

## Reach Summaries

### 1. Upper Ruamahanga – Reach 1

#### 1.1 Reach overview

The reach flows through Tararua Forest Park and is in a natural state with pools and rapids enclosed by diverse areas of native vegetation. This follows a narrow gravel-choked valley surrounded by steep bush-clad mountainous terrain.

This reach is located outside the existing Mt Bruce river management scheme.

A potential issue was identified that merits consideration as part of the FMP;

- Potential landslips occurring after an earthquake or severe storm event could result in damming of the river and have downstream consequences.

#### 1.2 Key locations in the reach

- No specific location identified.

#### 1.3 Development of reach specific options

This reach is generally in a natural state with high environmental value. It was proposed to support objectives to maintain natural character of this reach without active management activities.

Monitoring of this reach after earthquakes and severe storm events to identify potential adverse effects (may also aid in predicting future sediment supply) is suggested.

### 2. Mount Bruce – Reach 2

#### 2.1 Reach overview

In this area, the river remains partially contained within the semi enclosed flat valley floor. The formative influence of the river remains clearly apparent along adjacent terraces aligned in a north-south direction beyond the main channel of the river.

The channel width is inconsistent within the reach and there is no design corridor or buffer. The current river management approach adopted in this reach, downstream of the SH2 Bridge is reactive and responds to requests from landowners for specific erosion control measures.

The current level of service is very low (although not defined) and this reflects the nature of the reach, the limited infrastructure at risk and the demand from local landowners. This area is funded on a 50/50 basis where the owner requiring work carried out pays for half the work and half comes from the GWRC general rate contribution. The scheme funding of this reach is not consistent with the funding arrangement for all other scheme management funding, within the FMP area, where funding is split between the GWRC general rate (up to 50%) and a communal local share funded by all river ratepayers.

#### 2.2 Key locations in the reach

- State Highway 2
- High value remnant native vegetation

#### 2.3 Development of reach specific options

It is considered that maintaining the similar level of service within the reach to current level is appropriate.

It is considered important to recognise and protect areas where native vegetation is identified as high value.

Promote the opportunity to raise awareness of hazards to home and business owners (several houses and other building types located within erosion study area, including stock access bridges across the river).

Development of updated erosion hazard mapping to aid planning control was identified generally, across the reaches, as a tool to consider.

Design lines are not established for this reach and the need for them is limited when the level of service is very limited.

Recommended that should leave as it is with no active management however, native vegetation on opposite bank of Dunvegan Forest RAP needs to be investigated as to its ecological value.

