

August 6, 2021

## INTERIM FLOOD HAZARD MAPPING FOR CENTRAL HAWKE'S BAY

### Background and Purpose

An interim flood hazard map was prepared for the Central Hawke's Bay area in August, 2021. The purpose was to produce a flood hazard map to include as a submission to the proposed Central Hawke's Bay District Council District Plan, with submissions closing on August 6, 2021.

At present, there is no comprehensive computer flood model available to produce detailed flood hazard maps for the area. An interim solution is provided based on mapping of areas that are potentially floodable through use of computer models from limited areas, as well as contours and air photos where no model was available. There are limitations to the mapping produced, and no flood depths are provided. A sample of the output is shown in Figure 1.

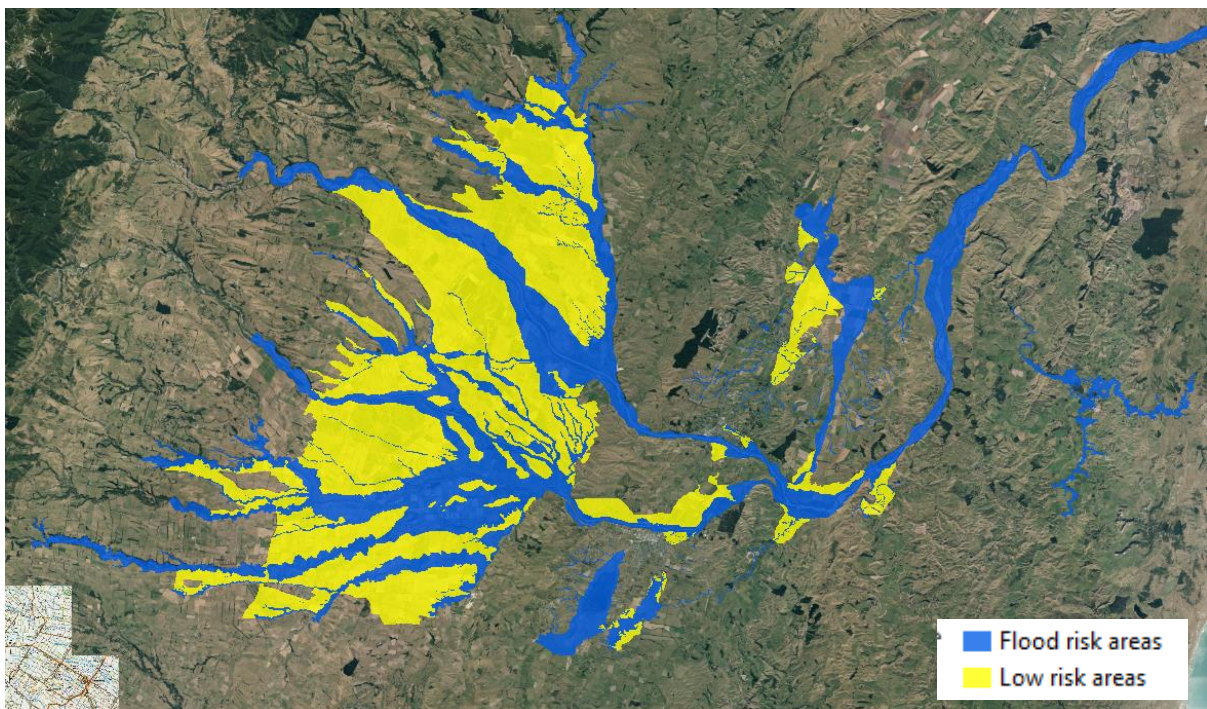


Figure 1: Flood Hazard Map for Central Hawke's Bay

### **Limitations:**

The specific line drawn to delineate the zones should be assumed to have a buffer ranging from approximately 5 m in steep areas, up to approximately 50 m in flat areas. There may be exceptions to this estimate.

Not all floodable areas have been mapped. There may be overland flow paths that are not able to be delineated due to limited resolution of the base contours (250 mm intervals), and there may be areas at risk from flooding that have not been examined due to lack of contour information.

The scale to use the mapping should be limited to approximately 1:20,000. There are instances where using the data at a smaller scale is possible, however, caution should be used in the interpretation of the specific location of the flood zone edge.

### **Description of Mapping Techniques:**

#### **Major Rivers:**

Figure 2 shows a section of the Waipawa River, with the main river channel as a flood risk area. This area is within the stopbanks, and poses the greatest flood hazard due to deep, high velocity water flowing, along with gravel and sediment movement.

The flood risk area is also shown in areas of close proximity to the stopbanks. These areas are at risk of flooding in the event of stopbank failure. The nominal level of service for the stopbanks in the Upper Tukituki Flood Control Scheme are protection up to the 1% annual exceedence probability (AEP) (100 year return period) for overtopping, however, there is the residual risk from other types of failures involving erosion of the stopbanks. The mapping provided help landowners in these areas to understand the risk, and the protection level provided by the scheme. In general, the UTFCS has provided protection to rural land which was then used for agricultural purposes.

The low risk areas are distanced from the stopbanks, and there is little risk of flooding from the major river, however, there could be risk from minor streams or overland flow.

