

**BEFORE THE CHRISTCHURCH REPLACEMENT DISTRICT PLAN
HEARINGS PANEL**

IN THE MATTER of the Resource Management Act 1991 and the Canterbury
Earthquake (Christchurch Replacement District Plan) Order
2014

AND the Christchurch Replacement District Plan

**FOURTH STATEMENT OF EVIDENCE OF ROBERT STANLEY ROUSE
ON BEHALF OF THE CROWN (SUBMITTER 495, 2387 and 3721)**

PROPOSAL 21.11 SPECIFIC PURPOSE (FLAT LAND RECOVERY) ZONE

Horizontal Infrastructure

Dated the 24th day of November 2015

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1. INTRODUCTION

- 1.1 My name is Robert Stanley Rouse. I am the Asset Rebuild Manager - Horizontal Infrastructure for the Canterbury Earthquake Recovery Authority ("**CERA**"). I commenced employment with CERA in July 2013.
- 1.2 This is the fourth statement of evidence I have prepared on the Christchurch Replacement District Plan ("**Replacement Plan**"). My first statement of evidence was provided in the Strategic Directions hearing,¹ my second was provided in the Stage 1 Residential Hearing² and my third was provided in the Stage 1 Subdivision, Development and Earthworks hearing.³ I continue to hold the views I expressed in my previous evidence. Rather than repeating that evidence I adopt that evidence for the purposes of this statement of evidence. A summary of my qualifications and relevant past experience and my role at CERA is contained within my first statement of evidence.⁴
- 1.3 I have been asked by the Crown (through CERA) to provide evidence in relation to horizontal infrastructure⁵ in the flat lands red zone area and in relation to the Crown's submission on the Specific Purpose (Flat land Recovery) Zone in the Replacement Plan ("**Proposal 21.11**"). For the purpose of this evidence, all reference to the flat lands red zone is the Christchurch (Brookland, Avon, New Brighton - South Shore) flat lands residential red zone area - excluding Waimakariri - unless stated otherwise.⁶

2. CODE OF CONDUCT

- 2.1 I confirm that I have read the code of conduct for expert witnesses as contained in the Environment Court's Practice Note 2014. I have complied with the practice note when preparing my written statement of evidence, and will do so when I give oral evidence before the hearings panel. While I am employed by CERA, my employer and I recognise my overriding obligation to the hearings panel in presenting evidence. CERA has agreed to me giving evidence on its behalf in accordance with my duties under the Code of Conduct.

¹ Dated 25 November 2014, available for download at <http://www.chchplan.ihp.govt.nz/hearing/chapter-3-strategic-directions-and-strategic-outcomes/> under the heading "*Evidence*".

² Dated 20 March 2015, available for download at <http://www.chchplan.ihp.govt.nz/hearing/chapter-14-residential/> under the heading "*Submitter evidence*".

³ Dated 8 June 2015, available for download at <http://www.chchplan.ihp.govt.nz/hearing/chapter-8-subdivision-development-and-earthworks/> under the heading "*Submitter Evidence and Submitter Statements*".

⁴ See paragraphs 1.2 and 1.3, and Appendix RSR1, of my first statement of evidence.

⁵ *Horizontal infrastructure* is explained in paragraph 5.2 below.

⁶ Ms Jacka's evidence (from the Stage 1 Natural Hazards Proposal) defines in detail the full residential red zone flat lands area (Waimakariri and Christchurch) in section 6 of her evidence.

- 2.2 The data, information, facts and assumptions I have considered in forming my opinions are set out in my evidence to follow. The reasons for the opinions expressed are also set out in my evidence.
- 2.3 Unless stated otherwise, this evidence is within my knowledge and sphere of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

3. SCOPE

- 3.1 The documents that I have referred to in preparing this evidence include:
- (a) the Replacement Plan Proposal 21.11, as notified in Stage 3;
 - (b) the Crown's Stage 3 submission on the Replacement Plan Proposal 21.11;
 - (c) the Stage 3 - Section 32 Report, Chapter 21, *Specific Purpose - Flat Land Recovery, Ruapuna, Burwood Landfill and Resource Recovery Park*;
 - (d) the Recovery Strategy for Greater Christchurch, Mahere Haumanutanga o Waitaha, 2012 ("**Recovery Strategy**");
 - (e) Greater Christchurch Earthquake Recovery: Transition to Regeneration. Transition Recovery Plan October 2015;
 - (f) my previous evidence described above, and that of Ms Jacka, for the Crown;⁷
 - (g) the statements of evidence of Mr Eman (planner) and Mr Anderson, (geotechnical expert) for the Council in these proceedings⁸, and the statement of evidence of Ms O'Brien and Mr Gregory on behalf of the Council in the Stage 1 Residential Proposal;⁹ and
 - (h) the Strategic Directions decision.

