Before the Independent Hearings Panel
at Waimakariri District Council

under: the Resource Management Act 1991

in the matter of: Proposed private plan change RCP31 to the Operative Waimakariri District Plan

and: **Rolleston Industrial Developments Limited**
Applicant

Summary of evidence of Mark Taylor

Dated: 3 August 2023

Reference: JM Appleyard (jo.appleyard@chapmantripp.com)
LMN Forrester (lucy.forrester@chapmantripp.com)

chapmantripp.com
T +64 4 499 5999
F +64 4 472 7111

PO Box 993
Wellington 6140
New Zealand

Auckland
Wellington
Christchurch

chapman tripp

SUMMARY OF EVIDENCE OF MARK TAYLOR

1 My full name is Mark James Taylor.

2 I worked as a Senior Technical Officer for Fisheries Research Division (*MAF*), and National Institute of Water and Atmospheric Research (*NIWA*), before establishing Aquatic Ecology Limited (*AEL*) in 2001.

3 I have been a member of the New Zealand Freshwater Sciences Society for many years, and served on the Living Laboratory Board of Management, an environmental lobby group for the Styx River, for about 10 years.

4 Working under AEL we have had extensive greenfield survey work, mostly in Canterbury, and in the Waimakariri District, for industrial, retail and residential developments. However, we also have significant experience with ecological surveys for local government (Christchurch City Council, Waimakariri District Council, Hurunui District Council, North Canterbury Fish and Game Council, and Environment Canterbury), but also further afield in New Zealand for both local government and private clients.

5 The fish community in the Plan Change Area were composed of four fish species, the native fish were composed of the longfin eel, shortfin eel, and upland bully. The brown trout was only identified from Ōhoka Stream, where the adult spawn in the winter months. We did not identify any rare fish and are confident that the Canterbury mudfish does not occupy the proposed Plan Change Area. Of the three native fish species, the longfin eel has a national conservation status of 'declining', but remains well-distributed in Canterbury. The shortfin eel and upland bully have a conservation status of 'not threatened'.

6 Waterways and wetlands in the Plan Change Area were fenced from stock, albeit usually with a minimum setback from stock access. Stream health metrics, based on indicator aquatic invertebrates, indicated "fair" stream health, as defined by (Stark & Maxted 2007). Notable clean-water taxa, including native mayflies and caddisflies are present in low numbers, suggesting a degree of ecological connection to habitats downstream, particularly the long-established reserve of Ōhoka Bush downstream of the Plan Change Area.

7 It is considered that, with ecologically suitable riparian buffer strips and the existence of clear ecological pathways for downstream habitats, the ecology in the Plan Change Area can be significantly enhanced from its currently "fair" level. However, this will also require a high standard of stormwater treatment to protect the instream ecology within the Plan Change Area, but also the

receiving environment, including Ōhoka Bush. Proposed stormwater treatment is covered in **Mr O'Neill's** evidence.

8 Given the utility of Ōhoka Bush as a source of native insects, and an existing "fair" level of stream health within the Plan Change Area, a high level of ecological protection holds the potential to produce aquatic habitats of a significant standard in the Plan Change Area. This potential will be contingent on ecological dispersal paths from Ōhoka Bush, including riparian strips and road bridging which facilitate ecological dispersal.

RESPONSE TO SUBMITTER EVIDENCE

9 I wish to respond to the evidence of Dr. Burrell dated 13 July 2023. My comments relate to his paragraphs annotated below.

10 Para 19 – While I don't dispute the PC31 area had wetland plants prior to any land development, as did the majority of the coastal Canterbury Plains, I do question the ecological relevance of conditions that existed in the 19th century. The point remains that the PC31 land and the surrounding area, along with wetlands, were extensively drained over a century ago, as Dr Burrell also acknowledges in Para 19.

11 Para 21 –I don't think there is any disagreement between Dr. Burrell and I in relation to the extent of wetlands on the site (provided that his reference to the Groundwater Seep is to the head of the seep itself and not the flows that travel from it. The definition of wetlands has been refined in a suite of recent MFE guides (mainly developed with reference to the new National Environmental Standards for Freshwater 2020 (NES-F) which provides a systematic process of defining wetlands from non-wetlands, based on hydrology, botany, and paedology (soils). This process requires on-site field survey and was applied in our survey of PC31.

12 In my main evidence I provided information indicating perennial (permanent), or near-permanent habitat around the Groundwater Seep but there is also minimal fencing around the origin of the seep. Despite its current poor state, a 20 m setback has been applied to this wetland. I discuss the groundwater seep further in my paragraph **Error! Reference source not found.** below.

13 Para 26 – Following on from Dr. Burrell's comments, and specific to this area, it is the 'hot spots' of clean-water taxa downstream of the PC31 area, and the lack of culverts between these hot-spots and PC31, which provide potential for ecological restoration for these waterways.

14 Para 32 – The NES-F imposes consenting obligations for activities that occur within 100 m of a natural wetland and that may impact wetland hydrology but the NES-F does not determine or mandate that a setback of 100 m is required in each and every case.