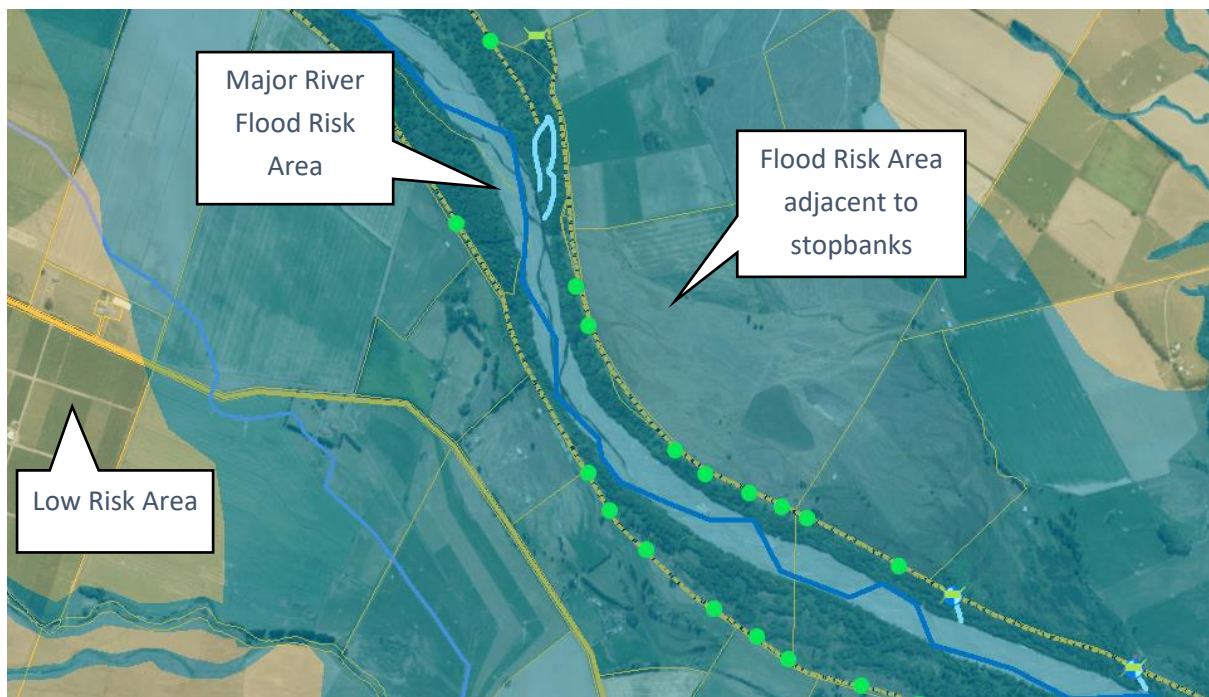


Figure 2: Major River



### Minor Rivers:

In Figure 3 the river channel was mapped out to the outer terraces. The land above the terraces generally has a low risk of flooding from rain landing on the terrace, as opposed to flooding from the river.

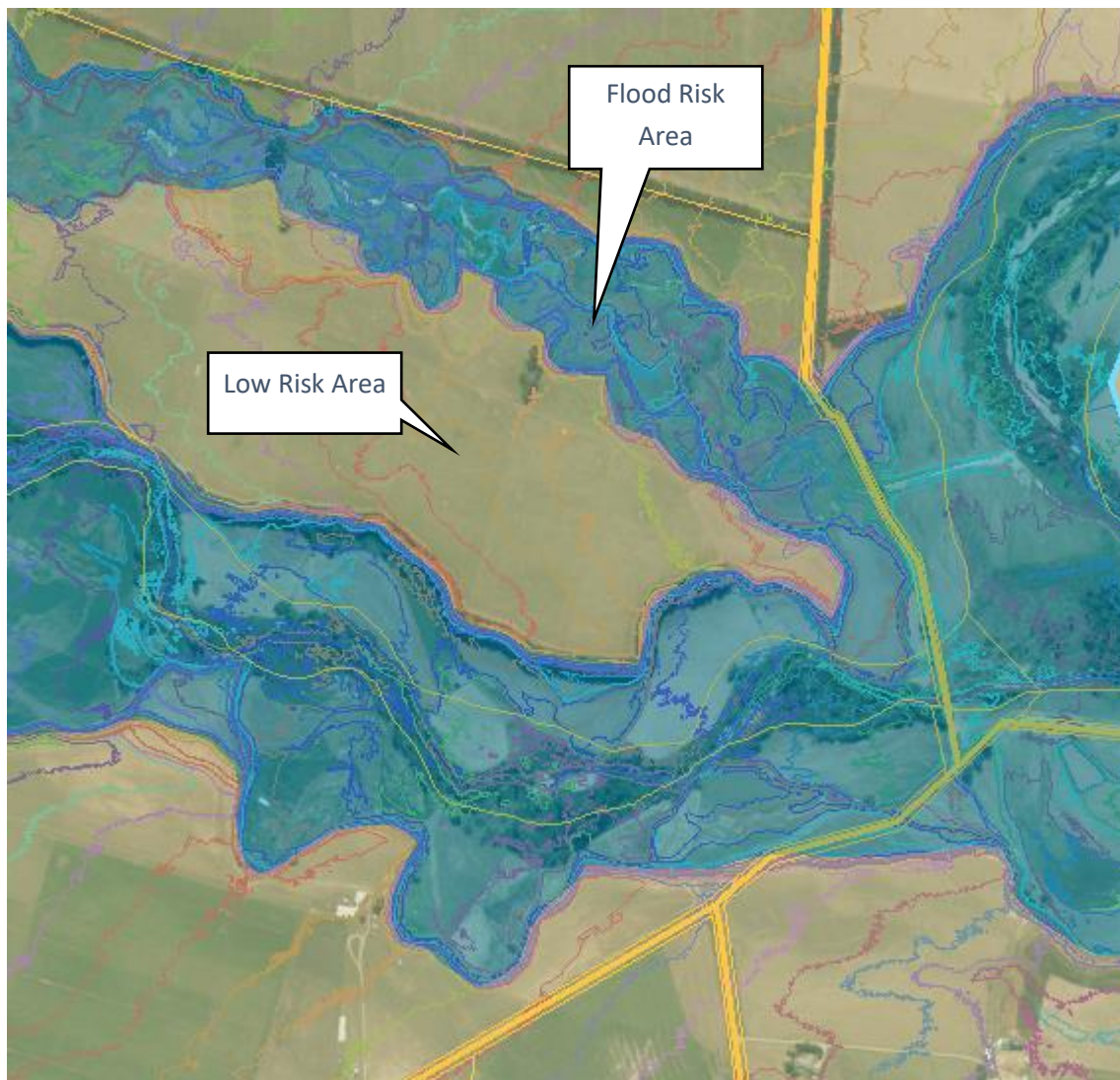


Figure 3: Minor river and terraces

### Small Channels:

Figure 4 and Figure 5 show several small channels, with the flood zone shown with a buffer on the outer edges of the channel.



