STAFF REPORT

TO: Mayor and Councillors

FROM: Dennis Bush-King, Environment & Planning Manager
Peter Thomson, Engineering Manager

REFERENCE: S611

SUBJECT: **TAPAWERA EVENT – REPORT BACK RCN10-07-09** Report prepared for meeting of 22 July 2010

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1. PURPOSE

This report briefs Council on the rainfall and storm event that occurred in Tapawera on Sunday 16 May 2010 which did not eventuate in a declared civil defence emergency but an Emergency Operations Centre (EOC) was activated and landslips did result in evacuations and much damage to roads and private properties.

2. RAINFALL INFORMATION

Annex 1 contains a report from the Coordinator, Environmental Monitoring, which details how the event unfolded in terms of rainfall. It highlights the intensity of the rainfall in a number of small catchments equivalent to a 1 in 75 year return period (at least).

3. CIVIL DEFENCE EMERGENCY MANAGEMENT RESPONSE

A Group EOC was established initially at the Trafalgar Centre and subsequently at Tasman District Council on 16 May 2010 in response to the rainfall and resulting landslips in the Tapawera area. Eighteen staff from Tasman and Nelson Councils staffed the EOC supporting the Police response. The Police were lead agency for the event but the scale of the operation soon grew to a point where evacuations were necessary and support from CDEM was required. A welfare Centre, staffed by Red Cross, was set up in Tapawera to cater for those evacuated. This represents the most significant activation of our CDEM structure for many years and it worked well.

A debrief was held 4 June and lessons learned will be reported back to the Readiness and Response Committee.

The impact of the event also lead to a formal, multi-agency recovery process chaired by Peter Thomson as CDEM Group Recovery Manager. This is the first time for such a process and a debrief is to be held 22 July.

4. COUNCIL INFRASTRUCTURE IMPACTS

The amount of debris that covered the roads was immense so the decision to use large earthmoving equipment proved to be the correct one. This showed that Council was committed in getting roads open as quickly as possible. Basic access to all was able to be achieved within three days and follow up work to get roads back to normal took just over eight weeks. Structural damage was minimal.

5. FUNDING

Council costs to date are:

Stage 1and 2 – Initial Clean up
Estimate $389,500 Actual $395,178 Remaining $ Nil
Stage 3 – Structural Repairs
Estimate $140,000 Actual to Date $9,943 Estimated Remaining $90,000.

The New Zealand Transport Agency (NZTA) has approved $389,500 with a subsidy rate of 50% for the 2009/10 financial year. Application will be made for the reminder on LTP online.

6. OTHER IMPACTS

The event has also created significant on-going issues for local streams in the area. Many remain blocked with debris and a programme of work will continue to clear channels within the limitations of the available Z-funding. The long term stabilisation of the catchment is important and a green solution appears to be the most likely and affordable solution to achieve the best results and this will require liaison with landowners.

7. CAUSE AND EFFECT

Of concern to the local community was the quantity of forest debris that that moved downslope and affected private dwellings and farms, in addition to roads and bridges. Evidence collated after the event shows that the majority of forest debris was not sawn logs. Some of the debris flows came from native forest as well as production forest under the control of Nelson Forests Ltd, Hancocks Forest Management, and at least two smaller private forests, one adjacent to Phillips Road, and another adjacent to Newport Road.

The predominant cause of the outflows is what is termed Mid-Slope Failure, where, as a result of the intense rainfall soil, rocks, and forest debris, including standing trees, moved downslope and formed a debris emulsion accumulating more material as it moved.

Affected people naturally want to apportion blame. However the forests tracks and skid sites, which were consented under the RMA, held up very well under the circumstances. There was one site where sawn logs did move off, but this did not affect any privately owned land. One of the Council's own bridges bore the brunt of this outflow.

One issue we have considered is the build up of debris from an extreme wind event in 2004 which was not cleared away at the time. While a contributing factor, we accept that we are dealing with deeply dissected and difficult country and there were health and safety considerations which meant that not all areas that were impacted by the wind throw event in 2004 could be safely accessed. Some might question whether or not the land should have been planted in trees – some of the plantings in the Motueka west bank go back to the 1940s when the Government of the day promoted planting as a means of soil stabilisation in what is geologically a very difficult part of the district. The staff view is that any alternative landcover would pose other risks.

