DDPR_feedback_0151s		
	Name	James White
	Organisation	on behalf of Parker Property 2021 Ltd Partnership
	Email	james@surveywaitaki.co.nz
	Response Date	Aug 30 22
	Notes	
Q1	Select the chapter you want to provide feedback on	
Q2	In general, to what extent do you support the contents of this chapter?	
Q3	Objective/Policy/Rule/Standard reference:	
Q4	Feedback/Comments	
Q5	Objective/Policy/Rule/Standard reference:	
Q6	Feedback/Comments	
Q7	Objective/Policy/Rule/Standard reference:	
Q8	Feedback/Comments	
Q9	Objective/Policy/Rule/Standard reference:	
Q10	Feedback/Comments	
Q11	supporting documents?	
	0	
Q12	If you need more space, or have any other general comments, please leave them here	
	Tēnā koe We hereby submit feedback to the draft Waitaki District Plan on behalf of Parker Property 2021 Ltd Partnership related to rezoning land at Freyberg Avenue, Kurow. Please find attached a feedback submission document setting out the basis of the feedback, as well as Appendix A being the proposed zoning plan. The full Appendices to the Feedback are: * Appendix A – Proposed Zoning Plan * Appendix B – Flood Assessment for Subdivision * Appendix C - Environment Canterbury Correspondence * Appendix D – Letters of Support * Appendix E – Records of Title * Appendix F – Soil Report * Appendix G – Avanzar Consulting Ltd – Freyberg Transport Assessment The file size of the Feedback Appendices A-G are too large to send as attachments to an email, therefore we have created a Dropbox folder containing the Appendices, with the following link providing access: https://www.dropbox.com/sh/zd2l1hj8qiqp66f/AAA9VIN07cnJouUDbXPccyIda?dl=0 [https://protect-au.mimecast.com/s/__gVC91Wz3FAqL7FohpTh?domain=dropbox.com] We trust all the required information is enclosed, but please do not hesitate to	

	contact me for any matter. We look forward to your considered response in due course. Ngā mihi nui James White | Planning & Projects Leader Survey Waitaki Ltd - Surveying Planning Engineering T 03 434 80 20 | M 021 195 1192 | 27a Coquet Street, PO Box 237 | Oamaru 9444 | www.surveywaitaki.co.nz

DRAFT DISTRICT PLAN FEEDBACK

August 2022

SUBMITTER: PARKER PROPERTY 2021 LTD PARTNERSHIP

LOCATION: FREYBERG AVENUE, KUROW

Survey Waitaki
surveying • planning • engineering

To:	Draft District Plan Feedback Waitaki District Council Private Bag 50058 Ōamaru 9444
Submitter:	Parker Property 2021 Ltd Partnership
Site Location:	Freyberg Avenue, Kurow
Legal Descriptions:	Lot 33 Deposited Plan 19718 (RT OT12C/547), Lot 34 Deposited Plan 19718 (RT OT12C/548), Lot 35 Deposited Plan 19718 (RT OT12C/549)
Proposal:	This feedback proposes that land south of Freyberg Avenue, Kurow, be zoned General Residential Zone. In addition, the Land Use Capability is proposed to be LUC 5.
Consultation:	The submitter has previously discussed the appropriateness of, and advocated for, changing the zoning of the subject land with officers of the Waitaki District Council. The submitter has previously consulted with Environment Canterbury regarding flooding risk. The submitter has consulted with members of the Kurow Community.

James White
Planner
MPlan

Signed on behalf of the Submitter

Addresses for Service:

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FEEDBACK ON DRAFT DISTRICT PLAN

Introduction:

This feedback proposes that land south of Freyberg Avenue, Kurow, be zoned General Residential Zone. In addition, the Land Use Capability is proposed to be LUC 5.

As well as providing information justifying the proposal, this feedback document provides a thorough assessment of all the potential considerations and effects for zoning the land General Residential Zone.

The proposed zoning is illustrated on the Plans attached in Appendix A.

Operative District Plan: Rural General Zone – Maps 13 & 43
Subject to Flooding Risk
Some High Class Soils

Draft District Plan: General Rural Zone
Flood Hazard
Waitaki Floodplain
Highly Productive Land - LUC 3

Feedback and Outcome Sought:

This feedback relates to the land immediately south of Freyberg Avenue, Kurow. The subject land is legally described as Lot 33 Deposited Plan 19718 (RT OT12C/547), Lot 34 Deposited Plan 19718 (RT OT12C/548), Lot 35 Deposited Plan 19718 (RT OT12C/549).

The Draft District Plan shows the land as General Rural Zone and is subject to Flood Hazard and Waitaki Floodplain notations and containing Highly Productive Land with Land Use Classification LUC 3.

Outcome Sought: This feedback seeks that the land be zoned General Residential Zone.

The proposed zoning is illustrated on the Plan attached in Appendix A.

Outcome Sought: The site Land Use Capability Classification is proposed to be LUC 5.

Description of Site:

The land subject to this feedback is located at 49A Freyberg Avenue, Kurow (Figures 1 & 2). The land is legally described as Lot 33 Deposited Plan 19718 (Record of Title OT12C/547), Lot 34 Deposited Plan 19718 (Record of Title OT12C/548), Lot 35 Deposited Plan 19718 (Record of Title OT12C/549) and is approximately 9.70ha in total area (3 Records of Title combined) (Appendix E). Figures 1-7 below visually describe the site and surrounds.

The site is zoned Rural General Zone in the Operative Plan on Planning Maps 13 and 43 (Figure 1). The land is shown on the Planning Maps as being subject to some risk of flooding and is also shown as containing some High Class Soils (Figure 3). No other items of interest or relevance are shown on the Operative Plan Planning Maps.

The Draft District Plan shows most of the existing Kurow township being subject to 'Surface Fault Rupture Hazard (Activities and Buildings)', while Freyberg Avenue and the subject land is free from this potential hazard.

Kurow is located in the Waitaki Valley, where the Waitaki River leaves the high country and begins its braided journey eastwards across the Waitaki Plains. The area is located within the Canterbury Region. The proposed subdivision site is located adjoining, and south of, residentially-zoned land surrounding Freyberg Avenue – which is part of the township of Kurow. The site is within easy walking or biking distance of the Kurow business centre (approximately 1km).

North of Freyberg Avenue is a golf course, then residential land associated with inner Kurow. Moving away from the subject property to the east is Rural Residential zoned land, Kurow-Duntroon Road (SH 83), more Rural Residential land, some low-lying flood prone Rural Scenic land associated with the Waitaki River margins, and the Waitaki River itself. To the south of the subject property is rural land, containing a mixture of 'rural residential' properties ranging in size from approximately 5.5ha to 12ha in area. To the west of the subject property is a racecourse owned by the Kurow Community and Recreational Club Incorporated (locally known as the Kurow Jockey Club), Waitaki Valley School, and Settlement Road.

As previously mentioned, the land is identified on the Planning Maps as being subject to some risk of flooding, and this is a known issue with this area of Kurow. The flood risk stems from two small watercourses, Cattle Valley Stream and Diggers Gulley Creek, with catchments originating in the hills to the south-west of the Kurow. A network of stormwater channels and culverts were developed in the past to mitigate the flood hazard, including a flood way within the subject property that follows the western, southern and half of the eastern boundaries. Meyer Cruden Engineering and subconsultant RJ Hall and Associates Ltd (RJ Hall) were engaged to prepare a flood assessment for a proposed 10-Lot subdivision currently before Council. The report *Flood Assessment Kurow Subdivision, 12 April 2022, Reference R2021299* (Meyer Cruden et al., 2022) is attached in Appendix B.

Figure 1: Map showing the location of the site (yellow border) in relation to the surrounding environment and Waitaki District Plan Planning Map notations which shows the flood hazard area and High Class Soils.

Figure 2: Aerial image from Canterbury Maps showing the location of the site (yellow border) in relation to the surrounding environment.

The land contained in Records of Title OT12C/548 and OT12C/547 currently has vehicular access to Freyberg Avenue via a shared right of way leg-in located between the properties at 31 and 33 Freyberg Avenue. Also of note, Record of Title OT12C/547 contains an electricity easement in favour of Network Waitaki for physical power pole, transformer and lines along the route of the right of way from Freyberg Avenue to within the net area of Lot 33 DP 19718 (Easement Instrument 6004124.1). Records of Title OT12C/547 and OT12C/548 both contain historic fencing covenants that are of no relevance. And there is also an encumbrance registered over each title in favour of the Kurow Duntroon Irrigation Company Ltd.

The property at 49A Freyberg Avenue (Record of Title OT12C/549) is accessed via an existing vehicle crossing from Freyberg Avenue (between 49 and 52 Freyberg Avenue), and a leg-in driveway. The property contains an established existing residential dwelling and several sheds, stock yards, amenity trees and landscaping – within an area of approximately 5000m^2. The property is largely flat, with some views to the surrounding hills, and having good access to sunlight. The dwelling disposes of wastewater via a septic tank and disposal field system, while stormwater is discharged to ground.

The wider property has a network of aging internal fencing and has remnants of border-dyke irrigation land sculpting – including a disused water race along the northern boundary. The property is now serviced with a small allocation of irrigation water from the Kurow Duntroon Irrigation Company Ltd, and with basic k-line irrigation infrastructure. The property is leased and periodically grazed with stock. A shelter belt hedge lines the southern boundary of the land, and another shelter hedge exists on the western boundary.

Figure 3: Photograph taken from approximately the middle of the site looking northwards towards Freyberg Avenue.

The NES for Assessing and Managing Contaminants in Soil to Protect Human Health is not likely to apply to the application site as the previous landowner has also confirmed that the known past land use has been residential and the extensive grazing of stock, and that there

are no known significant contamination issues. The previous owner managed the property between 1997 and 2021 and confirmed that he built the sheep yards in his time as owner. Significantly, the previous owner stated that he never used a sheep dip or a spray race in the yards, and that lice control was by a pour on dip poured directly onto the sheep back. It is noted that the existing septic tank and disposal field system will be removed, and the ground rehabilitated to an appropriate standard.

The property does not contain any known indigenous vegetation or habitat, instead being highly modified with exotic pasture and exotic tree species. The property fits within the lower Waitaki Plains ecological district, where it is recognised that continued human modification has resulted in very little remnant indigenous vegetation and limited nature conservation values.

Freyberg Avenue is a 20m-wide no-exit legal road, with an approximate 10m-wide formation, and provides for two-way operation with no marked centre line. Freyberg Avenue has streetlighting, kerb and channel, and wide grass berms on both sides. The use of wide grass berms and no footpaths is in line with other streets and roads within Kurow. Freyberg Avenue terminates in a turnaround area near the entrance to 49A Freyberg Avenue. There are no formal parking controls on Freyberg Avenue with unrestricted parking available between vehicle crossings. The northern end of Freyberg Avenue links with Ferguson Street and then Gordon Street to provide an efficient and safe linkage with the Kurow town centre. An unformed legal road (Hillies Road) lies to the south-east of the property.

Population & Demand:

The population of Kurow appears to be growing and community and business feedback points to a lack of supply and availability of suitable Residential Zone land within Kurow.

There are challenges in obtaining up-to-date objective statistics due primarily to the disruption to the New Zealand Census caused by Covid 19. However, demographics sourced from Wikipedia (which references Statistics New Zealand) show that Palmerston had a population of 372 at the 2018 New Zealand census, an increase of 51 people (15.9%) since the 2013 census, and an increase of 24 people (6.9%) since the 2006 census.

Along with population growth, demand for new housing options in Kurow has increased. People are moving and retiring from farms around the Kurow, Waitaki and Hakataramea areas and want to stay in the area, but on small, easily maintained residential properties.

As an exercise to understand the Kurow property market for both sales and rentals over the last 12 months, Trademe sales data was interrogated. The data showed that there were 37 new listings over the last 12 months (+8.82% YoY). Another 3 were relisted during the time period from the period before, so a total of 40 (+14.42% YoY). The median days on market before sold amounted to 65 days with a 100% success rate. There were 2 rental listings started in the last 12 months. This date indicates a tight market with strong demand for houses and rentals in Kurow.

The owner of the local business Kurow Auto Services Denise Cochrane emailed in support of the recent 10-Lot subdivision application (Appendix D). In part of her email, Ms Cochrane wrote:

'…At Present there is virtually no sections available for sale in Kurow and anything that comes on the market has been snapped up. We will have owned our business Kurow Auto Services for 24 years next week and I can say that demand for housing in the town has been steady for most of that time. Kurow has become more desirable as a holiday destination with the overcrowding and overpricing of places like Wanaka, Cromwell and Twizel. In addition to this the development of the Cycle Trail and the Viticulture in the area has also added to the desirability of small places like Kurow. We have found we are increasingly asked about the availibility of property and sections by members of the public. I recently talked to a builder who is constructing a Spec House as we'd had an enquiry regarding it only to be told it had been presold to another party who also "walked in off the street". In my opinion and based on my experience having grown up in the area, worked here and subsequently owning this business there is definitely a shortage of sections in Kurow.

The block of land you refer to is situated in a very desirable area in that it is not in the shade of Kurow Hill and will command great views. I wish you well with your venture and commend your confidence in our Community.…'.

In addition, local community leader Gaynor Lines emailed in support of the recent 10-Lot subdivision application (Appendix D). In part of her email, Ms Cochrane wrote:

'…The Kurow area is very attractive in general, with the wonderful Waitaki braided river, recreational lakes, excellent cafes, bike trail, medical centre, golf course, and a superb climate. Overall there is a strong sentiment that this area is moving forward and that things are happening in Kurow, it is an attractive place to live.
I am retired and have been seeking to downsize my property. I do not want to move from Kurow but find there is no land available to purchase and build on, nor suitable retirement style housing to purchase, seeking smaller, modern, and easy care. I know a number of local retirees in similar positions.
The existing township is located in the shade of the Kurow Hill and even if there was available housing , the shading is not ideal. The Freyberg Avenue area is much better suited to permanent housing as it gets considerably more sunlight...'

Real Estate Agent Jan Meikle of Harcourts provided a market analysis of the Kurow property market (attached in Appendix D). In her report, Ms Meikle references Harcourts statistics and states that demand for housing in Kurow remains strong.

In addition, Real Estate James Symes of One Agency provided another market analysis (Appendix D), again with similar results and conclusions. Likewise, the Principle of Waitaki Valley School wrote in support (Appendix D).

Clearly, the demand for new land and housing options in Kurow has increased and there is a need for new suitable options.

WDC Community Engagement Preliminary Feedback

In preparation for the review of the District Plan, the Waitaki District Council undertook an initial round of community engagement with residents of the upper Waitaki settlements of Ohau, Omarama, Otematata and Kurow between 20th December 2018 and 20th January 2019. The report from that consultation was published on the Council website titled '*Community Engagement – Preliminary Feedback for: Kurow/Otematata/Omarama/Ohau*'.

In terms of the participants, there were 77 responses in total across the 4 geographic areas. No breakdown was provided for the Kurow-specific respondents. Of some relevance to the proposed new zoning, the WDC asked the Kurow residents: '*Should we be providing for housing at higher densities*?' It is noted that this question could be misinterpreted to be either: 1. squeeze more houses in to existing land or 2. provide more land for more houses. Irrespective there were some indications from residents that more land and housing options are needed (Figure 4).

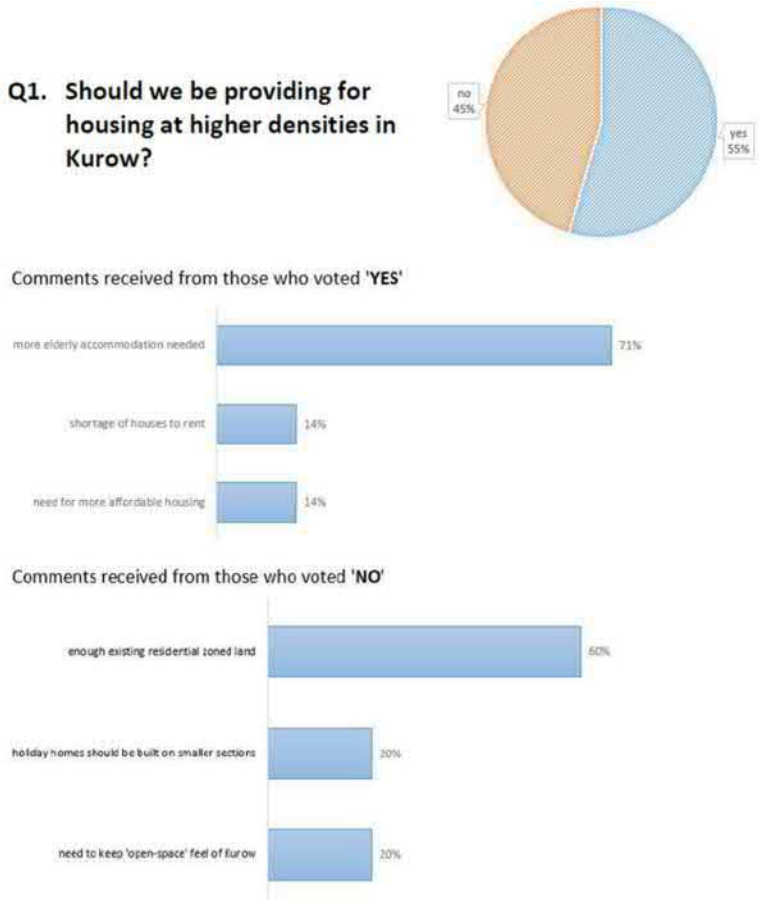


Figure 4: Excerpt from Council document 'Community Engagement – Preliminary Feedback for: Kurow/Otematata/Omarama/Ohau'.

Relevant community comments to the proposed re-zoning included:

> *'Affordable housing for locals and others who want to live here permanently. Difficult to expand a business when there is no accommodation available for new staff. Expanding and maintaining our current village vibe. Having council take notice and realise we are unique and not a part of Oamaru. We pay hefty rates to live here, our services are not maintained well enough. Less holiday homes, more housing for young people otherwise they will leave us.'*

When asked '*What do you see as Kurow's biggest challenges at the moment?*', relevant comments from respondents included:

'Developing residential areas. Balancing the ratio of holiday homes with permanent residents. Monitoring air b&b. losing people.'

'Moving into the area as there is nowhere to rent.'

While not particularly conclusive, the feedback gathered by WDC appears to indicate a lack of housing supply for both permanent residents and rentals, and a lack of available suitable Residential Zone land within Kurow.

Constraints

'Constraints' can include known areas where there are values or characteristics which typically require detailed consideration if urban development is proposed to occur.

A number of key features within the surrounding environment have been identified that together constrain and limit the suitability and availability of additional land for residential purposes within the existing Residential Zone in Kurow. These constraints are:

1. Kurow Hill dominates the town to the west and shades a large area of the current Residential Zone within Kurow from early afternoon, particularly during the winter months – restricting the available sunlight (Figure 4). For example, the Caltex Garage in the town centre (24-28 Bledisloe Street) begins to be shaded from 3:18pm on the shortest day of the year, with the Residential Zone further to the west losing sunshine before then.
2. The Rural Residential land to the south-west of Kurow is affected by the shading issue and is also constrained by steep land around the foothills.
3. The Kurow Golf Course occupies a large area of land north of Freyberg Avenue.
4. The Kurow Racecourse and Jockey Club lies to the west of Freyberg Avenue.
5. The Waitaki River and its low-lying flood prone margins constrain to the east (also shown on Draft District Plan as being subject to 'Liquefaction Susceptibility')
6. Rural Residential land is located to the east of the site alongside Kurow-Duntroon Road (SH 83).
7. Kurow-Duntroon Road (SH 83) limits additional access opportunities for development of new property directly from the highway.
8. The Draft District Plan shows most of the existing Kurow township being subject to 'Surface Fault Rupture Hazard (Activities and Buildings)', while Freyberg Avenue and the subject land is free from this potential hazard.

When mapped, the combination of existing constraints clearly limit the suitability and availability of additional land for residential purposes within the existing Residential Zone in Kurow. These constraining and limiting factors are depicted in Figures 5-7 below – with Figure 5 clearly showing the site as the only appropriate location for additional residential development.

Figure 5: Photograph showing a large part of the Kurow Residential Zone in shade, and approximate location of the site (blue arrow) (photo taken at 3.20pm 15 June 2022).

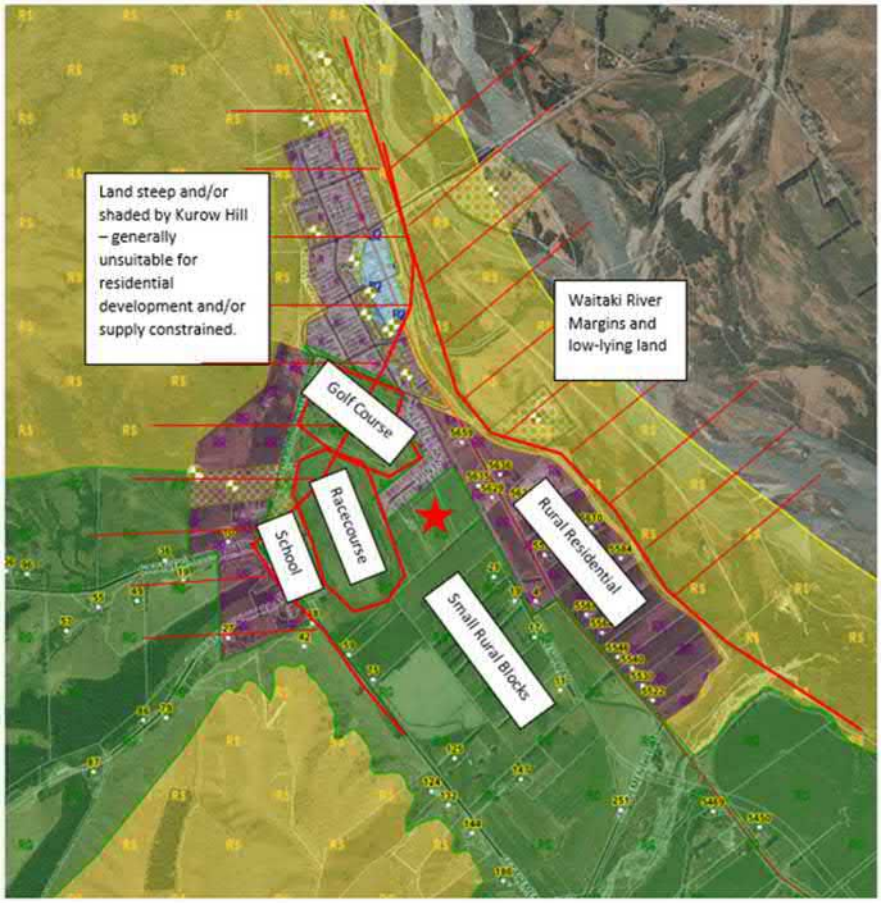


Figure 6: Map showing the location of the site (blue arrow and red star) in relation to the surrounding environment and Waitaki District Plan zoning. Key constraining features of the surrounding environment have been annotated (map sourced from WDC GIS website OurMaps).

