

Memo

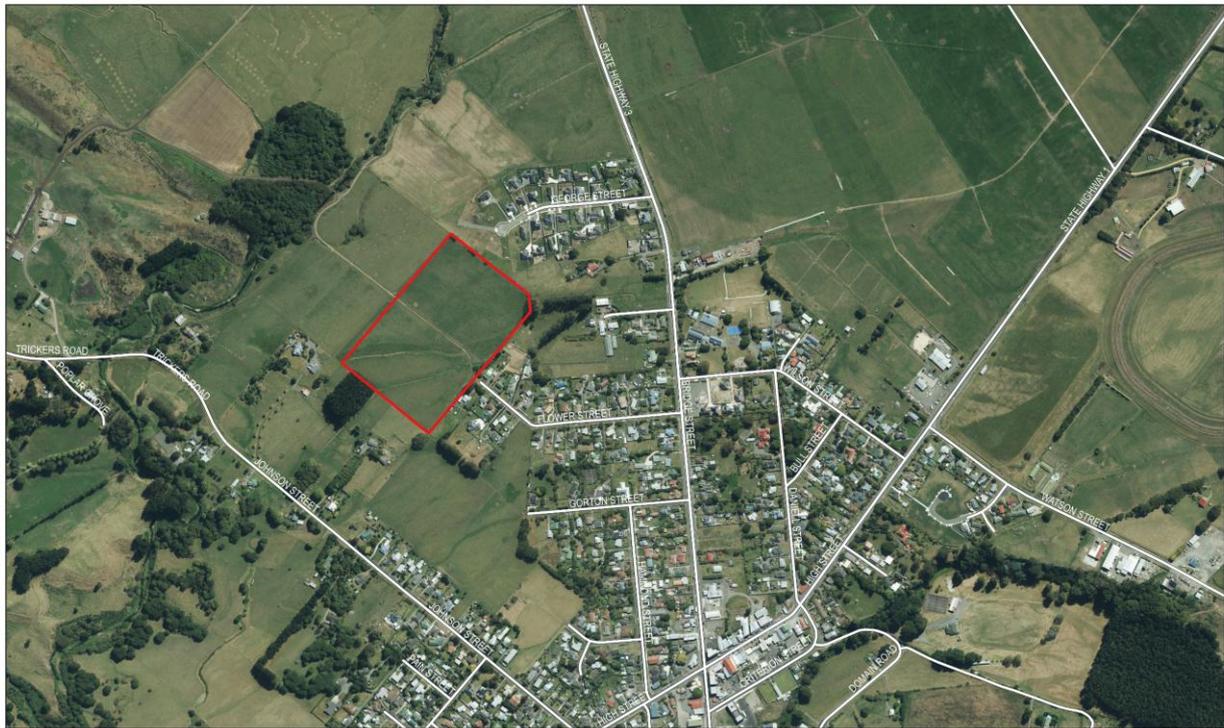
To: Tiffany Gower From: Jon Bell  
 Cc: Date: 19 February 2026  
 Subject: BUL03 Growth Area Flood Risk

Rangitikei District Council are considering a District Plan Change to rezone land in an area referred to as BUL03 to 'Residential'. This memorandum assesses the suitability of the rezoning of this land in terms of its flood risk.

1 THE SITE

The BUL03 Growth Area covers a site of approximately 7.096 hectares in northwestern Bulls. The site is found at the end of Flower Street, at its northeastern boundary is shared with properties at the end of George Street. The location of BUL03 can be seen in Figure 1.

Figure 1 – Location of BUL03 Growth Area



Rangitikei District Council  
 BUL03 Growth Area - Flood Risk  
 Location

Legend  
 Drainage channels & water races  
 BUL03 Area

Paper Size A3  
 0 70 140 210 280 m  
 Scale: 1 : 5787 (A3)



