RIVER AND DRAINAGE ENGINEERING REPORT

1. PURPOSE

1.1. The purpose of this item is to report on progress with river and drainage activities for the period 14 February 2019 to 9 April 2019.

2. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 19-52.

3. FINANCIAL IMPACT

3.1. Funding provision for all activities reported on in this item is either included in the River and Drainage General or River and Drainage Schemes Activity sections of the 2018-28 Long-term Plan (LTP); is covered by an approved carry-forward of unexpended budget in 2017-18; or additional approval will be specifically sought by way of recommendation in the item.

4. SIGNIFICANT BUSINESS RISK IMPACT

4.1. There are no significant risks inherent in the adoption of the recommendations contained in this report.

5. DISCUSSION

5.1. Much of the focus over the period has been on community engagement – the programme of Scheme/ Catchment Community meetings timed to coincide with the Annual Plan consultation period. Attendances are typically what we would expect, with some such as Foxton and Hokio drawing relatively large audiences and (with the latter) discussion covering a wide range of Council activities.

5.2. Various initiatives relating to the Lower Manawatu Scheme (LMS) continue to consume a large proportion of the Group’s technical resource. Those initiatives relate to the delivery/impending completion of the Rural Upgrade Project and work to compile an Operations and Maintenance Manual for the LMS. They also include the joint initiative with Science that ultimately looks to identify where investment to address sedimentation (accumulation of sediment on berms that is reducing flood protection standards over time for some parts of the scheme) is best directed.

5.3. Also progressing is the work being carried out by engineering consultants Tonkin and Taylor, applying the dam assessment guidelines to the stopbank network that protects Palmerston North. Combined with other operating risk reduction initiatives such as the Reid Line Floodway upgrade that has created some resourcing challenges.
5.4. At the February meeting, I mentioned some of the work underway through MWLASS relating to our material damage and infrastructure insurance policies and the damage scenario assessment work being undertaken by Tonkin and Taylor. Some of the preliminary results from that analysis suggest that the values covered by the existing policy may be too light; on the back of increasing premiums this work raises further red flags around insurance costs. As noted previously, around half the asset valuation for river management is attributable to the LMS, forming something of a perfect expenditure ‘storm’ (along with debt repayment) for that scheme.

5.5. Work to take the active channel of the Rangitikei River away from the old Rangitikei District Council (RDC) landfill at Putorino has commenced and should be nearing completion by the time the Committee meets. That diversion is being achieved in part through gravel extraction and in part through channel shaping; identifying a contractor able to extract at this location proved challenging due to the relatively remote location of the site. The part use of extraction to form the diversion channel will mean that for the Rangitikei, the volume extracted this year will exceed the average allocable volume limit identified in the One Plan.

5.6. Members might recall references in reports from 2016 and 2017 to work required/underway to KiwiRail’s Ngawapurua Bridge spanning the Manawatu River between Mangatainoka and Woodville. At the time a combination of changes in river alignment combined with some limitations relating to the original bridge construction (primarily the depth of the piles supporting some of the piers) required KiwiRail to undertake both structural modifications to the bridge and some river works.

5.7. Subsequent to that work being completed, the alignment of the Tiraumea River has continued to alter, particularly with the three or four high flows events that occurred in 2018. Those alignment changes have caused the Tiraumea to erode a part of the wedge of land between the Tiraumea and Manawatu Rivers (pastoral farmland at the northern end of the Haukopua Reserve); the gravel input from the Mangatainoka River makes the section of Tiraumea between the Mangatainoka and Manawatu confluences much more mobile than the other sections further upstream.

5.8. A number of landowners are potentially affected by those alignment changes but the Tiraumea sits outside the Upper Manawatu Scheme and direct interventions do not form part of the Tararua Scheme. Ultimately, the changes could see the confluence with the Manawatu shift further east, potentially with some costs falling to the Upper Manawatu Scheme to fortify the right bank of the Manawatu to prevent large-scale loss of land.

5.9. Laying the ground work for central government funding as it relates to the training structures along the lower reach of the Whanganui River continues. Notable events over the period include the completion of the BERL work commissioned by Horizons that brings together the business case for central government investing in improving the integrity of these structures; the value-add they provide to the Whanganui economy around avoided damage costs.