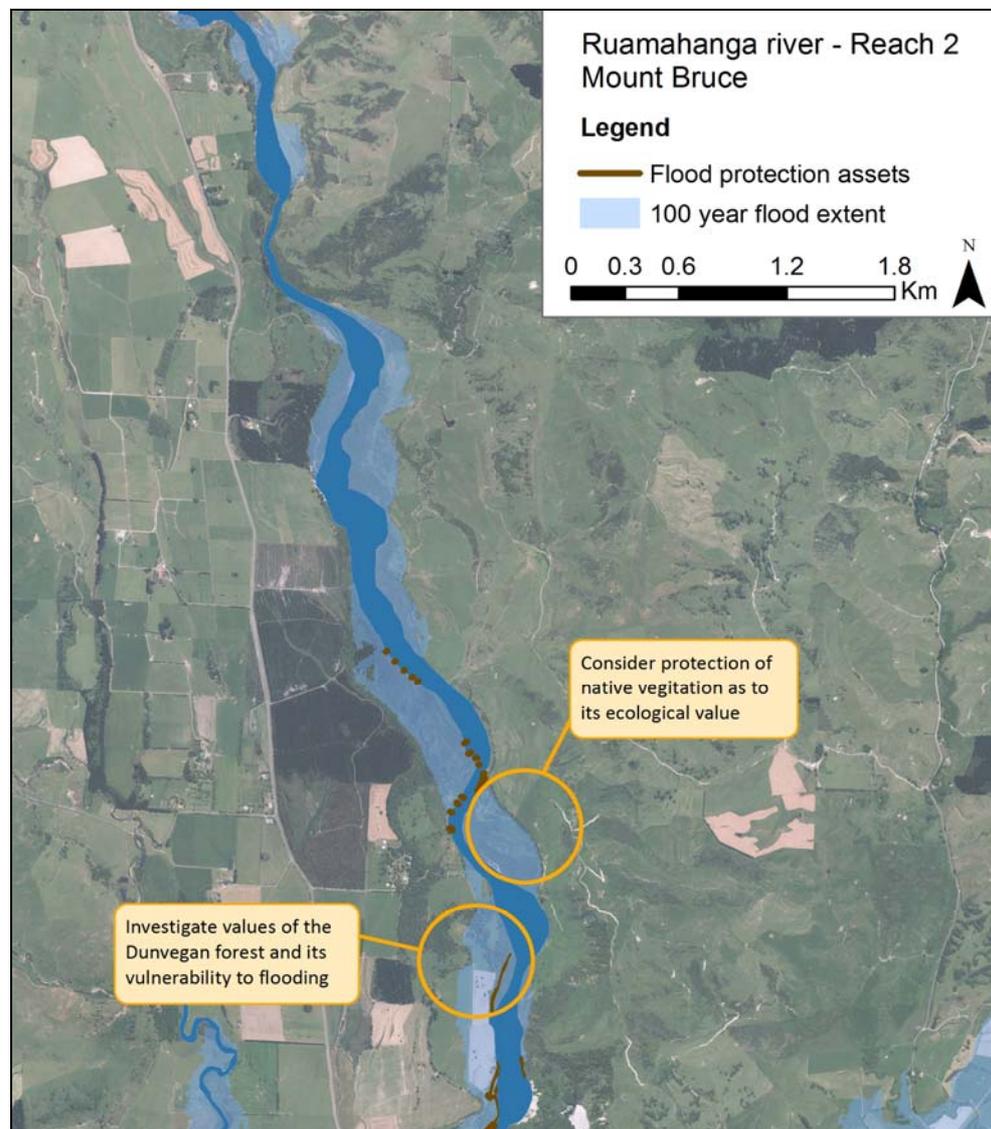


Fig. 1: Floodplain management options for the Mount Bruce reach.

### **3. Hidden Lakes – Reach 3**

#### **3.1 Reach overview**

This reach undergoes a transition from a semi-enclosed channel in the upper valley into the broader open character of the Masterton Plains. As the river continues south, the channel increases in width and begins to form a more distinctive braided form. Gradient of river changes around Hidden Lakes and gets steeper from that point.

There are concerns regarding the erosion occurring at toe of Hidden Lakes escarpment. Slip on true left bank is difficult to mitigate, however GWRC monitor the slip through topographical survey and visual inspection of the toe.

Most of the gravel is coming from the valley floor (river bank and river bed) rather than the upper slopes of the catchment headwaters. Severe flood events will release the gravel which is currently ‘tied up’ in vegetated areas.

#### **3.2 Key locations in the reach**

- Hidden Lakes
- Double Bridges

#### **3.3 Development of reach specific options**

Hidden lakes represent high cultural and ecological values and needs to be prioritised for protection. The river needs to be kept away from left hand bank to minimise erosion potential at the toe. Current operational channel maintenance recognises the importance of the Hidden Lakes slip and maintain channel to minimise effects, where possible, and this will continue. Further recognition of the value placed on this site can be achieved through the FMP process to identify what level of priority should be given to this site.

The design lines, which currently terminate at Hidden Lakes should be extended upstream by an appropriate distance of perhaps up to 200m to guide future channel management in this area.

Design fairways as a key management tool should be continued and options explored to strengthen buffer areas. Review of design lines to ensure they remain appropriate.

A relatively low level of service is appropriate for the assets that are being protected.

Improved understanding of the risk associated with the Rail Bridge and Road Bridge should be developed, in conjunction with KiwiRail and Masterton District Council.