Figure 7: Excerpt from Draft District Plan mapping showing the Surface Fault Rupture Hazard (Activities and Buildings) and Liquefaction Susceptibility areas in relation to the proposed new General Residential Zone (map sourced from https://spatialservice.waitaki.govt.nz/GPDistrictPlan/).

The site itself is potentially subject to several known constraints, being the potential flooding risk and High-Class Soils. These constraints are assessed later in this feedback and will be shown to not be limiting factors in the suitability of the site for residential zoning.

Consultation:

The submitter has previously discussed the appropriateness of, and advocated for, changing the zoning of the subject land with officers of the Waitaki District Council.

Appendix D contains letters of support from local people, businesses and organisations that provide testimony of these factors from a local perspective.

The submitter has recently lodged a resource consent application (201/202.2022.1944) to create 10 new residential lots in the north-western corner of the land and obtained written approvals from a number of surrounding landowners for that proposal. Figure 8 below depicts the properties for which the owners gave their written approval (blanked out in blue), with the location of proposed Lots 1-10 shown outlined in yellow. This shows broad overall support for further development in Kurow, and it is anticipated that the same level of community support will be afforded a proposed change of zoning to Residential.

Figure 8: Map showing the location of the properties that provided written approval to the recently lodged 10-Lot subdivision application (blanked out in blue), with the location of the proposed rezoning shown in yellow.

The submitter also engaged consultants to consult with Environment Canterbury (ECan) regarding the flood hazard risk relating to the 10-Lot subdivision and general Freyberg Avenue area. ECan subsequently provided written confirmation that the flood assessment is accurate, that the potential impacts of the 10-Lot subdivision on adjacent land is minor, and that the proposed floor levels are appropriate. It is anticipated that ECan will reach the same conclusion with the suggested zone change. A copy of the Flood Assessment and ECan correspondence confirming this is attached as Appendix B.

Assessment of Suggested Zone Change effects:

The following is an assessment of the potential effects of the suggested General Residential Zone change and includes the following considerations:

- Lot Size and Density:
  - Amenity Values
  - Visual & Landscape
  - Traffic generation

  - Earthworks
  - Infrastructure
  - Reverse Sensitivity
- Property Access
- Esplanade Provision
- Natural Hazards
- High Class Soils
- Servicing (water, wastewater, stormwater, trades waste, energy, telecommunications)
- Cultural, Heritage, Landscape, Archaeological and Vegetation
- Earthworks
- Easements
- Reserve Fund Contributions
- Positive Economic Effects

Lot Size and Density:

This feedback seeks that, along with the land being zoned General Residential Zone, all the draft and subsequent proposed/operative General Residential Zone standards and Subdivision rules should apply to the new zone.

A change to General Residential Zone on the property will clearly alter the potential lot size and density of properties, and, while the new Plan rules will be in place to effectively mitigate effects within the zone, the following is an additional assessment of potential effects.

Amenity Values:

To assess the potential impact of the proposed zone change and development on local amenity, the character of the existing environment has been considered. The site has been described in detail in the earlier 'Site Description' section of this feedback document. The site is currently zoned Rural General Zone in the Operative Plan, with the northern boundary being directly adjoining the Residential Zone. The site and the nearby surrounding topography is flat and the site is not readily viewed from nearby neighbouring properties (excluding adjoining neighbours) or nearby publicly accessible areas. Views of the site are limited from further afield such as from Settlement Road to the west, and Kurow-Duntroon Road to the east. There is already an existing residential dwelling and associated rural infrastructure and curtilage in the north-west corner, and a resource consent application (201/202.2022.1944) proposing 10 new residential lots in this location is currently before Council.

The adjoining residential properties along the northern boundary are orientated to the north, and views to the south towards the site are limited by high fencing, shrubbery and accessory buildings and appear to have not been maximised by those residents. This stands to reason as adverse weather conditions tend to come from the south, while the sun and views to the surrounding hills are to the northerly aspect (Figure 9). All residential properties adjoining to the north will continue to have the same levels of access to sunlight, daylight and privacy and a feeling of not being closed in or overlooked.

Figure 9: Photograph taken from the east boundary of proposed Lot 10 looking north-east along the southern boundaries of the existing residential properties within the Residential Zone.

Landuse, Building Location and Design

This submission accepts that all the draft and subsequent proposed General Residential Zone standards will ensure that amenity values will be maintained and enhanced within the re-zoned land.

Traffic generation effects on amenity

In terms of traffic generation effects on amenity, it is submitted that the levels of traffic generation and pedestrian activity resulting from the proposed zone change will be compatible with the character of the neighbourhood and nearby Kurow urban area.

The main route for vehicular access to the new Residential Zone would be via Freyberg Avenue. The northern end of Freyberg Avenue links with Ferguson Street and then Gordon Street to provide an efficient and safe linkage with the Kurow town centre.

There are currently several options for accessing the new proposed General Residential Zone from Freyberg Avenue, and these are shown on the plan attached in Appendix A. Further options are likely to become available should the new zone be confirmed. An unformed legal road (Hillies Road) lies to the south-east of the property, and this provides for a potential future opportunity for a through-road linkage with the newly zoned land and SH 83 to the south.

The subdivision application currently before Council contains a Traffic Impact Assessment from Transportation Engineer Antoni Facey of Avanzar Consulting Ltd. The assessment concluded that the proposed 10-Lot subdivision will result in traffic and transportation effects that are no more than minor. The assessment 'Avanzar Consulting Ltd – Freyberg Transport Assessment Memo, August 2022' is attached as Appendix G to this feedback document.

It is expected that a further Traffic Impact Assessment in terms of the proposed re-zoning will show that the surrounding road environment is capable of supporting the change in zoning and subsequent potential development.

The design and formation of Freyberg Avenue (and its feeder roads) meets the Operative Plan specifications for such roads as set out in Section 12.2.2 of the Operative Plan (aside from footpaths). This is in line with New Zealand Standard - Land Development and Subdivision Infrastructure NZS 4404:2010, which allows for such roads to cater for up to 200 dwellings and/or 2000 vehicle movements per day.

On the above basis, it is submitted that that the levels of traffic generation and pedestrian activity resulting from the proposed zone change will be compatible with the character of the neighbourhood and nearby Kurow urban area.

Amenity Effects Conclusion

It is submitted that the proposed re-zoning will have less than minor adverse amenity effects on people or properties, summarised in the following reasons:

- The site is essentially flat and is not readily viewed from nearby neighboring properties (excluding adjoining neighbors) or nearby publicly accessible areas.

- The site lies to the south of the Residential Zone, with dwellings and properties in the Residential Zone orientated to the north. All residential properties adjoining to the north will continue to have the same levels of access to sunlight, daylight and privacy and a feeling of not being closed in or overlooked.

- The design and formation of Freyberg Avenue generally meets the Plan and NZS4404:2010 specifications for such roads, which is suitable for up to 200 dwellings and/or 2000 vehicle movements per day.

Visual and Landscape:

The site is not identified as possessing any significant landscape values over and above general rural landscapes.

There is already an existing residential dwelling and associated rural infrastructure and curtilage covering a large area in the north-western portion of the site (where the10-Lot subdivision is proposed). Existing shelter belts on the northern, western and southern boundaries of the site assist in hiding views of the site.

The site and the nearby surrounding environment topography is flat, and the site is not readily viewed from nearby neighbouring properties or nearby publicly accessible areas. Views of the site are limited from further afield such as from Settlement Road to the west, and brief glimpses of the site from vehicles traveling on Kurow-Duntroon Road to the east. From both

of the main public viewpoints, once fully developed with roading, new dwellings and associated landscaping, the site will be easily assimilated into the existing surrounding environment.

Traffic generation – Safety and Efficiency:

As outlined above, Freyberg Avenue (and its feeder roads) can support safe and efficient transportation use should the subject land be rezoned.

It is expected that a further Traffic Impact Assessment in terms of the proposed re-zoning will show that the surrounding road environment is capable of supporting the change in zoning and subsequent potential development. Upon receiving Council's request for additional information to support the zone request (next stage of District Plan review), the submitter will invest and commission a Traffic Impact Assessment (at own cost) and supply it to Council in a timely manner.

Earthworks:

Should the land be re-zoned to General Residential, earthworks will be required to establish the required contours, construct new roads and accessways, and to establish building foundations and site landscaping. However, the earthworks will be temporary, and will be undertaken on flat land with minimal risk of instability, sediment loss or erosion. Any future earthworks for the balance land will necessarily have to comply with the applicable rules at the time.

Infrastructure:

The land is capable of being fully serviced with vehicular access, water, power, telecommunications, and sewer reticulation, all from nearby infrastructure, which is available and has capacity. Stormwater will be disposed of in an approved manner.

Reverse Sensitivity:

In terms of potential reverse sensitivity effects, consideration has been given to the extent to which the proposed General Residential Zone and subsequent residential use will conflict with existing nearby rural activities or affect their ability to continue to operate or diversify to alternative rural uses.

There are currently no intensive rural activities adjoining or nearby the site – with small rural landholdings adjoining to the south and east. Any future rural activities will necessarily have to comply with any applicable rules such as those contained within the draft Plan covering setbacks for buildings, intensive farming activities (e.g. pigs and poultry etc) and disposal of effluent – which are geared towards protecting amenity and preventing reverse-sensitivity. To the west is the racecourse which is likely to enjoy existing use rights. Given its infrequent use, insignificant off-site effects, and buffer distance, it is highly unlikely anyone residing in the newly zoned General Residential land would become sensitive to activities on the racecourse.

This submission accepts that all the draft and subsequent proposed General Residential Zone and General Rural Zone standards will ensure that amenity values will be maintained within the re-zoned land.

It is also noted that the existing residences within the existing Residential Zone around Freyberg Avenue all coexist comfortably with the existing rural land use on the subject site to the south.

Accessibility and Property Access:

Urban accessibility is people's ability to connect with people, goods and services and opportunities, and thereby engage in economic and social activity. The land proposed to be zoned General Residential Zone will rank reasonably highly in terms of urban accessibility.

The new zone lies within easy walking and cycling distance of the Kurow CBD, which contains most necessary modern services for residents to connect with people, goods and services and opportunities, and thereby engage in economic and social activity. Kurow has health services, supermarket and food outlets, motor vehicle servicing and fuel supplier, veterinarian services etc. Kurow also caters for primary education, with Waitaki Valley School within easy walking or cycling distance of the new proposed zone. There is also the potential for development of linking pedestrian tracks between the site and Manse and Settlement Roads through the Kurow Racecourse land, and northwards to the Kurow Gold Course and through Council-owned land.

As previously outlined, the main route for vehicular access to the new Residential Zone would be via Freyberg Avenue. The northern end of Freyberg Avenue links with Ferguson Street and then Gordon Street to provide an efficient and safe linkage with the Kurow town centre.

There are several potential options to access the proposed new General Residential Zone. As outlined above, Freyberg Avenue (and its feeder roads) can support safe and efficient transportation use should the subject land be rezoned. Further options are likely to become available should the new zone be confirmed.

Waterways & Esplanade Provision:

The subject land does not contain any waterways, and no esplanade reserves or strips may be warranted.

Natural Hazard:

<u>Flooding Risk</u>
Flooding risk is a known issue with this area of Kurow and flood mitigation infrastructure has been installed in the past.

The land is identified in the Operative Plan as being subject to some risk of flooding; while the Draft Plan shows it as being subject to Flood Hazard and as part of the Waitaki Floodplain. The flood risk stems from two small watercourses, Cattle Valley Stream and Diggers Gulley Creek, with catchments originating in the hills to the south-west of the Kurow.

Meyer Cruden Engineering and subconsultant RJ Hall and Associates Ltd (RJ Hall) were engaged to prepare a flood assessment for the whole site proposed to be re-zoned, and this assessment was later scaled back to apply to just the proposed 10-Lot subdivision resource consent application currently lodged with Council. The report *Flood Assessment Kurow*

Subdivision, 12 April 2022, Reference R2021299 (Meyer Cruden et al., 2022) is attached in Appendix B.

The submitter has engaged Meyer Cruden Engineering to produce a further report covering off the entire site, but due to time constraints this report will likely arrive shortly after draft District Plan feedback period closes (31st August 2022). The Council has indicated they will accept late feedback submissions where appropriate, thus the Meyer Cruden Engineering information will be forwarded directly to Council upon receipt to support this feedback submission. Notwithstanding, the initial site-wide flood assessment showed that with appropriate mitigation, any flood risk was less than minor, and the land was appropriate for residential zoning/development.

Should it be required, Meyer Cruden *et al* can also comment on the new 'Waitaki Floodplain' notation proposed to apply to the land. Notwithstanding, at the time of the Meyer Cruden Engineering (and subconsultant RJ Hall and Associates Ltd) assessment and subsequent ECan consultation, no flood hazard risk was identified from the Waitaki River.

In terms of the proposed zone alignment with the Canterbury Regional Policy Statement 2013 (CRPS), the flood assessment report for the 10-Lot subdivision describes some small locations of high flood hazard around the southern and eastern boundaries of the overall landholding (Meyer Cruden et al., 2022; Appendix A, Figure 5, page 10). The CRPS is clear that new subdivisions and the use and development of land should be avoided in areas subject to high flood risk and where risks are increased associated with that hazard. The proposed zone change would avoid this area of high risk, and as such, is consistent with the CRPS. This was confirmed during discussions with ECan (Appendix C). Again, it is expected that ECan will be in a position to re-confirm compliance with the CRPS when necessary.

The flood assessment report for the subdivision proposes mitigation in the form of minimum floor levels and it is expected similar mitigation can be extended to the new General Residential Zone land and subsequent development. Additional mitigation in the form of site contouring and flood infrastructure maintenance may also be required.

Given the findings of the initial flood assessment for the whole landholding (to be lodged upon receipt from Engineers), the flood assessment report for the proposed 10-Lot subdivision (and ECan Engineer confirmation), and the achievable mitigation, it is submitted that any potential flood hazard risk on the newly zoned land can be shown to be no more than minor.

<u>Seismic Risk</u>

While there are no other natural hazards identified on the Operative Planning Maps for this site, the Draft District Plan shows most of the existing Kurow township to the north being subject to 'Surface Fault Rupture Hazard (Activities and Buildings)'. The land around Freyberg Avenue and the subject land is free from this potential hazard.

Highly Productive Soils:

The property is shown on the Operative Plan Planning Maps as containing High Class Soils, while the Draft Plan shows the soils as Highly Productive Soils Land Use Capability 3.

Both the Operative Plan and the Draft Plan seek to retain the productive potential of the District's quality soils by ensuring that such land is not subdivided into small lots nor developed for intensive residential activity. This issue is not restricted to the Waitaki District and has been identified across New Zealand.

It is noted that the Canterbury Regional Policy Statement 2013 (CRPS) states in its explanation for Policy 15.3.1 related to soil degradation: '*the protection of soil quality is not absolute. There will be situations where soil will be degraded as a result of land-uses and where it is not necessarily appropriate to foreclose a development option purely for soil conservation or soil quality reasons, such as in existing urban locations, or when alternative areas or options are not available*'.

The Plan definition of High Class Soils states: '*means soils that are capable of being used intensively to produce a wide variety of plants, including horticultural crops*'.

A practical method of measuring the capability of soils is the Land Use Capability Classification which is a system that has been in use in New Zealand since the 1950s to try and achieve sustainable land development and management on farms. The system classifies all of New Zealand's rural land into one of eight classes (LUC 1-8), based on its physical characteristics and attributes and is depicted in Table 2 below.

Local Councils across New Zealand decide what land is classified as highly productive (or High Class), and most Council's use the LUC system.

At the top end, a classification of LUC 1 means that a particular soil has high suitability across all potential land use classes, and is very valuable for primary production, with the limitations on potential use increasing and the versatility decreasing with each class step. While LUC 1 is the gold standard for soils, a 'High Class Soil' can include LUC classes 1-3.

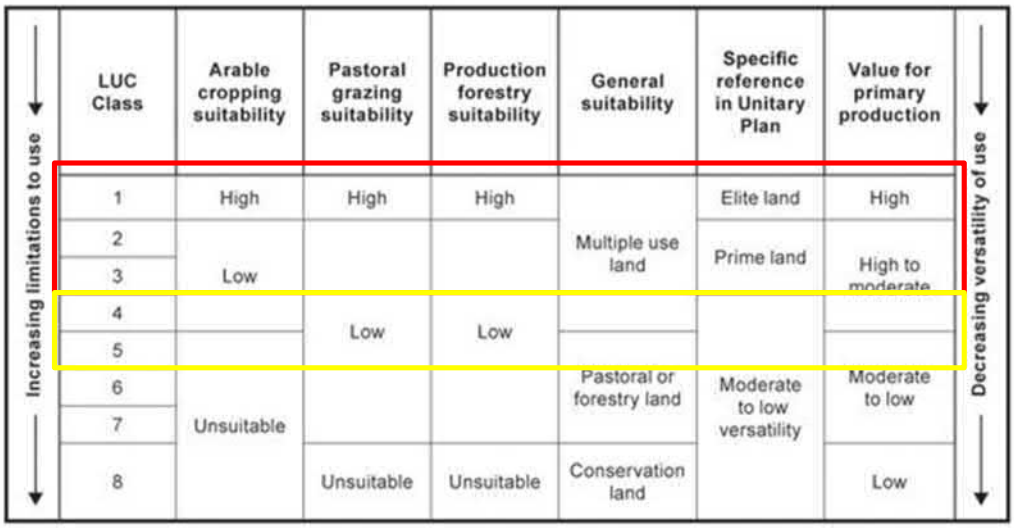
The Government is proposing a National Policy Statement for Highly Productive Land (proposed NPS-HPL) to improve the way highly productive land is managed under the RMA. Public consultation on the proposed NPS-HPL was undertaken in 2019. It is understood that final decisions on the proposed NPS-HPL will be made by the Government later in 2022, and if approved by Cabinet, the proposal would be gazetted and take effect soon after decisions are made.

The proposed NPS-HPL indicates that soils designated LUC 1, 2 or 3 should be described as highly productive land, which correlates with 'High Class Soils' as currently identified in the Plan. This is identified within the red box in Table 1 below.

Notwithstanding a particular LUC (or High Class Soils) classification, the onus is on Councils now, and will continue to be following the NPS-HPL becoming effective, to consider a number of other factors to exclude some of this land, or to identify other highly productive land. Examples of other factors are:

- the suitability of the climate for primary production;
- the size of land properties to support primary production;
- water availability; and
- access to transport routes and appropriate labour markets.

Table 1: Table showing the Land Use Capability Classification system which describes land as one of eight classes based on its physical characteristics and attributes. The land designated LUC 1, 2 or 3 (red box) is identified as highly productive land in the proposed NPS-HPL and correlates well with the Plan definition of 'High Class Soils'. The land within the proposed subdivision site has been identified as LUC 4 or 5 (yellow box) by a qualified Agronomist.



Increasing limitations to use	LUC Class	Arable cropping suitability	Pastoral grazing suitability	Production forestry suitability	General suitability	Specific reference in Unitary Plan	Value for primary production	Decreasing versatility of use
	1	High	High	High	Multiple use land	Elite land	High	
	2	Low				Prime land	High to moderate	
	3							
	4		Low	Low				
	5							
	6	Unsuitable			Pastoral or forestry land	Moderate to low versatility	Moderate to low	
	7							
	8		Unsuitable	Unsuitable	Conservation land		Low	

Agronomist Phil Johnston from Farmlands Co-Operative was commissioned to ground-truth the soils on the site, assess them for their productive potential, and report on their likely LUC classification. The soil report is attached to the application as Appendix F.

Essentially, the report found that the LUC class for the site should properly be classed as LUC 4-5, primarily due to the harsh climate in and around Kurow – extremely hot in summer and extremely cold in winter. This finding means the site would be highly likely fall outside of the 'highly productive land' (NPS-HPL & Draft Plan) or 'High Class Soils' (Operative Plan) classifications.

Given the above information, and particularly the findings from the Agronomist's report, it is submitted that the LUC 3 shown in the Draft Plan should change to LUC 4 or 5 to better reflect the actual site soils. This change would also compliment the proposed change in zoning to General Residential Zone.

Water Supply:

The new General Residential Zone can be serviced with a potable water supply from Council's Kurow reticulation. Council's Water Team have advised that water is available and that there is sufficient capacity for the new zone to be supplied with restricted water connections.

Sanitary Sewage Disposal:

The new General Residential Zone can be serviced for wastewater disposal via Council's Kurow sewer reticulation. Council's Engineer has advised that there is capacity within the Kurow wastewater infrastructure, and the proposal is achievable in this regard, subject to a future engineering approval process.

Stormwater:

Impervious surfaces and piped stormwater systems can have an effect on catchment hydrology and water quality within the receiving environment.

As discussed previously, the flood hazard and stormwater environment in and around the proposed new zone has been assessed and will be further addressed in a forthcoming report. The subdivision site is located on flat free-draining land, with an existing network of stormwater/flood channels both within and surrounding the site. The main receiving waterway in the area is the Waitaki River, located approximately 1km away to the east.

Subject to engineering design, it is expected that the new zone will be able to dispose of stormwater to the nearby water table and stormwater channels.

Trade Waste Disposal:

There is no trade waste disposal aspect to this application.

