

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Proposed Private Plan Change 2 to
the Hamilton City Operative District
Plan: Te Awa Lakes Private Plan
Change

**STATEMENT OF EVIDENCE OF CHAD CROFT FOR THE APPLICANT
(ECOLOGY)
29 OCTOBER 2019**

1. EXECUTIVE SUMMARY

- 1.1 The Te Awa Lakes Development site encompasses a highly modified industrial and agricultural landscape composed of quarry and pasture areas, with no original indigenous vegetation communities remaining. The site contains both terrestrial and aquatic habitats of generally low value. Freshwater is discharged from the site via a pond and stream which flows directly into the Waikato River. The Waikato River is a nationally significant waterbody and the associated riparian vegetation surrounding the stream is considered to be of regional significance as it provides habitat for inanga, which has a conservation status of At Risk - Declining.
- 1.2 Development of the site has the potential to cause negative effects on the aquatic habitats, including sediment transport during construction, stormwater discharge, installation of culverts, and stream diversion.
- 1.3 In my opinion the recommendations for avoidance, remediation and mitigation of ecological effects made by Kessels Ecology Limited are adequate. The development of both additional management plans such as an Ecological Rehabilitation Management Plan, Sediment and Erosion Control Plan, Bat Management Plan, Indigenous Fish Management Plan etc incorporating detailed design information, specific implementation and best practice methods can adequately ensure that practicable and effective avoidance and mitigation measures aimed at addressing significant adverse ecological effects are achieved.
- 1.4 I broadly agree with the conclusions reached in the Kessels report and its assessment of the ecological effects of the proposed development. I also agree that the development of the site presents a number of opportunities to enhance the ecological value of the site and positively contribute to the ecological values of the surrounding landscape.

2. QUALIFICATIONS AND EXPERIENCE

2.1 My full name is Chad Donald Croft.

2.2 I am a professional ecologist with 18 years' experience with specialist expertise in ecological impact assessment, mitigation and terrestrial and freshwater habitat restoration. I have worked with clients across a wide variety of industries including oil and gas, forestry, mining, transportation and construction as well as various government authorities throughout multiple jurisdictions in both Canada and New Zealand. I am a current member of the Environment Institute of Australia and New Zealand, and a former Registered Professional Biologist of both the College of Professional Biology in British Columbia, Canada and the Society of Professional Biologists in Alberta, Canada.

2.3 Relevant project examples and roles include:

- a) In Canada, the Highland Valley Copper Mine, Logan Lake British Columbia, Canada (2003) – Co-Lead biologist responsible for ecosystem mapping and impact assessment as part of proposed mine expansion application; COMINCO Tulsequah Chief Mine, Atlin, British Columbia, Canada, (2006-07) – Lead biologist responsible for ecosystem and critical wildlife habitat mapping, and stream crossing assessment as part of proposed new mine access road application; Imperial Oil (Exxon Mobil) In situ Oil Sands extraction, Cold Lake Alberta, Canada, (2004-07) – Lead biologist responsible for ecosystem classification and restoration planning as part of Ecological Impact Assessment for mine expansion; Imperial Oil (Exxon Mobil) Natural Gas extraction, Tilley Alberta, Canada, (2003-07) – Lead biologist responsible for ecosystem classification, species at risk surveys and habitat restoration planning as part Ecological Impact Assessment for multiple gas pad and access road expansion; and
- b) In New Zealand, the Comfort Group mixed Commercial/Residential Development, Ohinewai, NZ, (2019) – Principal and lead ecologist responsible for ecosystem classification, threatened species surveys and mitigation planning as part of Ecological Impact Assessment for Waikato District Plan change application; Hamilton City Council, Southern Links Strategic Transport Network – Principal and lead ecologist responsible for providing ecological

advice in support of Resource Consent application for works outside the designation; Questral Corporation Ltd, Broadwater Retirement Village development, Hamilton, NZ, (2019) – Principal and lead ecologist responsible for ecosystem classification, threatened species surveys and mitigation planning as part of Resource consent application.