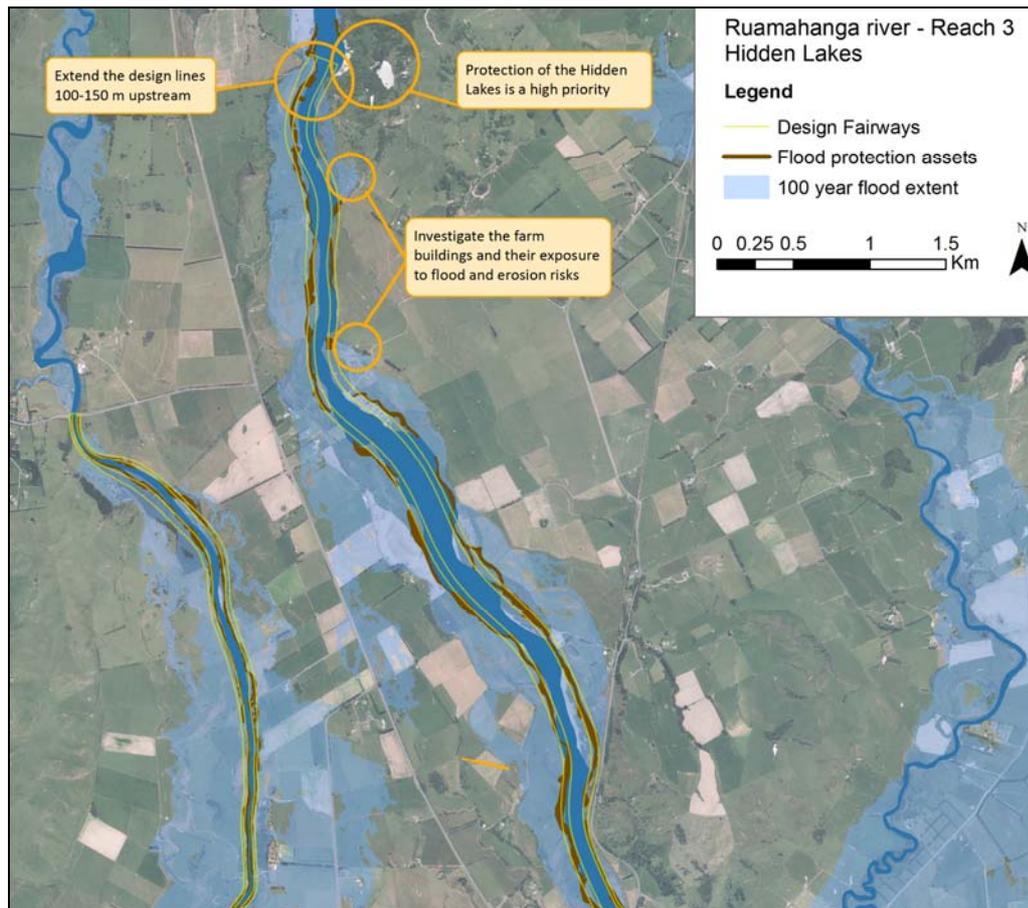


Fig. 2: Floodplain management options for the Hidden Lakes reach.

## 4. Double Bridges to Te Ore Ore – Reach 4

### 4.1 Reach overview

This reach continues a semi-braided river in character which becomes progressively more channelised through the Wairarapa Plains along the western toe of Te Ore Ore. The confluence with the Kopuaranga River occurs midway along this reach, below which the river widens and continues a braided form across gravel with pools and riffles. Belts of willow enclose most of the river corridor and include cabled willows in some areas.

Much of the adjacent land in this area is in productive rural use including there are several pivot irrigators nearby. Playing fields and mixed indigenous and exotic vegetation also adjoin the river near Rathkeale College.

A key issue in this reach is the Rathkeale College. The college and surrounded area are protected by the stopbank that is located right on the edge of the river. The college includes boarding houses and is not protected to a 100-yr standard. The long term sustainability of stopbank is doubtful, especially if a large flood event was to occur.

Te Ore Ore water race is in the process of being closed. This has occurred due to the continued difficulty in sustaining the necessary water levels in the river at the intake location, related to bed degradation.

### 4.2 Key locations in the reach

- Double bridges swimming hole
- Opaki Water Race
- Rathkeale College

- Te Ore Ore water race
- Henley Lake water intake
- Te Ore Ore stopbank.

### 4.3 Development of reach specific options

It was recommended that GWRC maintain close liaison with asset owners (Masterton District Council and KiwiRail) to ensure coordinated management and understanding of risk.

Native planting work at the Tirohinga public reserve, directly downstream of double bridges, has been carried out in previous years and there was a view that these types of activities around recreational and ecological values should be continued and if possible increased. This issue also encompasses better access to the river at key sites.