Energy Supply and Telecommunications:

The new zone will be able to be provided with suitable energy and telecommunication supplies. These services are available and with sufficient capacity within Freyberg Avenue.

Cultural, Heritage, Landscape, Archaeological and Vegetation:

This proposal is not expected to affect values, character or features associated with cultural, heritage, landscape, archaeological or vegetation matters.

The site is not subject to any Landscape or Vegetation overlays, Heritage or Archaeological items or Sites of Natural Significance.

Earthworks:

Earthworks will be required to create new roads, accesses and building platforms, and will be subject to normal engineering design processes and approvals.

Any earthworks will be undertaken on predominantly flat to moderately sloping land. There are no special landscape features identified pertaining to the site. The site is not readily discernible from any publicly accessible areas. In terms of vegetation, the site has 100% exotic pasture cover, with no indigenous vegetation or fauna anywhere in the vicinity of the site.

Economic Effects:

Economic effects are a relevant consideration for resource consent applications - the definition of environment includes the economic conditions which affect people and communities.

People are moving and retiring from farms around the Kurow, Waitaki and Hakataramea areas and want to stay in the area, but on small, easily maintained residential properties that maximise sunlight. There is a lack of supply and availability of suitable Residential Zone land within Kurow, and this is constraining the ability of people to stay in the area.

The proposed zoning will economically support local businesses and contractors over time as the land is developed.

As the land is developed and new properties are established, the Council and community will realise additional rates and Reserves Fund Contributions which will assist Kurow and the surrounding hinterland.

In the long term, the proposal will positively contribute to the Kurow community and Waitaki District economy through enabling local people to stay local. Retaining people in the area helps both those individuals and the community by maintaining social networks and supporting the local economy.

The Council is urged to consider and give due weight to the positive economic effects resulting from the proposed zoning. When communities are thriving, the local economy is resilient.

Conclusion:

Given the above effects assessment, it is maintained that any potential adverse effects of the proposal will either be no more than minor - with any effects able to be effectively mitigated - or less than minor.

In terms of the 'no more than minor' effects, these constitute effects associated with amenity, servicing and earthworks. Each of these matters can be adequately mitigated as detailed in the assessment of effects above and the submitter anticipates the Council wishing to impose conditions should consent be granted.

It is highlighted that there will also be a number of positive economic effects resulting from the proposal, including significant benefits to the people and the economy of Kurow and its wider hinterland.

Other Relevant Plans and Policies:

The following is an overview and assessment against the relevant provisions of applicable plans and policies.

National Policy Statement for Freshwater Management 2020

The National Policy Statement for Freshwater Management 2020 sets out the objectives and policies for freshwater management under the Resource Management Act 1991. It came into effect on 3 September 2020 and replaces the National Policy Statement for Freshwater Management 2014 (amended 2017). The Freshwater NPS is one of four pieces of national direction for managing New Zealand's freshwater.

Local authorities must give effect to the objective and policies in Part 2 of this National Policy Statement. Part 2 of the Freshwater NPS contains the overall Objective. Of relevance to the proposal are the following:

2.1 Objective

(1) The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that prioritises:

(a) first, the health and well-being of water bodies and freshwater ecosystems

(b) second, the health needs of people (such as drinking water)

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

2.2 Policies

Policy 1: Freshwater is managed in a way that gives effect to Te Mana o te Wai.

Policy 2: Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for.

Policy 3: Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.

Policy 7: The loss of river extent and values is avoided to the extent practicable.

Policy 9: The habitats of indigenous freshwater species are protected.

Policy 10: The habitat of trout and salmon is protected, insofar as this is consistent with Policy 9.

Policy 15: Communities are enabled to provide for their social, economic, and cultural wellbeing in a way that is consistent with this National Policy Statement.

It is understood that Environment Canterbury has given effect to the Freshwater NPS in its plans and policies, including those relating to developments and earthworks. The provisions of the Resource Management Act and the Canterbury Land and Water Regional Plan have been considered, and this feedback has been made on the basis that the proposed new zone can comply with these documents. The proposal is not expected to result in any actual or potential adverse effects on the water resources of the Kurow area.

Resource Management (National Environmental Standards for Freshwater) Regulations 2020

The National Environmental Standards for Freshwater (NES-FW) regulate activities that pose risks to the health of freshwater and freshwater ecosystems. The NES-FW came into force on 3 September 2020 (with several amendments since).

The proposed zoning (and subsequent use) is considered to meet the provisions of the NES-FW.

Canterbury Regional Policy Statement

The Canterbury Regional Policy Statement 2013 (CRPS) directs Environment Canterbury and Waitaki District Council to give effect to the CRPS provisions through the various applicable Regional and District Plans, and relationships with Nāi Tahu, and advocacy and facilitation with other key stakeholders. The CRPS emphasises integrated management of land uses and water quality and quantity between the Regional Council and territorial local authorities.

The CRPS provides an overview of the resource management issues in the Canterbury region, and the objectives, policies and methods to achieve integrated management of natural and physical resources. These methods include directions for provisions in district and regional plans. Both the Canterbury Land and Water Regional Plan and Operative Waitaki District Plan have given effect to the CRPS – and the new Plan Change will need to do the same.

While a full analysis will be required, it is expected that the proposed zoning will meet the relevant objectives and policies contained within the CRPS.

Canterbury Land and Water Regional Plan

The Canterbury Land and Water Regional Plan (CLWRP), which became operative on 13 December 2018, is the primary document that manages water within the Canterbury Region. The purpose of the CLWRP is to is to identify the resource management outcomes or goals (objectives in this Plan) for managing land and water resources in Canterbury to achieve the purpose of the RMA. It identifies the policies and rules needed to achieve the objectives and provides direction in terms of the processing of resource consent applications.

The CLWRP recognises the: '*interconnectivity between surface water and groundwater, between confined and unconfined aquifers, and between land use and water quality, it is essential that land and water resources and land and water use are managed in an integrated and consistent manner within a regional framework. It is no longer effective to look just at the effects of individual activities isolated from the catchments or groundwater zones within which they occur. Rather the cumulative effects of all types of activities need to be considered. Taking an integrated approach will allow competing demands to be more equitably and effectively managed, and better achieve the outcome of sustainable management of land and water*'.

Further, the CLWRP states:
'*Issues arising from the interconnectivity of water, and the use of land and water include:*
• effects of activities on parts of the environment that are not in the immediate vicinity of the site, and
• cumulative effects of activities on the environment over space and time, including lag effects and bio-accumulation.'

Of particular relevance to the proposed new zone, the CLWRP identifies the following matters that need to be addressed:

- Ensuring there is sufficient natural resource capacity in land and soils to provide for the needs of present and future generations.

- The protection of fresh water bodies and aquifers from contamination from discharges from urban areas.

- Managing natural hazards, such as flooding, through controlling activities that may exacerbate the risk of natural hazards.

- Earthworks and land excavation of land over aquifers.

While a full analysis will be required, it is expected that the proposed new zone will meet the relevant objectives and policies contained within the CLWRP.

Waitaki Iwi Management Plan (2019)

Te Rūnanga o Arowhenua, Te Rūnanga o Waihao and Te Rūnanga o Moeraki (Kā Papatipu Rūnaka) have developed the Waitaki Iwi Management Plan (2019) as an expression of rakatirataka and in fulfilment of their kaitiaki responsibilities within the Waitaki Catchment.

The following Strategic Objectives of the Waitaki Iwi Management Plan are seen as relevant to the proposal:

Wai

- *The mauri of water is protected, restored and enhanced through-out the Waitaki catchment.*

Mahika kai

- *Mahika kai species and their habitats are protected, restored and enhanced.*

Wāhi Tupuna

- *Wāhi Tupuna are protected and the relationship Manawhenua have with these landscapes is enhanced*

The following Desired Outcomes of the Waitaki Iwi Management Plan are seen as relevant to the proposal:

Manawhenua and rakatirataka

- *(all underlying matters)*

Mō te Taiao

- *Mahika kai and all other taoka are protected, able to be used, and where necessary restored and enhanced.*
- *All natural habitats in the Waitaki catchment are healthy and flourishing.*

While a full analysis will be required, it is expected that the proposed new zone will meet the relevant objectives and policies contained within the Waitaki Iwi Management Plan (2019).

'Other relevant Plans and Policies Conclusion:

The above assessment of the proposed zoning against any other relevant plans, policies or other matters has concluded that the proposal will either meet the relevant objectives and policies or will not be contrary or inconsistent to the extent that it offends the objectives and policies of any relevant Plan, policy or other relevant matter.

Conclusion:

The above feedback has presented a compelling case for zoning the subject site General Residential Zone.

The population of Kurow appears to be growing and community feedback points to a lack of supply and availability of suitable Residential Zone land within Kurow. The is broad community support for additional suitable land and housing in the area.

A number of existing significant constraints clearly limit the suitability and availability of additional land for residential purposes within the existing Residential Zone in Kurow. The site is suitable for residential zoning. Any constraining factors identified for the subject site (potential flood risk and presence of production soils) have been (and will be) shown to not be significant limiting factors for the suitability of the site for residential zoning.

The land proposed to be zoned General Residential Zone will rank reasonably highly in terms of urban accessibility.

The new zone lies within easy walking and cycling distance of the Kurow CBD, which contains most necessary modern services for residents to connect with people, goods and services and opportunities, and thereby engage in economic and social activity. Kurow has health services, supermarket and food outlets, motor vehicle servicing and fuel supplier, veterinarian services etc. Kurow also caters for primary education, with Waitaki Valley School within easy walking or cycling distance of the new proposed zone. There is also the potential for development of linking pedestrian tracks between the site and Manse and Settlement Roads through the Kurow Racecourse land, and northwards to the Kurow Gold Course and through Council-owned land.

The new zone can easily be serviced with all necessary services and infrastructure, and all normal subdivision and development requirements can be met with little to no effects.

The proposed new zone and its subsequent use sits comfortably within the objectives and policies of any relevant Plan, policy or other relevant matter.

The submitter requests that Council give due consideration to this feedback and is happy to work alongside Council and supply further information if required. It is considered that the Council, if it so inclined, can include the new zoning request in the upcoming Proposed Waitaki District Plan and proceed to the next stage of community consultation.

Please call to discuss any queries or questions you may have in regard to this application.

We look forward to your response in due course.

Regards

Survey Waitaki Limited

James White
Planner
MPlan

Appendices:

Appendix A – Proposed Zone Plan

Appendix B – Flood Assessment for Subdivision

Appendix C - Environment Canterbury Correspondence

Appendix D – Letters of Support

Appendix E – Records of Title

Appendix F – Soil Report

Appendix G – Avanzar Consulting Ltd – Freyberg Transport Assessment

ZONE CHANGE SOUGHT:

GRe

FERGUSON STREET

FREYBERG AVENUE

KUROW-DUNTROON ROAD

HILLIES ROAD

ACCESS & SERVICES

ACCESS & SERVICES

ZONE CHANGE SOUGHT - GRe

DRAFT PROPOSED
GRu

N

0 20 40 80 120 160 200m

Survey Waitaki surveying • planning • engineering	SURVEY WAITAKI LTD PO BOX 237 OAMARU Ph 03 434 8020 cameron@surveywaitaki.co.nz	DRAWN CJL	DATE AUG 2022	DRAWING TITLE OUTLINE PLAN IN SUPPORT OF DISTRICT PLAN SUBMISSION	PROJECT TITLE Parker Property - Freyburg Ave
		CHKD CJL	SCALE (A3) 1:2500	STATUS For Information	OUR REF 1627-SCH-001 REV A

MEYERCRUDEN
CIVIL | STRUCTURAL | GEOTECH

Draft District Plan Feedback

Waitaki District Council

Private Bag 50058

Ōamaru 9444

Re: Residential rezoning proposal for land owned by Parker Property 2021 Ltd Partnership at 49A Freyberg Avenue, Kurow

Legal Description: Lot 33 Deposited Plan 19718 (RT OT12C/547), Lot 34 Deposited Plan 19718 (RT OT12C/548), Lot 35 Deposited Plan 19718 (RT OT12C/549)

Meyer Cruden Engineering, and its subconsultant RJ Hall, have been engaged to determine the flood hazard for a proposed residential plan change for a parcel of land located at 49A Freyberg Avenue, Kurow. The most relevant planning document is the Canterbury Regional Policy Statement (2013)[1]. To determine if the proposed residential plan change can meet the requirements of the RPS, a hydraulic model has been constructed. This hydraulic model has previously been employed to determine minimum floor levels and effects of floodplain filling for a smaller sub-parcel of land (stage 1) located within the proposed parcel. The report which details the assumptions and parameters of this model build is appended.

The proposed residential development and stage 1 is presented in Figure 1.

[1] https://www.ecan.govt.nz/your-region/plans-strategies-and-bylaws/canterbury-regional-policy-statement

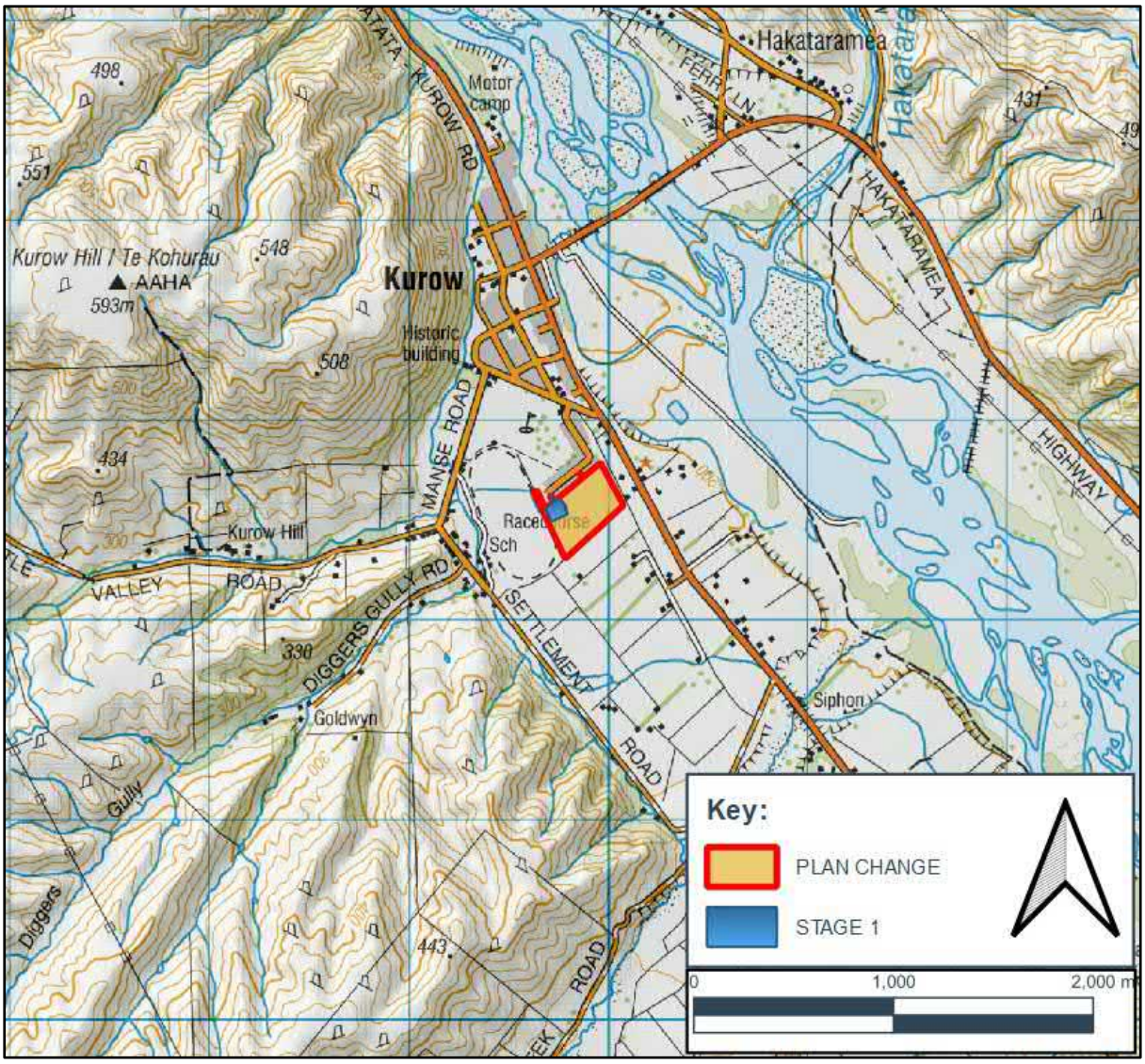


Figure 1: Site Location

ECAN REGIONAL POLICY STATEMENT

Chapter 11 of the RPS, Natural Hazards outlines policy for the development of new subdivisions upon land in high hazard areas and areas subject to inundation.

Policy 11.3.1 states that:

To avoid new subdivision, use and development (except as provided for in Policy 11.3.4) of land in high hazard areas, unless the subdivision, use or development:

1. *is not likely to result in loss of life or serious injuries in the event of a natural hazard occurrence;*
2. *is not likely to suffer significant damage or loss in the event of a natural hazard occurrence;*
3. *is not likely to require new or upgraded hazard mitigation works to mitigate or avoid the natural hazard;*
4. *is not likely to exacerbate the effects of the natural hazard;*

5. *Outside of greater Christchurch, is proposed to be located in an area zoned or identified in a district plan for urban residential, industrial or commercial use, at the date of notification of the CRPS, in which case the effects of the natural hazard must be mitigated; or*
6. *Within greater Christchurch, is proposed to be located in an area zoned in a district plan for urban residential, industrial or commercial use, or identified as a "Greenfield Priority Area" on Map A of Chapter 6, both at the date the Land Use Recovery Plan was notified in the Gazette, in which the effect of the natural hazard must be avoided or appropriately mitigated; or*
7. *Within greater Christchurch, relates to the maintenance and/or upgrading of existing critical or significance infrastructure.*

High hazard areas are classified by the RPS as:

flood hazard areas subject to inundation events where the water depth (metres) x velocity (metres per second) is greater than or equal to 1, or where depths are greater than 1 metre, in a 0.2% AEP flood event;

Therefore, residential development will be located outside of areas of high hazard. The high hazard definition has been obtained using the hydraulic model. Figure 2 shows the high hazard areas as defined by the hydraulic model of the 0.2% AEP event and the RPS definition. Figure 2 shows that there is a small parcel of high flood hazard located in the eastern corner of the subdivision. The current outline development plan (enclosed) shows that all residential lots will be located outside of this high hazard area.

Figure 2: Predicted flood hazard for the 0.2% AEP Event

Policy 11.3.2 states:

In areas not subject to Policy 11.3.1 that are subject to inundation by a 0.5% AEP flood event; any new subdivision, use and development (excluding critical infrastructure) shall be avoided unless there is no increased risk to life, and the subdivision, use or development:

1. *is of a type that is not likely to suffer material damage in an inundation event; or*
2. *is ancillary or incidental to the main development; or*
3. *meets all of the following criteria:*
    a. *new buildings have an appropriate floor level above the 0.5% AEP design flood level; and*
    b. *hazardous substances will not be inundated during a 0.5% AEP flood event provided that a higher standard of management of inundation hazard events may be adopted where local catchment conditions warrant (as determined by a cost/benefit assessment).*

Therefore, to comply with RPS policy 11.3.2, we propose floor levels which will be set to no less than the 0.5% AEP event plus a 300 mm allowance for freeboard.

To determine these floor levels, the hydraulic model that has been constructed will be extended to include the proposed residential area.

This model will also be employed to assess the effects of floodplain displacement as a result of increasing the land elevation to meet minimum floor level requirements. If necessary, the effectiveness of any required mitigation measures (compensatory storage, increased conveyance) will also be determined to ensure that floodplain displacement effects are less than minor.

CONCLUSION

The proposed plan change is consistent with the ECan RPS, in summary:

- Hydraulic modelling shows that no residential development will occur within high flood hazard areas, therefore Policy 11.3.1 is met;
- Floor levels will be set to the 0.5% AEP + 300 mm which ensures Policy 11.3.2 is complied with;

Given the flat hydraulic grade of the site, any displacement effects due to floodplain filling are expected to be minor. Modelling will be completed to quantify these effects and if necessary, mitigation options will be implemented.

MEYERCRUDEN

CIVIL | STRUCTURAL | GEOTECH

FLOOD ASSESSMENT
KUROW SUBDIVISION

DATE: 12 April 2022
REF: R2021299

REPORT VERSION CONTROL

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DOCUMENT REFERENCE	R2021299 R2	PROJECT NUMBER	2021299
CLIENT	Robbie McIlraith		

REV	DATE	REVISION CONTROL
-	16/2/22	Draft for client
1	31/3/22	Updated draft for client
2	12/4/22	Final

PREPARED BY	Ben Throssell	REVIEWED BY	Mark Cruden & Cam Hall
AUTHOR SIGNATURE		REVIEWER SIGNATURE	
QUALIFICATIONS	BEng (Hons)	QUALIFICATIONS	BEng (Hons), CPEng

TABLE OF CONTENTS

1 SCOPE

Meyer Cruden Engineering and subconsultant RJ Hall and Associates Ltd (RJ Hall) has been engaged to prepare a flood assessment for a proposed 10-Lot subdivision located near Kurow, Canterbury.

As part of this assessment, we have determined:

- The flood hazard, as defined by the Canterbury Regional Policy Statement (RPS);
- Proposed minimum floor levels as per NZS 4404 (100YR + 500 mm); and,
- Effects on flooding of nearby properties as a result of filling to achieve minimum floor levels.

2 INTRODUCTION

The proposed residential development is located just south of the Kurow township (Canterbury) on a terrace above the true right bank of the Waitaki River. Figure 1a, Appendix A shows the location of the proposed staged subdivision. A scheme plan of the proposed 10 lot subdivision is included as Figure 1b, Appendix A.

The site is in an area of Kurow with a history of flooding. Aerial photos from a flood event in March 1986 indicate that the site in question was partially inundated. Refer Figure 1c, Appendix A.

The flood risk for the subdivision stems from two watercourses, Cattle Valley Stream, and Diggers Gully Creek. These are both relatively small, hill fed watercourses with a predominantly agricultural catchment. The Waitaki River is not considered a flood risk as the terrace which the development is located on is some six metres above the bed of the Waitaki.