⁷ Statement of evidence of Emma Jacka for the Crown in the Natural Hazards Proposal, Government land zoning policy, 20 February 2015, paragraph 5.7 ("**Ms Jacka's evidence**"). Available at <http://www.chchplan.ihp.govt.nz/hearing/chapter-5-natural-hazards/> under "Submitter Evidence".

⁸ Available at <http://www.chchplan.ihp.govt.nz/hearing/chapter-21-specific-purpose-zones-zones-listed-below-only-stage-3/> under "Christchurch City Council evidence".

⁹ Dated 12 March 2015. This statement of evidence is available for download at http://www.chchplan.ihp.govt.nz/wp-content/uploads/2015/03/310-CCC-Residential-Ms-Bridget-O_Brien-11-3-15.pdf

3.2 My evidence addresses the following:

- (a) the current situation regarding the rebuild and repair of horizontal infrastructure in Christchurch;
- (b) the existing horizontal infrastructure situation in the flat land red zone;
- (c) infrastructure issues associated with increased levels of development in the flat land red zone; and
- (d) my opinion on the outcomes sought by the Crown on Proposal 21.11.

4. EXECUTIVE SUMMARY

4.1 To date no significant or specific horizontal infrastructure repair or rebuild work has been carried out on local networks within the red zone. Work to date has been focussed on:

- (a) the servicing of adjacent 'green zones' with network connections that traverse the red zone, i.e. horizontal infrastructure green zone to green zone;
- (b) where required, provide services at an acceptable level to the 87 properties in the flat land red zone that have chosen not to accept the voluntary purchase offer; and
- (c) taking infrastructure no longer required, out of service.

4.2 Investigating further options to service occupied properties will commence in early 2016.

4.3 Significant repair or rebuilding of horizontal infrastructure or new or realigned infrastructure, prior to future land use decisions being made, is unlikely to deliver effective and efficient infrastructure. In my opinion, integrating land development with infrastructure provision delivers the best outcomes.

5. THE CURRENT SITUATION REGARDING THE REBUILD AND REPAIR OF HORIZONTAL INFRASTRUCTURE IN WIDER CHRISTCHURCH

5.1 As described further in my first statement of evidence, "*Horizontal infrastructure*" includes:¹⁰

- (a) potable water networks;
- (b) wastewater networks;

¹⁰ See paragraph 5.1 of my first statement of evidence.

- (c) stormwater networks (including stop banks);
- (d) local land transport network; and
- (e) retaining walls.

5.2 As described further in my first statement of evidence:

- (a) Horizontal infrastructure sustained significant damage as a result of the Canterbury earthquakes.¹¹
- (b) The repair and provision of planned and appropriate horizontal infrastructure is critical to the recovery, development and growth of Christchurch.¹²
- (c) The Crown and the Council have committed up to a maximum of \$1.8 billion and \$1.14 billion respectively to the rebuild of Christchurch's horizontal infrastructure, with the total estimated cost of the rebuild being \$2.94 billion.¹³

(This funding commitment does not include funding for the repair and rebuilding of earthquake damaged local horizontal infrastructure networks in the flat land red zone. The repair and rebuilding of earthquake damaged horizontal infrastructure passing through the flat land red zone servicing the green zone is eligible for Crown funding.)