The level of flood and erosion protection provided to Rathkeale College and surrounds are significant. The stopbank protecting the College is located directly adjacent to the river bank and the level of protection from erosion is low. The stopbank is at high risk of breaching in the event of a large flood event.

It is considered that the best management option would be to relocate the stopbank further away from the river and ensuring that the school has emergency management plan specifically relating to potential flood events. However, discussion with Rathkeale is required to investigate options.

The channel through the Rathkeale section is narrow and confined in part due to the College but also due land-use on the other side of the river. A pivot irrigator is installed and irrigates almost up to the river edge, leaving limited room for buffer establishment.

Rathkeale's former sewage ponds are no longer used as the school has been connected up to the town's reticulated system. However, there might be an issue if a flood were to overwhelm the ponds the sludge would get into the river and also if the floods actually scoured out the ponds. Thus, it was recommended to consider desludging or stabilisation of the ponds.

Flood risk to potential users at Percy Reserve, at Te Ore Ore Bridge, should identify and described in. Signage should be erected at least to highlight potential risks. This area may also be appropriate for native planting.

Henley Lake is identified as a significant body in the Natural Resources Plan and is a significant recreational asset to the town of Masterton. It is suggested that an improved understanding of the potential effects on the lake from flood and erosion hazard be identified and if necessary mitigation measures developed.