To assess the flood risk and the effects of the development, an initial site visit was undertaken, following which a hydraulic model was constructed using the HEC RAS 2D engine. It is noted that there is reasonable uncertainty around the parameters that inform this assessment and there was no opportunity to meaningfully calibrate the model. To address this uncertainty, a conservative approach has been adopted which means that the results presented in this assessment are towards the maximum range of values that would be expected.

A total of five model runs have been completed, all with a 25% increase on peak flow to allow for climate change. This assumption for climate change is consistent with recent ECan[1] assumptions. The models are summarised as follows:

1. 500YR ARI (Average Recurrence Interval) no development, used to determine the flood hazard classification of the site in a manner consistent with the ECan RPS;
2. 100YR ARI (post development, with subdivision), used to determine the minimum floor levels required as per NZS 4404 for the proposed 10-Lot subdivision.
3. 200YR ARI (pre-development), used to set a baseline so the effects of development can be assessed; and,
4. 200YR ARI (post development, with subdivision), used to determine the effects of development;

[1] Wild M. (2019): Selwyn River/Waikirikiri floodplain investigation

3 SITE VISIT

A site visit was undertaken by Bob Hall (RJ Hall & Assoc) and Mark Cruden (Meyer Cruden Engineering). The site visit involved a detailed walkover of the site, upstream and downstream flowpaths, and a review of all structures within the flow paths. A review of the existing flood channels was undertaken to determine condition. Potential mitigation options were assessed for input into the modelling.

4 HEC RAS MODEL CONSTRUCTION

The 2D hydraulic model has been constructed using HEC-RAS 5.11. The model covers an extent of approximately 300 ha bounded to the west by the foothills, the Waitaki River to the east and North, and the Kurow Stream to the South. A schematic of the model is presented in Figure 2, Appendix A.

4.1 Model Geometry

The model terrain was derived from a photogrammetric survey flown by drone in 2021. This was used to develop a terrain surface with computational filters applied to remove above ground features such as trees and buildings. The final resolution of the filtered DTM was approximately 100 mm.

The grid size for the entire model was set to a resolution of 5m. Refinement regions were used to provide a higher resolution (1 m) for the open channels and drains. The higher resolution provides a more accurate representation of the topographical surface for these key locations of hydraulic conveyance. The refinement regions are presented in Figure 2, Appendix A.

Two terrain surfaces were required:

1. An undeveloped terrain (or current) surface which represents the present day topography;
2. A developed terrain with the proposed 10-Lot subdivision developed.

For the undeveloped surface, the DTM derived from the photogrammetric survey was employed. To represent the subdivision, the elevation was increased by 5 m which prevents flow over the developed area (Figure 3, Appendix A). It is not proposed to lift the subdivision by 5 m, in fact, the proposed increase in ground level is around 500 mm and therefore the assumption of 5 m is conservative as in reality the development will contain roads and other secondary flow paths which will help to mitigate the effects of development.

4.2 Boundary Conditions

Boundary conditions were applied at the locations shown on the model schematic (Figure 2, Appendix A). A normal depth boundary condition was applied at the “outflow” boundary. This represents the flow of water out of the model at normal depth with a hydraulic grade set equal to the grade of the terrain surface (1 in 100). The conclusions derived from this model are not considered sensitive to the downstream boundary.

The three inflow boundaries (Cattle Valley, Diggers Gully, and unnamed stream) were required for the representative design events (100YR, 200YR and 500YR). Table 1 shows the time of concentration and the catchment area for the three catchments. The time of concentration was estimated using Auckland Council’s TP-108 methodology and validated using the Bransby Williams formula for catchments less than 130 km².

Table 1: Catchment parameters			
	Un-named	Diggers gully	Cattle Valley
Catchment area (NIWA flood tool, km²)	1.89	9.02	8.63
Time of concentration (hrs)	0.5	2.25	2.5

There is no flow recorder available for either of the three water bodies. The closest long term records are the Otekaieke River at Weir (13 km to the south east) and the Maerewhenua River at Kellys Gully (21 km to the south east). These watercourses have a catchment area[2] of 78.7 km² and 187 km² respectively, significantly larger than the subject watercourses (Figure 4, Appendix A). A review of the available information was collated to determine an appropriate methodology for setting the peak flow of the design event.

4.2.1 ECan Review of flood frequency (2011)

A detailed review of flood frequency in Canterbury was undertaken in 2011[2]. This approach utilises the regional method to derive mean annual flood factors and q100 factors for long term recorder sites which can be mapped. Flood frequency statistics for a target site can be obtained by interpolating the contours.

4.2.2 Tonkin and Taylor: Flood frequency analysis for Canterbury Rivers (2017)

Tonkin and Taylor prepared an updated flood frequency assessment for a number of Canterbury rivers. However, neither the Otekaieke or the Maerewhenua River were included in this round of assessments and therefore this document was excluded from the analysis.

4.2.3 NIWA Flood Frequency Tool (2018)

The NIWA flood frequency tool[3] is a high level tool that provides design flows for various events across New Zealand. For the proposed development site, it includes in its assessment the flow record for the Otekaieke and the Maerewhenua River.

The tool uses a regression methodology to derive flow estimates for design events. However, the documentation[4] states that *"Some caution should be exercised in using the more extreme values, especially in areas of the country such as South Canterbury, where there is some justification for use of the GEV distribution."* The documentation further states that *"a satisfactory method assigning distribution type has not been found. It is recommended that flood estimates for 50-1,000 year return periods in these regions are used with caution as they will underestimate the flood peaks."* Indeed, the earlier 2011 study referenced above, found both sites were best suited to a GEV type 1 distribution and therefore, the information provided by tool should be treated with caution for this particular site.

4.2.4 Summary of design flood event selection

In summary, the 2011 flood frequency review is considered the most recent and relevant analysis. Given the proximity of the site to the Otekaieke River (13 km away) and the similar catchment characteristics (orientation, agricultural land use, foothill topography), the flood statistics for the

[2] Griffiths G. McKerchar A. Pearson C. (2011): Review of flood frequency in the Canterbury Region
[3] https://niwa.maps.arcgis.com/apps/webappviewer/index.html?id=933e8f24fe9140f99dfb57173087f27d
[4] NIWA (2018): Regional Flood Estimation Tool for New Zealand Part 2

provided for the Otekaieke River were adopted to and used to estimate design events for the three catchments.

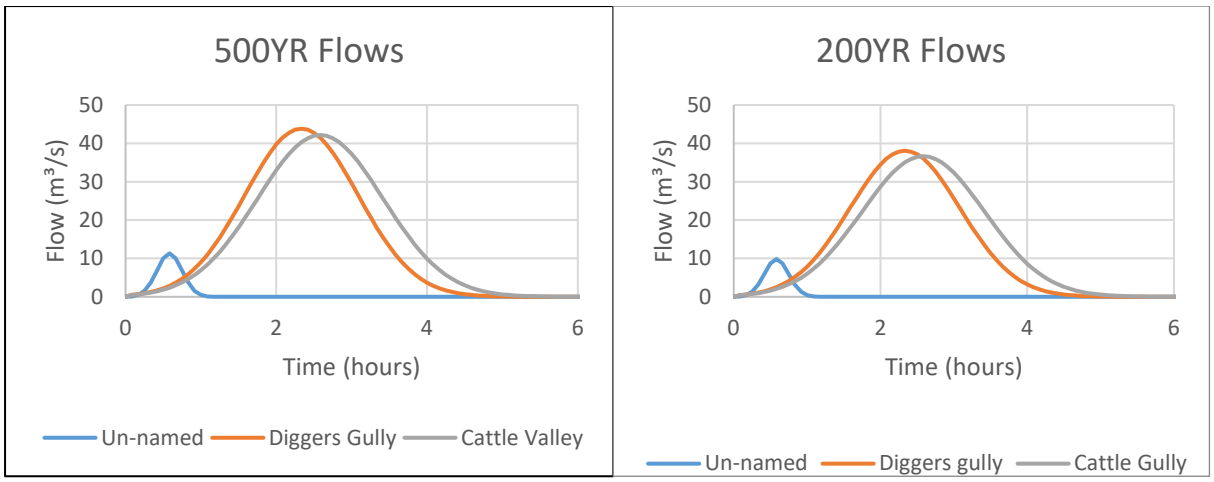
To check if this was a conservative assumption, rainfall frequency data was obtained from HIRDS for the respective catchment centroids. The 100YR and 250YR events were just over 10% greater for the Otekaieke Catchment centroid when compared to the three target catchments indicating that the adoption of the Otekaieke flood statistics is likely conservative.

ECan (2011) report that the mean annual flood for the Otekaieke is 44 m^3/s and it has mean annual flood factor of 1.0. The q100 flood frequency factor is reported as 3.8 although to provide a conservative assessment, this has been rounded to 4.0. Applying the relevant Q/Qm ratios from Table 5-1 (ECan, 2011) gives the design flows in Table 2. The ECan 2011 methodology gives a design flow for the 100YR event that is around 30% greater than the design flow provided by the NIWA flood tool.

Table 2: Design flows (m^3/s) without adjustment for climate change

	Un-named	Diggers gully	Cattle Valley
Catchment area	1.89	9.02	8.63
100YR flow (Ecan 2011)	6.97	26.97	25.95
100YR flow (NIWA flood tool)	5.65	19.63	18.33
200YR flow (Ecan 2011)	7.87	30.47	29.33
500YR flow (Ecan 2011)	9.06	35.06	33.74

The design flows provided by ECan (2011) in Table 2 were increased by 25% to allow for climate change and fitted to a normal distribution curve with the peak centred at the time of concentration. A bell-curve is considered appropriate given the catchment shape and geography is unlikely to produce an abnormal hydrograph shape. Figure 3-1 shows the design events used to represent the boundary inflow into the model.



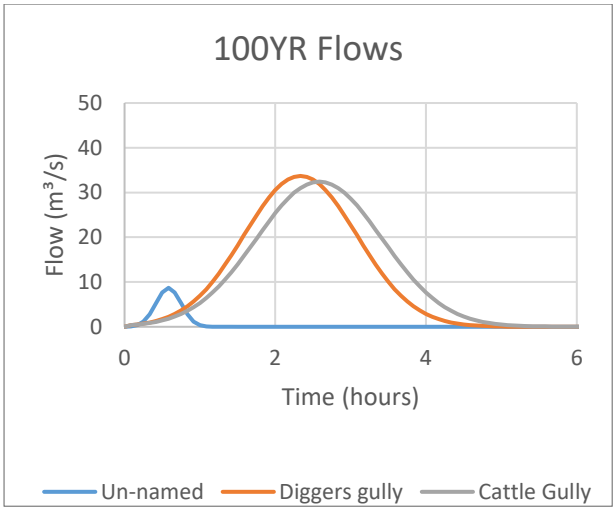


Figure 3-1: Flow hydrographs for 500YR, 200YR and 100YR design events with allowance for climate change

4.3 Structures

A total of 11 culverts were included in the model. Culvert details were surveyed in 2021. It is noted that some of the culverts need maintenance (cleaning out and removal of gates from inlets and outlets) and conveyance may be somewhat compromised in flood events based on their current condition. These culverts should be maintained by WDC to ensure adequate performance. The locations of the culverts are presented in Figure 2, Appendix A. The culvert details are presented in Table 3.

Table 3: Culvert dimensions and parameters

Culvert	Shape	Number	Width/ diameter	Height	Material	z (m)	NZTMX	NZTMY
1	Box	1	1.5	1.83	concrete	199.74	1400004	5042965
2	Circle	1	0.15		corrugated steel	201.01	1400091	5042804
3	Box	1	3	1.1	concrete	200.41	1400338	5042343
4	Box	2	2.12	1.6	concrete	202.19	1400022	5042706
5	Box	1	1.8	1.57	concrete	200.85	1399921	5042895
6	Box	1	2.8	1	concrete	200.92	1399881	5042863
7	Box	1	3.75	0.66	concrete	201.87	1399625	5042651
8	Box	1	3.6	1.2	concrete	203.92	1399393	5042461
9	Circle	2	0.75		concrete	205.37	1399349	5042434
10	Box	2	2.1	1.1	concrete	207.71	1399341	5042219
11	Circle	1	1.05		concrete	210.26	1399172	5042574

4.4 3.4 Model roughness

The model roughness was defined from three layers obtained from the LINZ data service and truthed against aerial imagery, site photos and knowledge of the area. These layers were:

- Building footprints;
- Road parcels; and,
- Land cover database (version 5.0)

Mannings roughness values for these materials were derived from the Greater Wellington Regional Council (GWRC) 2021 Flood Hazard Modelling Standard which are in turn, taken from Chow (1959). Selected Mannings roughness values are presented in Table 4 as well as the associated GWRC values from which they were derived (where applicable).

Table 4: Selected Mannings roughness values

Name	Selected mannings n	GWRC Material	GWRC roughness range
Deciduous Hardwoods	0.045	Brush - light	0.035-0.08
Lake or Pond	0.01	Not supplied	
Built-up Area (settlement)	0.03	Not supplied	
Gravel or Rock	0.03	Gravels/cobbles	0.03-0.05
Gorse and or Broom	0.065	Brush - medium to dense	0.045-0.16
Low Producing Grassland	0.045	Pasture, nor brush	0.025-0.05
High Producing Exotic Grassland	0.04	Pasture, nor brush	0.025-0.05
Surface Mine or Dump	0.03	Not supplied	
Road	0.012	Not supplied	
Building	1	Not supplied	

4.5 Additional model parameters

The model was run for a total of five hours with the full momentum equations (rather than the diffusive wave). The full momentum solution is considered a more robust approximation of the shallow water equations as it conserves momentum and accounts for critical flows and superelevation.

A time step of half a second was selected. Given an approximate maximum velocity of 2 m/s, this gives a courant number of:

- 1 for the 1 m grid; and
- 0.2 for the 5 m grid.

The HEC RAS user manual recommends a courant number no more than five for the full momentum solution. The cumulative mass balance error for all models was less than 0.5%.

5 RESULTS

5.1 Flood Hazard

Flood hazard is defined by the ECan regional policy statement. Development must be avoided in high hazard areas which for flooding is defined by the policy statement as:

> *"flood hazard areas subject to inundation events where the water depth (metres) x velocity (metres per second) is greater than or equal to 1, or where depths are greater than 1 metre, in a 0.2% AEP flood event"*

The 0.2% AEP flood event is equivalent to a 500YR ARI flood event. Figure 5, Appendix A shows the flood hazard definition for the undeveloped site. There are some patches of high flood hazard to along the eastern and southern boundaries of this site and no development is proposed in these locations. There are no areas of high flood hazard located within the proposed 10-Lot subdivision.

5.2 Effects of Flooding

The effects of flooding from developing the proposed 10-Lot subdivision have been assessed for a 200YR ARI event. The effects are determined by taking the difference in flood elevation between the post developed and pre developed events. Figure 6, Appendix A, shows the effect of developing the proposed subdivision for the 200YR ARI event.

To assess the effects on buildings, building outlines obtained from the Linz Data Service were intersected with the digital terrain model to obtain the maximum ground elevation within each building footprint. The building outlines were also intersected with the flood level surface for both the 200YR pre developed event and the 200YR post developed event (with mitigation). By subtracting the maximum flood level from the ground level, the flood depth could be determined and change in flood depth could be more accurately determined.

For existing buildings, the maximum increase in flood depth resulting from the development of the proposed 10-Lot subdivision for all buildings using the methodology above was no more than 11 mm. An increase of 11 mm is considered less than minor.

Figure A6 shows that the model predicts flood level increases of between 50 and 100 mm for the adjacent (east of the 10-Lot subdivision) rural land which appears to also serve as a racecourse. The model predicts that this area of the racecourse is already 600 mm underwater in the 200YR event, further, it will not be in use during such a flood, and therefore an additional 50 to 100 mm is considered less than minor.

Proposed Floor Levels for 10-Lot Subdivision

NZ4404 4.3.5.2 states that *"the minimum freeboard height additional to the computed top water flood level of the 1% AEP design storm should be as follows or as specified in the district or regional plan".* For habitable dwellings, the freeboard is set at 500 mm. Policy 11.3.2 of the ECan regional policy statement requires that there is no increased risk to life as a result of the 0.5% AEP event (200YR ARI event). Therefore, it is proposed that minimum floor levels are set to the 100YR event plus 500 mm or the 200YR event, whichever is the greater.

Figure 7, Appendix A shows the 100YR and 200YR flood elevations. This figure shows that the difference in peak water level between the two events is minimal (between 25 and 50 mm) and

therefore, the minimum floor levels will be set by the 100YR ARI plus 500 mm. This design standard will also ensure protection against the 200YR event.

For the proposed 10-Lot subdivision the floor levels (to the nearest 100 mm) will be:

- 203.0 mRL (202.5 + 0.5) for the eastern half of the proposed 10-lot subdivision ; and
- 203.1 mRL (202.6 + 0.5) for the western half of the proposed 10-lot subdivision .

This compares to a current ground level of around 202.5 m RL and therefore minimum floor levels will need to be achieved by a combination of increasing the ground level and/or raising the foundation/building platform. More detailed floor levels for individual building platforms can be determined once the 10-Lot subdivision layout is finalised at the building consent stage.

Sensitivity to Hydrology

Whilst there is some uncertainty to the hydrological assumptions for this model, this sensitivity of the model to these assumptions can be assessed. Table 5 shows the flood elevations for the three pre-developed events modelled at points of interest (Figure 8, Appendix A) and the increase in flood elevations (mm) relative to the 100YR event. Table 6 shows the increase in peak flow for the design events and the increase (%) relative to the 100YR event.

These tables show that for a 13% increase in peak flow (200YR event), the water level increases are between 10 mm and 40 mm. For a 30% increase in peak flow (500YR event), the corresponding water level increase is between 30 mm and 50 mm. This indicates that model predictions of absolute water level are relatively insensitive to design flow assumptions. Therefore, the design freeboard standard of 500 mm is considered more than adequate for addressing any uncertainties in the model related to hydrological assumptions.

Table 5: Flood Elevations (mRL) for Points of Interest (water level increase, mm, over the 100YR ARI level)

Name	100YR PRE (mRL)	200YR PRE (mRL)	500YR PRE (mRL)
Development	202.34	202.37 (30 mm)	202.39 (50 mm)
LINZ Building ID 1651952	202.28	202.32 (40 mm)	202.33 (50 mm)
Hillies Rd	201.88	201.92 (40 mm)	201.93 (50 mm)
Freyberg Ave	202.52	202.53 (10 mm)	202.54 (20 mm)
Kurow-Duntroon Road	202.05	202.07 (20 mm)	202.09 (40 mm)
LINZ Building ID 1651001	200.58	200.598 (18 mm)	200.61 (30 mm)
Racecourse	202.89	202.911 (21 mm)	202.92 (30 mm)

***water stage elevation from 100YR, 200YR and 500YR in metres. Bracketed values represent increase in flood levels relative to the 100YR flood.**

Table 6: Peak design flows, m^3/s (%age increase over 100YR ARI)

Design Flow Peak	100YR PRE	200YR PRE	500YR PRE
Un-named	8.71	9.84 (13%)	11.32 (30%)
Diggers gully	33.71	38.09 (13%)	43.82 (30%)
Cattle Gully	32.44	36.66 (13%)	42.17 (30%)

6 CONCLUSIONS

We have undertaken a flood assessment, including a site visit, and constructed a 2D hydraulic model for a proposed 10-Lot subdivision development just south of Kurow, Canterbury. The purpose of the model is to assess the:

1. Flood hazard, as defined by the ECan regional policy statement;
2. Minimum floor levels for the 10-Lot subdivision, as defined by NZS 4404; and,
3. The effects of floodplain filling associated with both the proposed 10-Lot subdivision.

The model was constructed from a photogrammetric drone survey flown in 2021. Key parameters included:

- 100YR, 200YR and 500YR design events derived using the flood frequency methodology stipulated by ECan (2011);
- Site verification of roughness parameters and survey of 12 culverts;
- Pre and post development definitions based on the proposed developable area and the results of the flood hazard assessment; and,
- Geospatial data from the LINZ dataservice including:
    - building outlines;
    - land cover Version 5;
    - road parcels; and,
    - aerial imagery.

