Waitotara Scheme Management Plan

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1. Introduction

This management plan has been developed to ensure that the significant benefits derived from the work undertaken in the Waitotara River Catchment to reduce the adverse effects from flooding are maintained and enhanced where practicable.

The plan focusses on two main activities. These are:

- maintaining the cleared channel and in places, as funding permits, clear other potential problems areas; and
- maintaining the alignment of the channel, particularly in key areas.

The following section titled “Background” is included here to ensure that the need for and importance of ongoing maintenance works are well understood.

2. Background

Flooding and other storm related damage is a significant and reoccurring problem in the Waitotara catchment. Storms resulting in flooding were experienced in 1869, 1891, 1903, 1904, 1924, 1936, 1971, 1990, 1999, 2004, 2006, 2011, and most recently in 2015 – causing significant damage within the catchment.

The earliest records of investigations into the flooding go back to 1991 when the Taranaki Regional Council commenced development of a flood management strategy for the catchment. The development of the strategy completed in 1995 examined the hydrology of the catchment but as the Rimunui Recorder station had only been established a few years earlier in 1993, very limited information was known about the actual size of the historical flood flows. At that time it was estimated that the large floods of 1936 and 1971 had flows of 1500 and 2000 cumecs respectively. The 1990 flood was determined to have a peak flow of 1560 cumecs.

The strategy reported on the significant impacts of flooding in the Waitotara Valley being residential inundation, loss of road access, bridge losses, silt deposition and stock and fence losses.

The focus of the strategy however was the establishment of a flood prediction and warning system to provide warnings to the local community. An automated warning system was subsequently developed and an additional telemetered rainfall site installed in the Ngutawera sub-catchment to assist with these warnings.

In regard to river channel management, the Strategy recommended that arrangements be made in consultation with the South Taranaki District Council to clear willow growth and maintain an adequate channel for the river in the vicinity of the Waitotara Township.

Very little if any works were undertaken to clear the heavily congested channel of willows and poplars until 2005 in response to the large of devastating flood in 2004.

2.1. The 2004 flood

The 2004 flood was considered to have been the most significant flood event in living memory in the Waitotara catchment. Of the 47 homes in the Waitotara Township, 41 were inundated as a result of the river reaching record levels and overflowing its banks into town and 14 of these homes were later condemned as a result of structural damage. There was also significant and costly damage to roading, telecommunication and electricity infrastructure in the township.

Immediately upstream of the township, considerable inundation of the broad valley floor resulted in considerable damage to farm buildings, roads, crops, fencing, housing, and the Waipapa Marae.

Extensive landsliding throughout the catchment also caused significant and costly damage to roading, telecommunication and electricity infrastructure. All farming properties in the Waitotara Valley were affected to varying degrees with the worst affected properties in the upper catchment. Farm bridges, culverts, fences, roads and tracks were damaged or destroyed by slips or inundation. There were also significant impacts on farm production resulting from deposition on alluvial flats and mass movement erosion in the hill country.

A conservative estimated on the cost of the 2004 storm event was over $11 million. Of this, $5million was associated with the evacuation and recovery costs of the Waitotara Township and the cost of repairing local roading, with the remainder being farm property damage.

The $11million did not take into account costs associated with repairing and restoring the town's housing and building stock or the indirect costs associated with the clean-up, loss of and the disruption to people's lives and general well-being.

Following the 2004 flood event, the Council prepared a report titled "Reducing the Risk – Proposed river clearance and maintenance programme for the Waitotara River" (Frodo No. 28555). As well as reporting briefly on the catchment and historical storms and flooding, the report set out a range of options that were considered by the Taranaki Regional Council and the South Taranaki District Council to reduce both the risk of and the adverse effects arising from flooding in the Waitotara Catchment.

Eight response options were considered. These were:

1. the upgrading of the telemetric flood warning system in the catchment;
2. the promotion of soil conservation to control erosion;
3. the removal of part of the Waitotara township;
4. the introduction of planning and building controls;
5. the implementation of a flood protection scheme for the Waitotara Township;
6. the undertaking of channel clearing and maintenance works;
7. the upgrading and improving of the stormwater drainage systems around the Waitotara township; and
8. taking no action.

Of the eight options considered, options 3, 5 and 8 were rejected.

Option 3 involving the **removal of part of the Waitotara township** likely to be inundated during a flood event was considered by the South Taranaki District Council but following consultation with the community, the South Taranaki District Council declined this option. A number of the properties severely affected by the 2004 flood have however now either been abandoned or demolished.