5.10. Staff/consultants associated with central government’s provincial development unit also visited Whanganui on 21 March, amongst other things being given a tour of the lower reach of the awa and an overview of Whanganui District Council’s (WDC) Port Revitalisation Project (PRP). That included understanding the interdependencies between the PRP and the river training structures and the strong ties to the local and (in part) regional economy.

5.11. On 1 March, staff met with Palmerston North City Council (PNCC) staff to discuss Flygers Line. A section of Flygers Line has been reduced to one lane following the June 2015 flood event, with PNCC contending that some of the reinstatement cost should fall to
Horizons on the basis that the operation of the Mangaone spillway exacerbated the erosion that occurred. The position conveyed to PNCC was that contributing to the reinstatement of a public road would not materially contribute to the levels of service provide by either the Lower Manawatu or Manawatu Drainage Schemes.

5.12. Noting that in addition to the approval provided at the March Council meeting relating to the draw on Pohangina-Oroua Scheme reserves and the draw approved by Council for the Rangitikei Scheme (both attributable to 2018 flood damage) I have approved a number of other more minor draws on reserves that lie within my financial delegation. Without fully reproducing the commentary contained in the report to the March Audit, Risk and Investment Committee meeting, they include Himitangi, Hokio, Tawataia and Pakihi, totaling around $35,000. Commonality is scheme size - small schemes where concentrating maintenance/ renewal activity is the most efficient approach, using reserves to smooth the expenditure ‘lumps’.

5.13. Work commissioned by Council to determine the suit of management options that exist for managing the mouth of the Waikawa Stream south of Levin has been completed. Undertaken by engineering consultants Tonkin and Taylor, the report provides comprehensive picture of the complex fluvial and coastal processes and the array of intervention options available. Staff are intending to meet shortly with the Waikawa Beach Ratepayers Association to discuss the report, followed by a wider community meeting.

5.14. In regards to staffing, Tyree Laskey has resigned his position of labourer within the southern team, replaced with new recruit Jordan Morton. Jordan has now been joined by Cameron Reid, meaning that the southern team now has a full complement and that the spray rig can now be fully utilized. Daniel Mackay has joined the northern team as engineering officer, replacing Jeremy Cumming who resigned late last year.

6. INVESTIGATIONS AND DESIGN

6.1. The Investigations and Design programme has a number of significant pieces of work programmed for this financial year. The table below has been developed, and will continue to be updated, to inform members of the current state of these projects and their anticipated completion date.

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<th>Project</th>
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<td>Non-Scheme Rivers Investigation</td>
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LMS – APPLICATION OF DAM ASSESSMENT GUIDELINES TO PALMERSTON NORTH STOPBANKS

6.2. During this reporting period consultants Tonkin and Taylor have continued to progress this project. Work has included undertaking a number of geotechnical analyses to help to
quantify risks associated with the stopbank network. A Failure Modes and Effects Analysis workshop between Tonkin and Taylor and River Management staff took place on 27 March.

**LMS – APPLICATION OF THE FLOOD PROTECTION ASSETS PERFORMANCE TOOL**

6.3. During this reporting period, staff have begun work on applying the *Flood Protection Assets Performance Tool (FPAPT)* to the LMS. The development of this tool, and the Code of Practice that underpins it, was commissioned by the River Managers’ Special Interest Group to provide a nationally consistent framework that accounts for all of the factors that contribute to an effective functioning flood protection scheme.

6.4. The tool builds upon the condition assessments that are routinely undertaken by river management staff and recorded in the *Asset Management System (AMS)*. Knowing the condition of every individual asset is important, but not enough on its own. As well as considering the condition of individual assets, the tool also takes account of:

- The consequences of failure of each asset;
- Interactions between assets, such as stopbanks, rock lining and culverts; and
- Elements that are not Scheme assets as such, but are major determiners of risk, e.g. berms are not an asset but a stopbank is much more secure if the adjacent berm is wide.

**SEDIMENTATION IN THE LOWER MANAWATŪ AND OROUA RIVERS**

6.5. This project is being carried out in collaboration with the Science and Innovation, and Information Management teams.

6.6. Consultants Tonkin and Taylor have continued to progress this project, reviewing available information and looking at the geomorphic processes that influence sediment transport and deposition in the Manawatu Catchment. The project will look into a range of river management strategies that could be further developed to mitigate or used reduce the impacts of on-going sedimentation in the lower reaches of the rivers.