- 2.4 I was engaged by Perry Group Limited (PGL) on October 8th, 2019 to review and provide my expert opinion on the assessment of ecological effects for a proposed Aquatic Adventure Park / Residential Development at Te Rapa North (the “Te Awa Lakes development”) completed in 2017 by Kessels Ecology Limited (the “Kessels report”). I have completed a site visit and walkover to view the key ecological features identified and assessed by Kessels, and I have reviewed information regarding the management of alligator weed prepared by Better Biosecurity Solutions Ltd, to the extent it bears on areas within my expertise.
- 2.5 I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and to the extent that I am giving expert evidence, have complied with it in preparing this evidence. I confirm that the issues addressed in this evidence are within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my evidence.

3. SCOPE OF EVIDENCE

- 3.1 I have been asked to provide evidence in relation to the ecological effects of Proposed Plan Change 2 to the Hamilton City District Plan: Te Awa Lakes (“PPC2”).
- 3.2 My evidence will cover the following matters:
- a) Relevant facts and context;
 - b) Summary of technical report;
 - c) Expert caucusing;
 - d) Comments on the Section 42A Report;
 - e) Comments on submissions;

- f) Proposed amendments to the plan change; and
- g) Conclusions.

4. RELEVANT FACTS AND CONTEXT

- 4.1 In this statement of evidence, I do not repeat the description of the plan change and refer to the summary of the application in the evidence of John Olliver for the Applicant.
- 4.2 Another key aspect of the application which has a bearing on my findings and conclusions is recognition of the existing alligator weed infestation on site, the designation of the site as a 'Restricted Place' under the Biosecurity Act, and the preparation of an Alligator Weed Management plan by Better Biosecurity Services Ltd (BBS). I have read the evidence of Peter Russell on alligator weed management issues, and refer to his evidence in relation to proposed alligator weed management on the site.

5. SUMMARY OF TECHNICAL REPORT

Description of Ecological Features

Ecological Context and Landforms

- 5.1 The Kessels report accurately describes the subject site as being within the Hamilton Ecological District (ED) and the Hamilton basin landscape unit, whereby the geological characteristics and soils are largely influenced by the presence and processes of the Waikato River. The Hamilton basin landscape unit is an alluvial plain with extensive deposits of silt, sand and gravel, as well as Holocene peatlands.
- 5.2 The Kessels report accurately characterises the site as a highly modified agricultural and industrial landscape with no remnant indigenous vegetation. The site's current condition is reflective of historical quarrying operations, with an abundance of exposed mineral soil, areas of deep ponding water, and an abundance of exotic herbaceous vegetation cover. Outside the quarrying operation area, approximately a third of the site is currently used as grazing pasture.
- 5.3 While the surveys undertaken included a detailed vegetation inventory and mapping of present vegetation across parts of the site, the Kessels report states that a detailed assessment of the vegetation cover across the quarry operations area was not

undertaken. This was due to the active, industrial disturbance regime and the understanding that adverse effects associated with the proposed activities within this area will not exceed what is currently permitted in accordance with current consents.

- 5.4 The Kessels report accurately describes and maps the vegetation cover within the grazing area in accordance with Atkinson (1985). The vegetation cover was classified into seven distinct vegetation types generally described as Open Water, Rushland, Sedgeland, Grassland, Exotic Pasture Grass, Shrubland and Treeland.

Aquatic Habitats

- 5.5 The Kessels report characterised the aquatic habitats on site as the ponds located in the gully floor of the site, and an unnamed stream conveying flow downstream from the pond and discharging to the Waikato River. The unnamed stream was accurately described as a first-order tributary of the Waikato River which flows for c. 265m from the pond to the Waikato River confluence through both pasture grassland and Treeland (*Pinus radiata*) vegetation types.
- 5.6 The Kessels report does not identify or describe the discharge point/confluence with the Waikato River; however, my site visit and walkover confirmed that the unnamed stream passes underneath the Te Awa River Ride path on the bank of the Waikato River, through a slightly perched, concrete culvert with a diameter of c. 1.5m and a gradient of c.3%.
- 5.7 The Kessels report undertook a qualitative, instream and riparian margin assessment over a 100m reach within the forested area of the stream alignment in September of 2013 in accordance with the Waikato Regional Council's (WRC) Regional Ecological Monitoring of Streams (REMS) methodology (Collier and Kelly 2005). The Kessels report concluded the stream provided poor habitat quality due to unstable banks, a highly modified channel and low instream habitat diversity. Aquatic macroinvertebrate sampling also indicated that the stream had poor habitat values with a Semi-Quantitative Macroinvertebrate Community Index (SQMCI) score in the "Poor" category, indicating

probable severe pollution. The diversity of the community was low, with only nine taxa found in the sample, and no EPT¹ taxa.