Job Number | 25095  
 Revision | 1  
 Date | 14/11/2025

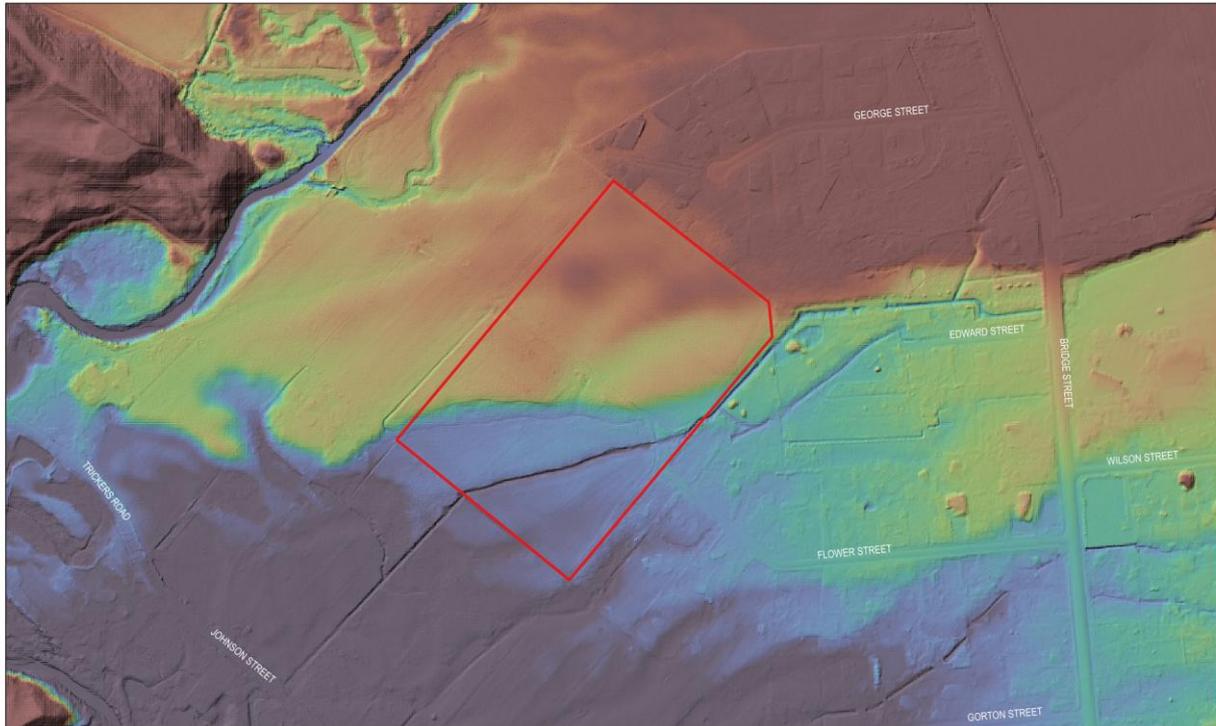
AERIAL IMAGERY IS SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.  
 THIS MAP IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.

Christchurch, Wellington, Blenheim, Ashburton www.e2environmental.com

Ground levels vary across the site from approximately 58.4 m (NZVD 2016) on the northeastern boundary to 54.1 m on the southwestern boundary. Whilst the levels generally fall to the

southwest, it is noticeable that there is a significant change in levels associated with the terrace that can clearly be seen in Figure 2.

Figure 2 – Topography of BUL03 Growth Area



Rangitikei District Council  
BUL03 Growth Area - Flood Risk  
BUL03 Topography from LIDAR

Legend  
Elevation (m NZVD2016)  
59  
54

Paper Size A3  
0 30 60 90 120 m  
Scale: 1 : 2893 (A3)



Job Number 25095  
Revision 1  
Date 14/11/2025

AERIAL IMAGERY IS SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE. THIS MAP IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.

Christchurch, Wellington, Blenheim, Ashburton www.e2environmental.com

## 2 BACKGROUND INFORMATION

In undertaking this assessment, the following information has been relied upon:

- 0.5% AEP<sup>1</sup> flood depth results from 2017 modelling, provided by Horizons Regional Council
- 1% and 0.5% AEP flood depth and velocity results from 2008 modelling, provided by Horizons Regional Council
- Stormwater Rapid Flood Hazard Assessment<sup>2</sup>
- Subdivision and Engineering Report<sup>3</sup>.

<sup>1</sup> Annual Exceedance Probability (AEP) refers to the likelihood that a specific flood event will be equalled or exceeded in any given year, expressed as a percentage. For example, a 1% AEP event has a 1 in 100 chance of occurring in any year.

<sup>2</sup> Stage 1 Status Quo Assessment, Stormwater Rapid Flood Hazard Assessment, Workshop Notes Summary, GHD

<sup>3</sup> Stormwater Re-design for Hydraulic Neutrality at George Street Bulls, Rev 2. 11/03/2025, Subdivision and Engineering Ltd.

### 3 MODELLED FLOOD RISK

The 0.5% AEP (200-year) flood from the Tutaenui Stream has been modelled by Horizons Regional Council. The results of this modelling, undertaken in 2017, can be seen in Figure 3 which shows the modelled flood depths across the BUL03 Growth Area.

As Figure 3 shows, approximately 75% of the site is shown as being inundated by flood waters in a 0.5% AEP event. Much of this flooding is associated with flows from the Tutaenui Stream, flowing in a generally south westerly direction across its floodplain. Additionally, there are flows associated with stormwater and the Henratty Drain that flow in a generally westerly direction.

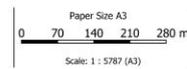
The modelled flood depths vary across the proposed growth area, up to a maximum of approximately 600mm in the western corner of the site.