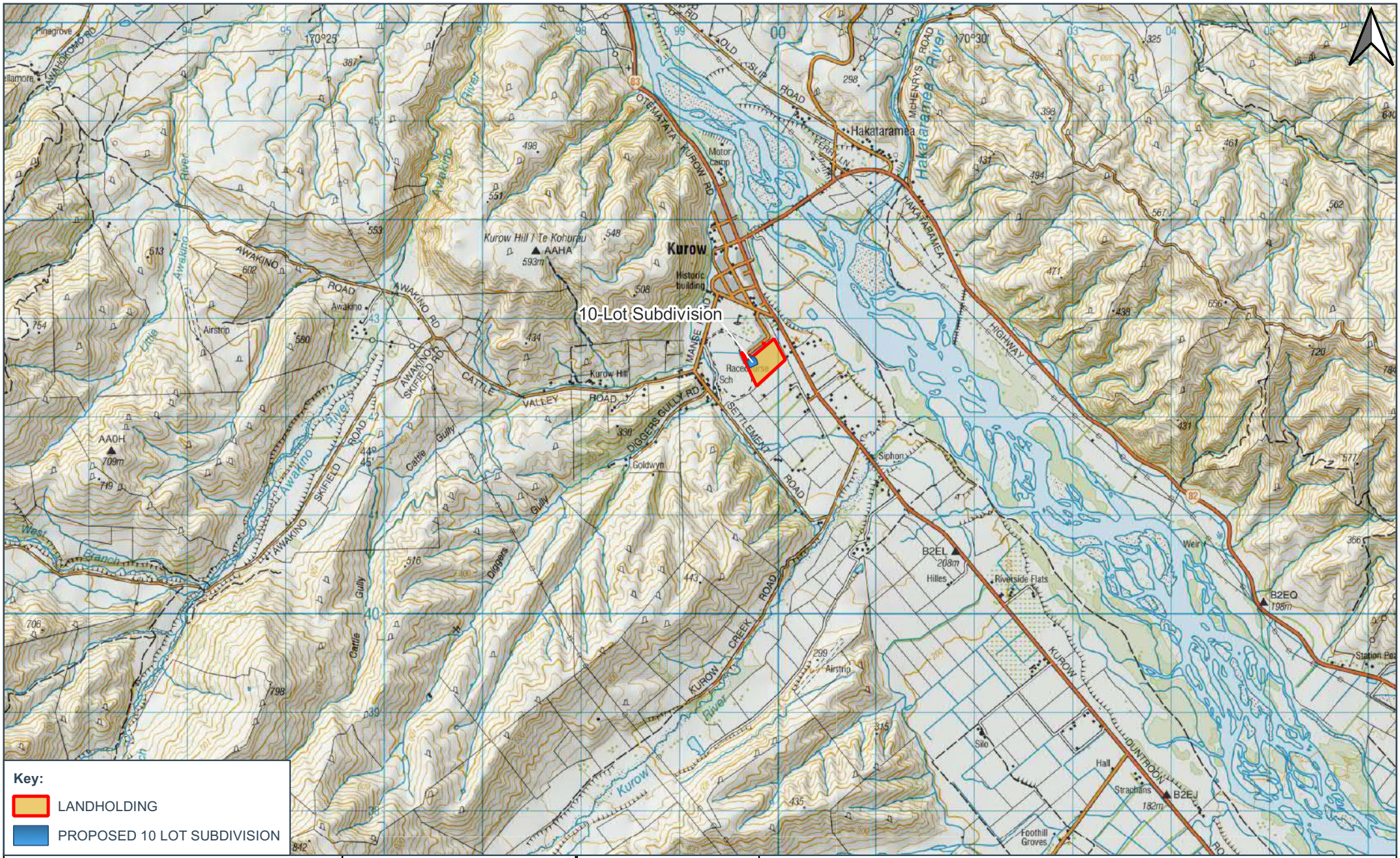
The model predicts some small locations of high flood hazard around the southern and eastern boundaries of the overall landholding. The proposed 10-Lot subdivision is located outside of any high flood hazard areas.

The minimum floor levels will be the 100YR ARI event plus 500 mm (as per NZS 4404), between 203.0 and 203.1 mRL. This will ensure that floor levels are above the 200YR and 500YR events as well. More detailed floor levels for individual building platforms can be determined once the subdivision layout is finalised at building consent.

The effects of the proposed 10-Lot subdivision on the 200YR event have been determined as no more than an 11 mm increase in the flood elevation. This effect is considered less than minor.

The sensitivity of the model to the hydrological assumptions has been investigated, a 30% increase in flow results in a 50 mm increase in water levels and therefore, the model results are not considered sensitive to the hydrological assumptions. Given the limited information available for this assessment, a degree of conservatism has been incorporated, particularly for the hydrological assessment, to ensure that the values presented are likely to represent the higher end of the range.

Appendix A - Figures


10-Lot Subdivision
Kurow
Hakataramea
Kurow Hill / Te Kohurau
AAHA
593m
Historic building
Motor camp
Racecourse
Sch
Kurow Hill
Awakino
Airstrip
AAOH
709m
Goldwyn
Siphon
Weir
B2EL
208m
Hilles
Riverside Flats
B2EQ
198m
Station Peak
Strachans
B2EJ
182m
Foothill Groves
Silo
Hall
Airstrip
Key:
LANDHOLDING
PROPOSED 10 LOT SUBDIVISION
0
1,000
2,000 m
METRES
2021299 R2
SCALE (@A4): 1:50,000
A Draft FEB 22 BT
PREPARED FOR:
MC ENGINEERING
BY: RJ HALL
FIGURE 1: Site location
SOURCE:
LINZ basemaps
Maps made with QGIS

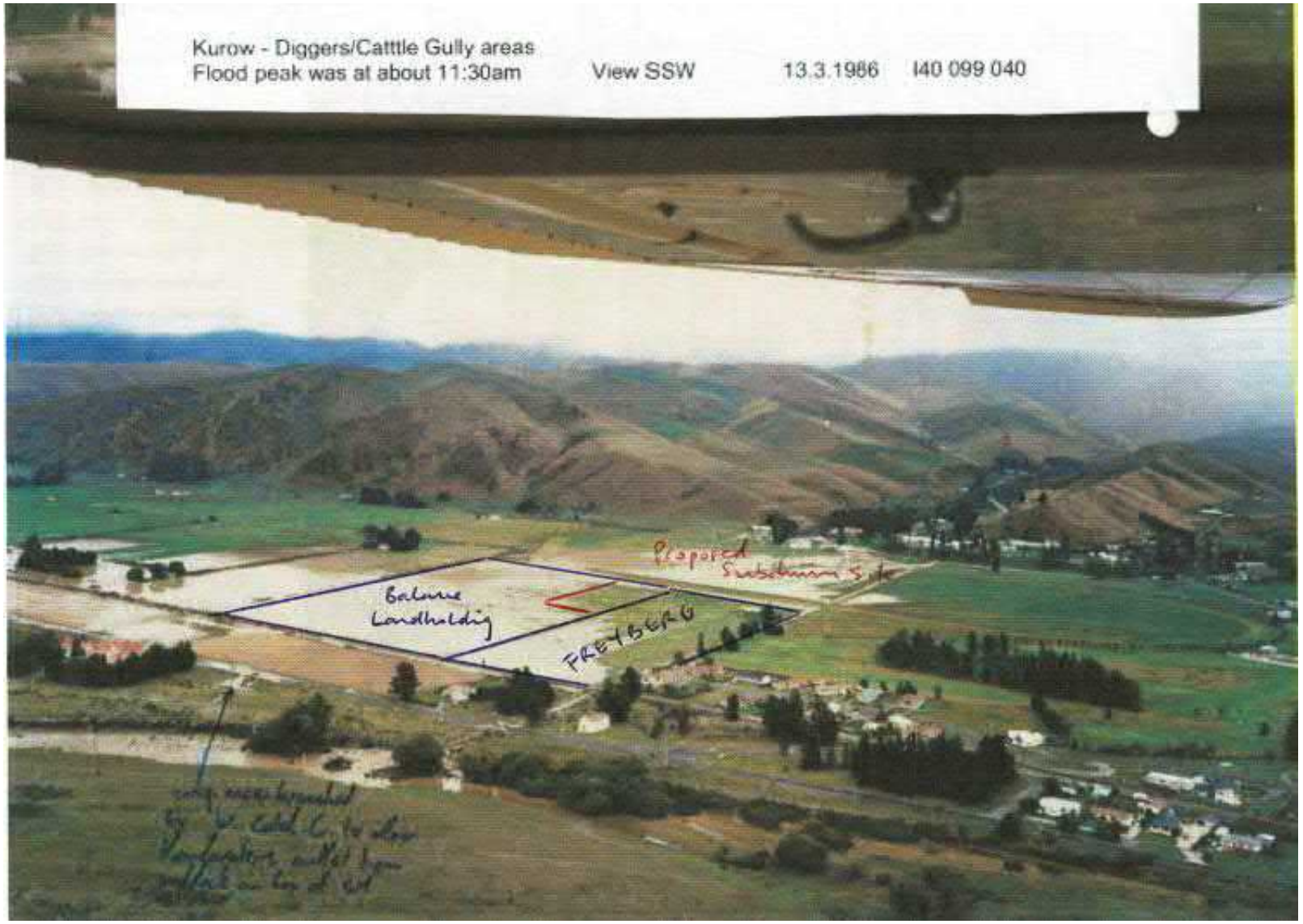
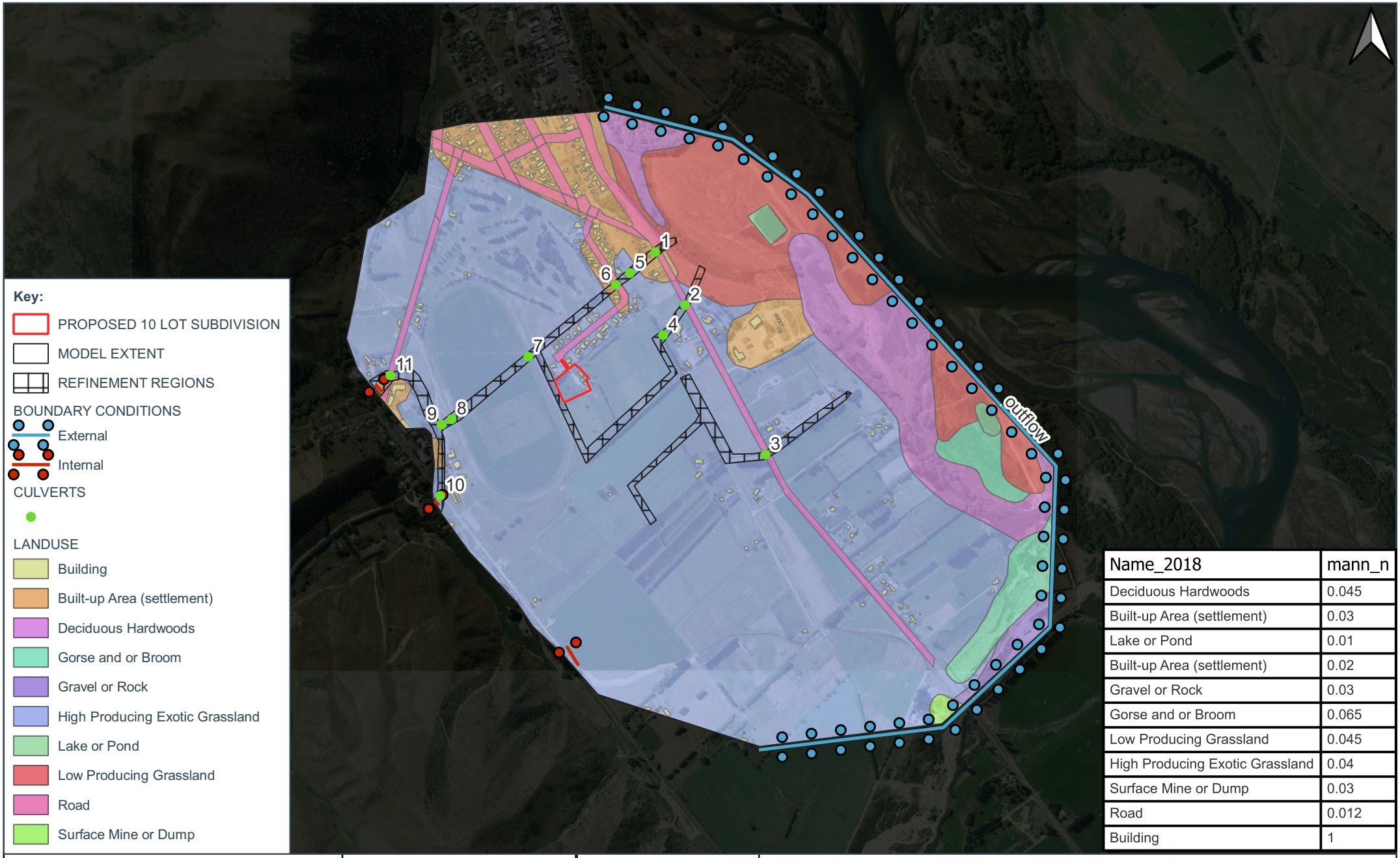


Figure 1b: 1986 flood photo



Name_2018	mann_n
Deciduous Hardwoods	0.045
Built-up Area (settlement)	0.03
Lake or Pond	0.01
Built-up Area (settlement)	0.02
Gravel or Rock	0.03
Gorse and or Broom	0.065
Low Producing Grassland	0.045
High Producing Exotic Grassland	0.04
Surface Mine or Dump	0.03
Road	0.012
Building	1

0 100 200 300 400 500 m

METRES

2021299 R2

SCALE (@A4): 1:15,000

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FIGURE 2: HEC-RAS MODEL SCHEMATIC

SOURCE:
LINZ basemaps
Maps made with QGIS

0 100 200 300 m

METRES

2021299 R2

SCALE (@A4): 1:1

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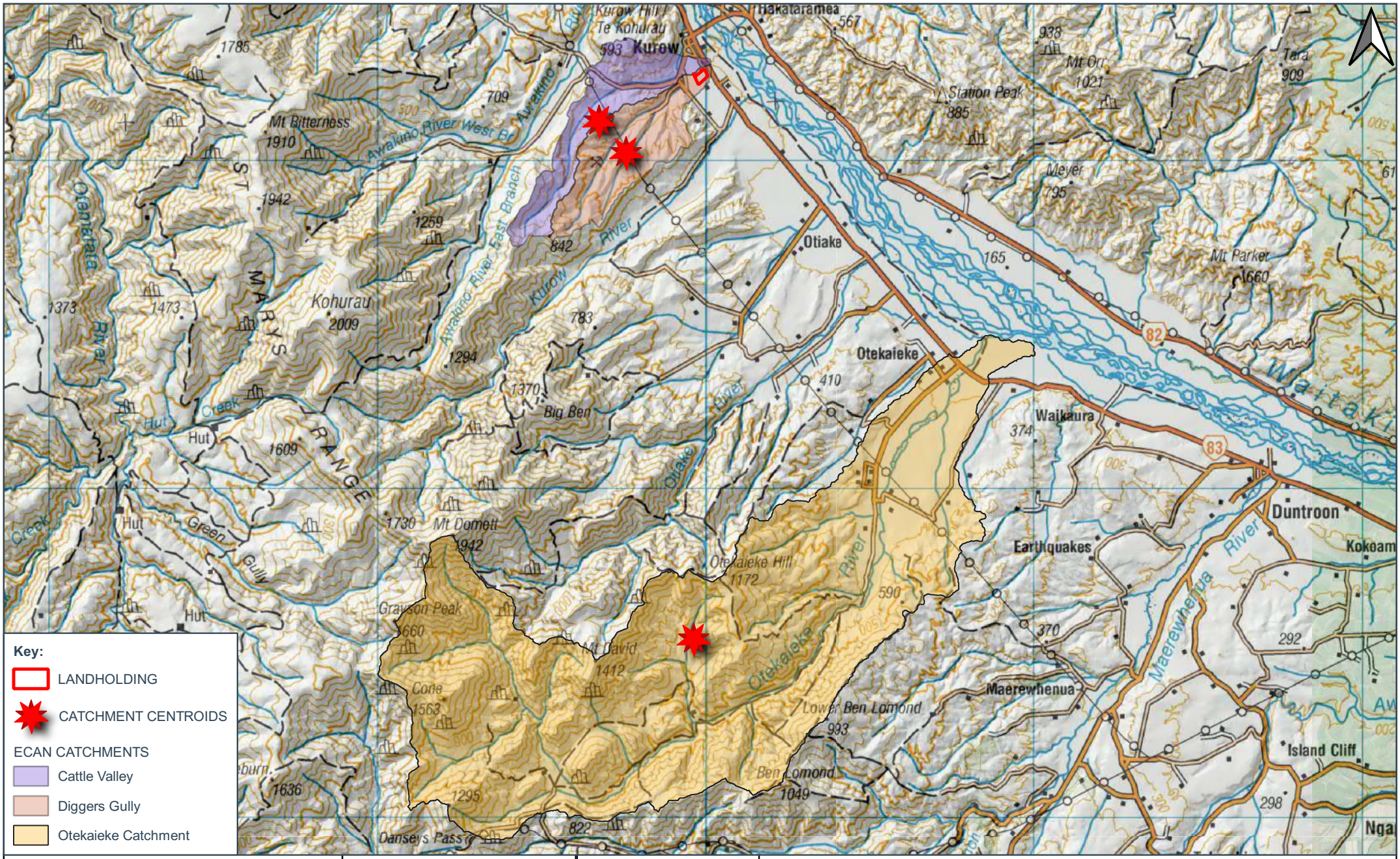
FIGURE 3: PRE-DEVELOPED SURFACE (LEFT),AND POST DEVELOPED 10 LOT SUBDIVISION (RIGHT)

SOURCE:
LINZ basemaps
Maps made with QGIS



0 2.5 5 km

2021299 R2

SCALE (@A4): 1:150,000

A	Draft	FEB 22	BT

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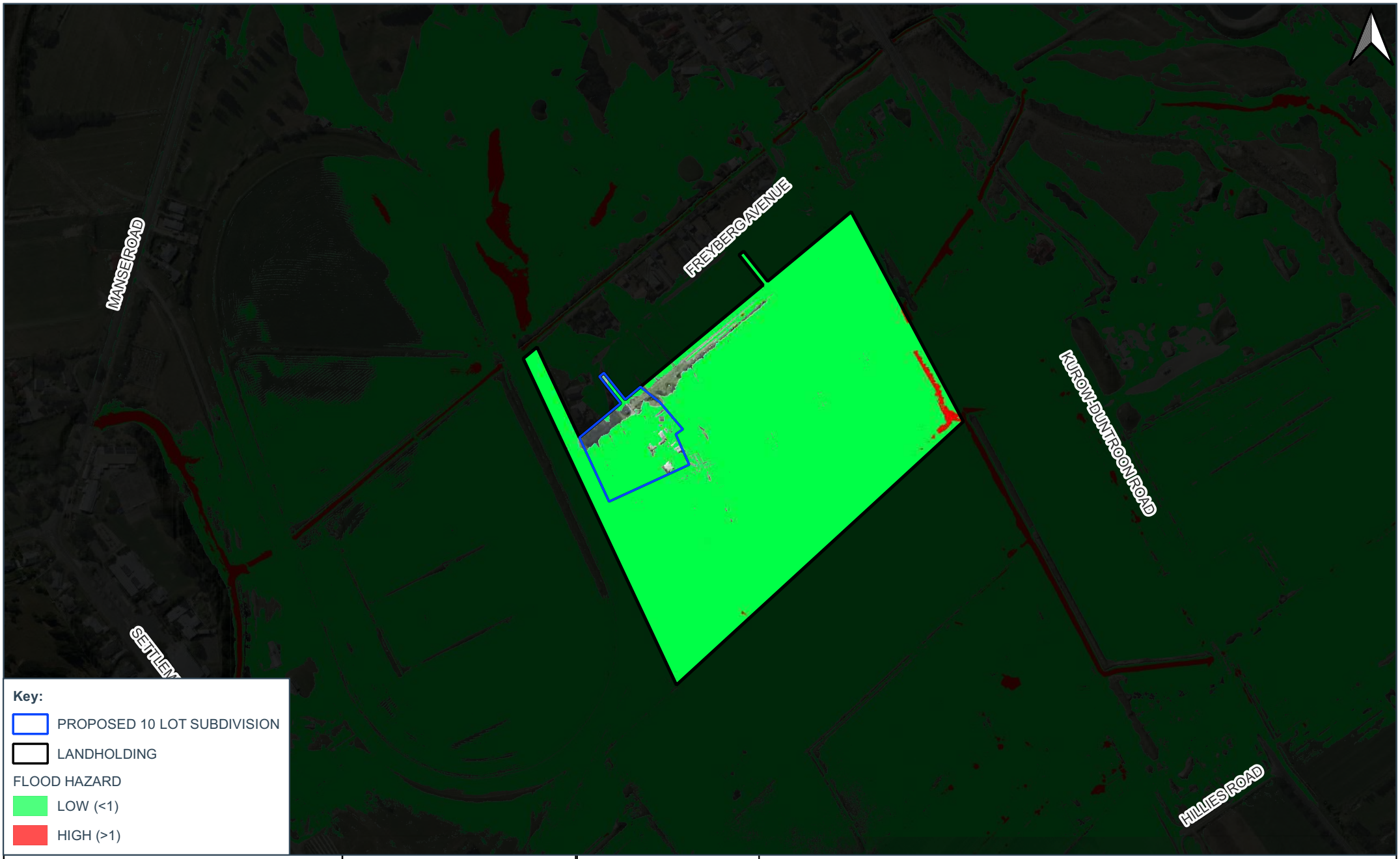
BY: RJ HALL

FIGURE 4: Catchment definitions

SOURCE:
LINZ basemaps
Maps made with QGIS



2021299 R2

SCALE (@A4): 1:5,000

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BY: RJ HALL

FIGURE 5: FLOOD HAZARD CLASSIFICATION FOR PROPOSED DEVELOPMENT SITE

SOURCE:
LINZ basemaps
Maps made with QGIS

2021299 R2

SCALE (@A4): 1:4,000

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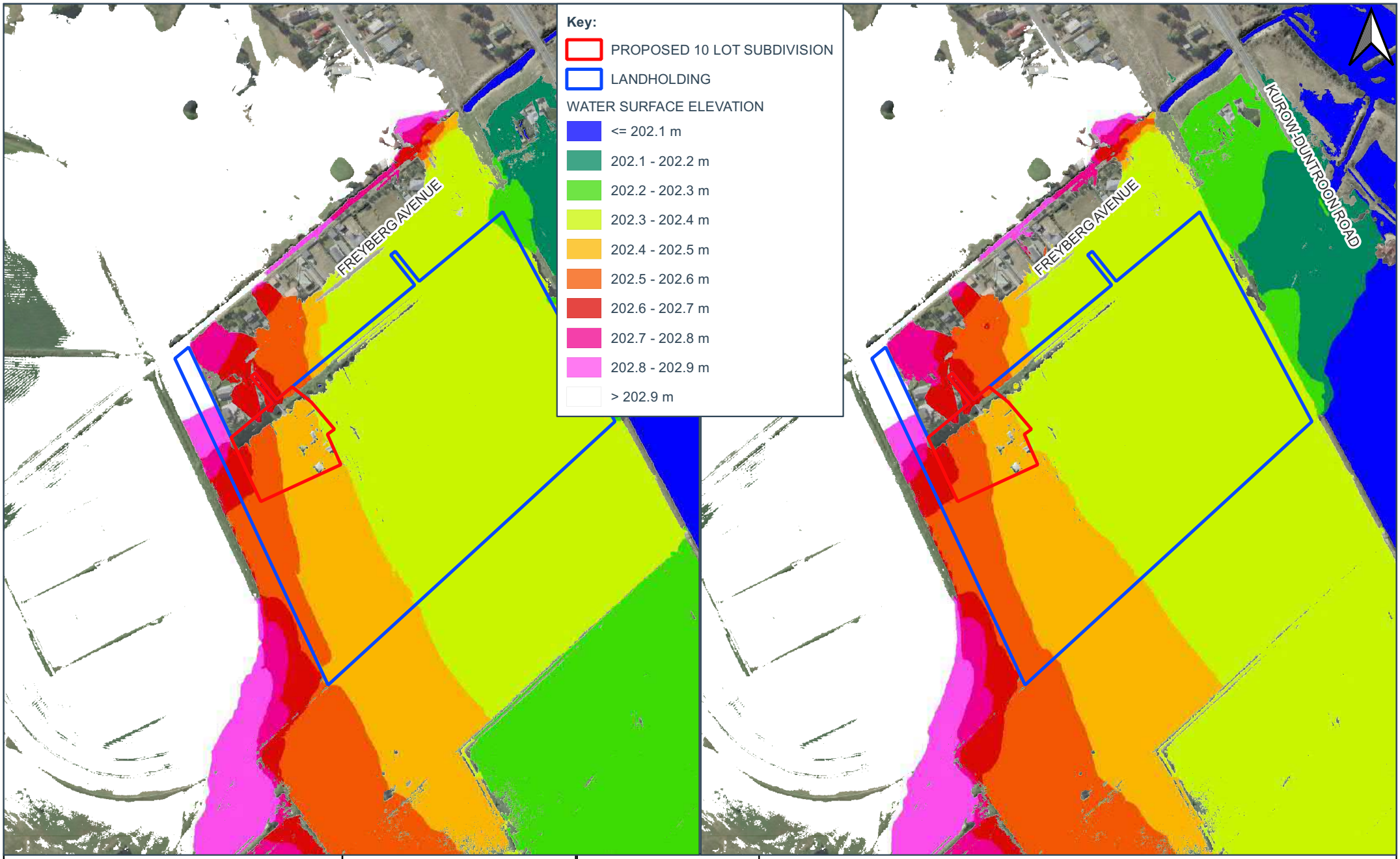
FIGURE 6: DIFFERENCE IN FLOOD ELEVATION FOR THE 200YR EVENT (POST - PRE). NOTE, DIFFERENCES LESS THAN 10MM NOT SHOWN