Figure 4: Minor channels (1 m contour interval)

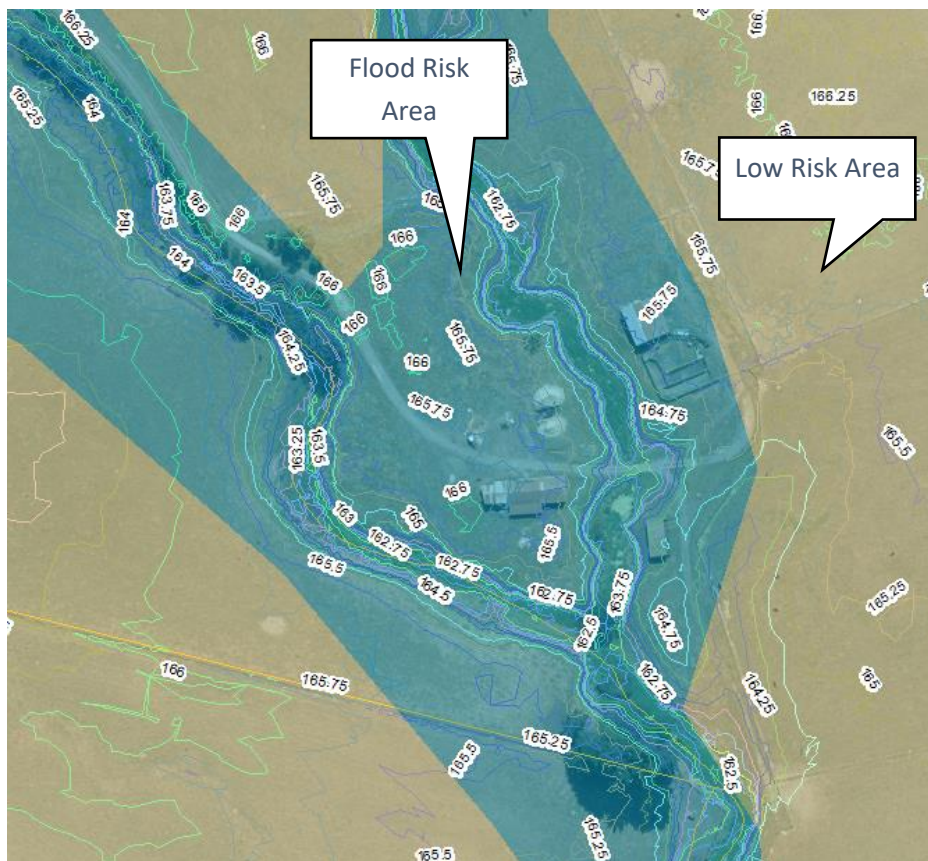


Figure 5: Minor channels (250 mm contour interval)



### Areas adjacent to steep hills:

Figure 6 shows mapping where a steep hill is adjacent to a low risk area and a flood risk area. The steep hill has virtually no chance of flooding, and the low risk area shows the transition zone, where consideration needs to be given to avoiding potential overland flow paths from runoff coming from the steep hill.

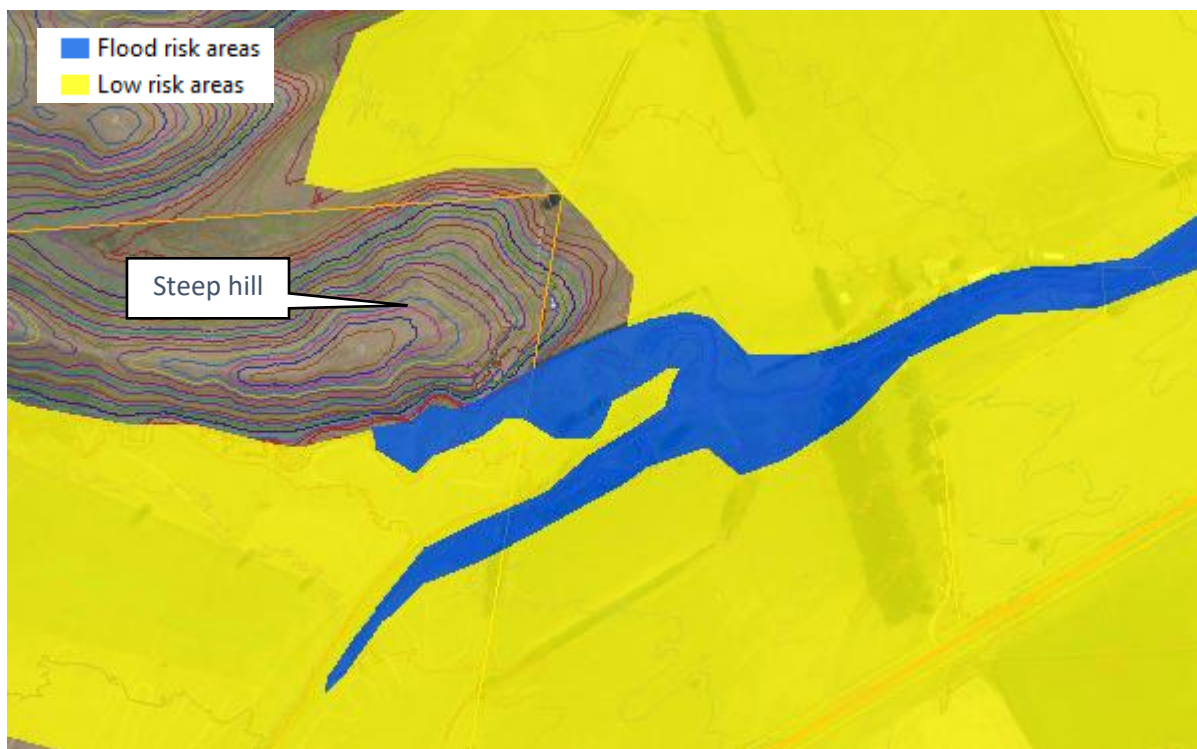


Figure 6: Area adjacent to steep hill

## Culverts/Bridges

Culverts and bridges have been shown in the mapping as being within the flood risk area, as shown in Figure 7, in order to maintain continuous flood hazard areas. In most cases the culvert or bridge will not be flooded, but the land under the bridge, or the invert of the culvert will be flooded.