- (d) The Horizontal Infrastructure Rebuild Programme seeks, as far as possible to restore the network's ability to provide at least the same level of service that existed prior to the Canterbury earthquakes. However, as explained in paragraph 6.12 below, this goal does not apply to all horizontal infrastructure within the flat land red zone.
- (e) Recommendations regarding rebuild work scope are made by officers from the three funding organisations, endorsed by the Horizontal Infrastructure Governance Group ("**HIGG**"). HIGG was established to oversee the horizontal infrastructure rebuild. It is independently chaired and is composed of senior representatives from CERA, the New Zealand Transport Agency and the Council. In the case of land transport, projects are approved into the programme by the Transport

¹¹ Paragraph 4.1, 6.1-6.9 of my first statement of evidence. For example, 41% of the wastewater reticulation network was damaged, 43% of the wastewater pumping stations were damaged, 31 % of the water supply pumping stations and reservoirs were damaged and 67% of land transport bridges were damaged.

¹² Paragraph 4.1 and 5.2 of my first statement of evidence.

¹³ Paragraphs 4.2, 7.5(a) and 7.9 of my first statement of evidence.

Agency, and in the case of wastewater, water and stormwater they are approved into the programme by CERA.

- (f) Key recovery goals relevant to horizontal infrastructure as outlined in the Recovery Strategy include:
 - (i) coordination and prioritisation of investment that effectively contributes to the economy during the recovery and into the future; and
 - (ii) rebuilding infrastructure and building in a resilient, cost effective and energy efficient matter.¹⁴

5.3 The Horizontal Infrastructure Rebuild Programme is anticipated to be substantially complete in 2017, but the wider rebuild and recovery will likely continue for at least 10 years.¹⁵ As at 20 November 2015 repair and rebuild progress is as follows:

- (a) wastewater:
 - (i) pipelines 68% complete
 - (ii) pumping stations (60) 76% complete
- (b) stormwater:
 - (iii) pipelines 62% complete
 - (iv) pumping stations (5) 63% complete
- (c) water supply:
 - (v) pipelines 90% complete
 - (vi) pumping stations and reservoirs (21) 72% complete
- (d) roading 73% complete;
- (e) bridges (130) 90 % complete; and
- (f) retaining walls (126) 67% complete.

¹⁴ Paragraph 7.4 of my first statement of evidence; page 11 of the Recovery Strategy.

¹⁵ Paragraph 8.1 of my first statement of evidence.

6. HORIZONTAL INFRASTRUCTURE IN THE FLAT LAND RED ZONE

- 6.1 Prior to the Canterbury earthquakes, 'local' horizontal infrastructure networks within the flat land red zone were constructed, operated and maintained to service approximately 6,000 properties.
- 6.2 Horizontal infrastructure was significantly damaged in the flat land red zone. The type of damage sustained was typically the same as for other areas across Christchurch, with wastewater, water and stormwater pipes breaking, collapsing, blocking with sediment and losing gradient. Roads suffered from surface cracking and damage, subsidence and undulations, as detailed in my first statement of evidence.¹⁶ Typically damage was more severe in areas where liquefaction and lateral spread had occurred along the Avon Corridor.
- 6.3 As stated in Ms Jacka's evidence,¹⁷ following the Canterbury earthquakes the Government agreed to an emergency social policy response to assist people in the worst affected suburbs. This included:
- (a) an area-wide process for categorising properties, which resulted in properties being categorised 'green zone' or 'residential red zone'; and
 - (b) terms for a voluntary purchase offer to owners of properties in the residential red zone.
- 6.4 During the establishment of the horizontal infrastructure repair and rebuild programme it was determined that a different response to the horizontal infrastructure rebuild and repair in the flat land red zone was required because of the zoning of the land (red zone). The need for servicing properties within the red zone was very limited as future land use decisions are yet to be made and infrastructure and servicing requirements determined.
- 6.5 For the reasons set out in paragraph 6.4 above:
- (a) condition assessment and repair work in the flat land red zone is or has been primarily focussed on assets passing through the red zone, i.e. infrastructure originating from a green zone that is required to service another green zone;
 - (b) no significant or specific work has been carried out on local horizontal infrastructure networks within the red zone;

¹⁶ See Table 1: Damage sustained as a result of the earthquakes in paragraph 6.2 of your 25 November strategic directions evidence.

¹⁷ Ms Jacka's evidence, paragraphs 3.4, 5.1 and 5.7.

