

Before the Selwyn District Council

under: the Resource Management Act 1991

in the matter of: Proposed Private Plan Change 73 to the Operative
District Plan: Dunns Crossing Road, Rolleston

and: **Rolleston West Residential Limited**
Applicant

Summary of Evidence of Paul Farrelly (Greenhouse gas
emissions)

Dated: 28 September 2021

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SUMMARY OF EVIDENCE OF PAUL FARRELLY

INTRODUCTION

- 1 My name is Paul Farrelly, I have a BE (Civil) from University of Canterbury and I have had over 25 years commercial experience working across a number of industries and, in the past 10 years, specifically in the energy and carbon field.
- 2 In the past 2 years I have worked for Lumen, an engineering consultancy, as a Principal Consultant in their energy and carbon team. In this capacity I have developed greenhouse gas (GHG) inventories for a significant number of organisations in a broad range of sectors.

SUMMARY OF EVIDENCE

- 3 The National Policy Statement on Urban Development 2020 (NPSUD) requires consideration of whether proposals "support reductions in greenhouse gas emissions".
- 4 When considering the GHG emissions of a proposed development or land change it is appropriate to consider the life-cycle emissions of the proposed development, and the net change in emissions compared to the emissions arising from the current land use.
- 5 In the context of GHG emissions arising from housing related developments, I believe that GHG assessments should be based primarily on the basis of how the development's net life cycle emissions (that is an evaluation of emissions before and after the development) compare to alternative development options within New Zealand, as opposed to whether the development, in of itself actually reduces GHG emissions.

GHG emissions from existing land use

- 6 A considerable level of GHG emissions are already occurring on the Holmes and Skellerup Blocks from methane emissions of livestock that is grazed on the land. Methane is a short-lived GHG and has a Global Warming Potential (GWP) that is 28-36 times that of Carbon Dioxide (CO₂) over a 100 year time frame and 84 times over a 20 year period.
- 7 I expect that were the plan change not to go ahead, the land would most likely continue to be used for grazing. GHG emissions from current farming operations can be calculated using guidance provided by the Ministry for the Environment (MfE) and the Greenhouse Gas Protocol. Based on this, and the assumption that 840 cows would continue to be grazed on the land, I have calculated the emissions resulting from the existing use of land at 1,607

tonnes CO₂e per annum (excluding fossil fuels, electricity use and fertiliser application.)

- 8 As mentioned, methane has a much greater impact per unit on global warming than the carbon dioxide emissions arising from construction / operation of dwellings and travel. I therefore consider that conversion of the Holmes and Skellerup blocks from farming to residential development supports a reduction in emissions.

Future anticipated GHG emissions arising from the proposed plan change

- 9 Like any new residential development, GHG emissions will be emitted during the construction of infrastructure, construction of dwellings / commercial buildings and their occupation. Emissions will also arise from the travel related activities of residents.

Infrastructure

- 10 The amount of infrastructure materials (and therefore emissions) required would likely not be substantially different to the level of development anticipated under the current District Plan. Infrastructure emissions are more a function of the hectares to be developed than the number of dwellings.
- 11 Further, from an emissions intensity perspective (i.e. emissions per resident), there is a benefit in increasing the density of housing in development, which the proposed plan change would support.

Dwellings

- 12 Embodied carbon relates primarily to the energy used to create the building materials. I note that embodied carbon is considerably more significant for apartment type housing due to the greater use of high emissions materials such as concrete and steel in construction. Apartments are not anticipated to be built under the proposed plan change.
- 13 Emissions are also a function of dwelling size. Emissions are expected to be lower per resident for houses developed under the proposed zoning, than were development to occur under the current, lower density, zoning. This is due to the likelihood that smaller houses would be built under the proposed zoning.
- 14 Energy related emissions can be minimised by encouraging energy efficiency, and new homes offer the potential to be substantially more energy efficient than existing homes. There is growing awareness of the value of passive houses, which are primarily heated via the sun. The PC73 sites are ideal for passive house construction due to the flat nature of the land and the relative lack of existing trees within the area.