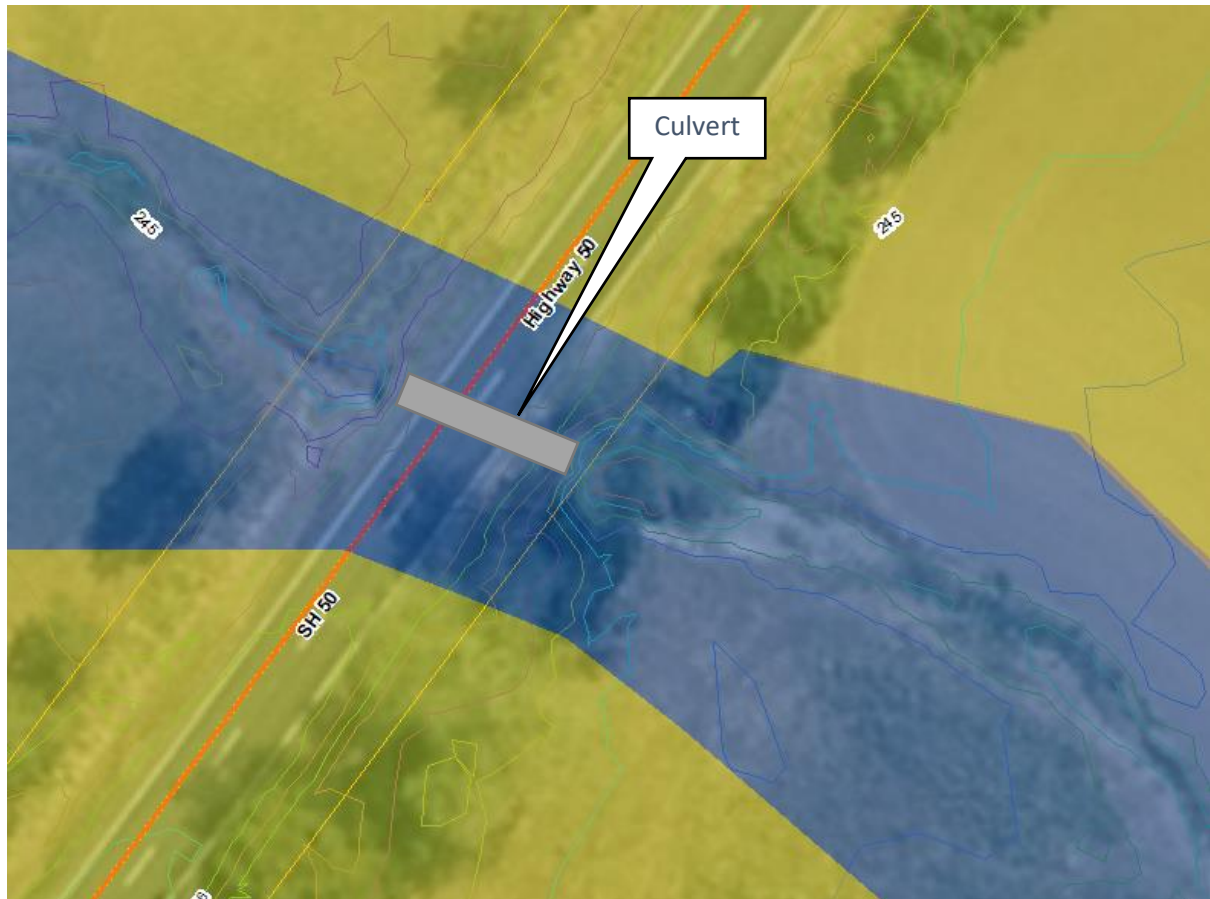


Figure 7: Culvert – showing flood hazard over top of culvert



## Dams and small reservoirs

Many small dams have been included in the flood risk zone, with an example shown in Figure 8. The reservoir area is generally permanently flooded, or will remain flooded for some time after rainfall. The areas downstream of any dam should be considered to have a high risk, which diminishes as the distance increase from the dam.

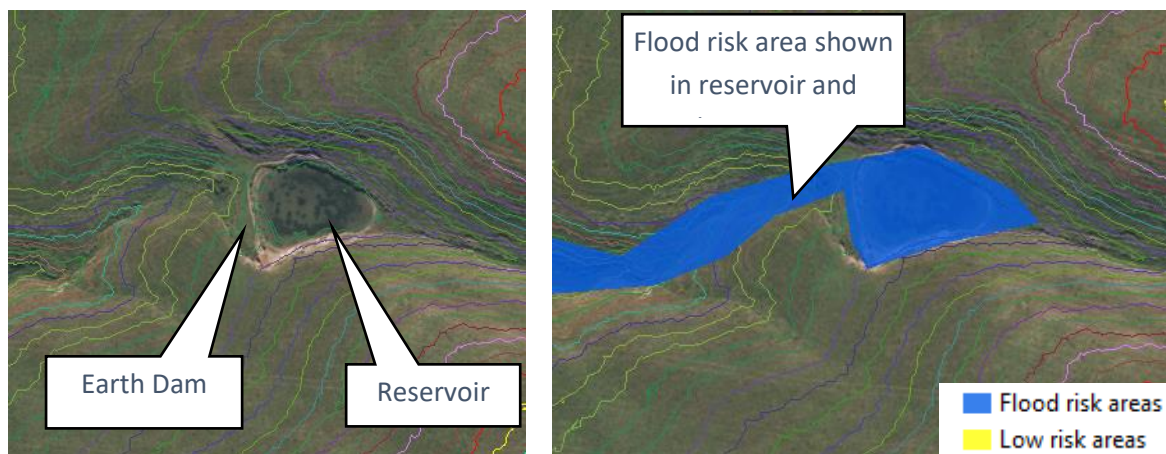


Figure 8: Dam and small reservoir (Left and right image are same location - Left image with no flood hazard map, right image with flood hazard map)

## Papanui Stream

The Papanui Stream (see Figure 9) is an old channel of the Waipawa River, and is protected from flooding from a section of stopbank on the Waipawa River. Protection is provided up to the 100 year return period event for overtopping. In the event of a stopbank breach, the flood hazard area identified along the Papanui Stream is at risk.