- (c) apart from rebuild and repair work to pipelines servicing green zones, work on 'local' horizontal infrastructure networks has been limited to:
 - (i) decommissioning infrastructure no longer required;
 - (ii) temporary stop bank repairs;
 - (iii) providing interim services to occupied properties that have not accepted the voluntary purchase offer. Servicing in some cases may include on-site options rather than connections to a local network; and
 - (d) no earthquake repair or rebuilding work has been programmed for local horizontal infrastructure networks within the flat land red zone.
- 6.6 Currently 87 properties of the approximately 6,000 properties that were the subject of the Crown offer within the flat land red zone have not taken up the voluntary purchase offer. These are as follows:
- (a) Brooklands - 23 residential properties and 8 vacant sections;
 - (b) Avon - 44 residential properties, 1 vacant section and 5 commercial properties;
 - (c) Southshore - New Brighton - 3 residential properties, 2 vacant sections and 1 commercial property.
- 6.7 The current voluntary Crown offer to purchase properties within the flat land red zone expires on 10 December 2015, therefore these numbers may reduce.
- 6.8 Occupied properties that have chosen not to accept the voluntary purchase offer are serviced by one or more of the following, temporary surface laid water pipes, holding tanks for wastewater with manual removal by 'sucker' trucks, and / or the on-going continued use of damaged infrastructure, which is primarily cracked, damaged and poor performing wastewater pipelines and surface damaged roads.
- 6.9 The Council services and provides access to occupied properties within the red zone. The provision of services to the remaining occupied properties in the flat land red zone is very expensive. In paragraph 7.38 of Mr Emans evidence, Mr Eman states that the cost of providing water supply, stormwater, wastewater and road networks in 2014 was an average of \$36,000 per occupied residential household.

- 6.10 The high cost, and resultant inefficiency, of providing services to occupied properties within the flat land red zone is a reason why the Council is considering reviewing the levels and form of service.¹⁸
- 6.11 The repair or rebuilding of 'local' horizontal infrastructure networks within the flat land red zone is not included in the horizontal infrastructure repair and rebuild programme as:
- (a) there are currently only a small number of properties requiring servicing (up to 87 properties) and these properties are not concentrated in one area in the red zone (these properties are distributed across Brooklands (31), Avon (50) and Southshore / New Brighton (6));
 - (b) these properties are currently being satisfactorily serviced using temporary interim measures;
 - (c) the cost to repair or rebuild the existing networks to service the small numbers of remaining occupied properties would be very high; and
 - (d) diverting rebuild and repair funds from other higher priority work would not result in the best recovery outcome.
- 6.12 A prioritised work programme for the repair or rebuilding of earthquake damaged horizontal infrastructure, excluding 'local' networks within the flat land red zone, has been prepared by the 3 funders and workscope eligibility determined based on the assets performance, risk of failure, criticality, location criticality, operations cost and opportunity to combine the work with other rebuild work.
- 6.13 Repairing and rebuilding horizontal infrastructure in the flat land red zone is low priority when compared with other works and it would almost certainly not pass the eligibility test. Investing in infrastructure that may no longer be required or may need to be relocated or realigned once future land use decisions are made is also not considered a good investment when:
- (a) other more critical work is required in the green zone;
 - (b) future use decisions are yet to be made and horizontal infrastructure requirements are yet to be determined;

¹⁸ Mr Eman statement of evidence, paragraph 7.39.

- (c) repaired or rebuilt horizontal infrastructure in the flat land red zone may limit or influence future use options for red zone land or require expensive realignments or relocations to facilitate future development;
- (d) multiple hazards exist in the flat land red zone, and time is required to ensure these are considered in an integrated way when planning for new infrastructure and land development; and
- (e) ideally only fully rebuilt or repaired horizontal infrastructure should remain connected to downstream networks, to prevent damage and capacity issues arising from infiltration of groundwater and migration of fine material into wastewater pipelines.

7. INFRASTRUCTURE ISSUES ASSOCIATED WITH INCREASED LEVELS OF DEVELOPMENT IN THE FLAT LAND RED ZONE

- 7.1 Mr Eman proposes that Proposal 21.11 enables an increased level of urban activity for the remaining privately owned properties in the flat land red zone.¹⁹ The high costs associated with maintaining the current level of service to occupied residential households in the flat land red zone is provided by Mr Eman as one reason why the Council is considering changes to levels and forms of service.²⁰
- 7.2 I agree that there are high costs associated with the current levels and forms of service.
- 7.3 However, while expensive, the alternative, such as in some cases onsite solutions to service occupied properties, are more cost-effective than continuing to operate and maintain, or repair or rebuild, significant lengths of damaged horizontal infrastructure. These bespoke solutions are less vulnerable to groundwater infiltration into the wastewater system, and provide increased security of supply / service.
- 7.4 Moreover, the notified proposal did not seek to continue this type of service, or costs, indefinitely. The notified proposal intended to establish a 'holding' zone as an interim measure to manage land use planning while decisions are made under the Residential Red Zone Programme or its successor about appropriate and efficient future land use in this zone and infrastructure to service it.