Option 5 involving the **construction of stopbanking to protect the Waitotara Township** was considered and rejected for practical and economic reasons. More recent large flood events have identified that the channel clearing and maintenance works undertaken since 2004 have reduced flood levels to the extent that structural flood defences are no longer required.

Option 8 which represents '**business as usual'** was considered but was not considered to be a realistic option on the basis that the reoccurrence of large floods is likely and the damage costs to the community were significant.

Actions have been taken to varying degrees on the other five options as follows.

The upgrading of the telemetric flood warning system.

Following the 2004 storm event, the Taranaki Regional Council installed a new telemetric recorder in the upper catchment at Omaru to monitor rainfall. The Council has also improved its flood warning system in the catchment by installing solar panels at the Riminui Station and Omaru sites to ensure there is backup power supply in emergencies and make the system less vulnerable to disruptions to power supply and communications.

Most recently (2017) a recorder has been installed in the Weraweraonga Stream, a tributary of he Moumahaki Stream, to provide flood flow information on the flows discharging from the Moumahaki catchment to improve the prediction of flood levels at Waitotara.

The promotion of soil conservation to control erosion

Extensive soil conservation works have been undertaken in the Waitotara catchment since 2004 as part of the Sustainable Land Management Programme to reduce erosion and the discharge of sediment into the river system.

Planning and building controls;

The South Taranaki District Council has recently undertaken a review of the District Plan. The Draft plan now includes planning restrictions that will prevent the building of residential dwelling on at risk sites in the lower Waitotara valley.

Upgrading and improving the stormwater drainage systems around the Waitotara Township;

Since 2004, works have been undertaken to improve drainage within the Waitotara Township, but despite these, a number of houses were still flooded in 2015 by stormwater that could not drain to the river because of the high river level. Further improvement works could still be undertaken by the South

Taranaki District Council to reduce the flood risks associated with runoff from the hill slopes to the west of the township.

2.2. Channel clearing and maintenance works

The infestation of willow in the Waitotara River and its main tributaries was considered to be the main contributor to flooding in the Waitotara Valley in conjunction with the heavy silt deposits arising from the hill country erosion. These silt deposits settle out in the flood flows slowed by the willows and further reduce the flood carrying capacity of the channel.

Figure 1: Willow congestion adjacent to Waitotara Township prior to clearing works – refer to Figure 3 for location

Following the 2004 flood event, a willow clearing trial was undertaken over a 4km reach of the river downstream and slightly upstream of the Waitotara Township utilizing different techniques to determine whether or not physical vegetation removal could be undertaken economically. The cost of the trial was $100,000 and was funded 70% by the Regional Council and 30% by the District Council.

The trial confirmed that physical clearance was a suitable option to clear willow from the channel and in February 2006 the Regional Council approved the expenditure of $40,000 per annum on capital works and $10,000 on maintenance subject to the commitment and support of the District Council. Support and commitment to match the Regional Council's input was subsequently obtained. This was later

increased to $80,000, shared equally between TRC and STDC with TRC meeting all costs associated with the administration, management and supervision of the works for an initial period of 10 years.

Clearance works proceeded and by 2012 the major willow removal work had been completed. Over this period 24.5 km of physical clearance works and 25.25km of chemical clearance of both standing and regrowth had been undertaken in the Waitotara, Moumahaki and Weraweraonga Rivers at a cost of approximately $670,000. Other than the initial trial works, the physical works costs have been evenly shared between both councils. In addition to the physical works costs, administration, contract management and supervision costs estimated to be $167,000 has been funded by the Regional Council.

Over the next three years a further $126,000 was spent on clearing a number of large stands of poplars close to the top edge of the riverbank and some further channel clearing works up the Moumahaki Stream. In 2014, a large aerial spraying programme was undertaken to control regrowth and some large willow that could not be effectively sprayed from the river.

Figure 2 shows the size of some of the willow that was removed from the channel as part of the initial clearing works.

Figure 2: Willow removal showing how large some of the trees were

Figures 3 to 6 show the river channel in the vicinity and upstream of Waitotara in 2002 and in 2013 being before and after the significant willow clearing works were undertaken on the river.