The fact that both private and public land received forest material does give rise to questions about the liability of the owners of that material to assist in removing it from someone else's land and cleaning it up. The companies concerned did move in to assist although the scale of assistance was variable subject in part to negotiations between the insurance companies for both the private landowners and, in particular, Nelson Forests Ltd.

Some have raised the Tasman Resource Management Plan (TRMP) status of forestry as a permitted activity in the expectation that more controls might be needed to prevent a reoccurrence. The fact that both native and production forests were similarly affected makes the case for further regulation more difficult. The staff view is that more regulation is not justified on the basis of this event. There will no doubt be lessons that the forest companies will learn about better land management practice but already our forest companies perform at a high level of environmental awareness. The Land Disturbance rules are programmed for a review (Project 16 in the Resource Policy Work programme) and this can pick up anything that may be appropriate but no further action is proposed or recommended.

8. BUILDING ACT CONSIDERATIONS

Following the event Council building staff inspected the 22 affected buildings. Two houses were determined to be dangerous and unsanitary and at the time of writing are still vacant while the insurance companies sort matters out. Another dwelling had its water and waste water systems affected by the debris flow. While temporary arrangements were put in place, refurbishment is expected. We have agreed to waive building consent fees for these three properties.

The manner in which the houses and properties were affected highlights the difficulties in appropriately locating dwellings on sites which are bisected by streams and downslope of tree-clad hills. Many of the affected houses have been in existence for over 50 years without any prior issue with debris flow. As such, the landowner view might be that something up-catchment must have contributed to event. However natural hazard risk will always exist in such situations and given the size and location of private titles, can often never be completely avoided. Where such risk is plausible and identifiable, provision exists under the Building Act to tag the title accordingly.

9. COMMUNITY FOLLOW UP

A community meeting has been arranged for 21 July chaired by the Mayor. The Forest Companies and CDEM representatives will be in attendance.

10. RECOMMENDATION

THAT the report Tapawera Event – Report Back RCN10-07-09 be received by the Tasman District Council.

Dennis Bush-King
Environment and Planning Manager

Peter Thomson
Engineering Manager

Annex 1

Rainfall and flood summary for storm of 16th May 2010

Compiled by Martin Doyle, Coordinator, Environmental Monitoring, Tasman District Council
26 May 2010

Background

Severe erosion and flooding in small streams occurred in the Lower Wangapeka area, a large flood occurred in the Baton River, and moderate flooding of other larger rivers occurred early morning on the 16th of May.

A North East storm brought steady rain to the lower and mid Motueka Valley, the Riwaka area, and the hills behind Takaka. This area was already wet from a storm two days prior. The most significant flood occurred in the Baton River, this being the fourth largest since 1972, with an ARI (Average Recurrence Interval) of 20yrs. The lower Riwaka River flooded to a level which had an ARI of 4 years. The Baton and Riwaka rivers peaked at around 6am.

Reports of damage indicate heavy rain occurred right up the Motueka west bank from Riwaka to Wangapeka. Recordings show the lower Motueka River at Woodmans Bend peaked prior to the upstream Woodstock location, which confirms heavy rain in this location, and photographs have been taken showing damage from a large flood in the Rocky River. Water from the Motueka River flowed across the paddocks at the head of Peach Island "before daybreak", and around behind Peach Island "about 10 – 10:30" (Bill Chapman – local resident). Sandra Young noted water across her property (straddling the road to Peach Island) at 6:45am.

