

Before an Independent Hearings Panel
Appointed by Waimakariri District Council

under: the Resource Management Act 1991

in the matter of: Submissions and further submissions on the Proposed
Waimakariri District Plan

and: Hearing Stream 12D: Ōhoka rezoning request

and: **Carter Group Property Limited**
(Submitter 237)

and: **Rolleston Industrial Developments Limited**
(Submitter 160)

Joint witness statement – engineering

Dated: 6 August 2024

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JOINT WITNESS STATEMENT – ENGINEERING

- 1 This joint witness statement relates to Hearing Stream 12D: Ōhoka of the proposed Waimakariri District Plan review.
- 2 The conference attendees were:
 - 2.1 Mr Eoghan O’Neill, Mr Tim McLeod, Mr Ben Throssell, and Mr Bas Veendrick for Carter Group Property Limited and Rolleston Industrial Developments Limited;
 - 2.2 Mr Christopher Bacon and Mr Colin Roxburgh for Waimakariri District Council; and
 - 2.3 Mr Nick Keenan for the Oxford Ōhoka Community Board.
- 3 This joint statement has been prepared in accordance with section 9.5 of the Environment Court Practice Note 2023.
- 4 All witnesses have read and agree to comply with the code of conduct for expert witnesses in the Environment Court Practice Note 2023.
- 5 This joint witness statement sets out all matters agreed and not agreed by the relevant experts, with an outline of the reasons for disagreement provided where appropriate for the following questions.

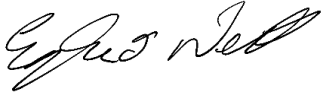
- 1. Is the proposed stormwater solution feasible?**
- 2. Does detailed design of stormwater treatment for residential developments typically occur at the subdivision resource consent stage when the detailed subdivision design has been established?**
- 3. Are the off-site flood effects from the development in the 200-year ARI event likely to be less than minor?**
- 4. Is the Ōhoka stream within and adjacent to the site, and further downstream subject to tidal influence?**
- 5. What is groundwater resurgence, and can the proposed development appropriately manage effects on and from any groundwater resurgence?**
- 6. Can the proposed development appropriately manage downstream effects from a 50-year flood event?**
- 7. Is the use of raingardens (constructed as proposed in Mr O’Neill’s evidence) appropriate for the treatment of stormwater at this site?**

- 8. If Environment Canterbury's interpretation of its Canterbury Land and Water Regional Plan (relating to the interception of groundwater from stormwater devices requiring a consent to take) changed prior to development, would more conventional stormwater conveyancing and treatment options also be feasible for the site?**