SOURCE:
LINZ basemaps
Maps made with QGIS



0 100 200 300 m

METRES

2021299 R2

SCALE (@A4): 1:5,000

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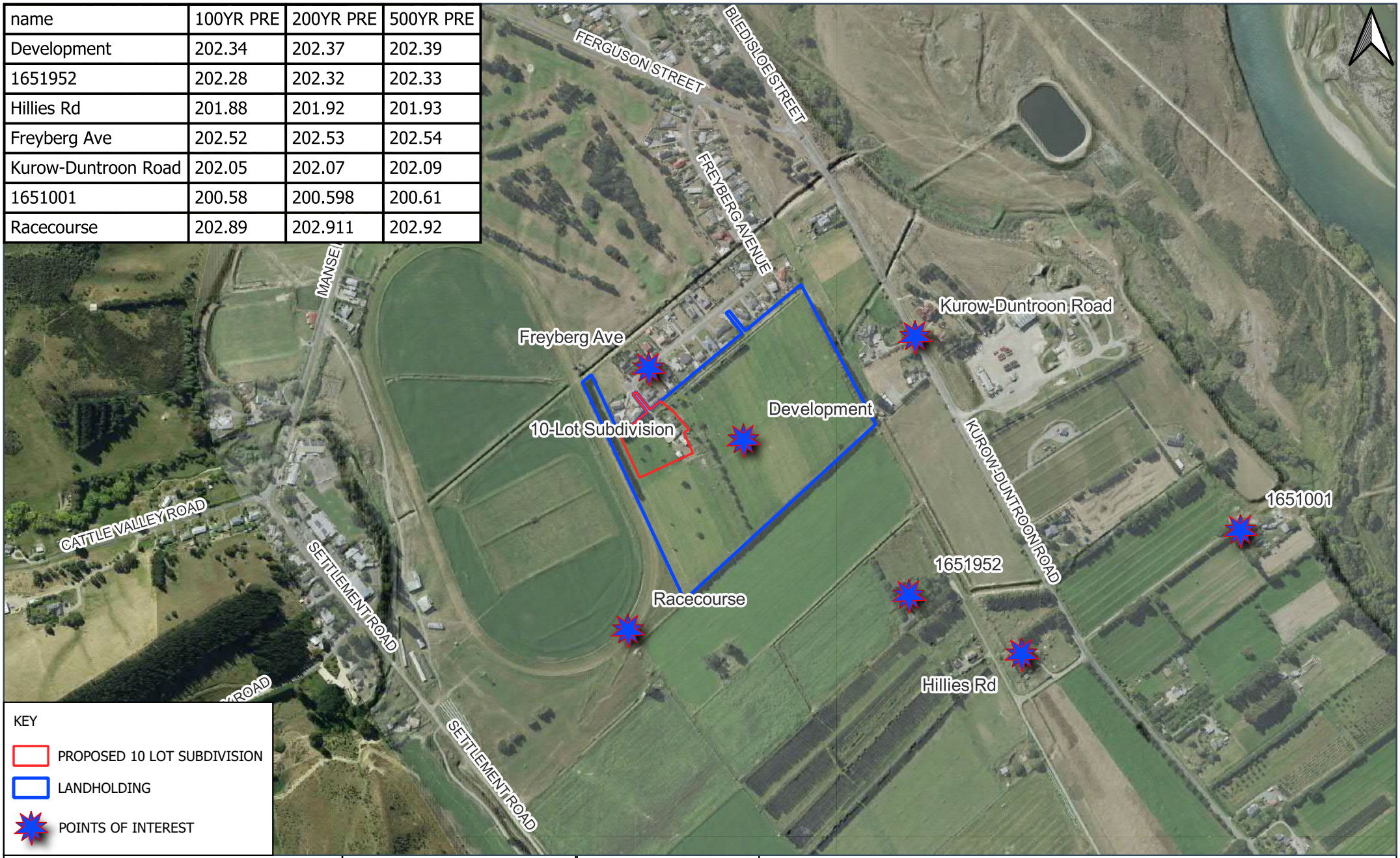
BY: RJ HALL

FIGURE 7: PEAK FLOOD WATER ELEVATIONS FOR THE PRE DEVELOPED 100YR (LEFT) AND 200YR (RIGHT) ARI EVENTS

SOURCE:
LINZ basemaps
Maps made with QGIS

name	100YR PRE	200YR PRE	500YR PRE
Development	202.34	202.37	202.39
1651952	202.28	202.32	202.33
Hillies Rd	201.88	201.92	201.93
Freyberg Ave	202.52	202.53	202.54
Kurow-Duntroon Road	202.05	202.07	202.09
1651001	200.58	200.598	200.61
Racecourse	202.89	202.911	202.92



0 100 200 300 m

METRES

2021299 R2

SCALE (@A4): 1:7,500

A	Draft	FEB 22	BT

PREPARED FOR:
MC ENGINEERING
BY: RJ HALL

FIGURE 8: COMPARISON OF FLOOD ELEVATIONS FOR POINTS OF INTEREST

SOURCE:
LINZ basemaps
Maps made with QGIS

MEYERCRUDEN

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www.mcengineering.co.nz

Cameron Leckie

From: Chris Fauth <Christopher.Fauth@ecan.govt.nz>
Sent: Monday, 23 May 2022 9:23 am
To: Cameron Leckie
Cc: Oliver Hermans
Subject: Kurow Subdivision
Attachments: 2021299 MEMO CULVERT BLOCKAGE.pdf; 2021299 MC Kurow Subdivision Flood Assessment R2.pdf

Hi Cameron

I have reviewed what yourself and Michelle Wild has forwarded regarding the proposed subdivision in Kurow (refer attached).

Michelle has discussed the modelling with you I believe but we agree with the approach you have taken and particularly the inclusion of sensitivity tests around culvert blockages which we know to be an issue in the area.

I agree with your conclusions that the potential impacts of the subdivision on adjacent land is minor.

The floor levels you propose for the 10 lots (100 year ARI + 500 mm) are conservative and I believe adequately protect future dwellings against the risk of flooding.

Regarding subdivision the key check for us is that no new lots are created that would not be suitable for development (high hazard) or would have unreasonable impacts on neighbours both of which are not the case here.

Environment Canterbury is satisfied that the proposed floor levels will be adequate for future Building Consent however I would appreciate if we could be kept in the loop of the final design that is settled on for the subdivision in terms of how reaching those floor levels is achieved (ground elevation/floor level/use of secondary flow paths).

Apologies it has taken so long to get back to you, I hope this email is suitable to carry on with the project. If you need the same in a more formal letter, let me know.

Regards,

Chris

Chris Fauth
Senior Scientist - Natural Hazards
Environment Canterbury
Timaru Office

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24 Hours: 0800 76 55 88
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James White

From: Robbie McIlraith <[redacted]
Sent: Thursday, 23 June 2022 12:04 PM
To: James White
Subject: FW: Letter of support for more land in Kurow

Hi James, please see below the updated email from Denise Cochrane.

Kind regards,

Robbie McIlraith
General Manager
NEW ZEALAND

P: [redacted]
E: [redacted]

From: [redacted]
Sent: Friday, 17 June 2022 9:39 AM
To: Robbie McIlraith[redacted]
Subject: Re: Letter of support for more land in Kurow

Hi Robbie,
Thanks for your email.
I've reread my email to you dated May 28 2021. Everything in that email remains true today – in fact there is probably even more pressure on the housing market here in Kurow. I often field questions from people wanting property in the area.
Its probably quite apt that next week is the shortest day (a depressing time of the year for us in the shelter of the hill as loss of the sun just after 3pm makes it a short day!).
I am happy to reconfirm my statements made to you in my previous email.
Kind regards.
Denise.

From: Robbie McIlraith
Sent: Wednesday, June 15, 2022 11:04 AM
To: [redacted]
Subject: RE: Letter of support for more land in Kurow

Hi Denise.

Sorry, one other thing, the planner we are using suggested you reviewing your email to ensure its still current as it is over 12 months old. If so, can you please re-send to me dated today for our application? Thanks

Kind regards,

Robbie McIlraith
General Manager
NEW ZEALAND

P: [redacted]
E: [redacted]

From: [redacted]>
Sent: Friday, 28 May 2021 2:26 PM
To: Robbie McIlraith [redacted]
Subject: Re: Letter of support for more land in Kurow

Hi Robbie,
Re: Potential Sub Division of land at Freyberg Avenue.
At Present there is virtually no sections available for sale in Kurow and anything that comes on the market has been snapped up. We will have owned our business Kurow Auto Services for 24 years next week and I can say that demand for housing in the town has been steady for most of that time. Kurow has become more desirable as a holiday destination with the overcrowding and overpricing of places like Wanaka, Cromwell and Twizel. In addition to this the development of the Cycle Trail and the Viticulture in the area has also added to the desirability of small places like Kurow. We have found we are increasingly asked about the availibility of property and sections by members of the public. I recently talked to a builder who is constructing a Spec House as we'd had an enquiry regarding it only to be told it had been presold to another party who also "walked in off the street". In my opinion and based on my experience having grown up in the area, worked here and subsequently owning this business there is definitely a shortage of sections in Kurow.
The block of land you refer to is situated in a very desirable area in that it is not in the shade of Kurow Hill and will command great views. I wish you well with your venture and commend your confidence in our Community.
Kind Regards.
Denise Cochrane.
Kurow Auto Services.
P.S. You may also like to contact the Community Centre here in Kurow as we often refer people over there when enquiring about property.

James White

From: Robbie McIlraith <[redacted]
Sent: Wednesday, 15 June 2022 7:54 PM
To: James White
Subject: FW: Letter of support.

Kind regards,

Robbie McIlraith
General Manager
NEW ZEALAND

P: [redacted]
E: [redacted]

From: Gaynor Lines [redacted]
Sent: Wednesday, 15 June 2022 7:28 PM
To: Robbie McIlraith <[redacted]
Subject: Fwd: Letter of support.

Dated 15 / 6 /22

To Waitaki District Council

To Whom it may concern.

Re Letter in support of further suitable residential land being made available and development of housing in Kurow.

I write to support the creation of more residential land in Kurow, specifically the land at 49a Freyberg Avenue.
My name is Gaynor Lines and I have lived in Kurow all my life, I am seventy years of age plus.
I was born in Kurow and my late husband and I owned Hakataramea Motors for forty four years.
I am involved heavily in the local community via a number of committees.
The board of trustees for the Waitaki Valley community cars.
Kurow Museum committee.
I also spend quite some time at the museum as assistant curator.
Kurow Island development committee. Our group helped rebuild the local dump into the pleasant area that it is today.
The Kurow area is very attractive in general, with the wonderful Waitaki braided river, recreational lakes, excellent cafes, bike trail, medical centre,golf course, and a superb climate. Overall there is a strong sentiment that this area is moving forward and that things are happening in Kurow, it is an attractive place to live.
I am retired and have been seeking to downsize my property. I do not want to move from Kurow but find there is no land available to purchase and build on, nor suitable retirement style housing to purchase, seeking smaller,modern, and easy care. I know a number of local retirees in similar positions.
The existing township is located in the shade of the Kurow Hill and even if there was available housing , the shading is not ideal. The Freyberg Avenue area is much better suited to permanent housing as it gets considerably more sunlight.

I seek council to consider an application to allow the creation of more residential style land and even better development of over 60s style housing for retirees like myself.

There is a strong demand and I believe this would be well supported by the community.

If you have any questions or require further information please contact me on 021362181.

Kind regards,

Gaynor Lines

Sent from my iPad

15th June 2022
To Whom it may concern

I have been asked to supply an insight into the Real Estate market in Kurow.

2021 saw a huge increase in demand for property New Zealand wide with the common theme being "there are not enough houses, and it is very difficult to secure vacant sections to build new". The 2022 market has slowed with lending criteria being tightened and interest rates rising, however changes to the lending laws around Kiwi Saver funds and First home starts for new builds will make these more accessible to first home buyers.
Kurow has remained popular, with 8 properties sold from June 2021-June 2022. Six of these were residential and two were Lifestyle blocks. Five of these properties sold with-in two1/2 months and two were private sales that didn't even reach the open market. This further proves the popularity of Kurow.

There are currently only four residential properties listed for sale in the Kurow area on the open market, and no residential sections for sale.
Kurow has limited vacant land with-in the township's boundary, with the bulk of vacant land either reserves, council, or government owned land.
Of the few vacant sections (approx. 10), and it is to be noted that of these 2 were sold at the end of 2020 with a new build already on one of these.
The demand for housing in Kurow remains strong, of the four properties Harcourts have taken to the market in Kurow this past year two sold under multi-offer situations, meaning there were disappointed prospective purchasers, the third sold in a short time frame and the fourth currently has a conditional offer upon it.

Following on from the initial and then on-going Covid concerns and the desire for people to escape the bigger cities, as a real estate salesperson, I am often asked if I know of any homes or land for sale in the Waitaki Valley.

I believe that should more land be made available for construction of new homes, these sections could be sold very quickly, bringing a boost to the local economy. Due to the general terrain restraints in Kurow of the Kurow Hill, and the Waitaki River, to enable more land to be opened up for residential sections would probably require a modification to the District Plan zoning.

Jan
Meikle
Sales Consultant

M 027 420 3461 **P** 03 434 3496
jan.meikle@harcourts.co.nz
blackhamandco.co.nz

Blackham & Co Real Estate Ltd
Licensed Agent REAA 2008
229 Thames Street, Oamaru

Harcourts

Jan meikle 15/06/2022.

15th June 2022

Dear Robbie,

Thank you for your enquiry regarding residential property in Kurow.

Kurow is a great little town and becoming more and more popular with purchasers from first home buyers living and working in the area, to retirees, both local and those looking to move out of the more built-up areas. In the last 24 months to date there have been 34 Residential properties sold ranging from $150,000 to $615,000, From bare residential land to new homes the demand has been strong to date.

With house prices and equity levels continuing to rise, it has become more and more achievable (not to mention more economical) for local residents to upgrade to a new/newer home, the main issue here being supply with a lack of residential land/properties available limiting options. Prices in the neighbouring Otematata, Omarama, and Twizel have soared out of reach for most people which has made Kurow become a popular option for retirees, holiday homes and those looking to live and work in the area.

With new listings our enquiry comes from far and wide and is not just limited to local enquiry. Looking forward with what prices are doing in the wider region I can only predict that Kurow will continue to grow and become more popular, as long as there is the infrastructure in place.

With only 2 of the 34 properties sold in the last 24 months being residential sections, and only four Residential properties currently for sale, it is essential I believe that more land options become available for Kurow to be able to continue to grow.

Yours sincerely,

James Symes

James Symes
Real Estate Specialist

JAMES SYMES
ONE AGENCY THE PROPERTY SPECIALIST
22 TEES STREET OAMARU
P: 0275226470
E: james.symes@oatps.nz
LICENCED REA 2008

James White

Subject: FW: Letter of support for more land in Kurow

From: Robbie McIlraith [redacted]
Sent: Wednesday, 15 June 2022 5:32 PM
To: James White <james@surveywaitaki.co.nz>
Subject: FW: Letter of support for more land in Kurow

Kind regards,

Robbie McIlraith
General Manager
NEW ZEALAND

P: +[redacted]
E: [redacted]

From: WVS Principal <[redacted]
Sent: Wednesday, 15 June 2022 12:40 PM
To: Robbie McIlraith [redacted]
Subject: Re: Letter of support for more land in Kurow

To Whom it may concern

Waitaki Valley School currently has a student roll of 113 students. This roll has been stable over the last 3 years. Our MOE rental housing within the kurow township are currently occupied. There does seem to be a buzz around Kurow as the population density in Kurow and Otematata townships increases through changing farming practices and growing tourism.

I wish you all the best in your application with the Waitaki District council.

Kind Regards

Nga mihi

Jane Severinsen

Principal

Waitaki Valley School

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **OT12C/547**

Land Registration District **Otago**

Date Issued 14 March 1989

Prior References
OT5A/1228

Estate Fee Simple

Area 2.8832 hectares more or less

Legal Description Lot 33 Deposited Plan 19718

Registered Owners

Parker Property 2021 Limited Partnership

Interests

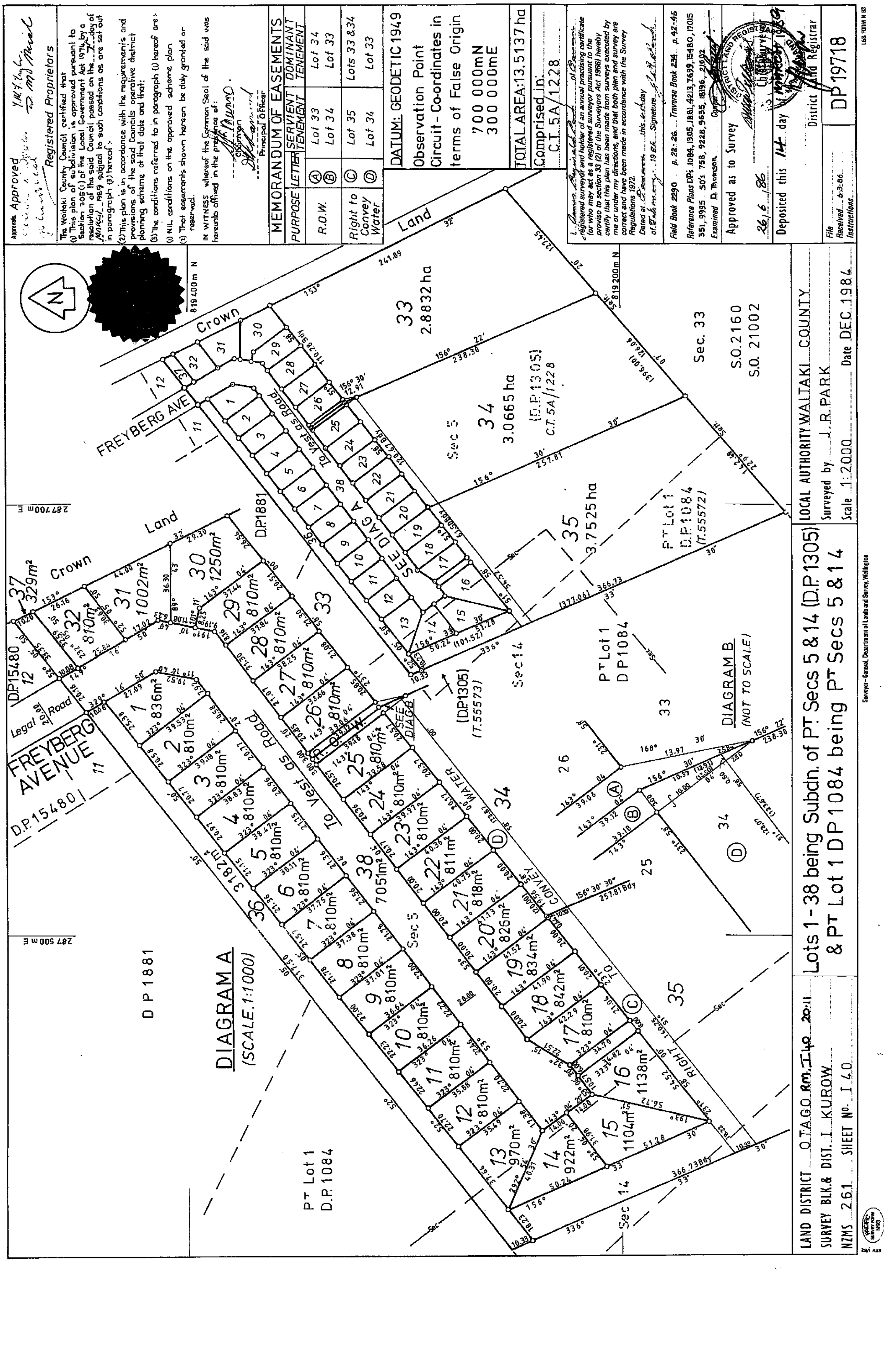
803543.1 Easement Certificate specifying the following easements - 24.4.1992 at 11.03 am