*Figure 3 – 0.5% AEP Modelled Flood Depths*



Rangitikei District Council  
BUL03 Growth Area - Flood Risk  
0.5% AEP Modelled Flood Depths

Legend	
Flood depth (m)	Color
<= 0.20	Light Yellow
0.20 - 0.50	Yellow-Green
0.50 - 1.00	Light Blue
1.00 - 1.50	Medium Blue
> 1.50	Dark Blue



Paper Size A3  
Job Number 25995  
Revision 1  
Date 14/11/2025

AERIAL IMAGERY IS SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.  
THIS MAP IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.

Christchurch, Wellington, Blenheim, Ashburton www.e2environmental.com

#### 4 HORIZONS REGIONAL COUNCIL – ONE PLAN POLICIES

In the Information Sheet “Flood Hazards and the One Plan<sup>4</sup>” Horizons Regional Council provides information to support Territorial Authorities in giving effect to the natural hazards policies in the One Plan. In this it is stated that “subdivision in flood prone areas without flood protection for at least a 0.5% AEP should be avoided.” Indeed, the information sheet includes a table with examples which explicitly cites Bulls as an example area where subdivision in flood prone areas is not only discouraged but avoidance is to be strongly advocated (see Figure 4).

Figure 4 – Examples from HRC’s “Flood Hazards and the One Plan”

EXAMPLE		OCCUPIED STRUCTURE		NON-HABITABLE STRUCTURE		SUBDIVISION
		NEW	INCREASE SCALE	NEW	INCREASE SCALE	NEW
FLOODWAYS	Mākīrīkiri, Moutoa, Reids Line, Taonui Basin.	Avoid	Avoid	Avoid (unless functional necessity)	Avoid (unless functional necessity)	Avoid
INUNDATED IN A 0.5% AEP (1:200 YR) FLOOD EVENT	Urban ≥ 0.5% AEP flood protection, e.g. Palmerston North, Balgowie industrial.	Allow	Allow	Allow	Allow	Allow
	Urban ≥ 1.0% AEP ≤ 0.5% AEP flood protection, e.g. Lower Manawatū Scheme, Ashhurst.	Allow (with floor level and access mitigation)	Allow (minor extensions or larger extensions with floor level and access mitigation)	Allow (recommended floor level)	Allow (recommended floor level)	Discourage (advocate to avoid)
	Urban ≤ 1.0% AEP flood protection, e.g., Marton, Bulls, Ohakune.	Discourage (except in established residential areas with floor level and access mitigation)	Allow (minor extensions or larger extensions with floor level and access mitigation)	Allow (recommended floor level)	Allow (recommended floor level)	Discourage (strongly advocate to avoid)
	Rural ≥ 0.5% AEP flood protection	Allow	Allow	Allow	Allow	Allow
	Rural ≥ 1.0% AEP ≤ 0.5% AEP flood protection	Allow (with floor level and access mitigation)	Allow (minor extensions or larger extensions with floor level and access mitigation)	Allow (recommended floor level)	Allow (recommended floor level)	Discourage (advocate to avoid)
	Rural ≤ 1.0% AEP flood protection	Discourage (except with floor level and access mitigation)		Allow (recommended floor level)	Allow (recommended floor level)	Discourage (strongly advocate to avoid)

Horizons Regional Council have advised that:

“Horizons [One Plan](#) Policy [RPS-HAZ-NH-P10](#) (Policy 9-2) generally discourages new habitable buildings or extensions to existing habitable buildings in areas that are likely to be inundated during a 0.5% AEP flood event. Where the flood hazard cannot be avoided, Policy [RPS-HAZ-NH-P10](#) (Policy 9-2) states that the risk must be mitigated. Flood mitigation for habitable dwellings (including attached garages) includes having a finished floor level that includes reasonable freeboard of 500mm above the 0.5% AEP flood surface, and ensuring that there is safe access to and from the property during a flood event. Reasonable freeboard is considered for habitable

<sup>4</sup> <https://www.horizons.govt.nz/HRC/media/Media/One%20Plan%20Documents/Flood-Hazards-and-the-One-Plan.pdf>

*dwelling to be 500mm as per New Zealand Standard 4404:2010 – Land Development and Subdivision Infrastructure. This freeboard requirement is to account for factors which cannot be included in the model, such as waves and debris effects. If the water flow paths cannot be avoided, then Horizons recommends that the finished floor levels for habitable dwellings to be elevated to be 500mm above the 0.5% AEP surface. The finished floor level needs to be based on the original ground level prior to any land disturbance works. Safe egress and access will need to be easily achieved for habitable dwellings and workplaces. Access between habitable structures and an identified safe area, where safe evacuation may be carried out (preferably ground that will not be flooded), must be a safe wading zone in a 0.5% AEP flood event. This would normally be an access way that would not be covered by more than 0.5 m of water in a 0.5% AEP flood event, but the depth of the water will vary depending on the speed of the flood flow. Please note that as per the Standard, reasonable freeboard for a commercial and industrial buildings is a minimum height of 300mm and reasonable freeboard for non-habitable residential buildings and detached garages is a minimum height of 200mm.”*

## 5 POTENTIAL MITIGATION OF FLOOD RISK AT A SUBDIVISION SCALE

To meet the flood mitigation requirements of the One Plan across the whole growth area significant earthworks would be required. Indeed, to raise the ground levels, in the areas modelled as being flood prone to a level 500 mm above the 0.5% AEP flood level would require in excess of 35,000 cubic meters of fill.