**MANAWATŪ THROUGH PALMERSTON NORTH 2 DIMENSIONAL MODELLING**

6.7. WSP OPUS have continued work on the development of a 2-dimensional model of the city reach of the Manawatu River. This model will provide detailed information that can be used to inform future uses of the berm land in the city, as well as supporting maintenance and operation decision affecting the city stopbanks.

6.8. Information about the work undertaken and the results produced will be presented as a separate agenda item.

**KOPUTAROA SCHEME REVIEW**

6.9. Staff have continued to progress this review primarily looking at how the scheme will need to function to meet changing and evolving expectations and demands over the coming years. These challenges include those driven by changing community expectations in terms of environmental management as well as those related to the predicted economic growth in the Horowhenua district.

6.10. The continuing development of the Scheme Review was presented, by staff, to ratepayers at the Koputaroa Scheme Meeting in March. This meeting provided valuable feedback that will help to inform the review and its recommendations.
MANAWATU & OROUA GRAVEL RESOURCE STUDIES

6.11. The report on the Manawatu Gravel Resource Study is currently being drafted. The study looks at how the gravel resource in the River between Ashhurst and Opiki has changed over recent years. In addition to an analysis of the gravel reach of the river, a cross sectional analysis of the silt phase of the river (between Opiki and the Tasman Sea) has also been carried out. This information has been shared with the consultants carrying out the Sedimentation Study.

6.12. The processing of the cross sectional data from the surveys of the Oroua River has begun. The reports of both the Oroua and Manawatu Gravel Resource Studies are programmed to be presented to the June Catchment Operations Committee Meeting.

POHANGINA GRAVEL RESOURCE STUDY

6.13. The data analysis for this study has been undertaken. Work is currently underway developing a gravel management strategy for the river based on the data obtained from the cross sectional analysis. This strategy will form the basis to inform extractions and consents to ensure that the gravel resource is managed in a sustainable manner. This approach is considered important especially considering the increasing gravel demands in the Region related to a number of significant roading projects coming on line.

RANGITIKEI RIVER MANAGEMENT STRATEGY

6.14. Work has continued with the northern area team to develop a strategic approach to the management of the river in line with the recommendations that Gary Williams has previously presented to Council. Following on from Mr Williams’ work as well as previous scheme reviews, staff have been looking at what practical in-the-field measures can be implemented to achieve a balance between funding resources and challenges from the river. This has led to a review of the types of physical works that have been carried out in within the river corridor in the past and those that could potentially be implemented.

REID LINE MODELLING

6.15. To inform the Reid Line Upgrade Project consultants Jacobs have been engaged to build a 2-dimensional model of the floodway. This model will be used to help guide the property purchases that are necessary to increase the use of the floodway.

ASSET MANAGEMENT

6.16. This period has seen a significant amount of work undertaken in terms of asset management. Work on the migration of asset information to the new Asset Management Information System (AMIS) has continued with the vital tasks of data cleansing and verification. In addition, information gathering to inform inspection criteria has been undertaken to aid the annual asset inspections that will be carried out before the end of the financial year.

6.17. In addition to this work, staff have also been working alongside the corporate assets team on the Insurance Valuation Project.

6.18. Following a meeting with Audit NZ, staff have been looking to the audit that is programmed for year end. To provide the information that the auditors will need possible work has begun on looking at the fair valuation of River Management assets; initial indications are that a valuation increase is almost certain.
REGULATORY ADVICE

6.19. During this reporting period, advice was provided on a number of substantive matters. This regulatory work has included specialist advice on flood risk and the production of technical reports for consent applications, rezoning and subdivisions.

LOWER MANAWATU SCHEME RURAL FLOOD PROTECTION UPGRADE PROJECT

6.20. This reporting period has seen largely settled weather patterns meaning that physical works able to be progressed have advanced quickly such that most are in the process of being finished and closed out for the season.

OROUA RIVER

6.21. The upgrade of the stopbanks on the right bank of the Oroua River between the Waste Water Treatment Plant and Aorangi Bridge has largely been completed. The stopbanks have been constructed and currently finishing works such as fencing are being completed before the contractor leaves site.

6.22. Stopbanking upgrade works on the left bank below the Feilding Golf Course have been completed for the summer. The works currently being finished off with fencing currently taking place.