Type	Servient Tenement	Easement Area	Dominant Tenement	Statutory Restriction
Right of way	Lot 33 Deposited Plan 19718 - herein	A DP 19718	Lot 34 Deposited Plan 19718 - CT OT12C/548	Section 309(1)(a) Local Government Act 1974
Right of way	Lot 34 Deposited Plan 19718 - CT OT12C/548	B DP 19718	Lot 33 Deposited Plan 19718 - herein	Section 309(1)(a) Local Government Act 1974
Convey water	Lot 35 Deposited Plan 19718 - CT OT12C/549	C DP 19718	Lot 33 Deposited Plan 19718 - herein	Section 309(1)(a) Local Government Act 1974
Convey water	Lot 34 Deposited Plan 19718 - CT OT12C/548	D DP 19718	Lot 33 Deposited Plan 19718 - herein	Section 309(1)(a) Local Government Act 1974

Fencing Covenant in Transfer 806427.1 - 3.6.1992 at 10.07 am

Subject to a right to convey electric power in gross over part marked A DP 321447 to Network Waitaki Limited created by Easement Instrument 6004124.1 - 14.5.2004 at 9:00 am

12074934.6 Encumbrance to Kurow-Duntroom Irrigation Company Limited - 18.5.2021 at 10:38 am


DP19718
DIAGRAM A
(SCALE 1:1000)
DIAGRAM B
(NOT TO SCALE)
MEMORANDUM OF EASEMENTS
DATUM: GEODETIC 1949
TOTAL AREA: 13.5137 ha
Comprised in: C.T. 5A/1228
Lots 1-38 being Subdn. of PT. Secs 5 & 14 (D.P.1305)
& PT Lot 1 DP 1084 being PT Secs 5 & 14
LOCAL AUTHORITY WAITAKI COUNTY
Surveyed by J.R. PARK
Scale 1:2000
Date DEC.1984
LAND DISTRICT OTAGO
SURVEY BLK.& DIST. I KUROW
FREYBERG AVENUE
Crown Land

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **OT12C/548**

Land Registration District **Otago**

Date Issued 14 March 1989

Prior References
OT5A/1228

Estate Fee Simple

Area 3.0665 hectares more or less

Legal Description Lot 34 Deposited Plan 19718

Registered Owners

Parker Property 2021 Limited Partnership

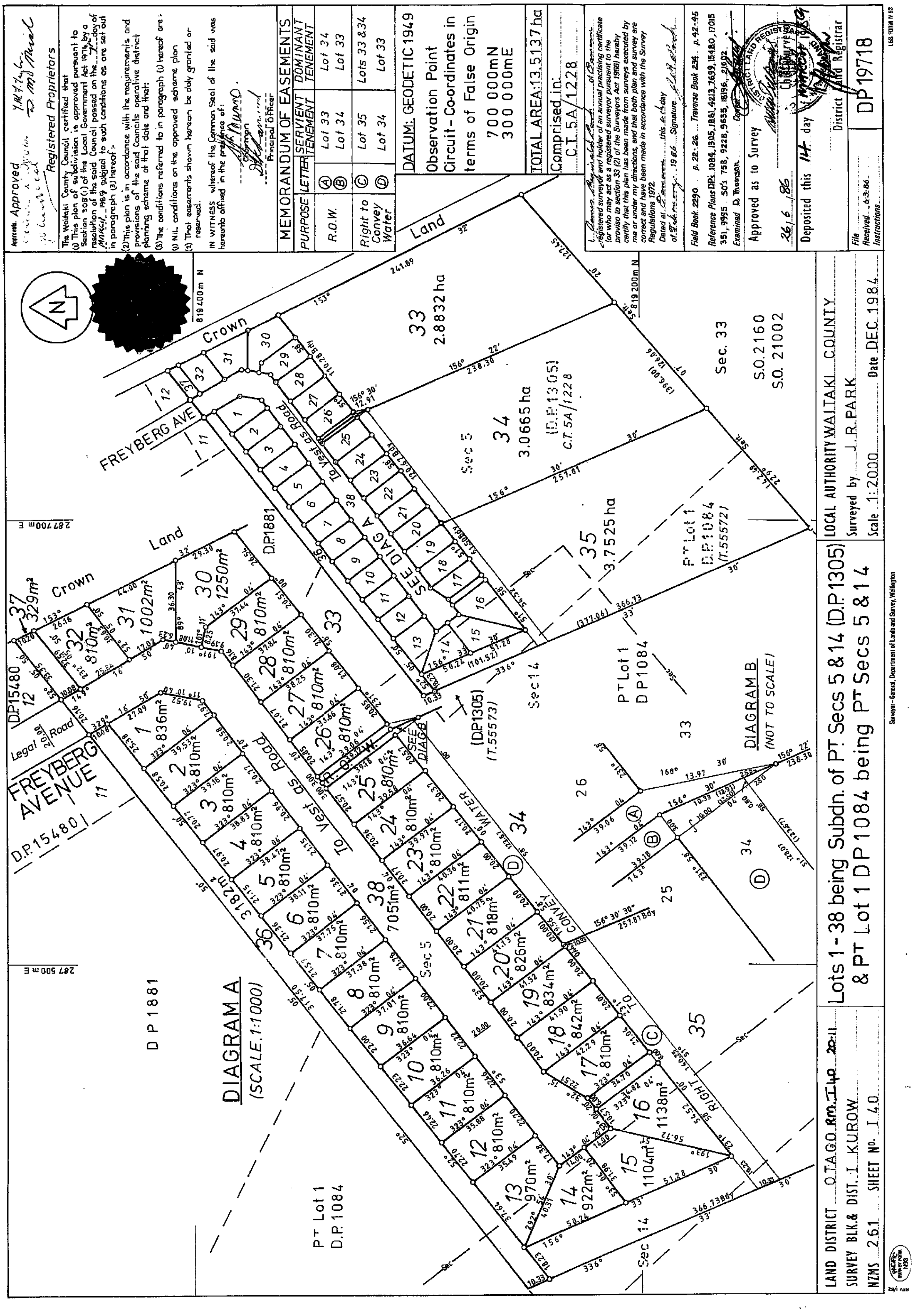
Interests

803543.1 Easement Certificate specifying the following easements - 24.4.1992 at 11.03 am

Type	Servient Tenement	Easement Area	Dominant Tenement	Statutory Restriction
Right of way	Lot 33 Deposited Plan 19718 - CT OT12C/547	A DP 19718	Lot 34 Deposited Plan 19718 - herein	Section 309(1)(a) Local Government Act 1974
Right of way	Lot 34 Deposited Plan 19718 - herein	B DP 19718	Lot 33 Deposited Plan 19718 - CT OT12C/547	Section 309(1)(a) Local Government Act 1974
Convey water	Lot 35 Deposited Plan 19718 - CT OT12C/549	C DP 19718	Lot 34 Deposited Plan 19718 - herein	Section 309(1)(a) Local Government Act 1974
Convey water	Lot 34 Deposited Plan 19718 - herein	D DP 19718	Lot 33 Deposited Plan 19718 - CT OT12C/547	Section 309(1)(a) Local Government Act 1974

Fencing Covenant in Transfer 806427.1 - 3.6.1992 at 10.07 am

12074934.6 Encumbrance to Kurow-Duntroom Irrigation Company Limited - 18.5.2021 at 10:38 am


MEMORANDUM OF EASEMENTS
DATUM: GEODETIC 1949
Observation Point
Circuit-Co-ordinates in terms of False Origin
700 000mN
300 000mE
TOTAL AREA: 13.5137 ha
Comprised in:
C.T. 5A/1228
DP 19718
DIAGRAM A
(SCALE 1:1000)
DIAGRAM B
(NOT TO SCALE)
FREYBERG AVENUE
Lots 1-38 being Subdn. of PT. Secs 5 & 14 (D.P.1305)
& PT Lot 1 DP 1084 being PT Secs 5 & 14
LOCAL AUTHORITY WAITAKI COUNTY
Surveyed by J.R. PARK
Scale 1:2000
Date DEC. 1984

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **OT12C/549**

Land Registration District **Otago**

Date Issued 14 March 1989

Prior References
OT5A/1228

Estate Fee Simple

Area 3.7525 hectares more or less

Legal Description Lot 35 Deposited Plan 19718

Registered Owners

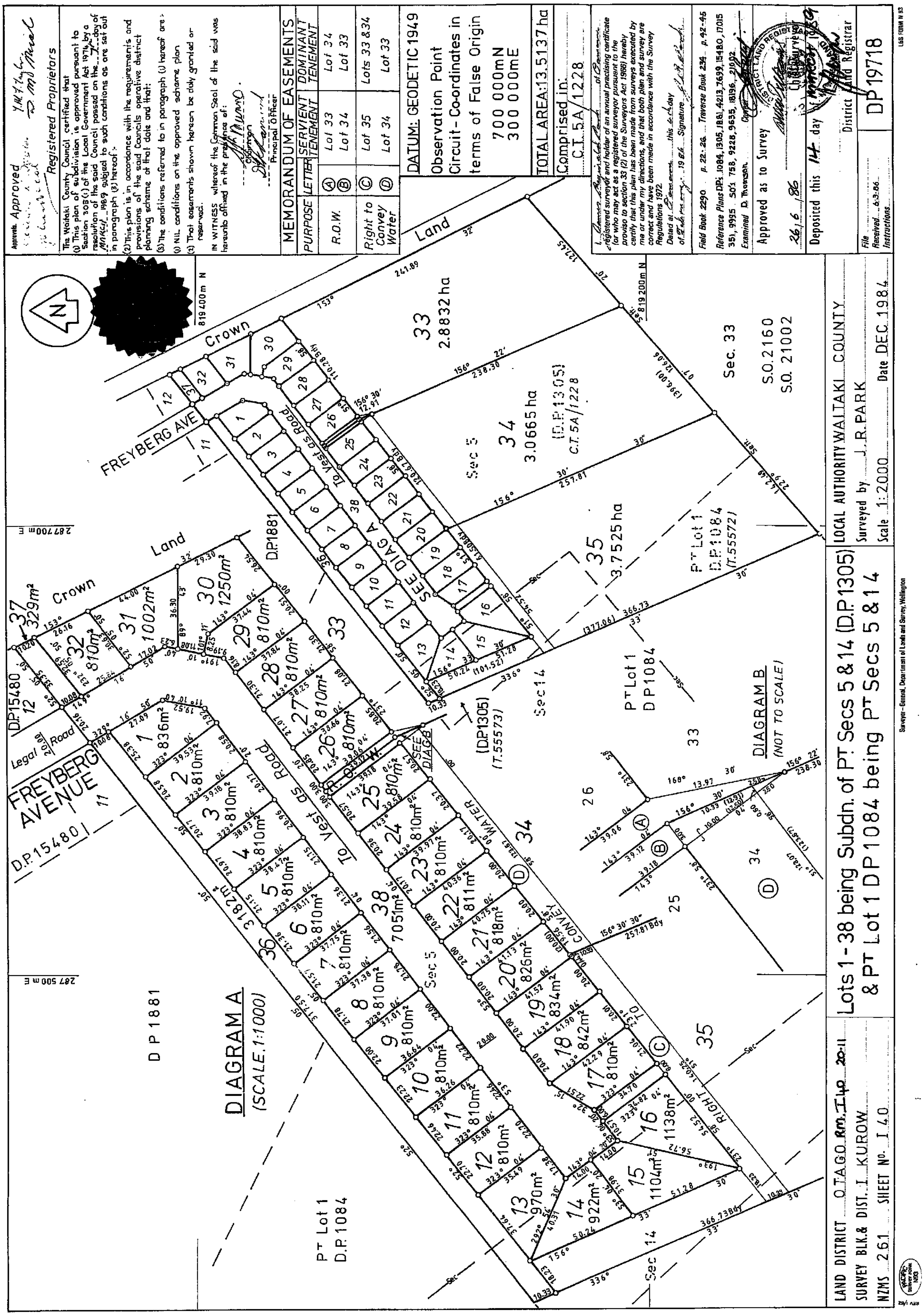
Parker Property 2021 Limited Partnership

Interests

803543.1 Easement Certificate specifying the following easements - 24.4.1992 at 11.03 am

Type	Servient Tenement	Easement Area	Dominant Tenement	Statutory Restriction
Convey water	Lot 35 Deposited Plan 19718 - herein	C DP 19718	Lot 33 Deposited Plan 19718 - CT OT12C/547	Section 309(1)(a) Local Government Act 1974
Convey water	Lot 35 Deposited Plan 19718 - herein	C DP 19718	Lot 34 Deposited Plan 19718 - CT OT12C/546	Section 309(1)(a) Local Government Act 1974

12074934.6 Encumbrance to Kurow-Duntroom Irrigation Company Limited - 18.5.2021 at 10:38 am


MEMORANDUM OF EASEMENTS
PURPOSE | LETTER | SERVIENT TENEMENT | DOMINANT TENEMENT
R.O.W. | A | Lot 33 | Lot 34
R.O.W. | B | Lot 34 | Lot 33
Right to Convey Water | C | Lot 35 | Lots 33 & 34
Right to Convey Water | D | Lot 34 | Lot 33
DATUM: GEODETIC 1949
Observation Point Circuit - Co-ordinates in terms of False Origin
700 000mN
300 000mE
TOTAL AREA: 13.5137 ha
Comprised in: C.T. 5A/1228
Registered Proprietors
DIAGRAM A (SCALE 1:1000)
DIAGRAM B (NOT TO SCALE)
FREYBERG AVENUE
Crown Land
Legal Road
Vesta Road
Lots 1-38 being Subdn. of PT Secs 5 & 14 (D.P.1305) & PT Lot 1 DP 1084 being PT Secs 5 & 14
LAND DISTRICT OTAGO
LOCAL AUTHORITY WAITAKI COUNTY
SURVEY BLK.& DIST. I KUROW
Surveyed by J.R. PARK
NZMS 261 SHEET No. I 40
Scale 1:2000
Date DEC. 1984
DP 19718

9th August, 2021

Parker Property (2021) LP
Attention Robbie McIlraith.

Farmlands co-operative

Farmlands Christchurch Office
535 Wairakei Road
PO Box 271
Christchurch 8140
New Zealand

0800 200 600
www.farmlands.co.nz

Re: Soil report For 49a Freyberg Avenue, Kurow

Your soil profile at Freyberg Ave is a Pallic Soil with moderate deep to deep soil depth class which will have pale coloured subsoils, due to low contents of iron oxides, have weak soil structure and high density in subsurface horizons.

Pallic Soils tend to be dry in summer limiting the crop or pasture species that can be grown in this location due to the risk of drought and wet in winter again limiting crop and pasture specie options due to pugging and/or flooding although this soil type has high soil water holding capacity. The topsoil typically has silt texture and is stoneless which from the photos looks accurate. These soils have a high structural vulnerability and a low N leaching potential.

After checking LUC suitability classes on S-Maps online, the soil classification is noted as 3. The classification system is broad and on a large scale in its soil mapping. Taking into consideration the climate of the location being extremely hot in the summer and extremely cold in the winter months, my opinion is that the area should be classed LUC 4-5.

Attached for reference:

1. Appendix 1 – S-Maps Classification of the site
2. Appendix 2 – Site Map of Soil Test Locations
3. Appendix 3 – Location Photos
4. Appendix 4 – Soil Test Results

Kind regards,

Phil Johnston
Agronomist - Cant/West Coast
Farmlands Co-operative Society Limited

m: +64 27 8011 316

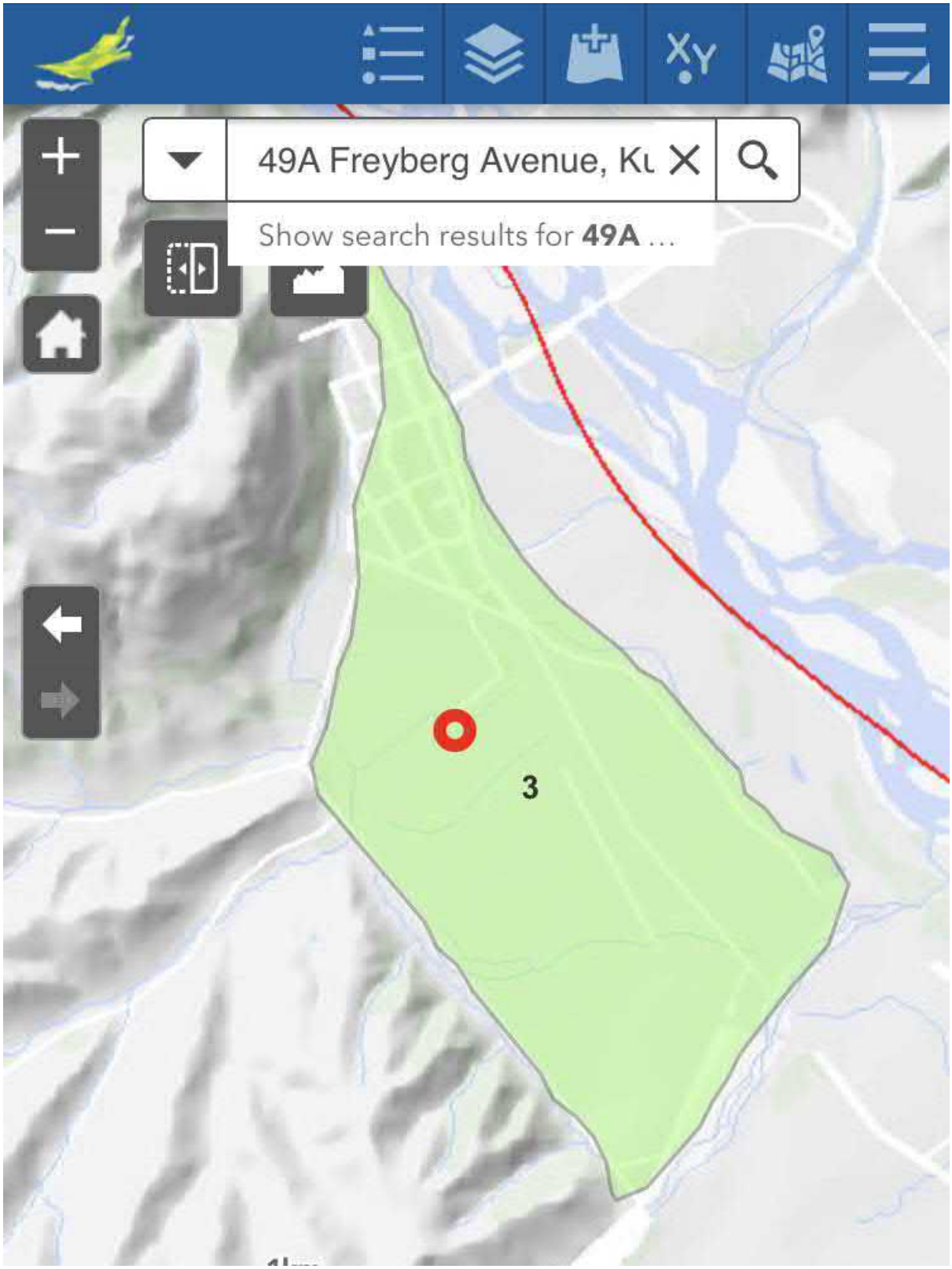
156 Waterloo Road, Hornby
PO Box 16 402
Christchurch 8042
New Zealand

www.farmlands.co.nz

Farmlands co-operative

TOITŪ CARBON REDUCE ISO 14064-1 ORGANISATION

Appendix 1 – Soil Classification



Appendix 2 – Soil Test Locations

Appendix 3 – Soil Test Location Photos

Location - 2

Location - 4

Location - 3

Farmlands co-operative

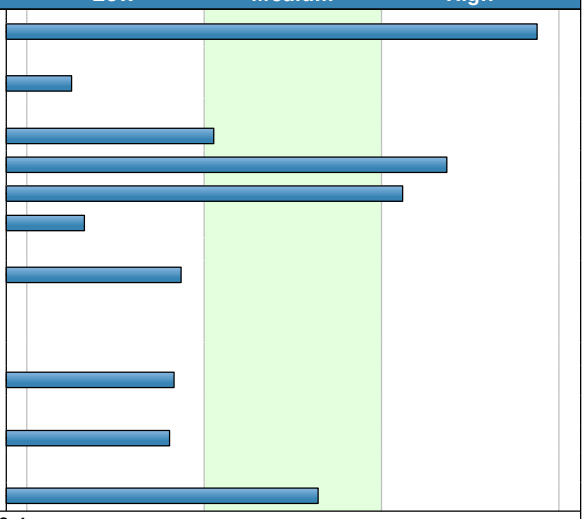
Hill Laboratories
TRIED, TESTED AND TRUSTED
R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand
T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	R McIraith	**Lab No:**	2664575 shvmpv1
Address:	PO Box 866 Christchurch 8140	**Date Received:**	27-Jul-2021
		Date Reported:	02-Aug-2021
		Quote No:	
		Order No:	
		Client Reference:	Parker Property 2021 LP
		Add. Client Ref:	49A Freyberg Avenue, Kurow
		Submitted By:	Phil Johnston

Sample Name: 2 **Lab Number:** 2664575.2
Sample Type: SOIL Mixed Pasture, Dry Stock (S82)

Analysis		Level Found	Medium Range
pH	pH Units	7.1	5.8 - 6.2
Olsen Phosphorus	mg/L	7	15 - 25
Potassium	MAF units	7	7 - 10
Calcium	MAF units	16	4 - 10
Magnesium	MAF units	36	17 - 30
Sodium	MAF units	3	10 - 24
Potentially Available Nitrogen (15cm Depth)*	kg/ha	137	150 - 250
Anaerobically Mineralisable N*	µg/g	112	
Organic Matter*	%	5.8	7.0 - 17.0
Total Carbon*	%	3.4	
Total Nitrogen*	%	0.26	0.30 - 0.60
C/N Ratio*		12.9	
Anaerobically Mineralisable N/Total N Ratio*	%	4.3	3.0 - 5.0



Base Saturation %	K 2.3	Ca 83	Mg 10.7	Na 0.4	
me/100g	K 0.43	Ca 15.2	Mg 1.96	Na 0.08	
Additional Properties	Cation Exchange Capacity (me/100g)				18
	Total Base Saturation (%)				96
	Volume Weight (g/mL)				0.82