- 15 I expect that dwellings built in the PC73 sites would be relatively energy efficient compared to other developments and consequently would have relatively low energy emissions per resident.

Travel

- 16 It is extremely difficult to accurately model or predict the level of travel related emissions and how they may compare to an equivalent development. However, the proposed sites are located approximately as close to the centre of Rolleston as other greenfield land in the area, and the Holmes Block is located right next to West Rolleston primary school.
- 17 Rolleston is already relatively well-serviced with amenities. I note and agree with Ms White's assessment in her submission on behalf of Waka Kotahi that "Rolleston has grown to a point where it is becoming self-sustaining", and I fully expect that as Rolleston further develops that a greater proportion of trips originating in the town will stay within the town.
- 18 Furthermore, I anticipate tenancies in the commercial areas proposed in the Holmes and Skellerup Blocks will likely be self-selected, accounting for their likely desirability and convenience to nearby residents. For example, tenancies such as a day care centre, a café, a convenience store and potentially takeaways would be well utilised by the residents of the Skellerup and Holmes Blocks and mitigate the need for travel further to other destinations.
- 19 I also consider instances of working from home will increase substantially in the future, which will substantially reduce the frequency of commuting.
- 20 When it comes to commuting transport mode, in all likelihood the vast majority of trips (at least in the next 10 years) that occur between Rolleston and Christchurch will continue to be undertaken in passenger vehicles. In the future, however, I would expect that a significant proportion of commuter trips undertaken in passenger vehicles between Rolleston and Christchurch will be in electric vehicles (EV), and I would also expect that as Rolleston continues to grow that a greater proportion of residents will be employed within the town.

RESPONSE TO EVIDENCE OF KEITH TALLENTIRE AS FAR AS IT RELATES TO GHG EMISSIONS

- 21 I have reviewed the evidence of Mr Keith Tallentire dated 20 September 2021 and I make the following points, in response to paragraph 132 of his submission.
- 22 I believe that it is entirely appropriate to calculate the baseline level of emissions from the Holmes and Skellerup blocks based on the

current usage of the land, as opposed to a theoretical land use based on the land's current zoning, which I note has now been in place for 9 years and to date has not resulted in a change in land use. Methane related emissions arising from the current use of land are significant and should be factored into any assessment of greenhouse gas emissions.

23 In any case, and as I note earlier, I consider the proposed land use and greater housing density proposed would support a reduction in emissions when compared to the lower density residential use that is currently anticipated under the District Plan for the sites.

24 I have read the report of Dr Dodge from Abley Limited referenced in Mr Tallentire's evidence, which reviews the likely uptake of EVs in New Zealand. This is a very well-considered analysis, however I make the following points in respect of PC73:

24.1 Dr Dodge's analysis considers EV uptake out to 2030. I consider this timeframe largely irrelevant in the context of greenhouse gas emissions at PC73 for the following reasons:

- (a) Emissions arising from residential developments should be assessed on a lifecycle basis, and for a typical NZ residential house this is considered to be 90 years. I note that Mr Copeland's analysis suggests that properties in PC73 will be developed between 2025-2031, depending on the market environment. As Dr Dodge's analysis only looks at EV uptake out to 2030, I consider this time period to be largely irrelevant in this context.
- (b) Dr Dodge's analysis looks at EV uptake at a total New Zealand level only. I expect that EV uptake will be considerably faster for those that have a regular commute, and as such I would expect to see a significant uptake of EVs in the Holmes and Skellerup blocks by commuters, in the early years of the development.
- (c) Looking beyond 2030, I note the Climate Change Commission's modelling, in its recent guidance to Government (Ināia tonu nei: a low emissions future for Aotearoa), anticipates that 36% of light vehicles on our roads will be electric by 2035, and that 46% of travel will be undertaken in EVs.
- (d) The proportion of travel undertaken in EVs will continue to increase beyond 2035, and the emissions efficiency of non-electric vehicles will improve also.

CONCLUSION

- 25 I consider the proposed development likely supports a reduction in greenhouse gas emissions, relative to other development opportunities available in the greater Canterbury region.

Dated: 28 September 2021

Paul Farrelly