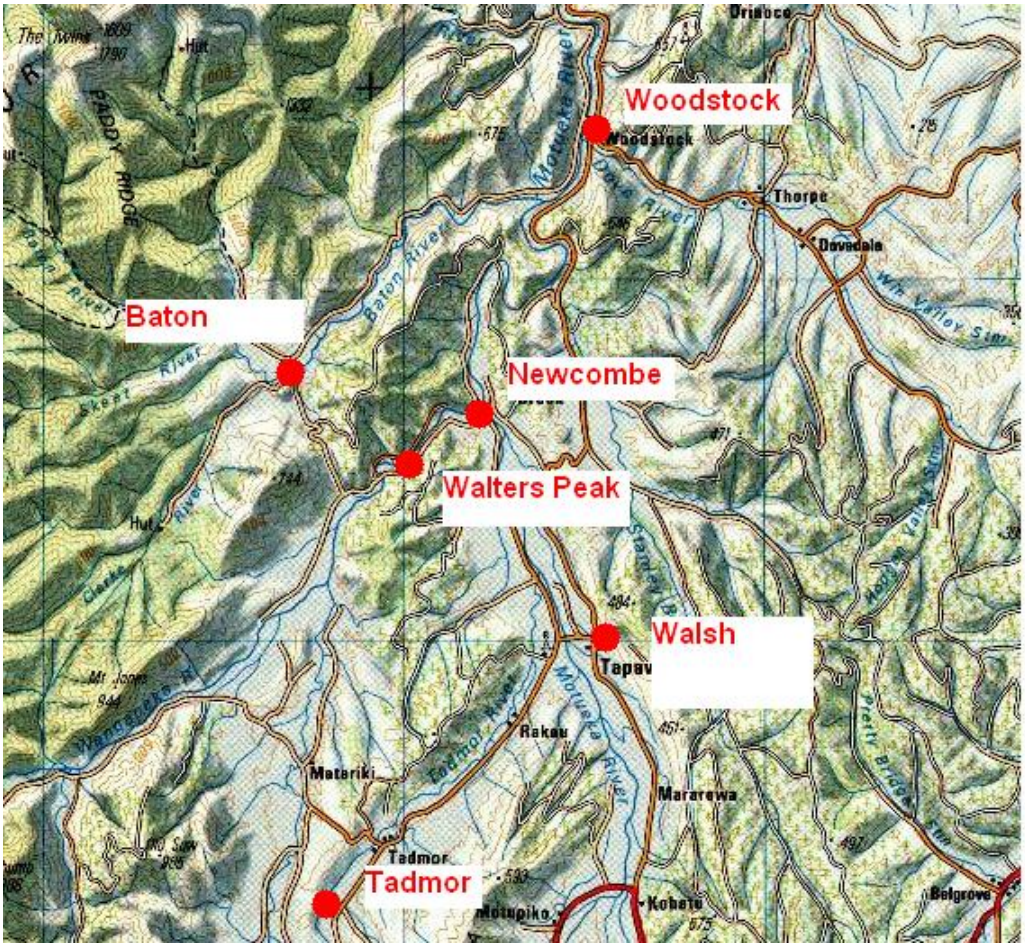
At 8am a period of intense rain formed in an area centred on the lower Wangapeka and caused large flows in small streams and considerable erosion, along with damage to property located at the lower reaches of these streams. This localised event was the notable feature of the storm.

Weather forecast

Metservice had advised that a large complex low lay west of Nelson, with bands of heavy showers and thunderstorms circulating around the low and crossing northern and central New Zealand. Some intense falls were possible at times from convective activity.

Location where rainfall recorders are located

Tasman District Council measures rainfall at 4 sites close to the area affect by the storm. Of these, the Walters Peak gauge appears to be quite central to the heaviest rainfall. Rainfall measured by manual gauges are also referred to in the report, and the location of all of these are shown in the map below.



Information recorded at automatic recording sites in the locality

Of the 4 automatic raingauge sites in the locality, the heaviest falls occurred at the Woodstock, Baton and Walter peak gauges. The Tadmor gauge did not experience any notable intensities, and this data is not discussed in this report.

In the Mid-Motueka Valley, around 50mm fell over the 12th and 13th May. Some showers then occurred, and rainfall began falling steadily again around midday on Saturday the 15th. Over the next 12 hours rainfall in the area continued at rates of 2 – 5mm/hr, totalling a further 23 – 32 mm. Around 1am on Sunday the 16th, the intensities increased, reaching 15mm/hr at times, with occasional short bursts of 10mm over a 15 minute period (a rate of 60mm/hr).

Totals continued to accumulate and it is notable that, prior to intense rain commencing at 8am on the 16th, 150 – 180 mm of rain had fallen over the past three days.

In the 15 minutes following 08:15am a burst of 17mm was measured at Woodstock, and for the same period 9.7mm at Walters Peak. These intensities didn't remain as high at Woodstock, but further 15 minute totals of 13.7 mm, 17.7 mm, and 9.2mm occurred at Walters Peak. This was a total of 50.3mm for the hourly period, and it is this rainfall that caused the damage.

Note: The Walter Peak gauge was checked against the on-site manual 'checkgauge' on the 11th May, and then again on the 21st May, so this data can be used with good confidence.