- 5.8 Fish sampling was undertaken using both active and passive methods. The species assemblage within the stream scored 18, (Poor), while the pond scored 12, (Very Poor) based on the Fish Quantile Index of Biological Integrity (Fish QIBI) (Joy and Henderson 2007). The Kessels report concluded these scores were reflective of an impacted site with poor water quality rather than limited fish access.
- 5.9 Based on my site visit and observation of the confluence of the stream at the Waikato River, I concluded fish access to the stream is likely limiting despite the presence of Inanga, which are known to be poor swimmers. The concrete culvert at the confluence is likely restricting indigenous fish access to those of good climbing ability or to periods of flood when the Waikato River rises to the height of the culvert inlet. This is likely how Inanga gained access to the stream. Access to the stream is limited by the steep channel gradient below the culvert outlet, the slightly perched nature of the culvert outlet and the flow velocity within the culvert.
- 5.10 Water quality was also evaluated via conductivity, pH, temperature, dissolved oxygen and turbidity. Based on the outcomes of these metrics, the Kessels report correctly concluded in my opinion that the overall water quality at the time of assessment was within the 'satisfactory' range as defined by the WRC (Tulagi 2015) with the exception of dissolved oxygen which was significantly lower in both the pond and stream.
- 5.11 The low dissolved oxygen levels are likely a reflection of the low flow regime and the abundance of organic matter decomposition occurring within both the pond and stream.

¹ EPT stands for Ephemeroptera (mayfly), Plecoptera (stonefly) and Tricoptera (caddisfly) which are macroinvertebrates which are sensitive to water pollution. Because these species are generally found in streams with good water quality, their abundance can give us an idea about how healthy a stream is.

Terrestrial Habitats

Avifauna

- 5.12 The Kessels report concludes accurately, based on my observations, that the Te Awa Lakes property is utilised by commonly occurring bird species which prefer open country and aquatic margin habitats.

Lizards

- 5.13 The Kessels report found no lizards during daytime habitat searches; however, in my opinion, the suitable habitat area for lizards may have been underestimated as a result of the pine treeland type being identified as the most likely lizard habitat on site. It should be noted that the wet margins and associated upland terrestrial vegetation communities surrounding the perimeter of the ponds are also likely to contain copper skinks which, although not considered 'At Risk' or 'Threatened', are protected under the Wildlife Act 1953.

Bats

- 5.14 The Kessels report records that a summer acoustic survey for bats was undertaken which did not detect any long-tailed bats. However, it correctly identifies the Waikato River and its bank vegetation as an important movement corridor for long-tailed bats, and the possible foraging and roosting value of the mature trees lining the banks of the river. The Kessels report accurately states that long-tailed bats have been known to utilise older or dead standing *Pinus radiata* for roosts. Despite this, the large, mature and over mature pine trees lining the river along the sites eastern boundary were not risk rated for potential bat roost suitability. The Kessels report noted that the development presents a "low, but not zero risk" to long-tailed bats, with a recommendation for pre-felling checks for occupied roosts before construction, in line with protocols set out in a Bat Management Plan for the site.

Threatened Species

- 5.15 No threatened flora species were observed within the property by Kessels. However, threatened fauna (Inanga) were caught in the lowest reach of the tributary stream,

draining the on site pond. Inanga (*Galaxias maculatus*) have a conservation status of 'At Risk – Declining' due to national population declines (Dunn et al. 2018²).

Ecological Significance Determination

- 5.16 In my opinion, the Kessels report appropriately determined the ecological significance in accordance with Section 11A of the Waikato Regional Policy Statement³ criteria. According to these criteria, the Kessels report accurately concluded the vegetation communities and ponds identified within the property were not considered to be ecologically significant. In my opinion, Kessels appropriately identify the lower reach of the tributary stream and associated riparian vegetation as being of regional significance due to the confirmed presence of Inanga within it.