15 I was involved in Plan Change 69 in the Selwyn District, and where a 100 m setback was adopted around the spring fields due to the multiple spring heads and the ecological synergies such a setback would provide to the spring field. This includes the dispersal of insects and birds between the individual spring heads. In contrast, PC31 has several scattered springs and wetlands across the Plan Change area, and the dispersal routes are provided by the respective streams and buffer strips flowing east to the Whites Road bridges.

16 Para 34 – the literature on required buffer zones around New Zealand wetlands has been sparse and rather variable in their conclusions, reflecting the complexity of ecologial effects, the interaction of instream ecology with riparian vegetation, and the slope and nature of soils. The adoption of a 10 m setback minimum around waterways aligns with the established literature for physical environment, including bank structure, sediment trapping, shading, nutrient and contaminant uptake. However, greater widths may be required for ecological processes and this is where the resident ecology needs to be considered, especially in regard to the dispersal of flighted lifestages of some aquatic insects.

17 While I am not familiar with the 2020 reference cited by Dr. Burrell, for the waterways and wetland in PC31, the proposed setbacks are based on the earlier Parkyn work, especially those in the early 2000s (Parkyn 2004; Parkyn & Davies-Colley 2003; Parkyn *et al.* 2003). The recent work cited by Dr. Burrell appears to be broadly consistent with the setback results from the earlier Parkyn work, and therefore, it is not surprising that Dr Burrell considers that the setbacks have the potential to protect PC31 waterbodies and, potentially, those further downstream.

The extent of the setback for the channel that *inter alia* drains from the groundwater seep area appears to be one upon which we currently differ a little in opinion. Dr. Burrell suggests a 15 m buffer rather than the proposed 10 m buffer. While the groundwater seep is a natural wetland, the linear waterway leading south-east to Whites Road has been constructed and aligned to paddock fence lines. Therefore, I regard this waterway as a 'farm drainage canal'' that does not directly engage the District Plan setback rules for waterways, nor the RMA/NES definition of a river.

18 A photograph of the channel is provided in App. II, Fig. c of my evidence in chief. The channel, even in winter had a small but perceptible flow, but the fish fauna (one species, the ubiquitous upland bully) suggested it had probably had some permanent water. We have not observed the channel during the dry months, so cannot comment on whether it has continuous flow then or retracts to occluded pools.

19 The channel from the groundwater seep has high banks, which will provide some shade for the narrow channel, as will the 10 m buffer strip. It is linked to Ōhoka Bush by a roadside waterway where

management for ecological dispersal will be compromised by drainage roles. The resident fish is the common and widespread upland bully, which occupies both rural and urban waterways throughout Canterbury. While we didn't obtain a macroinvertebrate sample, the macroinvertebrate score is unlikely to include flighted lifestages. What fauna is there, is unlikely to require feeding and roosting riparian areas. Therefore, I have proposed a setback for physical waterway structure, and nutrient and contaminant uptake, which can be achieved with a narrower setback.

20 In final summary, I still consider a 10 m well-vegetated buffer appropriate for the groundwater seep channel, but only because of its probable limited biodiversity, and limited ecological dependence to bank vegetation.

21 Para 38-40 – it is my expectation, and the normal course from my involvement in studies following a Plan Change to work with Landscape Architects to produce a riparian buffer strip which serves both aesthetic and ecological function. As Dr. Burrell suggests, the continuity is important, and large breaks in vegetation should be avoided to prevent an interruption in ecological dispersal. While the landscape plan is still draft, and one I had minimal input in, I am encouraged that the pathway is depicted as being set well back from the waterway, but further details will be worked through at the detailed design stage after the Plan Change process. This is further evidenced by the ODP text which requires an Ecological Management Plan be prepared by a suitably qualified and experienced practitioner including (but not limited to) riparian management.

22 I note that a revised buffer of 30m is proposed for the northern spring, an increase from the 20m proposed in mine and **Ms Drummond's** evidence in chief. The reason for the increase in setback was based on recent hydrological evidence suggesting a greater spring discharge, and that a larger setback is required to ensure its hydrological state. The setback is of sufficient size to be ecologically functional and is consistent with the setback around the Central spring head. My point is that, and I think Dr Burrell agrees, there is good/significant potential for ecological restoration provided important riparian design details are attended to, and his hydrological concerns are addressed.

23 Objective assessments of ecological health indicates that the stream health in the Plan Change Area is "fair", but given the ecological links to Ōhoka Bush, and the provision of ecologically significant riparian strips and a high standard of stormwater treatment, I consider that there is a high probability that the Plan Change Area could become an outstanding ecological area.

Dated: 3 August 2023

Mark Taylor

References

Parkyn, S. M. 2004. Review of Riparian Buffer Zone Effectiveness. Ministry of Agriculture and Forestry, Wellington. *MAF Technical Paper No: 2004/05 No. 2004/05*. 31 p.

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