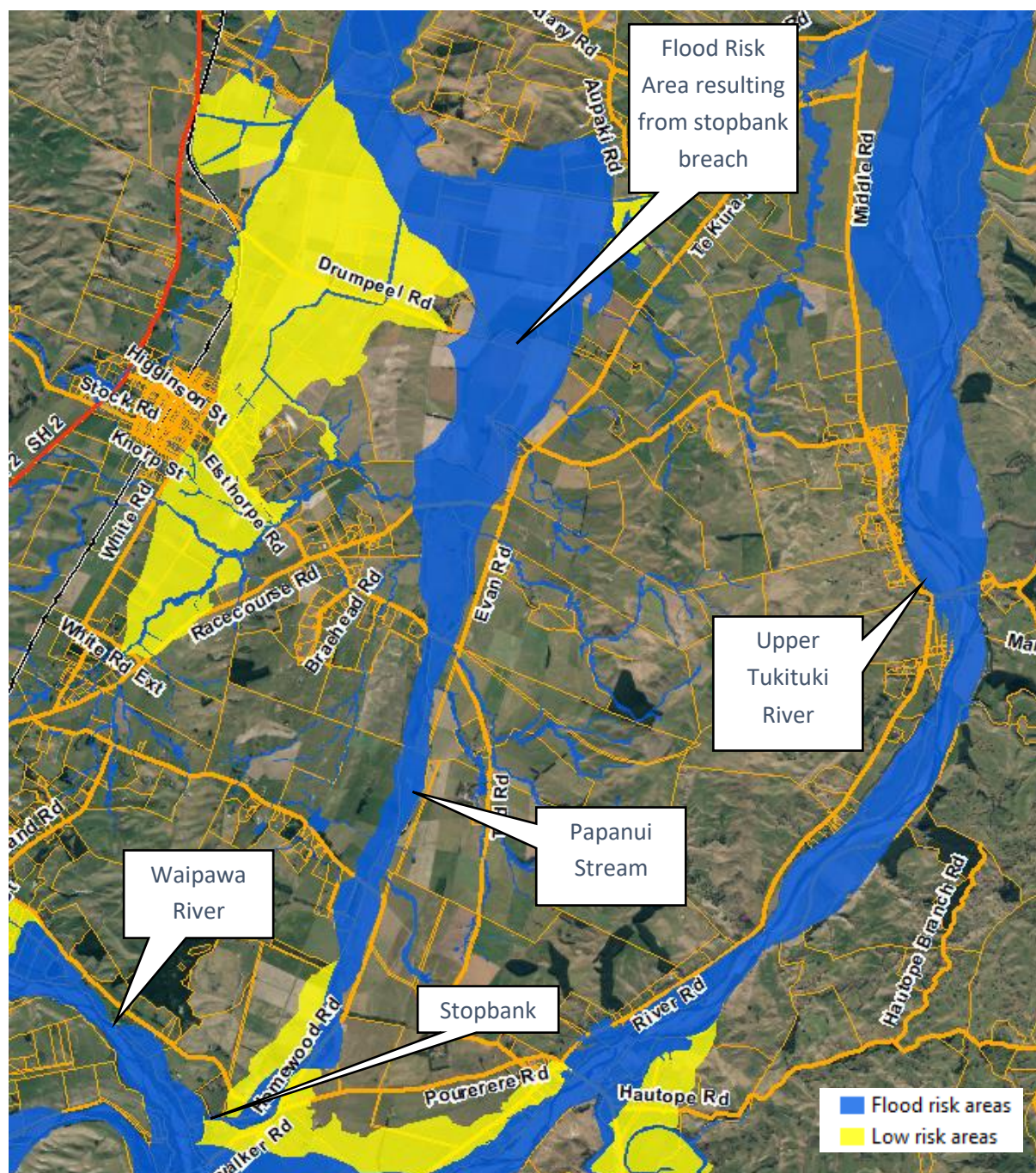


Figure 9: Papanui Stream



### Urban/Semi urban areas (Waipawa, Waipukurau, Otane, Tikokino, Takapau)

No specific modelling or flood hazard mapping has been done by HBRC in these urban/semi-urban areas with stormwater control managed by CHBDC, with the exception of the open drain (referred to as Bush Drain) on the north-east side of Waipawa (Figure 10)