Assessment of Ecological Effects

- 5.17 Kessels have concluded that the area with the greatest potential for adverse ecological effects from the proposed development is the lower reaches of the tributary stream discharging to the Waikato River, and the potential adverse effects of tree felling on long-tailed bats. I consider that this is accurate, given the active disturbance regime across the site attributable to consented quarrying activities.

Summary of Effects

Vegetation

- 5.18 The Kessels report appropriately discusses the potential adverse effects associated with the spread of weeds both to and from the site. The Kessels report highlights the risk that machine, people and soil movements present to the inadvertent dispersal of invasive weed propagules, as well as the risk of weed establishment on exposed soil during the construction phase of the development. The Kessels report also identify common control and mitigation measures to reduce these risks, including the cleaning of machines and vehicles prior to entering and leaving the site, limiting the time that soil remains exposed

² Dunn, N.R.; Allibone, R.M.; Closs, G.P.; Crow, S.K.; David, B.O.; Goodman, J.M.; Griffiths, M.; Jack, D.C.; Ling, N.; Waters, J.M.; Rolfe, J.R. 2018: Conservation status of New Zealand freshwater fishes, 2017. New Zealand Threat Classification Series 24. Department of Conservation, Wellington. 11 p

³ Waikato Regional Policy Statement, 2016, Waikato Regional Council, Hamilton

on site and ensuring all soil brought to site is certified weed free. These measures are considered appropriate and are reflective of not only industry best practice.

- 5.19 The Kessels report appropriately identifies the site as a Restricted Place under the Biosecurity Act. While the report itself does not refer to the Alligator Weed Management plan prepared by Better Biosecurity Services Ltd (BBS),⁴ I have reviewed the evidence of Mr Russell for the Applicant on biosecurity issues and confirm, from an ecological perspective, that it provides appropriate management systems for the risks posed by alligator weed on the site.

Aquatic Ecosystems

- 5.20 The Kessels report appropriately characterises the potential adverse effects on aquatic ecosystems as being generally attributable to sediment, stormwater and the maintenance of fish migration passage both upstream and downstream.
- 5.21 Sediment transport into streams and the process of sedimentation can have adverse effects on aquatic biota. The Kessels report accurately highlights the threat of sediment mobilisation associated with earthworks and exposed soil during the construction phase of the development. Accordingly, the Kessels report recommends erosion and sediment control measures be implemented in accordance with WRC best practice guidelines (Environment Waikato 2009⁵). In addition to temporary measures such as sediment ponds and silt fencing, the Kessels report appropriately identifies longer-term measures such as top-soiling and replanting of suitable, fast establishing vegetation on exposed slopes as part of a tool-box approach. In my opinion, these measures are considered appropriate and effective if implemented and monitored through the further Land Development Plan processes for earthworks and sediment control on the site.
- 5.22 Stormwater management can have a significant effect on the health of aquatic receiving environments. Development of the site will result in an increased impervious surface area with altered stormwater infiltration rates, and peak flows. The effects of increased impervious surface area on aquatic environments is well documented with increased transport and deposition of deleterious substances, and increased erosion. The Kessels

⁴ BBS, 2019, Te Awa Lakes Development: Alligator Weed Management Report, prepared by Better Biosecurity Service Ltd for Perry Group Ltd

⁵ Environment Waikato. (2009). Erosion and Sediment Control Guidelines for Soil Disturbing Activities. Environment Waikato Technical Report No.2009/02. Waikato Regional Council, Hamilton.

report appropriately provides recommendations on reducing the effects of stormwater on the aquatic receiving environment, including by reducing impervious surface areas where practicable, incorporating open channel grass swales for stormwater conveyance and the use of wetlands and biofiltration and bioretention devices. In my opinion, these recommendations are appropriate. From the evidence of Ms Rhynd, I understand that they have been incorporated into the concept design for stormwater management on the site. The incorporation of vegetated swales for conveyance, wetlands and biofiltration for treatment and the use of bioretention for managing flow is consistent with the overall character of the development and nature of site and surrounding area.