This, however, would not be a feasible solution for the BULO growth area as the raising of land across the entire growth area would essentially remove this area of land from the Tutaenui Streams floodplain. This would have the effect of diverting and / or displacing flood waters that would then create or exacerbate flood risk to other nearby properties.

Whilst it is therefore not considered feasible to use 100% of the BULO3 growth area for residential development, it may be possible to develop part of the site if other parts are used for the mitigation or offsetting of flood risk.

To illustrate how this could potentially be achieved the outlined concept shown in Figure 5 has been developed. In this concept there would be no development on the lower terrace to the south of the site as this area is subject to the deepest flood waters and is also an important overland flow path for stormwater as well as overflows from the Henratty Drain. Much of the higher terrace could likely be developed if earthworks were undertaken to raise ground levels to an appropriate level above the 0.5% AEP flood level.

Additionally, earthworks could be undertaken to provide for the conveyance of flood flows from the north and along the western boundary of the site in the buffer area indicated in Figure 5. This buffer area has been assumed to be approximately 35 m wide based purely on examination of the modelled flood depths.

Figure 5 – Concept of Potential Flood Mitigation



Rangitikei District Council  
BUL03 Growth Area - Flood Risk  
Flood Mitigation Concept

Legend

Mitigation Option  
Flood Buffer / Channel

Developable Area

Paper Size A3  
0 30 60 90 120 m  
Scale: 1 : 2893 (A3)



Job Number 25095  
Revision 1  
Date 14/11/2025

AERIAL IMAGERY IS SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE. THIS MAP IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.

Christchurch, Wellington, Blenheim, Ashburton www.e2environmental.com

It is noted that these dimensions are provided purely for the consideration of this concept and would need to be subject to detailed design if this option were to be taken forward.

It is also noted that earthworks could potentially be undertaken on the lower terrace to provide additional volume for the detention or retention of flood waters if required to enable the concept. This area also has the potential to be used for the detention or retention of additional stormwater discharge associated with any residential development in the BUL03 area.

Under this concept approximately 2.7 ha of the BUL03 Growth Area could be made available for residential development.

## 6 NATIONAL POLICY STATEMENT FOR NATURAL HAZARDS (NPS-NH)

The National Policy Statement for Natural Hazards (NPS-NH) took effect on 15 January 2026. The NPS-NH takes a risk based proportionate approach to managing natural hazards in relation to the use, subdivision and development of land. It states that *“natural hazard risk associated with subdivision, use or development must be assessed using:*

- a. The likelihood of a natural hazard event occurring, in accordance with Figure 6; and
- b. The consequence of a natural hazard event for life and property, in accordance with Figure 8”

Figure 7 – Risk Matrix (reproduced from [National Policy Statement for Natural Hazards 2025: December 2025 | Ministry for the Environment](#))

		Likelihood Level						
		Almost Certain	Very Likely	Likely	Possible	Unlikely	Rare	Very Rare
Consequence Level	ARI (years)	up to 10	10-20	20-50	50-100	100-500	500-5000	> 5000
	AEP	10% or more	10% to 5%	5% to 2%	2% to 1%	1% to 0.2%	0.2% to 0.02%	< 0.02%
	Catastrophic	Very High	Very High	Very High	High	Medium	Medium	Medium
	Major	Very High	Very High	High	High	Medium	Medium	Medium
	Moderate	High	High	High	Medium	Medium	Low	Low
	Minor	Medium	Medium	Medium	Medium	Low	Low	Low
	Negligible	Low	Low	Low	Low	Low	Low	Low

Figure 6 – Likelihood Table (reproduced from [National Policy Statement for Natural Hazards 2025: December 2025 | Ministry for the Environment](#))

Likelihood level	Annual exceedance probability (AEP)	Average recurrence interval (ARI) or 'return period'
Almost certain	10% or more	Up to and including 10 years
Very likely	10% to 5%	Over 10 and up to and including 20 years
Likely	5% to 2%	Over 20 and up to and including 50 years
Possible	2% to 1%	Over 50 and up to and including 100 years
Unlikely	1% to 0.2%	Over 100 and up to and including 500 years
Rare	0.2% to 0.02%	Over 500 and up to and including 5,000 years
Very rare	less than 0.02%	More than 5,000 years

*Figure 8 – Consequence Table (reproduced from [National Policy Statement for Natural Hazards 2025: December 2025 | Ministry for the Environment](#))*