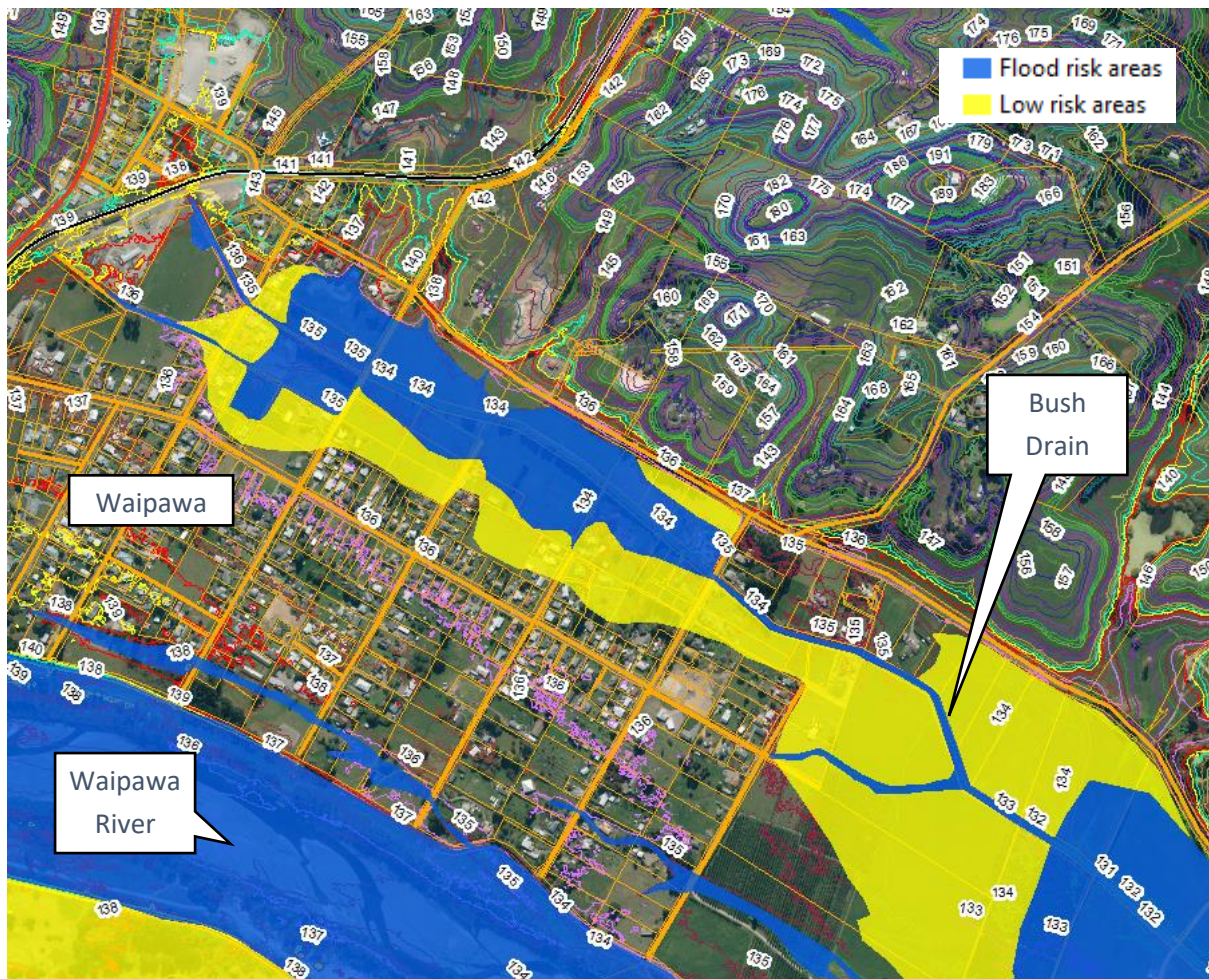


Figure 10: Waipawa – Bush Drain



## Ongaonga

Following a severe flood in November 2013, a 2D computer model of the Ongaonga area was created. The results showing the hazard areas are shown in Figure 11.

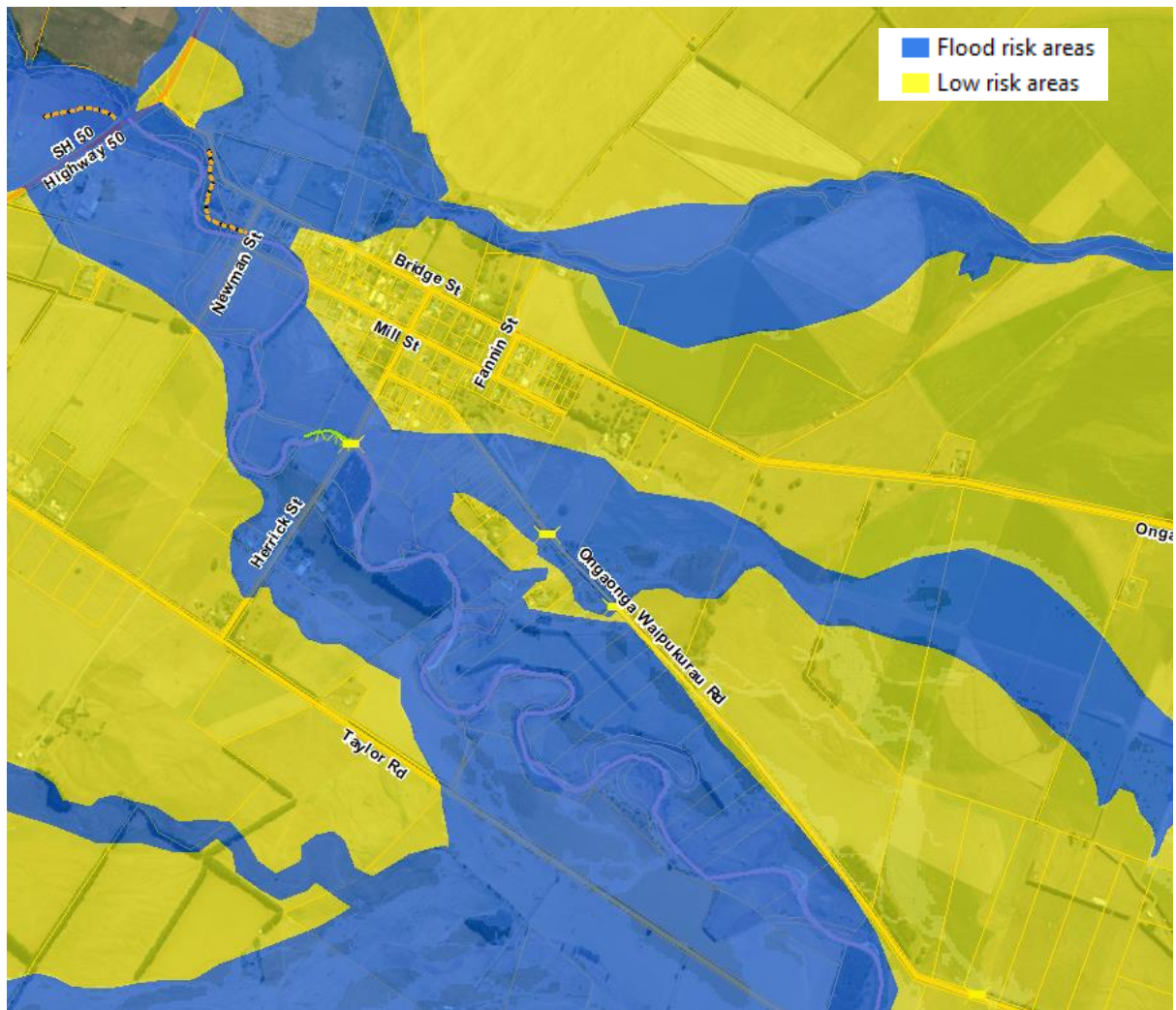


Figure 11: Ongaonga

## Lake Whatuma and upper Mangatarata Stream including Farm Road

Figure 12 shows the mapping for this area, which is mainly low lying land around Lake Whatuma, and flat, floodable areas on the eastern side of Porangahau Road to Farm Road.