Information recorded at manual gauges in the locality

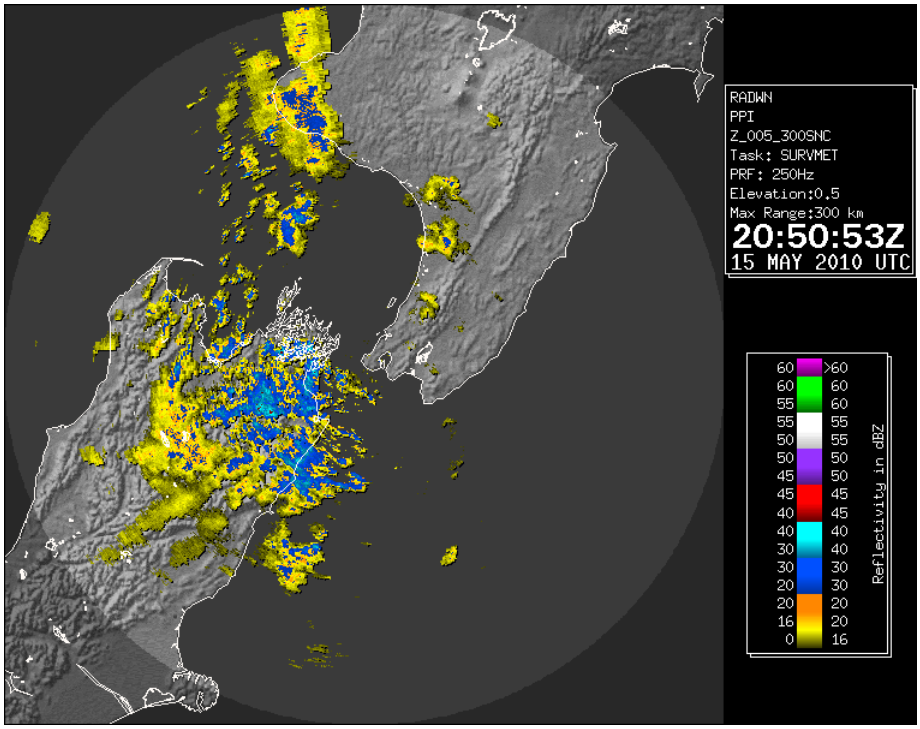
Other information has been provided from local residents who measure rainfall in manually read gauges. Most of these are daily totals, but two are of particular interest because rainfall was measured over shorter durations. Neither of these gauges has been sighted, so it is unknown whether they meet the requirements for a properly located gauge (most 'home' gauges do not).

The first reading comes from Mark Newcombe, who lives close to the confluence of the Wangapeka and Motueka rivers, about 2km NE of the Walters Peak gauge. Mark reports that he "tipped 75mm from his gauge at 7:30am Sunday, and a further 102mm at 10:30am". The second reading comes from Barry Walsh who lives in the Tapawera Village. He "measured 133mm for the weekend, and 75mm of this amount fell from 6am to 9am on Sunday". These rainfalls can be compared to that measured at the Walters peak gauge at the exact same periods:

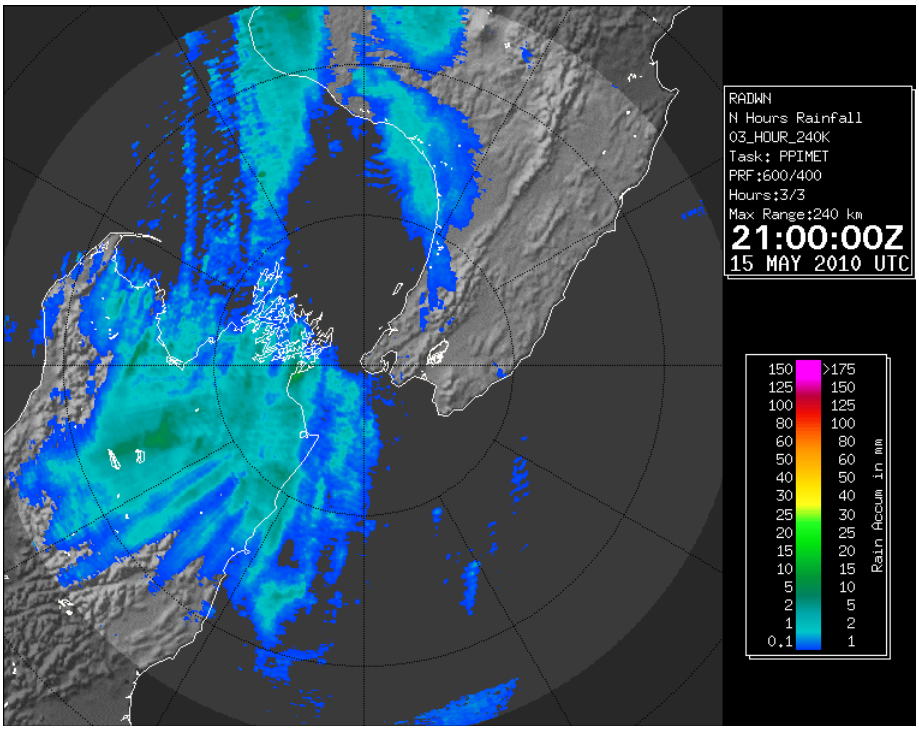
Newcombe: *103mm in 3.0 hours, (Walters Peak – 81.1mm in same period)*
Walsh: *75mm in 3.0 hours, (Walters Peak - 72mm in same period)*