6.23. As previously reported, the physical works on the left bank of the Oroua have been stopped upstream of Te Arakura Road to ensure that there is adequate time to consult with the landowners downstream of Te Arakura Road, a number of which have objected to the construction of stopbanks on their property.

6.24. Physical work to upgrade the stopbank on the right bank upstream of Aorangi Bridge, through Feilding, is programmed to be undertaken next year. Consultants GHD have been appointed to design the necessary flood protection through a reach of the river that has a number of physical constraints in terms of what is possible to construct.

MANAWATU RIVER

6.25. The upgrade of the Himitangi Block Road section of the Manawatu River stopbanks has progressed well over this reporting period with the majority of the construction works now completed. However, an archaeological discovery during the stripping of ground behind a stopbank means that a short section of approximately 250 m will have to be deferred to the next construction season to allow the necessary archaeological authority to be obtained; previous advice was that an authority was not necessary.

TOKOMARU RIVER

6.26. The works that were carried over from the last construction season have now been completed and work has now started on the Right Bank Upgrade between Opiki Road and Boundary Pump Station.

6.27. Works on the left bank adjacent to the Makurerua Reserve have been put on hold until next summer. This is to enable work to be undertaken along local iwi and Department of Conservation (DoC) to look at the potential to enhance the Reserve.
TAONUI BASIN PROPERTY PROTECTION

6.28. Tenders have been received for raising a house in the Taonui Basin as required as a condition of consent. The physical raising of this house is programmed to be completed by July.

PROJECT SUMMARY

6.29. The charts below summarise the progress that has been made in the Rural Upgrade Project. The first shows that by the end of March over 154,000 m³ of material has been placed into the stopbanks, and that by the end of the construction season it is anticipated that approximately 63% of the material needed to complete the project will have been placed.

6.30. The second chart summarises the current financial position of the Rural Upgrade Project. As shown, we have currently spent approximately $3.1M and anticipate that we will expend $5.7M by the end of the financial year which will leave approximately $4.8M of work to complete in the next financial year.
6.31. With the physical construction works for the 2018-19 summer season drawing to a close staff have begun preparations for the 2019-20 construction season. To date much of this work has focused on progressing negotiations, under the Soil Conservations and Rivers Control Act process, for the stopbanking on the left bank of the Oroua. It is considered important to progress these negotiations to enable a contractor to be appointed in a timely manner for what will be a large construction project.

6.32. Staff have begun to develop a programme for the delivery of the remainder of the Rural Upgrade Project. This is to ensure that all of the necessary survey and design works can be completed in a timely manner. This will enable the tendering of works packages to occur as soon as possible to ensure that contractors are available for the critical part of the construction season.
7. CENTRAL AREA

GENERAL

Central Area
Percent of Long Term Average Flow

Central Area Rainfall

Rainfall (mm)

Quarterly Total  Long Term Mean

Makino at Cheltenham  Mangaone at Milson Line  Oroua at Rangiwahia  Upper Mangahao at No.1 Dam
7.1. This reporting period was characterised by prolonged dry spells broken by infrequent and light periods of rain. This has resulted in sustained low flows.

**LOWER MANAWATU SCHEME**

7.2. Works undertaken on the various rivers within the scheme this period include the following:
MANAWATU RIVER

7.3. The scheme held its annual Catchment Community meeting on 25 March. Budgets, projects and issues affecting the scheme were discussed. Attendance was good, with the 9 am time slot suiting many.

7.4. The rock revetment near the State Highway 3 Bridge near Ashhurst has been completed. During the works, gravel relocation was also undertaken near the Pohangina confluence to reinstate the previous main channel alignment. This will reduce the flow in the previous high flow only channel that enters the Manawatu River upstream of one of the three rock groynes that were constructed last year, reducing the likelihood of the newly constructed top groyne being outflanked.

7.5. The upstream rock groyne nearest the confluence had lost some rock during high river flows since its construction and to reduce the risk of it being outflanked by the Pohangina, rock that was stockpiled last year has been used to repair the groyne nose and extend the groyne.

7.6. The other ongoing concern with the Pohangina is that it will continue to erode the point of the vegetated gravel bar upstream of the top groyne. If this area disappears, the Manawatu could outflank the top groyne.

7.7. Assisting matters, KiwiRail recently removed the significant amount of debris that had built up on the rail bridge over the Pohangina River.

