Flood Mitigation Report for Waipapa and Kerikeri Districts

(1)Preamble

The area of concern is contained within the catchments and flood plains of the Waipapa River, Kerikeri River and the Puketotara Stream plus minor catchment streams and tributaries that connect to these main area river systems.

Kerikeri River Flood 2007 – near Kemp House

There have been many recorded historical flood events, the earliest (1843) relating to the missionary establishment in the Stone Store basin. A stack of newly sawn timber intended for the construction of an outside wash house next to Kemp house was washed away.

The existing 'boulder bank' in the Kerikeri basin is a zone of deposition of boulders, that have washed down stream, in ancient major flood events. This gives rise to the premise that these extreme weather events are not confined to the modern era.
For a comparison background, the purpose of this report is confined to the floods of 1981-1988 (Cyclone Bola) -2007 and 2011 all of which had origins as tropical cyclones with varying damaging impacts to the local district infrastructure and communities. It is noted that these storm events appear to be increasing with frequency, possibly linked to climate change?

The 1981 flood was the most devastating in volume with one life lost – all this caused by a 300mm high intensity 'weather bomb' in the upper catchment of the Kerikeri River!

Should such a 250 – 300mm high intensity weather event occur again, in any of the Kerikeri river and district river systems, would now be catastrophic. The advanced development in the area over the last 43 years would reflect a huge increase of costs and with the further possibility of lives lost.

(2) Planning and Development

Since 1981 through to the present time, development has been rapid and extensive, especially with the establishment of the Waipapa industrial and commercial area – most situated within the Kerikeri river flood plain. The known potential of a future flood events has been designed for, by artificially raising local ground levels above any perceived future flooding event. This has had the effect, that the service roads now becoming a directional flood paths for future events. This will undoubtably impact the flow volumes and raise the intensity of the flow on downstream infrastructure and properties.

Photo depicting new extension of Kahiatearoa Lane Waipapa Industrial Area Note the new proposed hard-fill floor levels on property to the left of photo.

Photo taken February 2023

This has been a typical design feature of the majority of the major industrial and commercial developments projects within the entire flood plain area. The entire new roundabout in the background of this photo would be under water in an average flood event. The properties on either side of this development are for sale or have been sold.

It is also noted that most of these new developments greatly increase the impervious surface run-off of the area's associated with each development, this by way of roofing and paved parking zones. Sealed access roads also contribute to the total impervious surfaces that create the directional flood paths to the nearest drain or river system.