Wellington weather radar

The following image was taken at 8:50am NZ time. A small cell of rain can be seen as a blue section in the Wangapeka area.



This image was taken at 9am, and shows three hour accumulations. It shows the band of rain that had fallen right down the Motueka west bank to Riwaka.



Significance of rainfall that was recorded at the three automatic sites

A summary of maximum rainfall for various intervals at the 3 automatic sites is shown below, and is compared to previous recorded maximum rainfall at each site for that interval, and is assigned a statistical significance as well.

The statistical value is the ARI (Average Recurrence Interval, or return period), and has been calculated from version three of the HIRDS software, developed by NIWA. This software provides a regional analysis of all rainfall data. The software has just been updated, although it is not widely available at the time of writing.

It can be seen that the most unusually high rain occurred over the 30 – 60 minute period, and for a small catchment this is a particularly damaging duration, as the flows created from intense rain at the most distant part of the watershed arrive while the nearby parts are also still contributing very high flows.

Woodstock Raingauge, records commenced 1987

	Max 15 minute	*Max 30 minute*	*Max 1 hour*	*Max 2 hour*	*Max 6 hour*	*Max 24 hour*
May 2010	17.5	23.5	35	47.5	93.5	155
Previous max	20	32.5	45.5	48	99	199.5

Return period of 2010 rainfall	30	15	12	12	25	16

Walters Peak Raingauge, records commenced 1988

	Max 15 minute	*Max 30 minute*	*Max 1 hour*	*Max 2 hour*	*Max 6 hour*	*Max 24 hour*
May 2010	17.7	31.4	50.3	55.3	105.9	154
Previous max	14	25.5	43	53.5	85	199
Return period of 2010 rainfall	57	90	88	35	70	24

Baton Flats Raingauge, records commenced 1988

	Max 15 minute	*Max 30 minute*	*Max 1 hour*	*Max 2 hour*	*Max 6 hour*	*Max 24 hour*
May 2010	12.5	17	22.5	35	78	138
Previous max	17	21	31	49.5	91	154
Return period of 2010 rainfall	20	10	4	5	3	9

Significance of rainfall that was recorded at the two manual raingauge sites

Of the two 3 hour duration manual readings supplied by local residents, the highest is that measured at Mark Newcombe's property. From conversation with Mark, the timing of the 7:30 and 10:30 readings may not be exact, but this is not important given that it straddles the period of heaviest rainfall.

A total of 102mm over 3 hrs, when analysed using the HIRDS programme, has an ARI of around 200 – 250 years. Much of this rain will have fallen within a 2 hour period, and this ranks with the highest rainfalls over this duration ever recorded in this region. A graph showing the HIRDS output is provided at the end of this report.