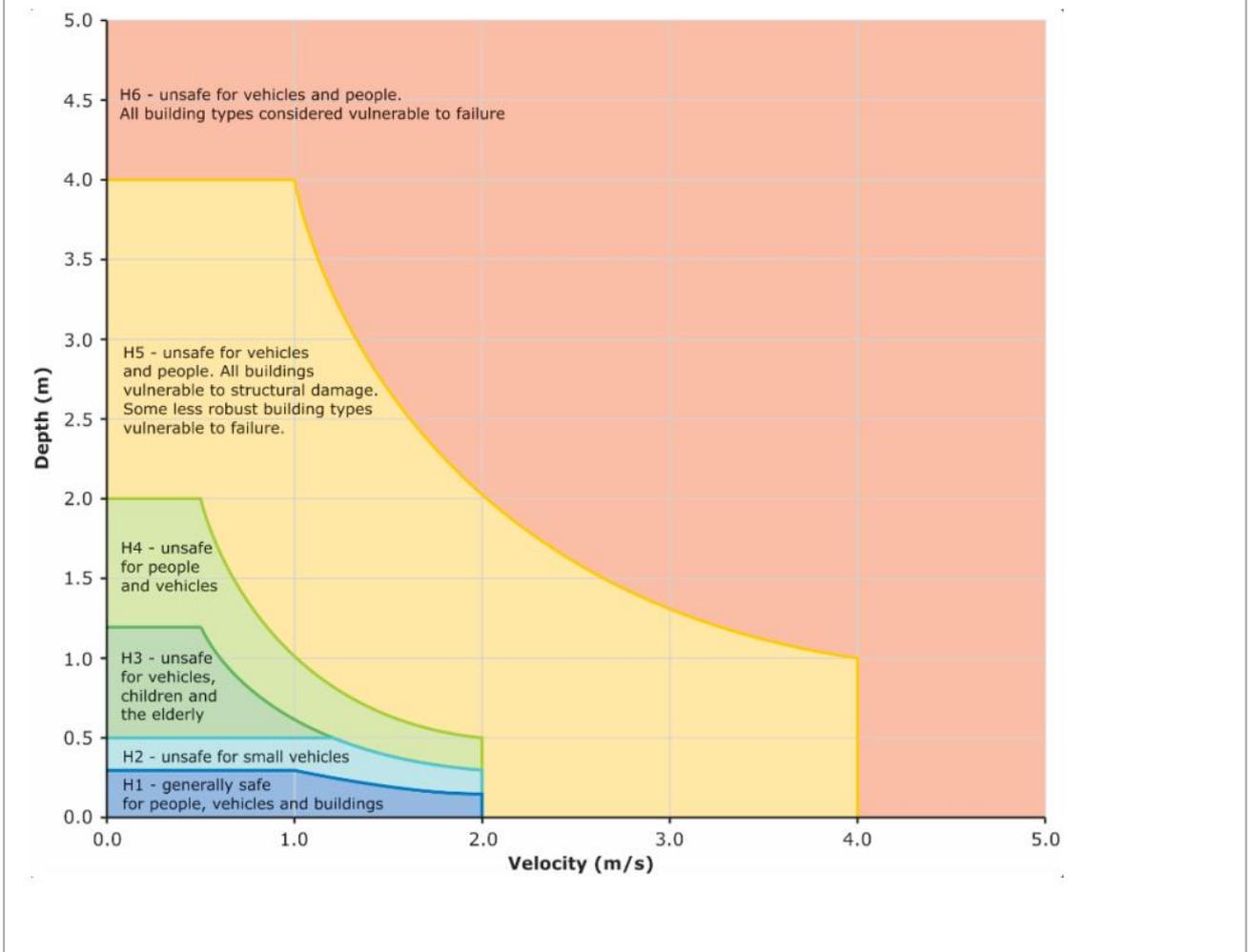
Consequence level	Damage to property	Potential for injury or fatalities
Catastrophic	Severe damage to land and building(s), potential for collapse or total destruction of structures. Building(s) need to be demolished, rebuilt or relocated.	High threat to life safety, with probable fatalities and/or critical injuries.
Major	Major damage to land and building(s), including structural damage. Loss of use and substantial repair required.	Unsafe for people, with potential for many injuries, or critical injuries and/or fatalities.
Moderate	Some damage to land and non-structural damage to building(s). Limited loss of use, repairs required.	Unsafe for people, with potential for injuries, although expected to be minor.
Minor	Minor damage to land and building(s). No loss of use, minimal repairs required.	Isolated minor injuries possible.
Negligible	No loss of use, no building repairs required.	No injuries.