- 5.23 It is not yet clear how many or where culvert crossing structures will be required; however, the Kessels report adequately highlights the risk these structures present to aquatic fauna migration and the adverse effects they can have on aquatic ecosystem health if not designed and installed correctly. As a result, Kessels makes several recommendations for the use of culverts and how the effects can be mitigated. The recommendations are reflective of general best practices for the installation of round culverts. Kessels also point to the loss of instream habitat when a round culvert is placed in a stream and the required compensatory requirements associated with habitat loss.
- 5.24 In my opinion, the report could have gone further to include a recommendation to use alternative crossing structures as an avoidance measure. Too often in my experience the default approach to stream crossing is an inappropriately sized, round culvert. Small bridges and or open bottom structures such as box or arch culverts which span the width of the channel should be considered as a preferred option where practicable. These structures protect existing habitat and avoid altering stream morphology. Consequently, the need for potentially costly compensatory action can be avoided. I understand that these matters can be taken into consideration during the consenting and detailed design phases of the Te Awa Lakes development.

Terrestrial Fauna

- 5.25 The Kessels report recognizes the presence and use of the site by common exotic and indigenous bird species and therefore appropriately recommends pre-construction checks be conducted to ensure no ground-nesting species are utilising the areas of works at the time of construction commencement. However, in my opinion the omission

of a reference to lizards and the potential for copper skinks to be present across the site should be addressed. While no lizards were found during surveys, they may be present. Therefore, it is recommended that suitable lizard habitat be afforded the same pre-construction checks similar to that recommended for ground-nesting birds. My understanding is that these are all matters that can be considered through the later Land Development Plan stage.

- 5.26 In my opinion, despite the survey recording no long-tailed bats during observations, the Kessels report could have addressed the potential presence or utilization of the site by long-tailed bats in more detail. In my opinion, the proximity of the site to the Waikato River and the presence of abundant decadent pine which, is scheduled to be removed, would tend to suggest there may be increased potential for the presence of bats within the site area. The Kessels report does appropriately recognise there is a risk, albeit stated as low, to long-tailed bats during vegetation removal, and as such recommends a Bat Management Plan be prepared in any Land Development Plan process, outlining vegetation removal protocols to be implemented, pre-felling checks for occupied roosts be undertaken and any restoration planting incorporate cavity forming tree species which will potentially provide roost habitat over time. In my opinion, those proposed mitigation measures should be sufficient through the further consenting process to avoid or mitigate the effects of the proposed development on bats.
- 5.27 Further to mitigating the developments effects on bats, in my opinion, it is important that effects of lighting on bats be minimised. I understand from the evidence of Mr Mckensey for the Applicant that proposed lighting for the development will comply with the standards set out in the Hamilton City District Plan, which include (in respect of public spaces and transport corridors) a general requirement for downward directional lighting. In any event, I understand that these matters can be addressed further through the Land Development Plan phase.

Proposed measures to avoid, remedy and / or mitigate ecological effects

- 5.28 The Kessels report states that in order to avoid, remedy and/or mitigate the ecological effects of the proposed development on freshwater and ecological values, a detailed Ecological Rehabilitation Management Plan (ERMP) will need to be incorporated as part of the further RMA processes to follow. The ERMP will need to incorporate information

and specific implementation methods to appropriately address the potential for significant ecological effects. I am in agreement with this recommendation.

- 5.29 The Kessels report also states that, to avoid, remedy and/or mitigate the potential effects of sediment and erosion referred to above, a detailed sediment and erosion control plan will be required prior to the commencement of earthworks, along with a detailed stormwater management plan (the latter of which has already been provided as part of the updated plan change material).
- 5.30 Other proposed management plans at the consenting stage include Indigenous Fish and Bat Management Plans, which are appropriate for a development of this scale and ecological values identified.
- 5.31 In addition to the management plans proposed, the Applicant will also need to comply with its obligations under the Wildlife Act, which include the taking of all reasonable steps to avoid the disturbance and / or destruction of wildlife habitat without lawful authority.

Conclusion on Kessels report

- 5.32 In summary, I broadly agree with the conclusions reached in the Kessels report and its assessment of the ecological effects of the proposed development. I agree that the site lends itself to a number of restoration opportunities which, if implemented through the later consenting and detailed design phases, will enhance the ecological value of the site and positively contribute to the ecological values of the surrounding landscape.