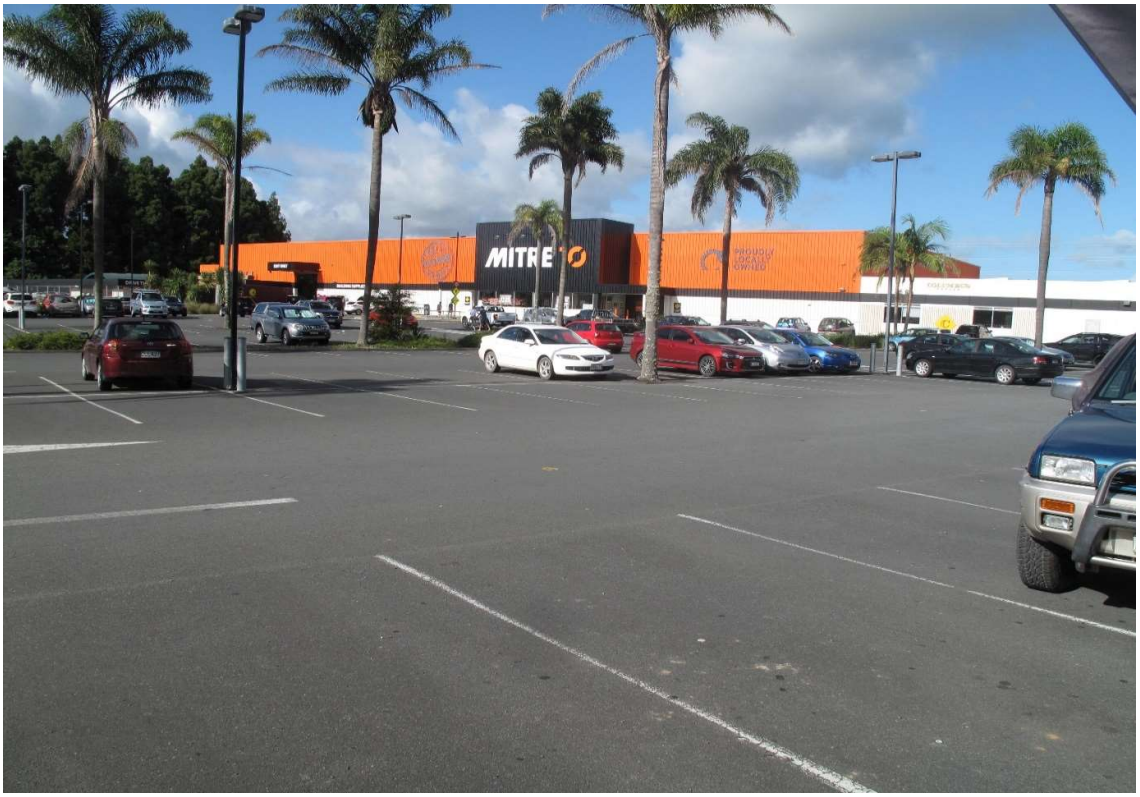
The immediate storm water drainage for most of Kahiatearoa Lane and part of Klinac Lane passes under State Highway 10 intersection with Kahiatearoa Lane via an under capacity 600-750mm culvert pipe. In a flood event the stormwater flow path would overflow to join with the Waipapa river catchment and the Kerikeri river.

Discharge drain from an undersized culvert under SH10 intersection with Kahikatearoa Lane – the main access road to Waipapa Estate

Background earthworks are preliminary work being undertaken for the new Far North District Council's Waipapa Sports Hub

Above photo of New Commercial building under construction depicting raised building platform in Klinac Lane. ***Photo's taken February 2023***

Lower Photo featuring extensive sealed parking areas that is common to the entire Waipapa commercial and industrial centre.



Downstream from State Highway 10 in the Waipapa area, there has been extensive housing sub-development projects and infill of small and large business developments. Of particular note is the large ITM Building Supply Ltd premises on the intersection of SH10 and Waipapa Road. An even larger Bunnings Store complex development is under construction in the immediate Eastern boundary of ITM. These two adjoining sites was formally rural grassland and a Macadamia orchard. The buildings, yards and parking facilities have created large impervious surfaces, which will now drain into the small Whiriwhiritoa Stream catchment, before discharging downstream to the Waipapa river catchment. From the regional authority, Northland Regional Council (NRC) there has been no recent survey of impervious surfaces since (2009)? There has been many consultant survey's and designs associated with the Kerikeri/Waipapa flood catchment area, focusing on the then known ground levels and potential flood paths. Far North District Council, and NRC are in the process of issuing Resource Consents and Building Permits, both in the **FNDC Operative District Plan** and in some cases processing Resource Consents and Building Permits in the **Proposed District Plan** ***This anomily is partly due to the complexity of provisions set out in the RMA***

Kerikeri river is joined by the Puketotara Stream before discharging into the Stone Store basin. The Waipapa river discharges separately to the Kerikeri Inlet at Waipapa Landing. Both localities have experienced much developed since the 1981 flood event and the Kerikeri Stone/Kemp House are of National historical importance. There would now be significant risk to this area, should there be an event of a similar 1981 intensity. Urban Kerikeri township experiences limited flooding from spilling from stormwater manholes during a 10 year ARI event, but increases to wide spread flooding of properties from stormwater manholes in a 100 ARI + event (1981)

Photo taken February 2023

Bunnings Building under construction with the ITM Building complex in the background. Both properties feature extensive impervious surfaces that increase the stormwater flows to the Waipapa and Kerikeri river catchments.

