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 Victor Mkurutsi Mthamo

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SUMMARY OF EVIDENCE OF VICTOR MTHAMO

1 My full name is Victor Mkurutsi Mthamo.

2 I am a Principal Consultant for the environmental science, engineering and project management consultancy Reeftide Environmental and Projects Limited (Reeftide). I have been in this role for almost 11 years. Prior to this I was a Senior Associate with the surveying, environmental science and engineering, and resource management consulting firm CPG New Zealand Limited (now rebranded to Calibre Consulting Limited), where I was also the South Island Environmental Sciences Manager. I have worked in the area of environmental science and engineering for over 28 years

3 I have the following qualifications:

3.1 Bachelor of Agricultural Engineering (Honours) with a major in Soil Science and Water Resources (University of Zimbabwe); Master of Engineering Science in Water Resources (University of Melbourne in Victoria, Australia); Master of Business Administration (University of Zimbabwe). I hold an Advanced Certificate in Overseer Nutrient Management modelling qualification. I am a member of Engineering New Zealand (MEngNZ) and am a Chartered Professional Engineer (CPEng) and an International Professional Engineer (IntPE). I am a past National Technical Committee Member of (i) Water New Zealand and (ii) New Zealand Land Treatment Collective (NZLTC).

4 I am familiar with private plan change 31 (*PC31*) to rezone land bound by Mill Road, Whites Road, Bradleys Road (the *Site*). To inform the proposed plan change request, I was engaged in November 2021 to assess the capacity of the Site to support primary production.

SUMMARY

5 High Productive Land (*HPL*) or versatile soils are regarded as the best possible land or soils for agricultural production because of their properties.

6 The PC31 comprises of Land Use Capability (*LUC*) Classes 2 and 3 soils as follows:

6.1 2.45% LUC 2 soils; and

6.2 97.55% LUC 3 soils.

7 There are some 'constraints' which will (in some cases significantly) affect the productive capacity of any Site. These include poor to very

poor soil drainage, moisture limits and irrigation availability, nutrient limits, characteristics of soils, and the drinking water protection zone. I summarise these factors and their impact as follows:

7.1 Poor Drainage. The soils are poorly drained, and this impacts the land's productive potential.

7.2 Soils. While the soils are predominantly classified as LUC 2 – 3, there is significant variability in the nature and extent of those soils across the Site. Some spatial variability even over short distances affect the management of the land.

7.3 Moisture deficits and irrigation availability. The Site experiences moisture deficits. There are two consents that are used for irrigation. However, at least one of the consents is subject to minimum flows in the Ōhoka Stream. The restrictions will be further enhanced under the regional council Plan Change 7 and this will reduce the reliability of the consents exposing productive uses to moisture deficits.

7.4 Nutrient limits. In my opinion, the Site soils are such that application of nutrients to the Site would be essential to support land-based primary production activities. However, strict nutrient limits are currently in place through the Canterbury Land and Water Regional Plan (*CLWRP*) which would significantly constrain the use of nutrients at the Site. In my opinion, those limits are unlikely to ease in the short or medium term. The baseline N loss rate is 14 kg/ha/year which is relatively low and likely to accommodate only some farming activities. Future N losses are determined by the baseline loss rate with plan change 7 requiring further reductions in nutrient loss over time.

7.5 Drinking Water Protection Zone. The water supply source for Ōhoka is taken from two bores whose drinking water protection zone overlay part of the Site thus reducing the area that is available for productive use.

8 In addition to these factors, the 'costs' of losing the Site for land-based primary production must also, in my opinion, be considered in the context of land which would remain available for those activities within the Waimakariri District and the Canterbury region. In particular, of all the "highly productive land" in those geographical areas, the Site represents a reduction of only:

8.1 0.0002% and 0.0016% respectively under the regional policy statement definition of HPL.

9 I have looked at alternative sites within this area, and, having regard to the various factors relevant to productive capacity, I have not

identified any sites which in an overall sense would be less suitable for land-based primary production than the Site. That is in large part because, as set out in my evidence, the ability of the Site to support primary production over the long term is constrained by a number of factors.

10 For that same reason, it is my opinion, supported by the evidence of **Mr Akehurst**, that the long-term environmental, social and economic costs associated with the loss of the Site for primary production are negligible.

11 Therefore, it is my conclusion that the applicant's proposal would result in the negligible loss of LUC Class 2 and 3 soils within both the district and the region since the site is subject to a number of constraints which significantly limit its productive capacity over the long term.

RESPONSE TO SUBMITTER EVIDENCE

12 I have reviewed the evidence of Mr Peter Craig Almond. We are in general agreement regarding the characterisation of the site soils, LUC Classes, the drainage properties and also as stated in his Paragraphs 13 and 14 that aspects on my November 2021 report have been superseded by the NPS-HPL.