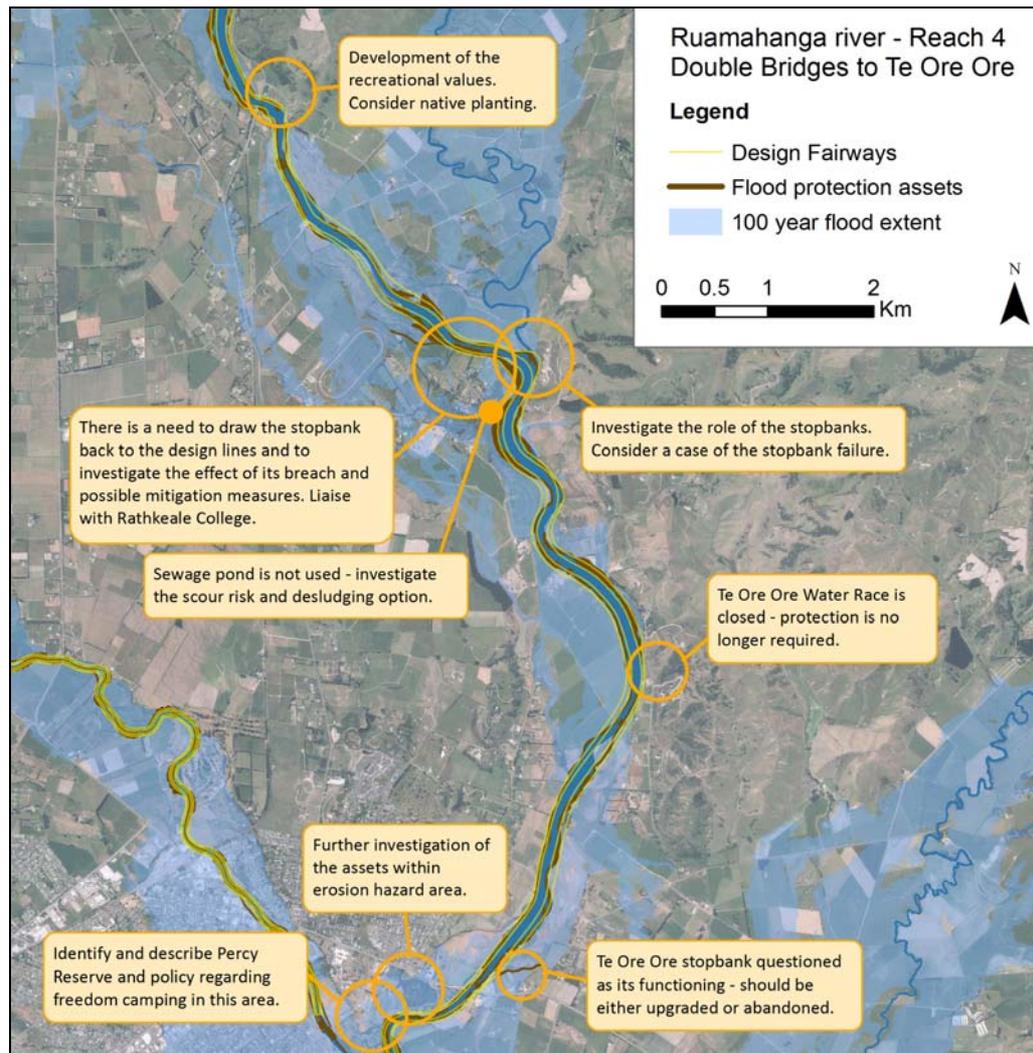


Fig. 3: Floodplain management options for the Double Bridges to Te Ore Ore reach.

## 5. Te Ore Ore to Waingawa – Reach 5

### 5.1 Reach overview

This reach extends to the south of Masterton through the Masterton Plains. Urbanising influences characterise parts of the western banks of this reach including increased public access adjoining Henley Lakes, Masterton landfill and earthworks and ponds associated with the Masterton Sewage Works. Below the confluence with the Waipoua River, the river channel tends to be managed as a single thread enclosed by willow and poplar belts along its margins with limited public access.

Downstream of Te Ore Ore is protected by harder edge to river as opposed to a vegetation buffer. A large number of rock groyne assets are located within this reach but is noted they have not specifically been constructed to a design standard and their performance during larger, more intense flooding is unknown.

A group of residents in the Homebush area have recently raised concerns about groundwater levels, which has dropped up to 1.5m; residents suggest that the groundwater level has been adversely affected by ongoing river management practices, and in particular, identify gravel extraction as a root cause.

### 5.2 Key locations in the reach

- Te Ore Ore bridge
- Henley Lake

- Confluence with Waipou
- River Road (properties and cemetery)
- Closed landfill site
- Homebush wastewater treatment plan
- Wardells Bridge.

### **5.3 Development of reach specific options**

The level of service should be reconsidered and probably increased, taking into account the infrastructure present through this reach. This reach of the river currently has a higher level of service, in terms of expenditure per kilometre of river, than the other reaches within the Upper Ruamahanga to reflect the value of community assets through this section.

The river is very close to the River Road properties. There is an erosion risk rather than a flood risk from the Ruamahanga in this location. An investigation is needed to define what are the options and the costs and what the most appropriate way to improve the current situation. In relative terms, relocation or retreat of the nearby cemetery is less desirable than retreat of houses, affected along River Road. Any management options developed for this site need to consider the wider implications on the town and cemetery.

During the workshop, relocation or retreat of the cemetery was not considered a desirable option and this has to be factored into any proposals for any option to protect River Road properties. A number of options need to be considered further however, the general view is that regardless of the option selected, a relatively high level of service will be required to protect this bend.

Further investigation of gravel extraction impacts on groundwater level is recommended but further discussion is required to identify what role the FMP should have in this investigation.

The finished crest level of the recently constructed stopbanking around the Homebush wastewater plant is higher than the level of existing stopbanking further upstream, to which it is connected; The new stopbank has been designed to provide 100 year flood protection and is MDC asset rather than a GWRC asset. This discontinuity in levels may present a flood risk which needs to be investigated.

