removal for all storm events with a less than 10 year ARI.”*
- 30 I have reviewed Ms Grant’s proposal and, for the reasons set out in paragraph 25 above, I support it.
- 31 It is relevant to note the following comments made in **Mr Brabhaharan’s** rebuttal evidence with respect to the soils that will be encountered along the route:
- “As the majority of the Project will be constructed in rock, this can be expected to generate much less sediments than the fine grained soils in the Auckland area. Even the older alluvium between Battle Hill and SH58 comprising silt, sandy silt and sandy silty gravel are coarser than

² Refer Table L5, Appendix L, Technical Report 15

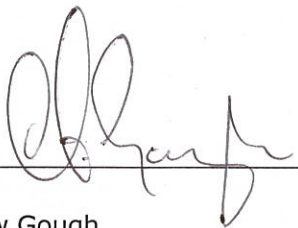
the fine grained soils predominantly encountered in the Auckland area, and may be expected to generate less fine grained sediments.”

- 32 Accordingly, I would expect comparatively higher efficiencies to be achieved for this Project than are typically achieved in similar projects in and north of Auckland.
- 33 Ms Grant comments in paragraph 87.5 on the need to establish criteria that would trigger a review of erosion practice and pond performance in a catchment. I suggest that this would best be done by nominating 2 criteria:
- 33.1 The first being a drop in sediment removal efficiency below a level of 75%; and
- 33.2 The second being a drop in performance by more than 5%.
- 34 If either of these criteria is reached, then that is sufficient to trigger a review. These trigger criteria will be included in the Erosion Sediment Control Plan (so they can be more easily revised if they are not providing appropriate early warnings). Trigger levels set at a higher level than those established in the consent conditions allow time for corrective action before those conditions are at risk of being breached.
- 35 Finally, I disagree that a condition precluding winter works is warranted (see paragraph 94 of Ms Grant’s evidence). The whole rationale of the Adaptive Management approach is ongoing monitoring of devices followed by corrective action (as set out in my paragraph 21 above) if the criteria set out in the Erosion and Sediment Control Plan are exceeded. This applies to every catchment and for all seasons. In addition, I note that **Mr Brabhakaran’s** rebuttal evidence comments on the low efficiency achieved when carrying out earthworks on fine grained soils during winter, meaning those works are less likely to be scheduled in any event...

CORRECTION

- 36 In my EIC, paragraph 56.1, I proposed that the extent of unstabilised earthworks be limited to no more than 25% of the construction area. After discussing with **Ms Malcolm** her most recent analysis, I no longer support this suggestion.
- 37 I understand **Ms Malcolm’s** rebuttal evidence will suggest conditions E1 and E2 are amended to restrict non-stabilised earthworks to particular lengths of road corridor within specific catchments. I would support this approach.

38 Section 27.1 of my EIC should also be amended to delete the reference to "25% of the construction Area."



Andrew Gough
20 January 2012