Figure 3: Upstream of SH3 - 2002 - Prior to willow clearing

Figure 4: Upstream of SH3 - 2013 - After willow clearing

Figure 5: At Waitotara - 2002 - Prior to willow clearing

Figure 6: At Waitotara - 2013 -After willow clearing

2.3. The 2015 flood

On 19 and 20 June 2015, the Waitotara Catchment was hit by yet another period of very heavy rain that caused extensive flooding within the valley and damage to roading and other important infrastructure. Despite the flood being as large as, if not larger than the 2004 flood event, the river level at Waitotara and the flooding and damage that occurred within the Waitotara Township was significantly less than that which occurred in 2004. The clearing of the heavy willow infestation from the river channel would have been the most significant contributor to this reduction.

Anecdotal evidence from landowners in the valley indicates that the flood had a very long peak but receded relatively quickly. This would have been the major contributor to the significant slumping of the river banks that occurred over extensive lengths of the river channel. The long peak in the flood would have resulted in the banks becoming saturated and then when the water level receded quickly, the weight of the water within the banks would have caused the slumping. The slumped material would generally have been silt deposits that had built up on the river banks over an extended period of time especially in areas formally congested with willow.

This slumping and resultant land loss has cause a number of significant problems along the river channels. In some areas willow and poplar set back from the channel edge slumped into the river and will need to be removed or sprayed to prevent a repeat of the channel congestion that has generally been remedied in the key area since 2006. In other locations this has put roading assets at risk which has required some extensive repair works by the District Council.

In regard to river management, the slumping has had both positive and negative effects. The positive effect is a small increase in cross sectional area of the river channel which results in lower flood levels. However a more concerning effect has occurred at the tight bend in the river approximately 750m downstream of the SH3 Bridge. The erosive power of the flood combined with subsequent slumping has removed a large area of land on the inside of the bend and has in effect shortened and steepened the channel in that reach of the river. Over a 1km reach of the river centred on this bend, the channel is now at least 30% shorter than it was prior to the flood event and consequently approximately 43% steeper. Whilst this will have increased the flood carrying capacity of that section of the river, it will over time cause bed degradation upstream of the bend which may cause further riverbank instability adjacent to the Waitotara Township as the river readjusts itself to reduce that increased grade.

Rebuilding the bend to reduce the grade on the channel is not feasible. Preventing further erosion on the bend will however be critical to ensure the potential upstream channel instability is not made any worse. Considerable effort has been put into planting the riverbank on the left bank of the river both upstream and downstream of the bend. Ongoing follow-up planting and layering will be needed to stabilise the riverbank in this area.