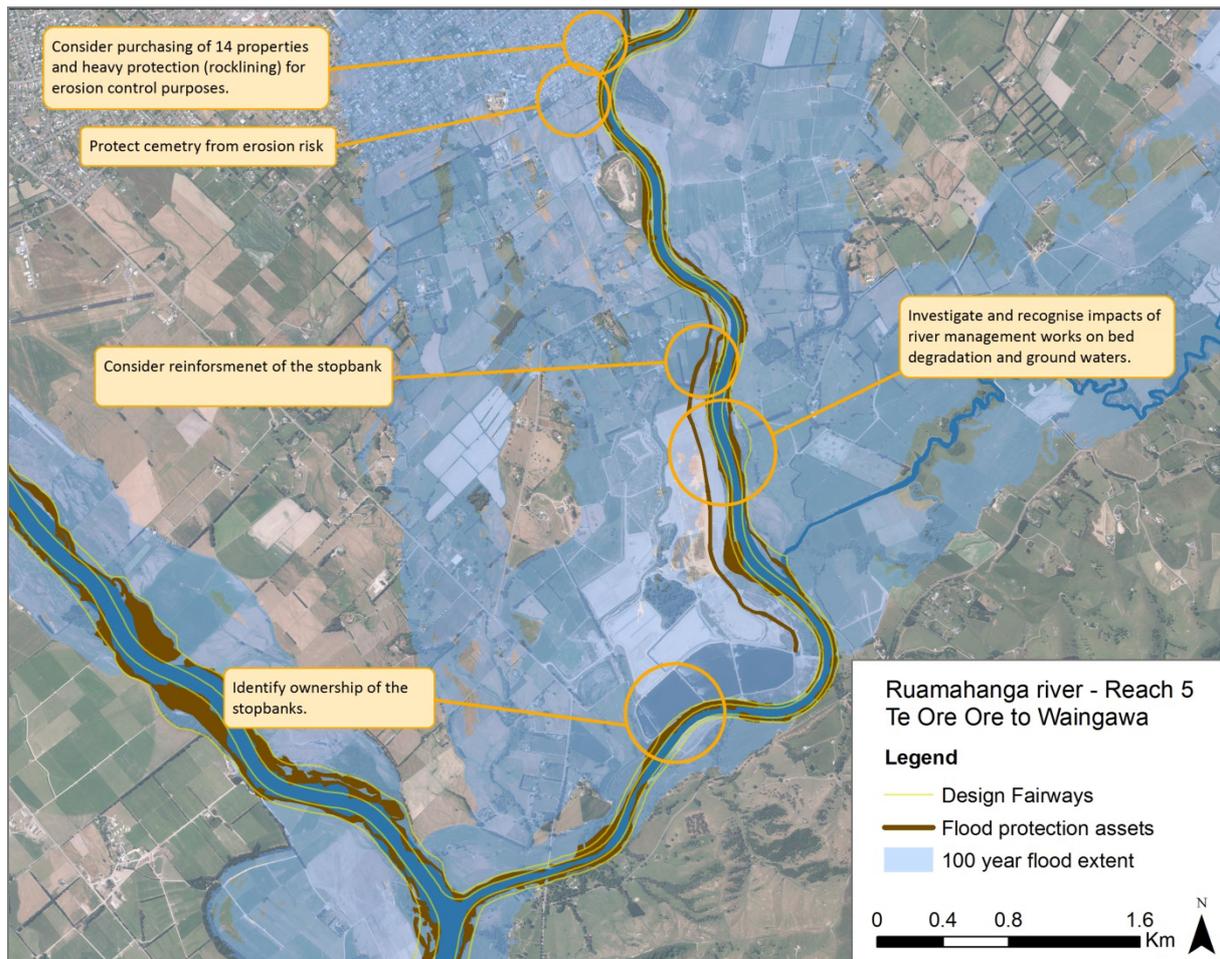


Fig. 4: Floodplain management options for the Double Bridges to Te Ore Ore reach.

## 6. Waingawa to Gladstone – Reach 6

### 6.1 Reach overview

Downstream from the confluence of the Waingawa River, the Ruamahanga River corridor increases in width and continues as broad semi-braided form. The northern part of the river skirts the western slopes of Foster's Hill before opening out into the Central Plains towards the confluence with the Taueru River to the south.

### 6.2 Key locations in the reach

- Dakins Road
- Confluence with the Waingawa River
- Te Whiti stopbank.

### 6.3 Development of reach specific options

This reach is very similar in nature to the Gladstone to Kokotau Reach, downstream and in general terms, the range of options considered appropriate in the reach will be the same.

## 7. Kokotau to Waiohine – Reach 8

### 7.1 Reach overview

Below Kokotau Road Bridge, the Ruamahanga River re-enters the wider Masterton Plains to the south of Tiffen Hill and flows around the northern toe of Pukengaki. A single thread channel along a contained gravel corridor continues through this reach. The majority of this river reach is enclosed by continuous bands of willow

established along the river margin, with isolated Totara extending into adjoining farmland from the river margins in some areas.

## 7.2 Key locations in the reach

- Taumata Lagoon
- Confluence with the Waiohine River

## 7.3 Development of reach specific options

This reach has a relatively low level of service (in terms of expenditure per kilometre) and annual maintenance requirement are generally low. The reach is very similar in nature to the Gladstone to Kokotau Reach, upstream and in general terms, the range of options considered appropriate in the reach will be the same.