13 In Paragraph 15 Mr Almond states that "*the block is well suited to pastoral farming as current land use attests, and that involves at times cultivation and planting of crops*" and goes onto highlight that crop production has occurred on the site over the years based on Google Maps. It is not in dispute that crop production has occurred as I discuss in Paragraphs 26, 53 and 125 of my evidence and also supported by the Overseer reports. While maize and indeed some crops are able to be grown the practical realities on the site is that the yields are constrained by the site specific factors I discuss in my evidence and above and special management is necessary for meaningful yields to be realised.

14 In Paragraph 16 Mr Almond writes "*…. high to very high-water holding capacity, which gives them resilience to drought, and they have low or very low vulnerability to nitrate leaching. This makes them ideal soils for pastoral farming in Canterbury where ground and surface water suffer from over-allocation (loss of quantity) and contamination by leached nutrients and pathogens (loss of quality). Soils that are effective at storing rainfall (high water holding capacity) limit the necessity for irrigation, and low N leaching vulnerability reduces N passing the soil into groundwater*". It is my opinion that:

14.1 The high groundwater I discuss in Paragraphs 31 and 46 means the nitrates do not have to travel far to reach groundwater and be part of the groundwater, spring and surface flows. What Mr Almond describes in Paragraph 16 is what I would expect if the watertable was not as high as it is at the site.

14.2 The soils would be ideal for pastoral and arable farming had drainage not been a constraint. The site is high maintenance and requires specific management strategies such as those being applied by the Mr Sheriff and even then there is a limit to the productive capacity of the land as a result of the high groundwater and drainage which is not consistent with its HPL status or LUC classes.

15 In his Paragraph 17 Mr Almond takes issue with my conclusion (in my report [1] prepared in support of the application) that "*the level of production on them can be compensated for by soils of lower capability (higher LUC class) with more inputs."* He then goes on to say that "*He disingenuously cites a report of Horizons Regional Council (Mackay et al., 2008), which shows lower capability soils can produce as much as higher capability soils when greater technological input is used. However, he neglects to include the statements from the report which effectively say that such compensation comes at a disproportionately high financial and environmental cost*". He then lists the following three statements from Mackay et al.:

i. "Technologies (i.e. cultivation, drainage and irrigation) used as substitutes for the lack of productive capacity (weakly developed soil structure, limited plant available water) of soils will lead to increased N loss, through a combination of increased production and greater leaching volumes."

ii. "The number and efficiency of mitigation options for compensating for the limited capacity of soils to retain N in the topsoil horizons, declines as the natural capital [read capability] of soils becomes more limited."

iii. "The soils on which the production technologies have their biggest impact on production levels will be the landscapes that provide the greatest challenge in mitigating N losses."

16 These statements effectively suggest that productivity can be compensated for on >LUC Class 3 soils using appropriate mitigation and technologies. However, in drawing that conclusion I must point out that this does not apply all the way through to Classes 5-8 soils. What I had in mind when I made my own statement were the LUC Class 4 soils of which there are significant areas of them of varying types and a lot of which are used productively using best farming practices to reduce environmental impacts.

17 In his criticism Mr Almond neglects to discuss how these three statements would be relevant or not relevant to the site compared to say LUC Class 4 soils. It is my opinion that the soils at the proposed plan

[1] *Mthamo V. 2021. Proposed Plan Change – 535 Mill Road/347 Whites Road – Assessment of Potential Loss of Productive Land. Prepared for Rolleston Industrial Developments Ltd*

change site have constraints that would still make this site more challenging and to a point less productive than some LUC Class 4 soils. For example:

(a) Cultivation on the proposed plan change site has to be done at a strategic time to avoid soil compaction to which the soils at the site are susceptible.

(b) The soil has to be managed to keep the soil moisture at optimal levels, not just for plant water needs and production but protect the soils cracking. The soils have also have to be protected from pugging by actively managing the times stock is on them.

(c) Drainage management is critical if the soils are to achieve their productive potential. I make further comments in Paragraph 22 below.

(d) While as he states N leaching would be high on poorly formed soils with higher LUC Class what his evidence does not seem to acknowledge is that N leaching would also be higher at this site given the high groundwater levels as these mean that nitrates do not have to travel far down the soil profile to be part of the groundwater and surface water as I noted in Paragraph 14.1 of my evidence in chief.

(e) The resources employed at this for this site may be used just as productively and possibly with less adverse impact on some LUC Class 4 soils. I note that in his assessment Mr Almond has assumed the worst possible types of LUC Class 4 soils which might not necessarily be the case given the amounts and range of types of LUC Class 4 soils within the district and the region.