¹⁹ Statement of evidence of Mr Eman, paragraph 3.1.

²⁰ Statement of evidence of Mr Eman, paragraph 7.38.

- 7.5 As explained below, my key concerns with implementing plan provisions which enable higher levels of non-residential development at this stage in the recovery process relate to:
- (a) the ability of the damaged and unrepaired local network to provide the required level of service to support non-residential activities;
 - (b) the costs incurred to provide services to larger new developments, diverting resources from other priority areas at this time;
 - (c) the potential for significant investment in infrastructure now to reduce future land use flexibility; and
 - (d) the potential for new, repaired or rebuilt infrastructure requiring expensive relocation or realignment after future land use decisions are made.
- 7.6 At the stage 1 hearing on the Residential Proposal Bridget O'Brien, Senior Planning Engineer - Growth for the Council gave evidence on intensification in residential areas and the effects on wastewater.²¹ Ms O'Brien commented that there are "*significant wastewater capacity issues in some areas of Christchurch,*" and "*increased wastewater flows from residential intensification can exacerbate the problem, and make it more difficult for Council to comply with its resource consent for overflows*".²²
- 7.7 I am concerned that no infrastructure evidence has been provided by the Council that provides certainty that allowing for more intensive non-residential activities connecting to existing and potentially unrepaired wastewater networks will not create capacity issues on existing downstream horizontal infrastructure networks. I consider that wastewater modelling would need to be carried out to address these concerns.
- 7.8 In order to service a new development within the flat land red zone it would be necessary to:
- (a) repair or rebuild the existing network; and / or
 - (b) construct new infrastructure to specifically service the development; and

²¹ Evidence of Bridget O'Brien on behalf of the Christchurch City Council on the Residential Proposal, dated 12 March 2015. This statement of evidence is available for download at http://www.chchplan.ihp.govt.nz/wp-content/uploads/2015/03/310-CCC-Residential-Ms-Bridget-O_Brien-11-3-15.pdf

²² Evidence of Bridget O'Brien on behalf of the Christchurch City Council on the Residential Proposal, dated 12 March 2015. Page 4 paragraph 3.1.

- (c) in conjunction with any of the above, provide suitable onsite alternatives servicing the development from a network connection.

7.9 There are significant issues associated with rebuilding or repairing the existing networks or building new horizontal infrastructure within the flat land red zone to provide services to a new development prior to any future land use decisions being made. These include:

- (a) the distance between the new development and undamaged infrastructure may be significant, requiring significant physical works and high costs e.g. a new development could be located a significant distance from the repaired networks in the green zone, requiring a significant length of damaged infrastructure be repaired or rebuilt, or new infrastructure constructed.
- (b) Infrastructure capacity would need to be determined and allowed for, e.g. should the full capacity of the existing infrastructure be repaired, rebuilt or restored; or, should only limited capacity required to service only the new development be provided; or should an allowance be made to increase capacity for additional future but as yet unknown development.
- (c) Until future land use decisions are made, rebuilt or new infrastructure will need to follow the alignment of the existing horizontal infrastructure. It is unlikely that new infrastructure or a new pipeline or road alignment or location will be approved on Crown owned land until future land use decisions have been made.
- (d) Rebuild and repair of local networks within the flat land red zone is outside the scope of the Horizontal Infrastructure Repair and Rebuild Programme. The Council will need to determine who will fund repair or rebuild work and provide capacity - the developer or the Council.
- (e) The inclusion of on-site servicing alternatives means servicing development is possible, but (as previously stated):
 - (i) it would be expensive to provide. Currently the cost to service properties in the flat land red zone as stated in Mr Emans' evidence is on average \$36,000 each per year; and
 - (ii) on-site alternatives are vulnerable to damage (e.g. above-ground pipelines), but may be more resilient than a connection to the existing damaged network.