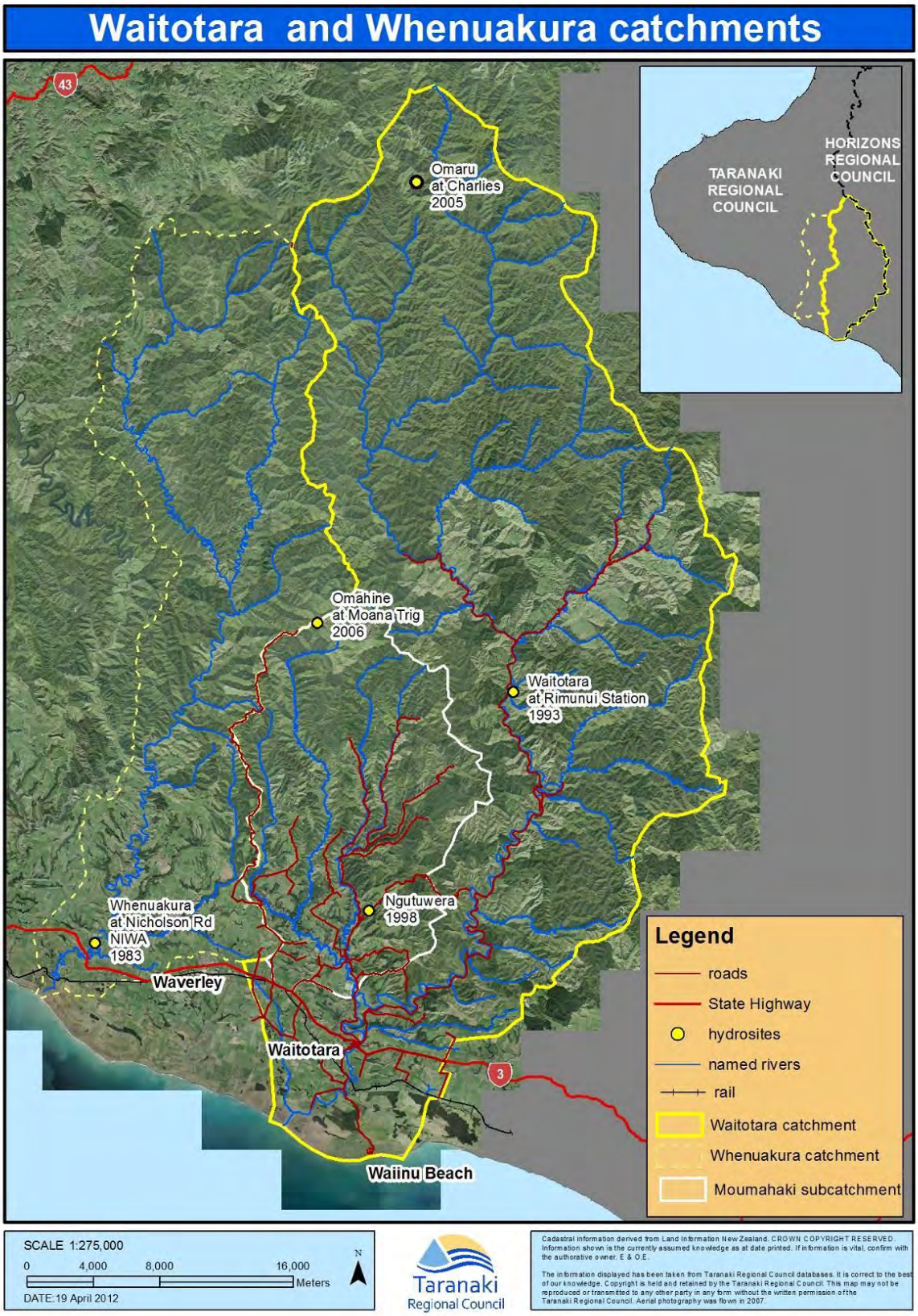

Figure 2: Catchment Map

3. Future channel management

3.1. Scheme works area

Figure 7 shows the extents of the Schemes Rivers which are included in the works area. Close examination of 2002 and 2016 aerial photographs however show that most of the clearing works on the Waitotara River occurred in the river between the Lime Works Bridge and the Moumahaki confluence and in the Moumahaki River up to Weraweraonga confluence

3.2. Maintaining the cleared channel

Maintaining the channels in the Waitotara Catchment that have been cleared as part of the Waitotara Scheme works is the No1 task for this Scheme.

Maintenance will generally involve spraying but some mechanical clearing work will also be required from time to time. Isolated clearing works may still be undertaken where there will be benefit to the flood carrying capacity of the river channels and also where there will be an erosion control benefit.

It is not practicable to develop a long term programme for this work. An annual programme will need to be developed each year and implemented at the most appropriate time to achieve the best results.

Refer to Figure 7 for the previously cleared reaches of the Waitotara River and the Moumahaki and Weraweraonga Streams.

3.3. Erosion and channel alignment control

General erosion control works do not form part of the Scheme activities.

However planting and layering works required to control erosion is a Scheme activity at key sites especially where there is a chance of a change in the alignment of the channel that may lead to an unstable river situation.

Isolated trees and small clumps will be removed where they have the potential to deflect flows into the bank and cause erosion, or alter the river course.

At very critical sites anchored tree protection work may be undertaken and funded by the Scheme to manage the channel alignment.

Works required to protect roads and bridges are the responsibility of the asset owner but advice will be provided.

Where erosion control works will be of benefit to more than one landowner, a subsidy from the Councils General Rate may be available from the Regional Council. No subsidy will be available for the protection of District Council or national assets such as highway and rail bridges.

Currently the key location where channel management works are required to control channel is at the bend 850m downstream of the SH3 Bridge. It is important that more land is not lost off this corner as it will steepen and destabilise this section of the river.