The Australian Rainfall and Runoff (ARR) Guidelines Book 6 – Flood Hydraulics (Coombes & Rosso, 2019) discusses flood hazard in terms of floodplain management. It states that *“the primary hazard is the result of a flood event that has the potential to cause damage or harm to the community.”* In this regard the magnitude of a flood hazard can be influenced by several factors, including:

- Depth of floodwaters;
- Velocity of floodwaters;
- Combination of depth and velocity of floodwaters;
- Isolation during a flood;
- Effective warning time; and
- Rate of rise of floodwater

The ARR suggests that the Combined Flood Hazard Curves (Smith, Davey, & Cox, 2014), shown in Figure 9, can be used as a general classification of flood hazard on a floodplain.

Figure 9 – Combined Flood Hazard Curves (Smith et al., 2014)



The combined curves in Figure 9 are divided into hazard classifications that relate to specific vulnerability thresholds as described in Table 1. The limits for these classifications are shown in Table 2.

*Table 1. Combined Flood Hazard Curves - Vulnerability Thresholds (Smith et al., 2014)*

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings
H2	Unsafe for small vehicles
H3	Unsafe for vehicles, children and the elderly
H4	Unsafe for vehicles and people
H5	Unsafe for vehicles and people. All buildings subject to structural damage. Some less robust buildings subject to failure
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

*Table 2. Combined Flood Hazard Curves - Vulnerability Thresholds Classification Limits (Smith et al., 2014)*

Hazard Vulnerability Classification	Limiting Still Water Depth – D (m)	Limiting Velocity – V (m/s)	Classification Limit (D and V in combination)
H1	0.3	2.0	$D*V \leq 0.3$
H2	0.5	2.0	$D*V \leq 0.6$
H3	1.2	2.0	$D*V \leq 0.6$
H4	2.0	2.0	$D*V \leq 1.0$
H5	4.0	4.0	$D*V \leq 4.0$
H6	-	-	

Both the NPS and the ARR define vulnerability or consequences in terms of the risks to property and to people. These definitions are compared in Table 3, which suggests the ARR’s Hazard Vulnerability Classifications can be considered to be analogous to the Consequence Levels as defined by the NPS-NH.

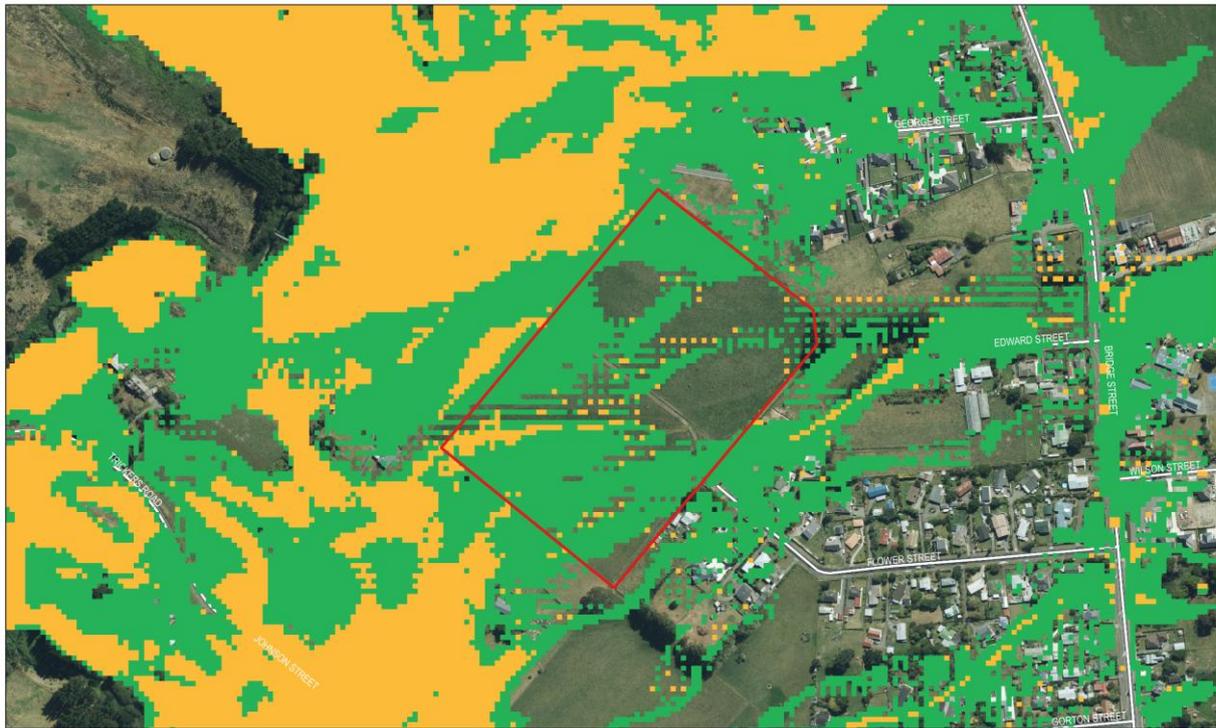
*Table 3. Comparison of vulnerability / consequences as defined in the NPS-NH and ARR*