(3) Flooding Impacts to State Highway 10 (SH10)

SH10 is a major highway link to all the east coast communities from Pakaraka north, to and including Kaitaia and the Far North. SH10 now has enhanced importance as a detour link following SH 1 closure due to the extreme flood damage to Mangamuku hill section of SH 1. It is not expected the main SH One link will be restored within the near future.

The importance of SH10 as a reliable alternative route to the Far North is very important although it has in times of flood events, become temporally impassable (hours/days only)

SH10 flood zone in this instance, extends from a position just South of Puketotara Stream bridge to the new SH10/Waipapa roundabout intersection – distance of some 3 kms

If a major flood event occurred in the upper catchments of the Waipapa, Kerikeri rivers and the Puketotara Stream with an intensity of 250 – 300mm over 24 hr. period, there is potential to close SH10 completely with possible road, river channel and bridge damage. The waterway clearance of all three bridges have proved operational only in moderate storm flow events, before over topping. The flow velocities under bridges are often further compromised by flood debris material. The Waipapa industrial and commercial development will considerably enhance the directional flow to the Kerikeri River, with a possible land overflow into the Waipapa River catchment that could affect the downstream infrastructure and development of the Waipapa river communities. This was the event that caused much damage and a loss of life in the 1982 event.

Vegetation growth in the Whiriwhiriroa Stream channel approach to the 30m/s capacity box culvert under SH 10 Waipapa. This culvert is under capacity to receive spill-overflow from the Kerikeri River when in flood.

Photo taken February 2023

(4) Discussion and Conclusions

In 2012 NRC established the Kerikeri River Catchment Liaison Committee, drawing its membership from local landowners, interested engineers, cultural representatives, interest groups and members of FNDC staff. Regular meetings were held under the Chairmanship of NRC councillor Mr Joe Carr, supported by senior NRC staff members. Planning progress was made in the area of flood mitigation, with several in-house committee discussions which led to the review of several existing reports and the commissioning of further consultants to provide updated reports. These included investigation of increasing the downstream flow and the spread dissipation of flood events. Following extensive hydrological and hydraulic modelling of the drainage system of the entire Kerikeri River catchment, the main conclusion reached was a detention dam mitigation strategy was the best option. In 2015, Riley Consultants were engaged to prepare a Concept Design and Costing for a proposed previously selected Kerikeri K3A Dam site. Total (2015) cost was $13,766,000 inclusive of $2,501,000 contingency sum (25%)

Through unfortunate events such as critical staff and councillor losses, and more latterly the restrictions imposed by the Covid era, this essential design proposal has not been advanced. The increasing frequency of these storm events impacting Northland, Auckland and New Zealand east coastal regions requires and immediate proactive preparedness response.

A newly published (November 2022) Government report on climate change, identified Kerikeri as one of the 5 most vulnerable large communities in Northland. Kerikeri / Waipapa region has a considerable proportion of its population and infrastructure at risk to flooding.

The proposed mitigation detention dam, if construction was confirmed now, would still be 4-5 years before commissioning.

There are immediate pro-active responses to the flooding threat, that I recommend.

(a) Review and complete the Riley Consultants design and costings. Confirm and fast-track the construction option of the K3A detention dam.

(b) Urgently consider the funding options that may be available. Involve the key stake holders, including the New Zealand Transport Agency. Strongly advise the N Z Govt that the SH10 asset is a vital transport link that is at **severe risk.** Flood mitigation should receive an immediate funding allocation. This proposal is a priority to alleviate the **threat of damage to property, infrastructure, loss of access and above all the threat to human life.**

(c) Support and funding from FNDC and Irrigation Companies etc. that would be beneficiaries from a detention dam water supply a source Kerikeri/Waipapa water supply

(d) Funding and interest support from other potential users e.g., Irrigation Companies

(e) Revise and update the planning and the drainage effects of impervious surfaces in conjunction with accelerated stormwater flow into a known flood plain. This would include the effects of the creation of directional flood paths. A compliance interpretation check to be made in the issuing of Resource Consents and Building permits.

(f) Review and upgrade a maintenance work program to clean all drainage channels, culverts and bridge structures within the potential flood zones.

F.W.Terry **7th February 2023** **7.**

Infrastructure Consultant