Farmlands co-operative

Hill Laboratories
TRIED, TESTED AND TRUSTED
R J Hill Laboratories Limited
28 Duke Street Frankton 3204
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Hamilton 3240 New Zealand
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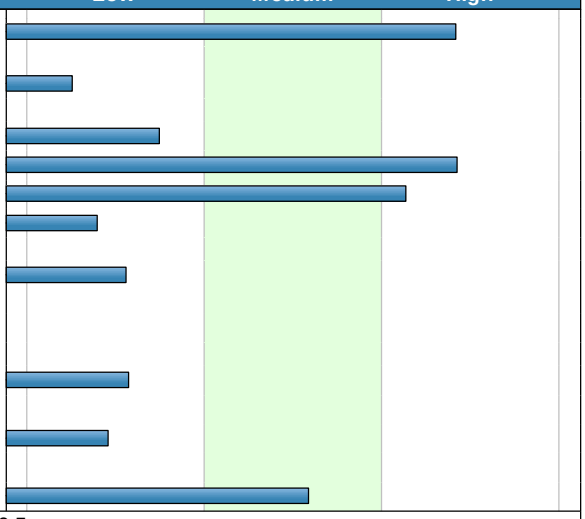
Certificate of Analysis

Client:	R McIraith	**Lab No:**	2664575 shvmpv1
Address:	PO Box 866 Christchurch 8140	**Date Received:**	27-Jul-2021
		Date Reported:	02-Aug-2021
		Quote No:	
		Order No:	
		Client Reference:	Parker Property 2021 LP
		Add. Client Ref:	49A Freyberg Avenue, Kurow
		Submitted By:	Phil Johnston

Sample Name: 3 **Lab Number:** 2664575.3
Sample Type: SOIL Mixed Pasture, Dry Stock (S82)

Analysis		Level Found	Medium Range
pH	pH Units	6.6	5.8 - 6.2
Olsen Phosphorus	mg/L	8	15 - 25
Potassium	MAF units	6	7 - 10
Calcium	MAF units	16	4 - 10
Magnesium	MAF units	37	17 - 30
Sodium	MAF units	4	10 - 24
Potentially Available Nitrogen (15cm Depth)*	kg/ha	106	150 - 250
Anaerobically Mineralisable N*	µg/g	80	
Organic Matter*	%	4.0	7.0 - 17.0
Total Carbon*	%	2.3	
Total Nitrogen*	%	0.19	0.30 - 0.60
C/N Ratio*		12.1	
Anaerobically Mineralisable N/Total N Ratio*	%	4.2	3.0 - 5.0



Base Saturation %	K 1.6	Ca 72	Mg 9.1	Na 0.5	
me/100g	K 0.33	Ca 14.9	Mg 1.86	Na 0.09	
Additional Properties	Cation Exchange Capacity (me/100g)				21
	Total Base Saturation (%)				84
	Volume Weight (g/mL)				0.88

Farmlands co-operative

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R J Hill Laboratories Limited
28 Duke Street Frankton 3204
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Hamilton 3240 New Zealand
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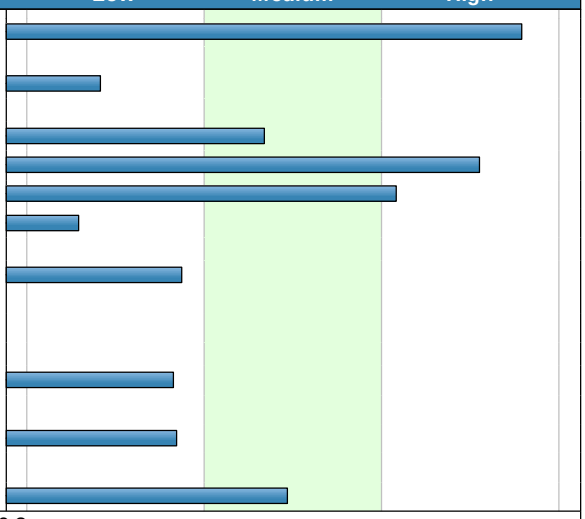
W www.hill-laboratories.com

Certificate of Analysis

Client:	R McIraith	**Lab No:**	2664575 shvmpv1
Address:	PO Box 866 Christchurch 8140	**Date Received:**	27-Jul-2021
		Date Reported:	02-Aug-2021
		Quote No:	
		Order No:	
		Client Reference:	Parker Property 2021 LP
		Add. Client Ref:	49A Freyberg Avenue, Kurow
		Submitted By:	Phil Johnston

Sample Name: 4 **Lab Number:** 2664575.4
Sample Type: SOIL Mixed Pasture, Dry Stock (S82)

Analysis		Level Found	Medium Range
pH	pH Units	7.0	5.8 - 6.2
Olsen Phosphorus	mg/L	9	15 - 25
Potassium	MAF units	8	7 - 10
Calcium	MAF units	18	4 - 10
Magnesium	MAF units	34	17 - 30
Sodium	MAF units	3	10 - 24
Potentially Available Nitrogen (15cm Depth)*	kg/ha	137	150 - 250
Anaerobically Mineralisable N*	µg/g	106	
Organic Matter*	%	5.8	7.0 - 17.0
Total Carbon*	%	3.4	
Total Nitrogen*	%	0.27	0.30 - 0.60
C/N Ratio*		12.5	
Anaerobically Mineralisable N/Total N Ratio*	%	3.9	3.0 - 5.0



Base Saturation %	K 2.2	Ca 84	Mg 8.7	Na 0.3	
me/100g	K 0.45	Ca 17.0	Mg 1.76	Na 0.07	
Additional Properties	Cation Exchange Capacity (me/100g)				20
	Total Base Saturation (%)				95
	Volume Weight (g/mL)				0.86

The above nutrient graphs compare the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

Farmlands co-operative

Hill Laboratories
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R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand
T 0508 HILL LAB (44 555 22)
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Certificate of Analysis

Client:	R McIraith	**Lab No:**	2664575 shvmpv1
Address:	PO Box 866 Christchurch 8140	**Date Received:**	27-Jul-2021
		Date Reported:	02-Aug-2021
		Quote No:	
		Order No:	
		Client Reference:	Parker Property 2021 LP
		Add. Client Ref:	49A Freyberg Avenue, Kurow
		Submitted By:	Phil Johnston

Soil Analysis Results

Sample Name:		2	3	4			
Lab Number:		2664575.2	2664575.3	2664575.4			
Sample Type:		SOIL Mixed Pasture, Dry Stock	SOIL Mixed Pasture, Dry Stock	SOIL Mixed Pasture, Dry Stock			
Sample Type Code:		S82	S82	S82			
pH	pH Units	7.1	6.6	7.0	-	-	-
Olsen Phosphorus	mg/L	7	8	9	-	-	-
Potassium	me/100g	0.43	0.33	0.45	-	-	-
Potassium	%BS	2.3	1.6	2.2	-	-	-
Potassium	MAF units	7	6	8	-	-	-
Calcium	me/100g	15.2	14.9	17.0	-	-	-
Calcium	%BS	83	72	84	-	-	-
Calcium	MAF units	16	16	18	-	-	-
Magnesium	me/100g	1.96	1.86	1.76	-	-	-
Magnesium	%BS	10.7	9.1	8.7	-	-	-
Magnesium	MAF units	36	37	34	-	-	-
Sodium	me/100g	0.08	0.09	0.07	-	-	-
Sodium	%BS	0.4	0.5	0.3	-	-	-
Sodium	MAF units	3	4	3	-	-	-
CEC	me/100g	18	21	20	-	-	-
Total Base Saturation	%	96	84	95	-	-	-
Volume Weight	g/mL	0.82	0.88	0.86	-	-	-
Potentially Available Nitrogen (15cm Depth)*	kg/ha	137	106	137	-	-	-
Anaerobically Mineralisable N*	µg/g	112	80	106	-	-	-
Organic Matter*	%	5.8	4.0	5.8	-	-	-
Total Carbon*	%	3.4	2.3	3.4	-	-	-
Total Nitrogen*	%	0.26	0.19	0.27	-	-	-
C/N Ratio*		12.9	12.1	12.5	-	-	-
Anaerobically Mineralisable N/Total N Ratio*	%	4.3	4.2	3.9	-	-	-

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	R McIraith	**Lab No:**	2664575 shvmpv1
Address:	PO Box 866 Christchurch 8140	**Date Received:**	27-Jul-2021
		Date Reported:	02-Aug-2021
		Quote No:	
		Order No:	
		Client Reference:	Parker Property 2021 LP
		Add. Client Ref:	49A Freyberg Avenue, Kurow
		Submitted By:	Phil Johnston

Analyst's Comments

It was noted on the request form that the sample depth for the soil samples "2", "3" & "4" was 240mm.

Samples 2-4 Comment:
The medium or optimum range guidelines shown in the histogram report relate to sampling protocols as per Hill Laboratories' crop guides and are based on reference values where these are published. Results for samples collected to different depths than those described in the crop guide should be interpreted with caution.
For pastoral soils, the medium ranges are specific for a 75mm sample depth, but if a 150mm sampling depth is used the nutrient levels measured may appear low against these ranges, as nutrients are typically more concentrated in the top of the soil profile. These soil profile differences are altered upon cultivation or contouring.

Samples 2-4 Comment:
While soil Mg MAF levels of 8-10 (0.4 - 0.6 me/100g) are sufficient for pasture production, soil levels of 25-30 (1 - 1.6 me/100g) are required to ensure adequate Mg content in pasture for animal health (greater than 0.22% in the herbage).

Samples 2-4 Comment:
The Potentially Available Nitrogen (kg/ha) test above assumes the sample is taken to a 15 cm depth. If the depth is 7.5 cm, then the result reported above should be divided by two.
To calculate Potentially Available Nitrogen (as kgN/ha) for other sample depths use the reported Anaerobic Mineralisable Nitrogen (AMN) result in the following equation:
AN (kg/ha) = AMN (µg/g) x VW (g/ml) x sample depth (cm) x 0.1
Note that the AN and AMN results reported include the readily available Mineral N (NH4-N and NO3-N) fraction, which is typically quite low.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Sample Registration*	Samples were registered according to instructions received.	-	2-4
Soil Prep (Dry & Grind)*	Air dried at 35 - 40°C overnight (residual moisture typically 4%) and crushed to pass through a 2mm screen.	-	2-4
pH	1:2 (v/v) soil:water slurry followed by potentiometric determination of pH. In-house.	0.1 pH Units	2-4
Olsen Phosphorus	Olsen extraction followed by Molybdenum Blue colorimetry. In-house method.	1 mg/L	2-4
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units	2-4
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units	2-4
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units	2-4
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	2 MAF units	2-4
Potentially Available Nitrogen*	Determined by NIR, calibration based on Available N by Anaerobic incubation followed by extraction using 2M KCl followed by Berthelot colorimetry. (Calculation based on 15cm depth sample). Note that any Mineral N present is included in the AN/AMN result reported.	10 kg/ha	2-4
Anaerobically Mineralisable N*	As for Potentially Available Nitrogen but reported as µg/g.	5 µg/g	2-4

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Certificate of Analysis

Client:	R McIraith	**Lab No:**	2664575 shvmpv1
Address:	PO Box 866 Christchurch 8140	**Date Received:**	27-Jul-2021
		Date Reported:	02-Aug-2021
		Quote No:	
		Order No:	
		Client Reference:	Parker Property 2021 LP
		Add. Client Ref:	49A Freyberg Avenue, Kurow
		Submitted By:	Phil Johnston

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Organic Matter*	Organic Matter is 1.72 x Total Carbon.	0.2 %	2-4
Total Carbon*	Determined by NIR, calibration based on Total Carbon by Dumas combustion.	0.1 %	2-4
Total Nitrogen*	Determined by NIR, calibration based on Total N by Dumas combustion.	0.04 %	2-4
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.01 me/100g	2-4
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.5 me/100g	2-4
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.04 me/100g	2-4
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.05 me/100g	2-4
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.1 %BS	2-4
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 %BS	2-4
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.2 %BS	2-4
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.1 %BS	2-4
CEC	Summation of extractable cations (K, Ca, Mg, Na) and extractable acidity. May be overestimated if soil contains high levels of soluble salts or carbonates. In-house.	2 me/100g	2-4
Total Base Saturation	Calculated from Extractable Cations and Cation Exchange Capacity.	5 %	2-4
Volume Weight	The weight/volume ratio of dried, ground soil. In-house.	0.01 g/mL	2-4

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 30-Jul-2021 and 02-Aug-2021. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Memorandum

TO:	James White
FROM:	Antoni Facey
DATE:	5 August 2022
SUBJECT:	**Transport Assessment of Proposed Subdivision 49A Freyberg Ave, Kurow**

We have been asked to prepare a Transport Assessment of the proposed 10 Lot residential subdivision of 49A Freyberg Avenue, Kurow. A Request for Information has been received from Waitaki District Council in response to the subdivision application submitted. The item of relevance to Transport in the RFI is reproduced below:

"1. Traffic Impact Assessment

Although the proposed access lot (Lot 12) complies with the technical requirements of the Plan in regard to formation, a Traffic Impact Assessment is needed to determine the impacts of the proposed development on the wider roading network. In particular, this assessment is needed to determine whether the design of the proposed development (including the access arrangement and additional traffic generation) will result in more than minor adverse effects on the safety and efficiency of the roading network, taking into account the existing layout of Freyberg Avenue. The assessment should also consider vehicle movements during the construction phase of the development and likely impact of construction vehicles."

This assessment will address those items identified in the RFI as requiring further consideration. Specifically;

- The effects on safety and efficiency of the development traffic on Freyberg Avenue and
- The effects of construction traffic movements on Freyberg Avenue.

Proposal

The development is shown below. Access to the residential lots is through a private Right of Way between two established residential properties. The RoW is from a well-established cul-de-sac turning head. The RoW will have a legal width of 6 metres and a carriageway width of 5 metres. The carriageway will be confined by nib kerbs on each side.

Existing fences line the boundary of the access.

As can be seen on the aerial photograph, Lots 8 and 9 already have buildings but only one dwelling established so the nett increase will be 9 residential Lots.

Existing roading environment

Freyberg Avenue is a cul-de-sac with a carriageway width of approximately 10 metres with a reserve width of 20 metres. The road is flat with a single right angled curve.

The carriageway is confined by kerb and channel. There are no footpaths or defined cycle facilities. Streetlights are erected along the full length of the road.

There are currently 43 dwellings on Freyberg Avenue with 5 vacant Lots.

Mobile Roads notes that traffic volume based on WDC RAMM data is 104 vpd. The road was constructed in 1983 and the latest reseal was January 2009.

The approximate development site is shaded in red below.

During a site visit, it was observed that there was no on street parking demand on Freyberg Avenue at that time.

Crash data

The shaded area below was searched for crashes in the NZTA CAS Database between 2013 and 2022. No reported crashes were identified in the 10 year period. This suggests that there are no underlying safety concerns.

Traffic generation

The additional 9 potential dwellings will generate additional traffic. Estimating the likely traffic generation rates of these sites requires site-specific analysis. There is little published information about traffic generation from residential units in small townships like Kurow.

The AEE (page 23) has identified published data showing between 5 and 8 vehicle trips per day is appropriate for residential properties in these areas. I agree with these figures as a reasonable first assumption, but consider further refinement is appropriate.

It is assumed that owners of the existing properties are a mix of retired farmers and others who want to remain in the area on a residential property and some could be holiday homes with intermittent occupancy.

The traffic volume on Freyberg Avenue from MobileRoads is 104 vpd. Given that there are currently 43 dwellings on Freyberg Avenue, the average traffic generation from these properties is 2.4 movements per day per dwelling.

While it is possible to argue that a similar traffic generation could be expected from any new dwellings, it is considered that a more conservative 5 vehicle trips per day would be appropriate. Considering this is double the current trip generation from properties on Freyberg Avenue, it is likely to be a conservative assumption.

Therefore, it is estimated that an additional 45 vpd will be added to the traffic volume on Freyberg Avenue as a result of the subdivision.

Access arrangement

The access will be 6 metres wide with a 5 metre carriageway. It is noted that Rule 14.4.2.4.8(c) asks for a passing bay every 50m (widening to 5.5m for a length of 10m), and the proposed access does not include such a bay. Notwithstanding, the proposed formed width is sufficient for two vehicles to pass each other in opposite directions with care without the need for passing bays. Since the kerb on each side is a nib kerb/dish channel, it allows drivers to drive on the kerbs also to increase the available width if they are driving a wider vehicle or are less confident drivers.

The proposed access is different to any of the categories for Suburban Roads in NZS 4404 “Land Development and Subdivision Infrastructure” but not inconsistent. The 10 residential units suggest that the appropriate category of road is the E10.

PLACE CONTEXT			DESIGN ENVIRONMENT				LINK CONTEXT					TYPICAL PLAN AND CROSS SECTION	FIGURE NUMBER
Area	Land use	Local attributes	Locality served	Target operating speed (km/h)	Min. road width (m)	Max. grade	Pedestrians	Passing, parking, loading, and shoulder	Cyclists	Movement lane (excluding shoulder)	Classification	SEE APPENDIX E FOR LARGER VERSION OF FIGURES	
Notes	See 3.2.4, table 3.1 & 3.3.1.6	See table 3.1	See table 3.1	See 3.3.5	See 1.2.2, 3.3.1.9, & 3.4.16		See 3.3.11	See 3.3.6 & 3.3.1.4	See 3.3.1.5, 3.3.7, & 3.3.11.2	See 1.2.2, 3.3.1.1, 3.3.1.2, 3.3.1.3, 3.3.1.10, 3.3.11.3	See 3.2.4.2 & 3.3.16 (Typical max. volumes)		
	Live and play	Side or rear service access	Up to 100 m in length between streets, 1 to 20 lots	10	6	16%	Shared (in movement lane)	Allow for passing up to every 50 m	Shared (in movement lane)	2.75 - 3.00	Lane (~ 200 vpd)		E10

The carriageway proposed for the access is between 5-5.65 metres which exceeds the NZS 4404 recommendation of 2.75-3 metres. This enables pedestrians and cyclists to use the carriageway to walk along the seal rather than a grass berm which is easier when taking a rubbish bin to the kerb. The relatively low traffic volume using the access and the increased seal width allows the cyclists and pedestrians to share the carriageway safely with vehicle drivers.

Note that cyclists and pedestrians will also have an alternative access to the Racecourse walkways.

NZS 4404 suggests this combination of dimensions is capable of accommodating up to 200 vpd.

Due to the increased width, a passing bay is not required.

Given that the access exceeds the minimum standards expected by NZS 4404, it is considered that the access will operate safely and efficiently.

Development effect on Freyberg Avenue.

The additional residential Lots will add an extra 45 vpd to the existing 104 vpd on Freyberg Avenue. This is a 43% increase in traffic.

For guidance, NZS 4404 can be consulted. The appropriate category of road for a road such as Freyberg Avenue is E12 reproduced below.

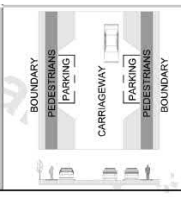
	Live and play	Primary access to housing	1 to 200 du	40	15	12.5%	1.5 m one side or 1.5 m each side where more than 20 du or more than 100 m in length	Shared parking in the movement lane up to 100 du, separate parking required over 100 du	Shared (in movement lane)	5.5 - 5.7	Local road (~ 2,000 vpd)		E12

Table 3.2 (continued)

Freyberg Avenue exceeds all of the design expectations other than providing the separate footpath. The AEE (page 24) describes the reasons for the WDC preferring walkable grass berms for pedestrians on Freyberg Avenue. It is noted that this approach is consistent throughout Kurow with a formed footpath only adjoining SH 83 and on Wynyard Street. Having no footpaths on the low volume local roads assists

with creating the semi rural environment of a small town and I consider this an appropriate solution.

The design standards of Freyberg Avenue are closer to the E13 category.

Given that the carriageway exceeds the expectations of the E12 with a 10 metre wide carriageway, it can be assumed that the carriageway can be expected to carry at least 2000 vpd. The expected 149 vpd can easily be accommodated within the existing carriageway.

The evident low level of on street parking demand will not change as a result of this subdivision.

Cyclists will be able to share the carriageway safely with the small amount of traffic as they do now.

Pedestrians from the development will use the berms when necessary as pedestrians currently do now.

Visibility along Ferguson Street from the Freyberg Avenue approach is good. The view in both directions is unrestricted once past the properties on the intersection.

Construction traffic

There will be two periods of construction;

- Construction of the subdivision
- Construction of the dwellings

Construction of the subdivision will occur first over a relatively short timeframe. The construction will be typical of any other site with heavy machinery being brought to site on trailers while trucks will manage the delivery of materials to site and removal of spoil.

Staff are likely to park both within the site and on the street.

Construction is expected to be completed within a 6 month period.

The construction will need to be controlled by a temporary traffic management plan to be approved by WDC. The plan will need to include consideration on where contractors staff will park their private vehicles to ensure the cul-de-sac turning head is kept clear for vehicles including the contractors trucks to be able to turn.

Any damage caused by the vehicles above general wear and tear on the carriageway is typically covered with a standard clause requiring the contractor to repair damage they may cause.

It is expected that construction traffic from the relatively small subdivision will be able to mix with the existing 104 vpd on Freyberg Avenue with no safety concerns and no effect on the capacity of the road.

Construction of the individual houses will be over a longer period because each house will be built individually but each house will have less impact than the initial subdivision construction. House construction requires delivery of specific items on trucks to use in the building process. These deliveries are not regular.

Because the houses are being constructed, building contractors typically park on site at the house building so on street parking is less likely to occur. Vehicles will be parked on the Lot where the building is occurring.

The regular building contractors vehicles are typically utility vehicles or vans similar to private vehicles and are expected on residential roads such as Freyberg Avenue. There is no reason to expect that there would be any effect on safety or efficiency during the building process.

Conclusion

I am of the opinion that the traffic generated by the completed subdivision and the construction traffic for the subdivision and dwellings can be accommodated safely and efficiently in the Freyberg Avenue traffic flow.

The private ROW access for the subdivision is appropriate for the scale of the development.

It is my opinion that approving the subdivision will have traffic and transportation effects that are no more than minor.

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