Consequence Level	NPS-NH		ARR	
	Damage to Property	Potential for injuries or fatalities	Hazard Vulnerability Classification	Description
Catastrophic	Severe damage to land and building(s), potential for collapse or total destruction of structures. Building(s) need to be demolished, rebuilt or relocated.	High threat to life safety, with probable fatalities and/or critical injuries.	H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.
Major	Major damage to land and building(s), including structural damage. Loss of use and substantial repair required.	Unsafe for people, with potential for many injuries, or critical injuries and/or fatalities.	H4 & H5	H4 - Unsafe for vehicles and people H5 - Unsafe for vehicles and people. All buildings subject to structural damage. Some less robust buildings subject to failure
Moderate	Some damage to land and non-structural damage to building(s). Limited loss of use, repairs required.	Unsafe for people, with potential for injuries, although expected to be minor.	H3	Unsafe for vehicles, children and the elderly
Minor	Minor damage to land and building(s). No loss of use, minimal repairs required.	Isolated minor injuries possible.	H2	Unsafe for small vehicles
Negligible	No loss of use, no building repairs required.	No injuries.	H1	Generally safe for vehicles, people and buildings

### 6.1 0.5% AEP (200 year) Flood Risk

As per Figure 6, the likelihood of a 0.5% AEP flood event is considered to be ‘possible.’ The flood model results provided by Horizons Regional Council have been used to classify the consequences of flooding in accordance with the definitions in Tables 2 & 3. This classification has then been used to map the flood risk in accordance with the NPS-NH classifications in Figure 7. The flood risk classifications in this scenario are shown in Figure 10.

Figure 11 – Flood Risk Classification, Unlikely Scenario



Rangitikei District Council  
BUL03 Growth Area - Flood Risk  
Flood Risk associated with an 'Unlikely' (0.5% AEP) event

Legend  
200yr ARR Risk Classification  
Low  
Medium

Paper Size A3  
0 30 60 90 120 m  
Scale: 1 : 2893 (A3)



Job Number 25095  
Revision 1  
Date 29/01/2026

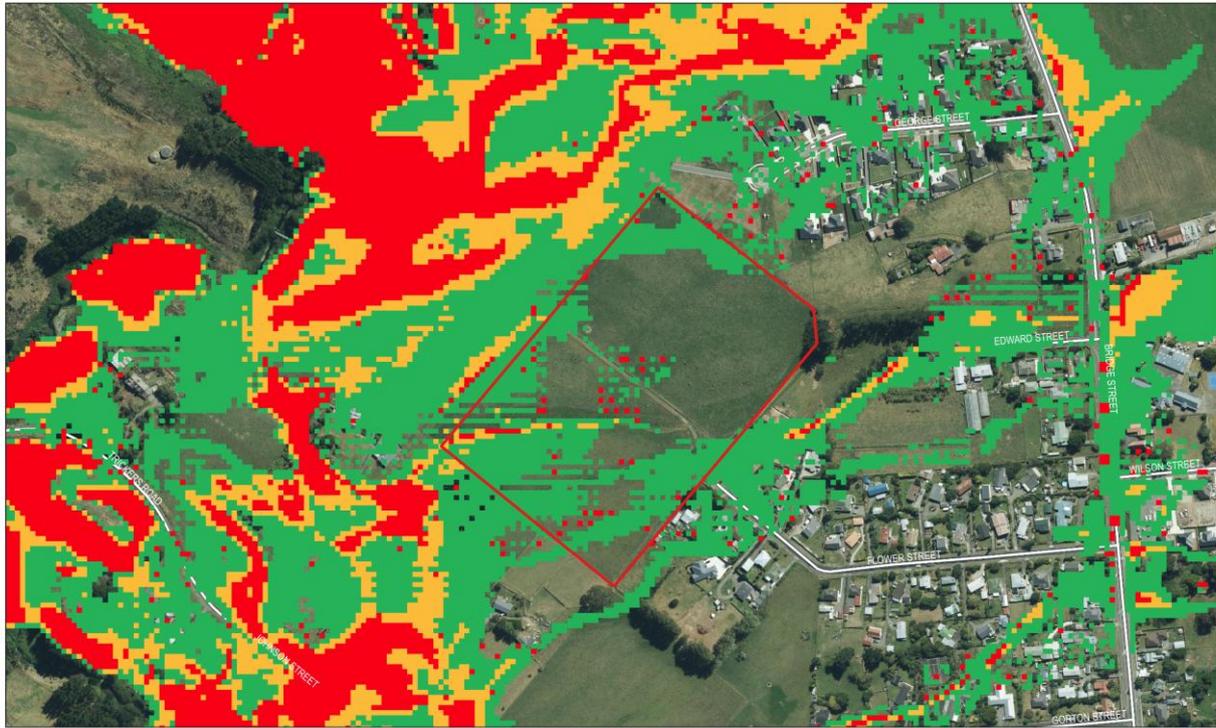
AERIAL IMAGERY IS SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE. THIS MAP IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.