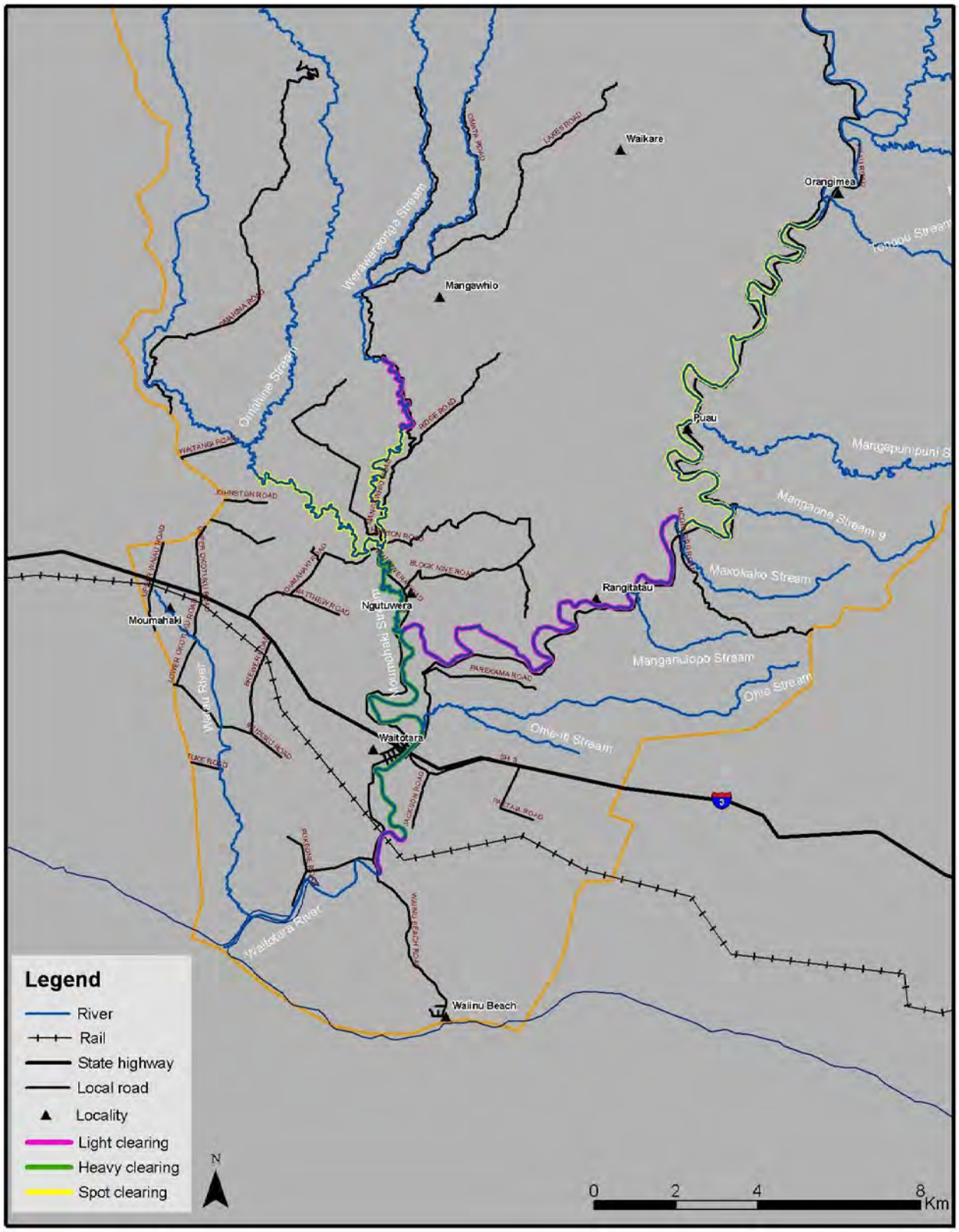

Figure 7 : Extent of Scheme Works Area

In the bend directly downstream of that location, works also need to be undertaken to prevent the river from cutting off the right bank edge and further straightening the river.

In the longer term, the 1.2km reach of the river directly upstream of the Railway bridge will need to be monitored closely to prevent the river trying to cut off that long bend by eroding the right bank at the upstream end of that bend. Refer to Figure 8. Also in relation to the stability of this bend, the right bank of the river directly upstream of the rail bridge needs to be monitored and protected if required as flood overflows from the upstream bend will cause erosion as they re-enter the river. Erosion at the upstream and the downstream end of this bend could over the long term cause the bend to be cut through.