18 While in his Paragraph 17, referring to my work, he states that "..*he disingenuously cites a report"* I note in his Paragraph 18, Mr Almond cites the literature on the worst possible LUC Class 4 soils and compares this with LUC Class 1 soil which are non-existent at this site when he reports that "..*the shift of intensive dairying onto "leaky" stony soils of LUC class 4 has had a dramatic deleterious effect on water quantity and quality. Class 4 soils leach twice as much N under cow urine patches than Class 1 soils (Carrick et al., 2013)"*. Comparison of these two extremes and with no specific relevance to this site or the types of LUC Class 4 soils that could be used to compensate for any reductions in the use of highly constrained LUC 3 soils overstates any impacts on the reductions of N loss through the use the plan change soils.

19 I agree with Mr Almond's Paragraph 19 that fragmentation affects the productivity of a piece of land. However:

19.1 As has been discussed in the legal submission while this site comprises LUC Class 3 (and a net area of approximately 0.64 ha LUC Class 2 soils) the land is not HPL for the purposes of the NPS-HPL.

19.2 The land has a number of constraints which I consider may:

(a) Cause adverse environmental impacts (e.g. due to N leaching),

(b) Require additional management (e.g. to prevent pugging and drainage),

(c) Require infrastructure investment (e.g. tile drains) and the associated operation and maintenance costs,

(d) Result in increased production inputs (e.g. imported feed to compensate for the limited growing season of some crops).

19.3 Therefore, it is my view that any fragmentation of this land as a result of the proposed development can be compensated for elsewhere within the district or region where the available resources could be employed more productively.

20 In Paragraph 19 Mr Almond considers that consideration of proportional reduction in the LUC Class 1-3 soils is a "…*myopic approach* [that] *ignores the trend and most importantly the endpoint*". This is in reference to my Paragraph 111 where I concluded that "*Using the CRPS definition of HPL, the reduction in HPL would be 0.0002% and 0.0016% in Canterbury and in Waimakariri District, respectively*". These are insignificant reductions by any measure, and one would think well below the margin of error used in the estimation of the LUC Classes 1-3.

21 I disagree with Mr Almond's Paragraph 20 that my evidence "*makes some inappropriate interpretations, 2) fails to identify the favourable characteristics of the land (why it is considered Class 3), and 3) misrepresents the accepted knowledge about the influence of land use capability on the economics and environmental impacts of intensive agriculture"*. I disagree because:

21.1 Mr Almond's evidence has been based on generalised properties of LUC Class 3 soils and has not specifically considered the site-specific characteristics. I discuss in detail the challenges faced by Mr Sheriff in working on this land in my evidence in chief.

21.2 In taking issue with my assessment Mr Almond has used the extreme comparisons in particular where he compares what he calls a "leaky" LUC Class 4 soil to a LUC Class 1 soil. While such extreme comparisons helps makes his point they overstate the

specifics of this site because the soils at this site are primarily LUC Class 3 soils. There are no LUC Class 1 soils on the site.

21.3 Where, in my report (which Mr Almond references) I state that loss of production at this site may be compensated for by use of LUC Class >3 soils the implication was that the soils would be LUC Class soils and it would not necessarily be the worst possible LUC Class 4 soils which he calls leaky soils.

22 Finally, Mr Wilkins' evidence notes that I have not subtracted the standup of the well from the groundwater levels listed in my evidence. Groundwater from an infrastructure perspective is covered in the evidence of others.

22.1 My evidence referred to the groundwater levels to demonstrate that the watertable can at times be high on the site, which is a constraint to productive capacity. While I identified the potential for the water table to be within 200 mm of the surface (Paragraph 31 of my evidence in chief) I note that if we accept his estimated groundwater levels then the effects of the high water table and drainage issues are more pronounced than would be the case based on my assumed groundwater levels in Wells M35/0367 and M35/0596 (Paragraph 30 of my evidence in Chief). In fact, what Mr Wilkins describes in his evidence provides further support for my conclusions and aligns with the management challenges experienced in managing this land.

22.2 Mr Wilkins' observations reinforces the point I make in Paragraphs 14.1, 17(c) and 18 above in response to Mr Almond's conclusion that the risk to groundwater from nitrates is pronounced on leaky Class 4 soils.

CONCLUSION

23 In summary, I support RIDL's rezone proposal for urban purposes through PC31 on the basis that:

23.1 There are multiple long-term constraints on the capacity of the Site to support primary production activities.

23.2 In light of these constraints, the overall benefits of retaining this land for primary production are, in my opinion, negligible. That is especially so, given that there are likely to be very few other rural sites within the Waimakariri District that have lower LUC class (and therefore higher productive capability) or less constraints than the Applicant's site.

24 The proportional reductions in HPL in the district and the region as a result of the rezoning of the Site are insignificant.

Dated: 3 August 2023

Victor Mthamo