It is noted that the stopbank asset identified in the reach offers limited protection value, and sits within the identified buffer area.

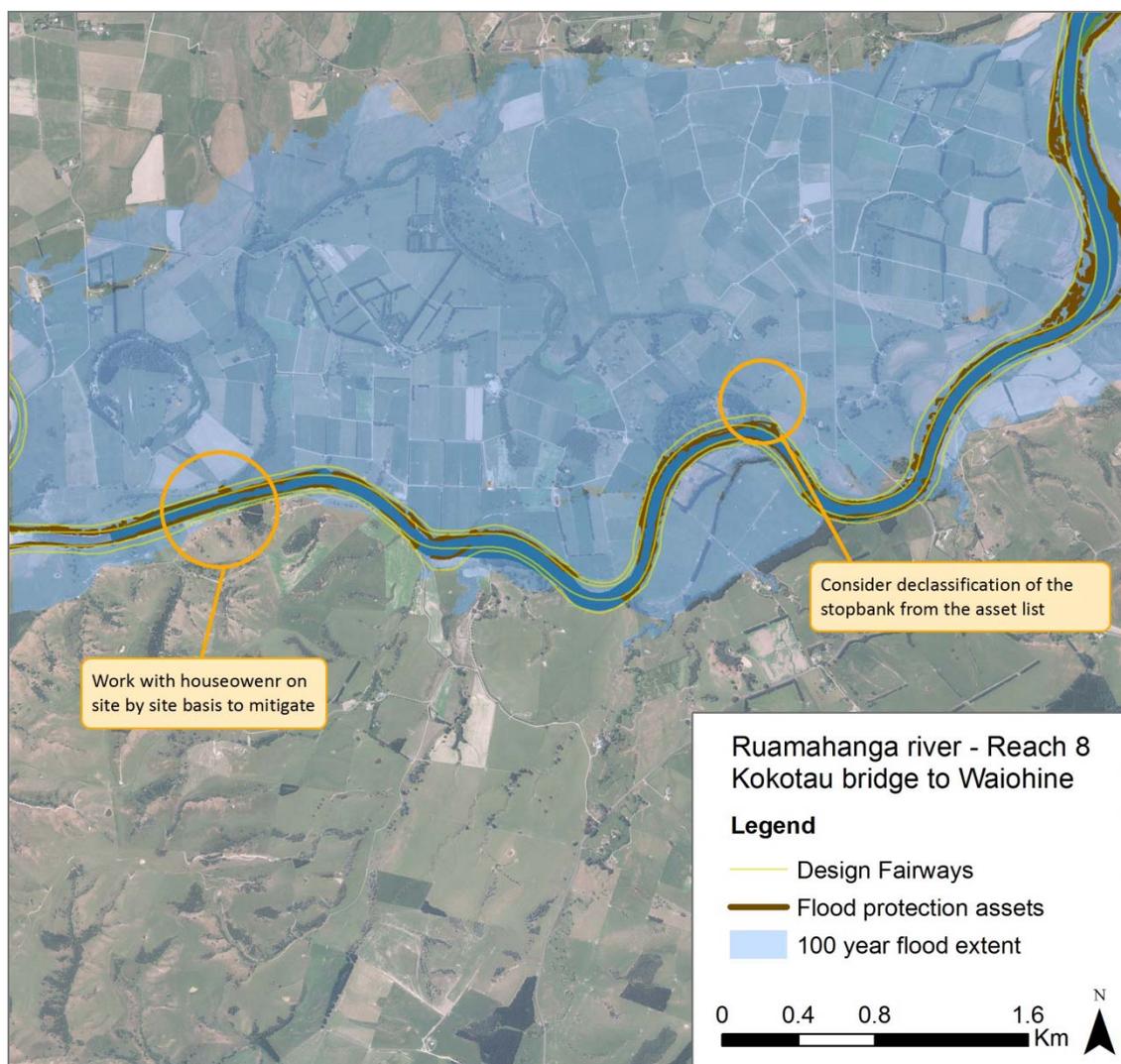


Fig. 5: Floodplain management options for the Kokotau to Waihone reach.