- (f) Horizontal infrastructure that is not integrated with land development will not result in effective and efficient infrastructure. This point was addressed at the stage one Residential hearing by Ms O'Brien. Ms O'Brien stated *"the City Council takes an integrated approach to wastewater network planning, taking into account planned growth areas, and must work within its budget constraints to deliver projects that provide the most benefit"*.²³ As I explained in my first statement of evidence, an absence of integration between land use and infrastructure planning could undermine the significant amount of investment made and the future role that horizontal infrastructure has in supporting economic activity critical to recovery and beyond. An unplanned development that will require new infrastructure to service it also carries an opportunity cost where existing or planned infrastructure capacity elsewhere does not get used or built as a consequence.²⁴

8. THE OUTCOMES SOUGHT BY THE CROWN

- 8.1 The Crown's submission supported the notified version of Proposal 21.11 establishing the specific purpose (flat land recovery) zone as a "holding zone" as it will be the subject of a later plan change to confirm the zoning. Any subsequent plan change will be informed by the outcome of the Residential Red Zone Programme or its successor.
- 8.2 I consider that Proposal 21.11 should establish a temporary holding zone, which appropriately enables the integration of land development with the provision of effective and efficient horizontal infrastructure.
- 8.3 The establishment of a temporary holding zone is consistent with decisions made to date on the provision of infrastructure to occupied properties and vacant privately owned property in the flat land red zone. Under the Local Government Act ("**LGA**") Council is legally obliged to provide service to occupied privately owned properties, in situations where there is vacant privately owned properties the Council is also legally obliged to provide services if they previously had services prior to the earthquakes. However, the level of service can be reduced. Any new or repaired infrastructure required to service vacant residential properties would need to be on existing alignments and not on Crown owned land based on the Crown's current position.

²³ Evidence of Bridget O'Brien on behalf of the Christchurch City Council on the Residential Proposal, dated 12 March 2015. Page 8 paragraph 4.13 http://www.chchplan.ihp.govt.nz/wp-content/uploads/2015/03/310-CCC-Residential-Ms-Bridget-O_Brien-11-3-15

²⁴ First statement of evidence, paragraph 9.3.

- 8.4 New non-residential development in the flat land red zone may require significant repair or rebuild of earthquake damaged horizontal infrastructure to service the development, potentially resulting in the allocation of public funds away from critical recovery work and a lack of integration with future land development.
- 8.5 The Council must adhere to its obligations under the LGA. This point was addressed in the evidence of Christopher Gregory, Asset and Networks Unit Manger on behalf of the Council at the stage one Residential hearing. Mr Gregory stated that *"the LGA sets out Council's obligations for its LTP to consider demand for services, service levels and standards, asset capacity and the cost implications"*. Mr Gregory goes on to say that *"For the Council this means efficiently providing levels of service demanded/expected by the community while maintaining sustainable levels of debt and of course keep rates affordable for residents and businesses"*.²⁵ I consider that allowing for more intensive non-residential uses in the flat land red zone may undermine the integrated approach to land use and infrastructure that has been planned and budgeted for through the appropriate LGA processes and which the community is expecting to occur.
- 8.6 Maintaining and continuing to operate significant lengths of damaged and unrepaired infrastructure creates issues for downstream infrastructure, and can include:
- (a) capacity issues arising from infiltration of groundwater and the migration of fine material into the wastewater system; and
 - (b) increased maintenance and operations costs.
- 8.7 Significant repair or rebuilding of horizontal infrastructure or new or realigned infrastructure solely to service current development potential within the flat land red zone, prior to future land use decisions being made, is unlikely to deliver effective and efficient infrastructure. In my opinion, integrating land development with infrastructure provision delivers the best outcomes.



Robert Stanley Rouse
24 November 2015

²⁵ Evidence of Christopher Gregory on behalf of the Christchurch City Council on the Residential Proposal, dated 25 March 2015. Page 5 paragraph 3.7 and 3.8 <http://www.chchplan.ihp.govt.nz/wp-content/uploads/2015/03/310-CCC-Rebuttal-Mr-Christopher-Gregory-Residential-25-3-15.pdf>