Christchurch, Wellington, Blenheim, Ashburton www.e2environmental.com

### 6.2 1% AEP (100 year) Flood Risk

As per Figure 6, the likelihood of a 1% AEP flood event is considered to be ‘unlikely.’ The flood model results provided by Horizons Regional Council have been used to classify the consequences of flooding in accordance with the definitions in Tables 2 & 3. This classification has then been used to map the flood risk in accordance with the NPS-NH classifications in Figure 7. The flood risk classifications in this scenario are shown in Figure 10.

Figure 12 – Flood Risk Classification, Possible Scenario



Rangitikei District Council  
BUL03 Growth Area - Flood Risk  
Flood Risk associated with a 'Possible' (1% AEP) event

100yr ARR Risk Classification  
■ Low  
■ Medium  
■ High

Paper Size A3  
 0 30 60 90 120 m  
 Scale: 1 : 2893 (A3)



Job Number: 25095  
 Revision: 1  
 Date: 29/01/2026

AERIAL IMAGERY IS SOURCED FROM THE LINZ DATA SERVICE AND LICENCED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE. THIS MAP IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY.

Christchurch, Wellington, Blenheim, Ashburton www.e2environmental.com

### 6.3 Flood Hazard Classification Discussion

The flood hazard has been classified in accordance with the definitions in the National Policy Statement – Natural Hazards for both a ‘Possible’ and ‘Unlikely’ event. More frequently occurring events have not been considered as they are unlikely to impact the developable area in the north of the site. More extreme events have also not been considered due to the lack of information about the likely impacts of these events.

As illustrated by Figures 10 & 11, the 0.5% AEP ‘unlikely’ event impacts a greater area of the site than the more commonly occurring 1% AEP ‘possible’ event. However, in both of these events the majority of the area defined as being at risk is considered to be a ‘low’ risk as defined by the NPS-NH.

As shown in Figure 11 there are a number of small areas within the BUL03 Growth area that have been classified as high risk. Other than those found at the toe of terrace in the western corner of the site, these isolated spots are likely to be due to ‘modelling noise’ rather than being an accurate representation of risk levels.

Overall, it can be seen that the risk associated with flooding across most of the BUL03 Growth area is defined as being 'low.'

## 7 SITE ACCESS

When considering the flood risk to the plan change area, an important consideration is access and egress to the site. It is anticipated that Flower Street would provide access to the site. To allow for this, the access road will need to cross the Henratty Drain which is managed by Horizons Regional Council as part of their Flood Control and Drainage Schemes.

It is likely that the access will need to incorporate a bridge or other crossing of the Henratty Drain. This crossing will need to be designed to ensure that it provides safe access and egress to / from the site in a 0.5% AEP flood, as well as being able to convey flood flows without causing them to back up in the drain increasing the flood risk to neighbouring properties. Whilst no work has been undertaken to confirm the conveyance requirements and/or required bridge sizes, the topography of the site suggests that such a structure should be able to be designed and constructed.

## 8 SUMMARY

Having undertaken a high-level review of the flood risk to the proposed BUL03 Growth Area, it has been found that it is likely feasible for part of the area to be used for residential development.

The growth area is affected by flooding as part of the floodplain of the Tutaenui Stream, and from stormwater that enters the site via the Henratty Drain.

There is extensive modelled flooding on the lower terrace, in the southern portion of the site. Due to the difficulties associated with the mitigation of flood risk in this area, options for residential development have not been considered further.

Modelled flood depths are shallower on the upper terrace, in the northern part of the site. The flooding shown in this area is at the edge of that attributable to the Tutaenui Stream floodplain. Ground levels in this area generally fall towards the southwest, meaning that there is an area of land in the northeast of the BUL03 Growth Area that is not shown to be inundated by flood waters.

It is feasible that part of the upper terrace could be used for residential development. This would require earthworks to be undertaken to ensure that levels would be above the 0.5% AEP flood level with an appropriate allowance for freeboard. Additionally, works would be required to ensure that flood flows from the Tutaenui Stream would be effectively conveyed without creating or exacerbating flood risk to neighboring properties. By undertaking these works, it is estimated that in the order of 2.7 ha of land could be used for residential development.

These are high-level estimates of the potential developable area in the BUL03 Growth Area. If a plan change is to be sought for this area it is recommended that the total areas of land available for development, and the required mitigations, are subject to a more detailed assessment. To inform such an assessment, it is likely that a 2-dimensional hydraulic model of the site would need to be

built, which would include inflows from the Tutaenui Stream (and its floodplain), as well as the Henratty Drain and local stormwater effects.

The flood risk to the BUL03 Growth area has been assessed against the risk matrix in the National Policy Statement – Natural Hazards and has been classified as low across most of the site.