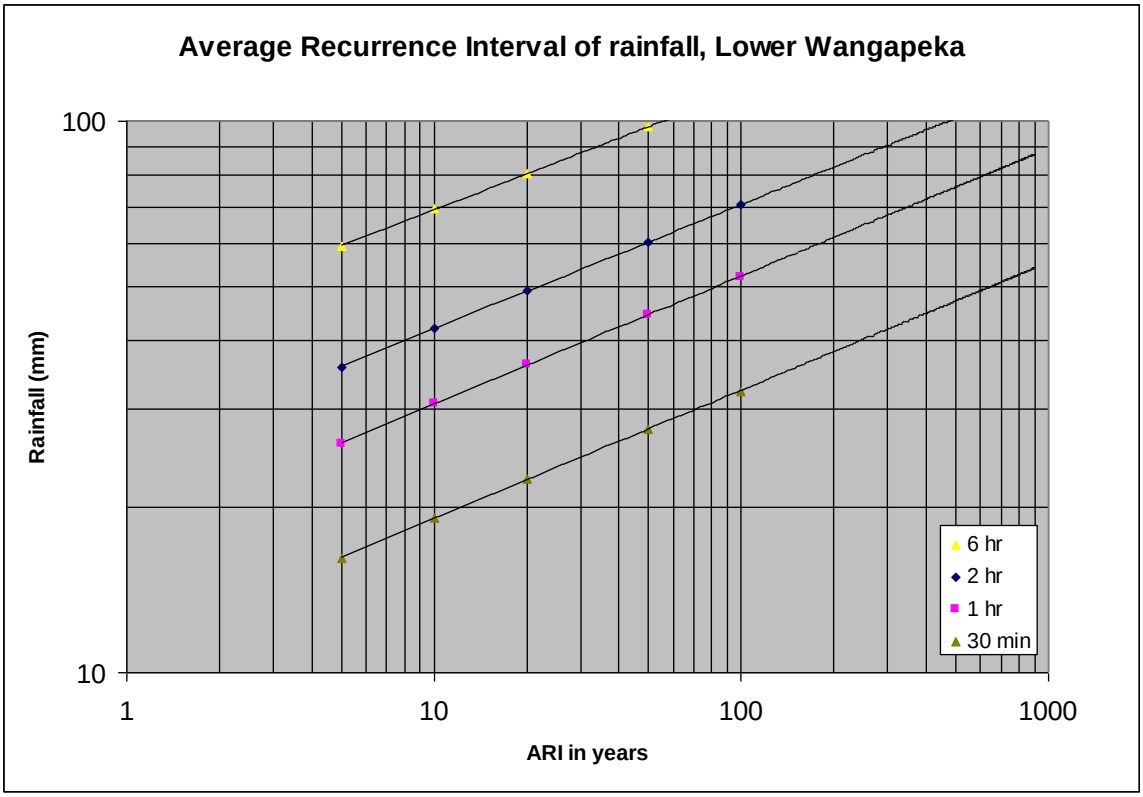
Some notable rainfalls from this district are shown in the next table. Not all of the rainfalls for a given site are notable, but for completeness, all durations are provided for each site that has at least one notable rainfall.

Note that some of the longer duration rainfalls (2hr and 3 hr) come from locations such as Waingaro in Golden Bay, and these sites cannot be directly compared with the lower Wangapeka as they have naturally higher rainfalls from orographic influence, this being more important rainfall generating process for longer durations.

Some high intensity rainfalls previously measured in the Tasman and Nelson area

Location	*15 min rain (mm)*	*30 min rain (mm)*	*1 hour rain (mm)*	*2 hour rain (mm)*	*3 hour rain (mm)*
Stoke	30.2	50.2	55.3	79.5	89
Upper Brook	17.5	25.5	45.8	77.7	89
Roding Valley	27	43	55	81	93
Richmond	35	52	55	75	85
Wairoa (Upper Gorge)	25	31.9	41	53.5	61.5
Wairoa (bottom Gorge)	20	29.5	44	55.5	59.5
Motueka Gorge	21	32	45	55.5	84
Upper Moutere	25.8	37.5	47.9	77.5	91
Tasman	18	34.5	55	71.5	81.5
Riwaka Valley	33.8	53.1	59.8	91.7	124
Motupiko	21.2	38.4	45.1	55.3	62.4
Upper Wangapeka	15	23	39	59	97.5
Takaka Hill	27.3	35.5	57	82.5	104.5
Waingaro	22	35	59	95	128
Anatoki	18	27	50	85	108
Upper Takaka	18	29.5	48	75	101
Lower Wangapeka (2010)	*17.7*	*31.4*	*50.3*	*55.3*	*81.1*
Maximum	**35**	**53.1**	**59.8**	**95**	**128**

Rainfall frequency output from HIRDS program, with lines extrapolated past an ARI of 100 yrs by the writer


Average Recurrence Interval of rainfall, Lower Wangapeka
100
10
Rainfall (mm)
1
10
100
1000
ARI in years
6 hr
2 hr
1 hr
30 min