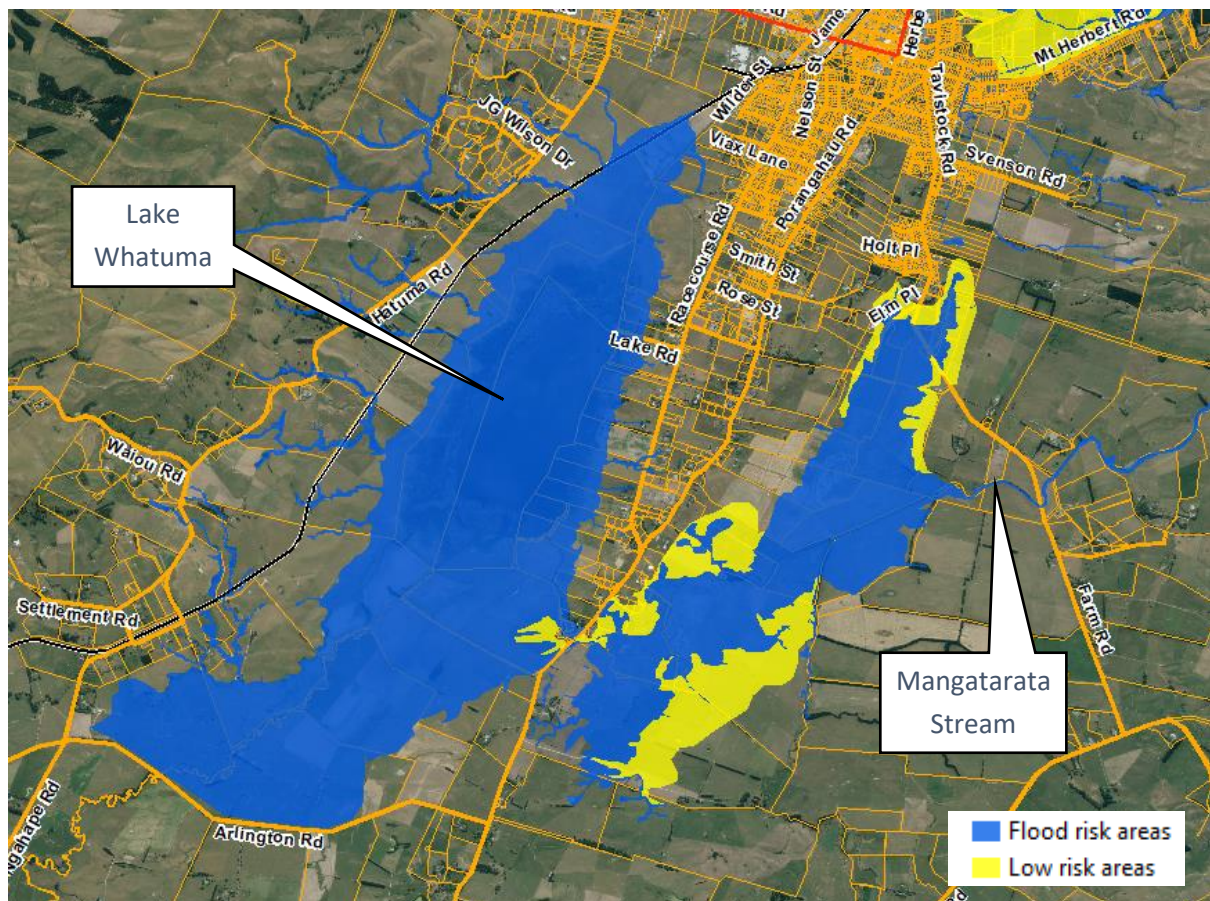


Figure 12: Lake Whatuma and upper Mangatarata Stream (near Farm Road)



## Porangahau

Flood hazard mapping for the Porangahau River from Saleyards Bridge to the ocean was derived from a 2D computer model, with results shown in Figure 13.