Agreed Statements of Conferencing Experts.			
Issues	Questions Posed by Commissioners	Agreed Position	Disagreements
Stormwater	1. Is the proposed stormwater solution feasible?	All experts agree that the proposed stormwater system solution can feasibly manage stormwater runoff from the site in terms of water quality and attenuation of peak flows. Any effects immediately downstream of the proposed development can be adequately managed. Some potential effects further downstream, in the 50-year event, remain uncertain. These are discussed in more detail in Question 6 below.	
Stormwater	2. Does detailed design of stormwater treatment for residential developments typically occur at the subdivision resource consent stage when the detailed subdivision design has been established?	All experts agree that subdivision stage is appropriate for demonstrating a detailed development plan for the site with associated stormwater management solutions	
Flooding	3. Are the off-site flood effects from the development in the 200-year ARI event likely to be less than minor?	All experts agree that the off-site flood effects resulting from the development in the 200-year ARI event are likely to be less than minor.	
Tidal Effect	4. Is the Ōhoka stream within and adjacent to the site, and further downstream subject to tidal influence?	All experts agree that there is no tidal effect at the Ohoka site, which is approximately 20m above sea level. The zone of tidal influence extends to approximately the confluence of the Kaiapoi River, Silverstream and the Cust Main Drain, approximately 3.5 km from the site.	
Groundwater Resurgence	5. What is groundwater resurgence, and can the proposed development appropriately manage effects on and from any groundwater resurgence?	<p>Groundwater resurgence is the occurrence of high groundwater levels following extended periods of high rainfall. These have the potential to increase baseflows in surface waterways and spring flows which contribute to downstream waterways.</p> <p>All relevant experts agree that the baseflow component (groundwater component) of flow to streams is a very small percentage of flow during flood events and therefore won't have a significant impact on flooding. Groundwater emerges in stream channels and local springs but there are natural limits on the extent to which groundwater will rise because of natural discharges to these features.</p> <p>All relevant experts agree that in a 200-year flood event ground water flows are unlikely to have a significant impact on the difference of flood levels pre and post development.</p>	<p>Some experts agree to the following (BV, TM, EO, BT):</p> <p>The near surface soils on the site consist of silt and clay and the site is crossed by well-defined watercourses and springfed land drains which intercept the underlying water bearing gravels. Unlike other areas in district these watercourses currently act as a discharge (relief) point for groundwater in these gravels which is recharged from further up the Canterbury plains and these watercourses will be maintained in the development. At times of high groundwater levels on the development site, groundwater in these gravels will dominate the discharge via existing springs and springfed watercourses rather than surface expression of flow at the surface emerging through the overlying low permeability clay and silty soils.</p> <p>Based on these considerations, site visit and investigations and the agreed statements between all experts, the proposed development is not expected to result in increased groundwater levels or 'groundwater resurgence'.</p> <p>Other experts agree to the following (CR, CB, NK):</p> <p>Groundwater resurgence within the site still carries some risk which has not been fully addressed by the proposal.</p> <p>Groundwater resurgence can be unpredictable and is not well understood, both in terms of where the resurgence</p>

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			<p>may occur, and at what flowrate. It is also hard to predict how changes to a site may change groundwater resurgence both within and around the site.</p> <p>Because of this unpredictable nature, if systems are not designed to accommodate it, this can then lead to surface ponding.</p>
Flooding	6. Can the proposed development appropriately manage downstream effects from a 50-year flood event?	<p>All experts agree that there are mitigations that can be identified and implemented within the site to address offsite effects from the 50-year event, immediately downstream of the site to approximately Christmas Rd bridge.</p> <p>Downstream of this point there are existing low-lying rural areas which are prone to flooding and which will receive an increased volume of stormwater as a result of the development. The effect of this additional volume, below Christmas Rd bridge, has not been assessed by modelling to date.</p> <p>Whilst there is uncertainty regarding the effects on flooding around Christmas Road Bridge there are further mitigation options that could be implemented to address these effects such as increased attenuation storage and/or reduced intensity of development. We note additional modelling would be required to further assess these effects at the subdivision consenting stage.</p>	
Stormwater	7. Is the use of raingardens (constructed as proposed in Mr O'Neill's evidence) appropriate for the treatment of stormwater at this site?	The system indicated in Mr O'Neill's evidence is encapsulated. The experts agree that the proposed raingarden system, if constructed properly, will provide appropriate treatment of stormwater. Given the nature of groundwater at the site, a higher level of care will be required during construction to achieve this, relative to other sites with low groundwater levels. It is agreed that there is potential for some groundwater seepage into the raingarden drainage layer and stormwater network over the lifetime of the system. This base flow should be managed via detailed design so it does not result in a continuous flow through the downstream attenuation basins and result in a maintenance issue within the basin.	
Stormwater	8. If Environment Canterbury's interpretation of its Canterbury Land and Water Regional Plan (relating to the interception of groundwater from stormwater devices requiring a consent to take) changed prior to development, would more conventional stormwater conveyancing and treatment options also be feasible for the site?	All experts agree that this is true.	

Dated: 6 August 2024



Eoghan O'Neill



Tim McLeod



Ben Throssell




Bas Veendrick



Christopher Bacon



Colin Roxburgh



Nick Keenan