6. EXPERT CAUCUSING

- 6.1 I did not attend facilitated expert caucusing on ecology as there were no specific matters raised requiring expert caucus discussion. As a result, I do not comment on any disputed caucusing matters below.

7. COMMENTS ON THE SECTION 42A REPORT

- 7.1 The Section 42A Report does not raise any significant issues regarding ecology or the management of ecological effects, apart from recognising that development of the site risks the spread of alligator weed which is present on the site.

7.2 The Report is generally supportive of the ecological assessment of effects completed by Kessels and the recommendations made. The report also identifies the consistency expressed throughout the application documents regarding the potential for ecological values at the site and in the adjoining area to be enhanced as a result of the development.

7.3 I broadly agree with the conclusions reached in the Section 42 report as they relate to ecology and the ecological effects of the proposed development. I agree that the site lends itself to a number of restoration opportunities which, if implemented through the later consenting and detailed design phases, will enhance the ecological value of the site and positively contribute to the ecological values of the surrounding landscape.

8. COMMENTS ON SUBMISSIONS

Waikato Regional Council

41.08 General: Include objectives, policies and assessment criteria against which the Ecological Rehabilitation Plan can be assessed.

8.1 The objective of the Ecological Rehabilitation Management Plan is to avoid where practicable and to mitigate and compensate for, potential adverse effects on freshwater and terrestrial ecological values. Policies and assessment criteria can be incorporated in to the final document once specific measures have been agreed to through the further consenting stages. I understand that this submission has been addressed through amendments to the plan change that were provided with the updated information filed in August 2019.

41.09 General: Include controls to stop the spread of Alligator weed, listed as a progressive containment pest plant.

8.2 An alligator weed survey was carried out by a suitably qualified person (Peter Russell – Better Biosecurity Services Ltd. (BBS)) to ascertain the existence of any alligator weed on the application site. BBS prepared an alligator weed management plan which outlines how alligator weed is to be practicably managed during full development (BBS 2019⁶).

⁶ BBS, 2019, *Te Awa Lakes Development: Alligator Weed Management Report*, prepared by Better Biosecurity Service Ltd for Perry Group Ltd

8.3 The Waikato Pest Management Plan addresses the management of identified pest species, including alligator weed. It includes enforceable controls relating to subdivision and land development in infested areas. To the extent that this relates to ecological issues, I understand that this submission has been addressed through amendments to the plan change that were provided with the updated information filed in August 2019.

9. PROPOSED AMENDMENTS TO PLAN CHANGE

9.1 In my opinion, and despite the areas above in which I may have placed greater emphasis on certain points than in the Kessels report, no further changes are required to the plan change to appropriately avoid, remedy or mitigate the anticipated ecological effects of the proposed development.

10. CONCLUSION

10.1 The Te Awa Lakes Development site encompasses a highly modified industrial and agricultural landscape composed of quarry and pasture areas, with no original indigenous vegetation communities remaining. The site contains both terrestrial and aquatic habitats of generally low value. Aquatic habitats include ponds located in the gully floor of the site, and an unnamed stream conveying flow downstream from the pond and discharging to the Waikato River. Terrestrial habitats include both exotic and indigenous vegetation communities, suitable for commonly occurring bird species which prefer open country and aquatic margin habitats, as well as indigenous lizards and bats.

10.2 The stream flows directly into the Waikato River, which is a nationally significant waterbody and the surrounding riparian vegetation is considered to be of regional significance as it provides habitat for Inanga, which has a conservation status of At Risk - Declining.

10.3 Development of the site has the potential to cause negative effects on the aquatic habitats, including sediment transport during construction, stormwater discharge, installation of culverts, and stream diversion.

10.4 I concur with the Kessels report's recommendations for avoidance, remediation, and mitigation of ecological effects including the development of both an ERMP and a detailed sediment and erosion control plan. In my opinion, the incorporation of clear objectives, detailed design information and specific implementation methods and

guidance in these plans can adequately ensure that practicable and effective avoidance and mitigation measures aimed at addressing significant adverse ecological effects are achieved. The proposed suite of management plans, including the alligator weed management plan discussed in the evidence of Mr Russell, will be appropriate to avoid, remedy and/or mitigate the ecological effects of the proposed development.

Chad Croft

29 October 2019