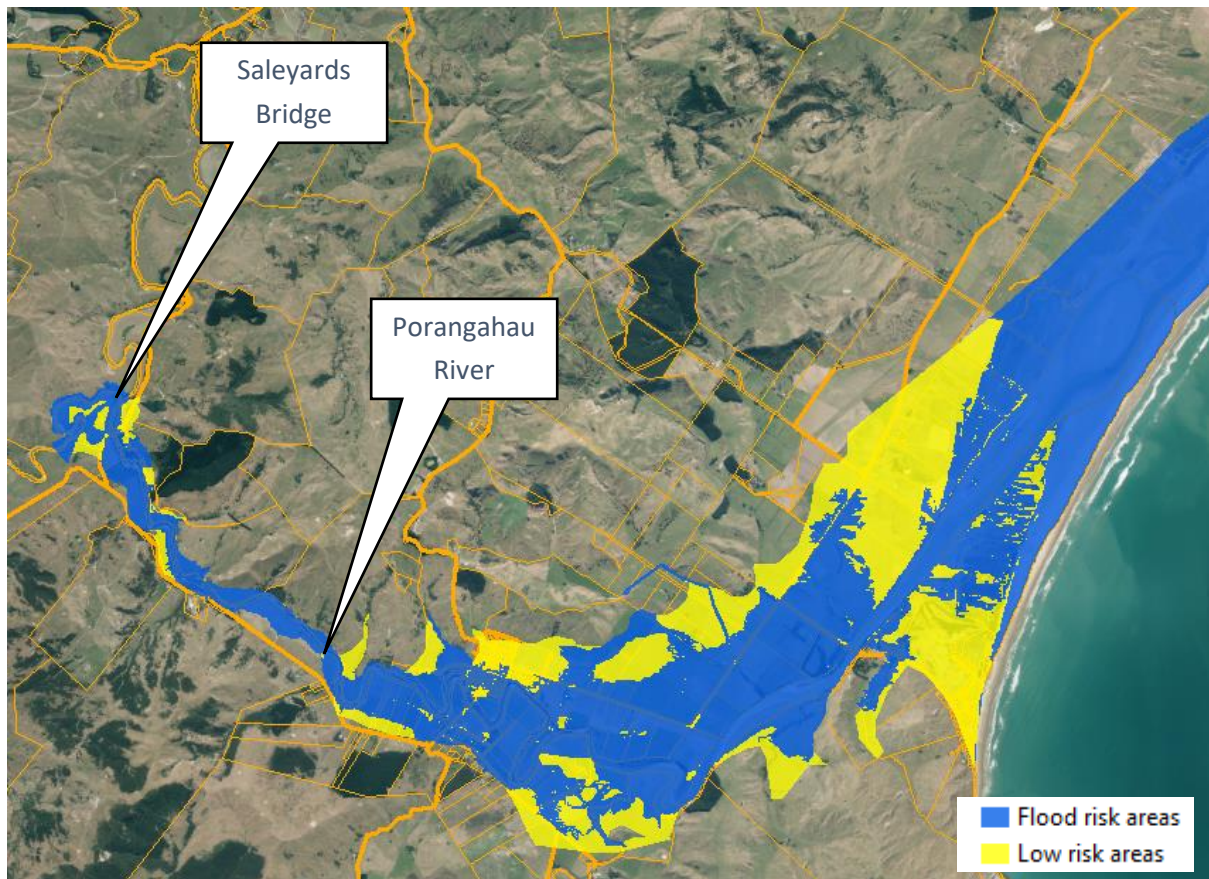


Figure 13: Porangahau



## Elsthorpe including Makara Dams

Flood hazard mapping in this area was derived from a 2D computer model from Makara Dam 1, as well as estimates from air photos for the Wharemate Stream.

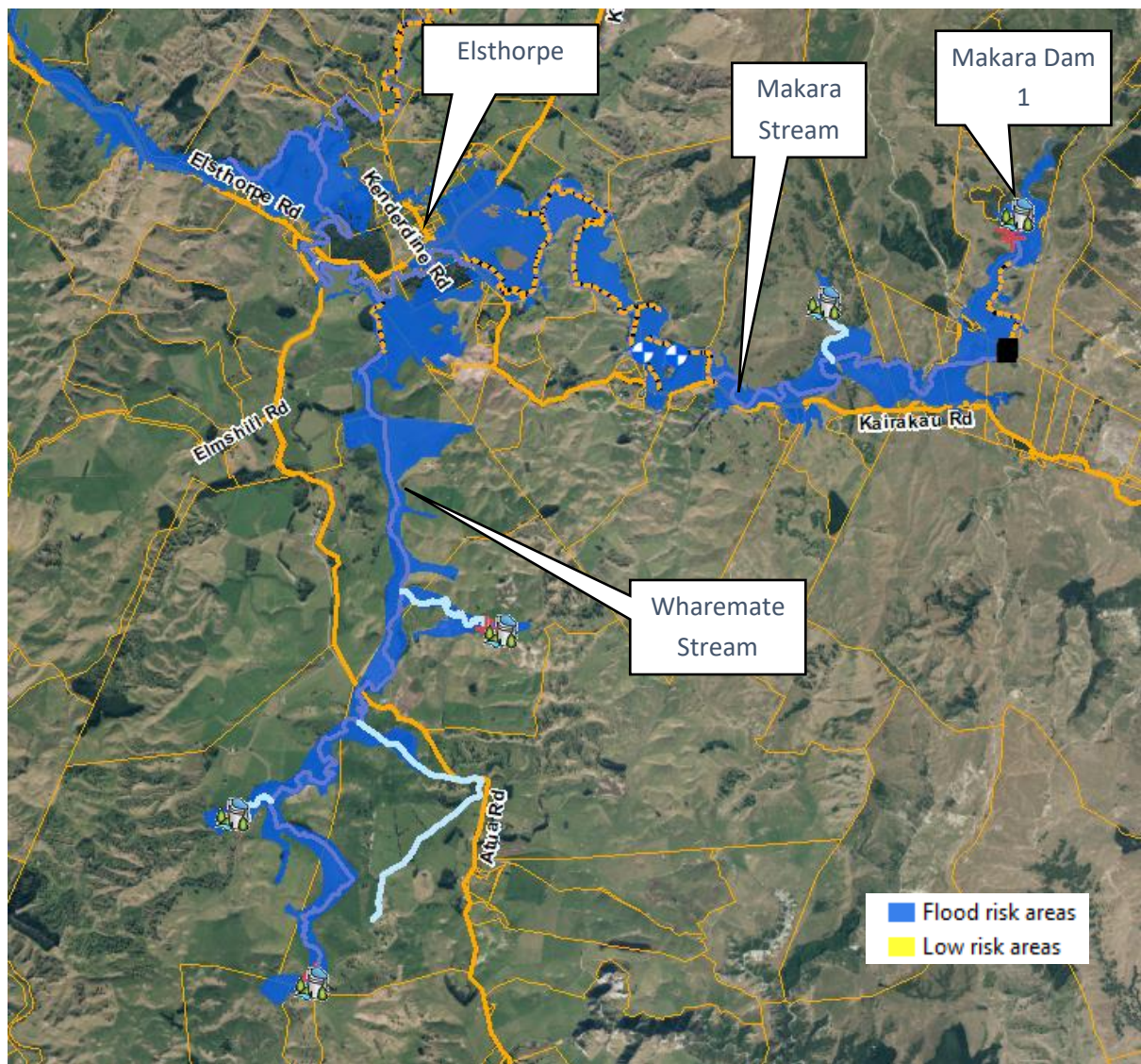


Figure 14: Elsthorpe and Makara Dams

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