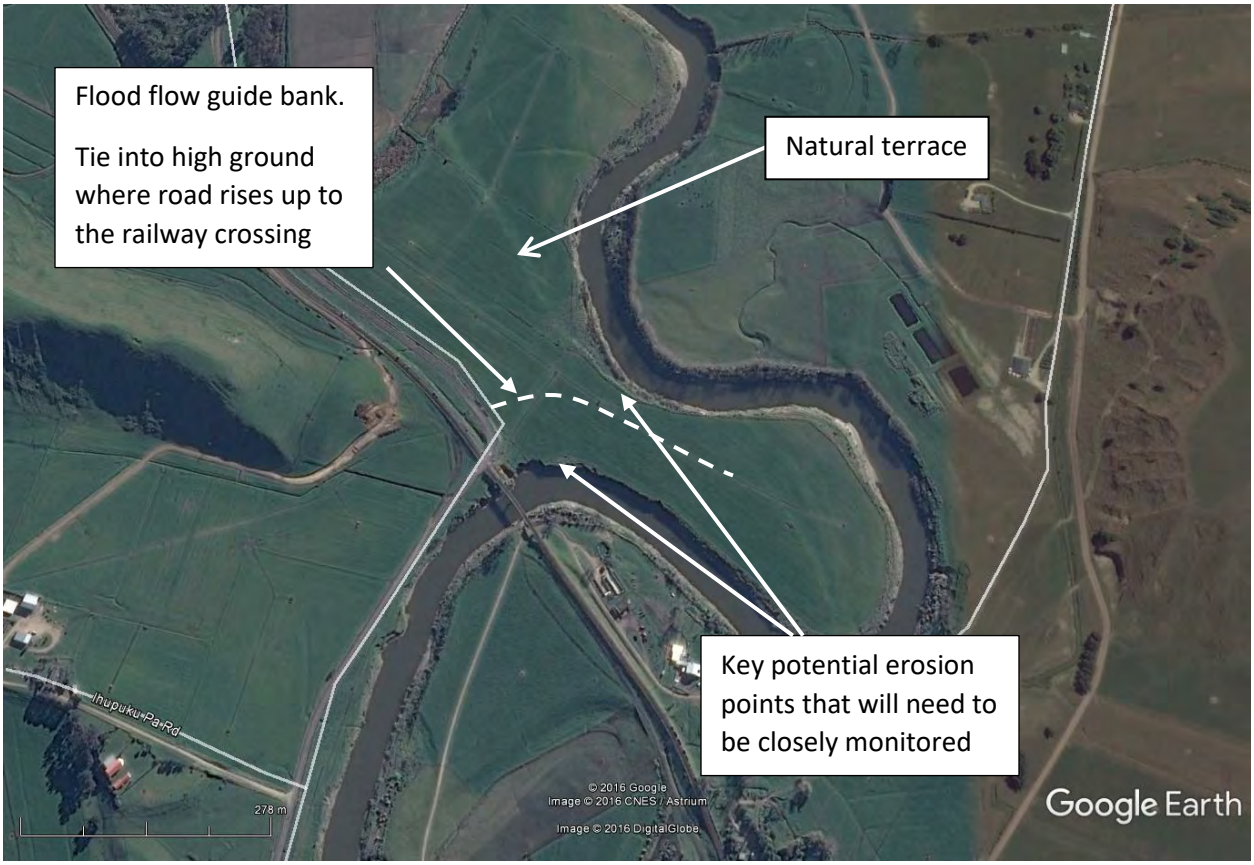

Figure 8

One option available to manage this bend should erosion at the downstream point become a problem, would be to construct a guide bank along the dashed line or along the natural terrace shown in Figure 7 to prevent flood waters from taking the short steeper path, and forcing the flood flows to pass around the longer bend.

4. Scheme Expenditure & Funding

Scheme funding is currently sourced 50% from the Regional Councils General Rate and 50% from the South Taranaki District Council.

Since the initial clearing works were finished in 2010, $80,000 was budgeted annually for works up to and including 2011/12. In 2012/13 the budget was reduced to $40,000 per annum and this has proven to be sufficient to undertake the necessary scheme maintenance. In 2014/15, the expenditure exceeded the budget by $14,000 to enable a large aerial spraying programme to be undertaken.

It is proposed that $40,000 continues to be budgeted for works in the foreseeable future but this will need to be reviewed regularly and will depend on any works required to maintain channel stability arising from flood events. This figure should also be adjusted with inflation to keep the same level of funding in real terms.

In the Councils 2017/18 annual Plan it is **proposed** that in the future, the Scheme will be funded by way of a targeted rate Levied of the South Taranaki District. This rating system will include additional rates to fund works on the Okato Scheme within the South Taranaki District and the Opunake Scheme.