7.8. Staff continue to work with PNCC concerning the new pedestrian bridge over the Manawatū River and the Turitea and Kahuterawa Streams, and the paths connecting these structures. Construction is progressing well with two of the three bridge structures moving into their final stages and paths being cleared, hard faced and fenced between these sites.

7.9. Ahimate Park development work by PNCC is continuing. Further shaping of the berm area, where sedimentation traps were initially constructed, has been undertaken by PNCC and the entrance road and car park areas have been opened up for public vehicular access during daylight hours. Any issues in regards to public vehicles accessing areas they should not will be resolved as they arise.

7.10. Last year, scheme staff gave permission for PNCC to stockpile a limited amount of clean fill within the berm area to build a pump track through the pine trees opposite ANZAC Cliffs. However, other unauthorised fill dumping has begun to occur at this location; PNCC have removed that material and have brought forward the formation of the track. Both parties have reviewed vehicle access to this part of the berm.

7.11. Programmed vegetation maintenance works continued along the lower reaches of the Manawatu River. This work involves the layering and/or mulching of the existing willows to control their size while maintaining a strong root structure. This live vegetation provides cost efficient bank stability and is the first line of protection against river edge erosion.

7.12. Mulching has also been undertaken along sections of the Manawatu River within the city reaches. Positive feedback has been received from members of the public who are appreciative of the river views, particularly around the new He Ara Kotahi Bridge being constructed at the end of Ruha Street.

7.13. The opportunity was taken to undertake a small section of bank shaping at the downstream end of the rock lining within the esplanade while an excavator was nearby. This area has since been hydro seeded and will be planted with Meuhlenbeckia Complexa. This species is more recognisable in the topiary realm, however the opportunity is being taken to trial for
its usefulness in bank protection. Willow would usually have been planted in this environment, however the time of year is not optimal for pole planting.

7.14. The outer edge of the berm adjacent to Waterloo Park has been track rolled and cleared of debris in preparation for mowing. This unmowed area has been growing in size and has the potential to trap greater volumes of sediment when the river is in flood, ultimately leading to flood flows becoming more channelized. The area will be added to the PNCC mowing schedule.

7.15. Works continued on the “Rural Area” programme for river edge vegetation maintenance. This involves the layering and/or mulching of the existing willows, using an excavator. This is done to control the size of the willows while maintaining a strong root structure which provides cost effective bank stabilisation. This live vegetation provides the first line of protection against river erosion. Vegetation maintenance works were completed on the true left bank, downstream of the confluence with the Mangaore Stream. Repairs to the stopbank and access ramp upgrades were completed at several sites in the same location while machinery was on site.

7.16. Concrete riprap material was stockpiled on an erosion site at Aokautere, ready to be placed.

7.17. A recent survey has confirmed that significant damage has been sustained to the snub groyne located at the head of the ANZAC Cliffs rock riprap revetment. Consideration is being given to what the most appropriate ‘fix’ is, in parallel with the stockpiling of rock (in addition to that able to be salvaged from the river).

7.18. Staff are continuing to monitor and look for potential solutions for the erosion adjacent to the stopbank that protects Hartley Street, Foxton Beach. Berm erosion has been a slow, but ongoing issue in this area that has been caused mainly by wave action at high tide. Finer material is being washed out from behind assets placed to try and prevent erosion. The many attempts made over the years are evident, using various materials with varying degrees of success.

**OROUA RIVER**

7.19. Removal of silt from a section of the Oroua River berm (part of the ongoing silt removal programme) has been completed for the season. 9000 m³ of silt was removed between distances 16 km to 17 km by contractors John Ray Ltd., used to flatten undulating land and raise land with drainage issues. Several repairs to the stopbank and access ramps have been undertaken through the use of machinery on site for the silt relocation.

7.20. Vegetation removal, bank shaping and access works have been completed to a section of the Oroua River right bank upstream of the Rangiotu Marae. Funded through a Manawatu River Leaders Accord grant, the work includes the construction of steps down to the river, complementing the land purchase made in 2016 (removing the dis-used Rangiotu dairy factory and allowing the stopbank to be set back from the river bank edge). The steps allow access to a reach that has been generally inaccessible enabling a much greater level of community interaction with this reach of the river.

7.21. Native planting of this area is envisaged over time, provided that the planting does not comprise scheme operation (slowing flood flows/ elevating flood levels and/ or increasing sediment deposition rates, analysis that must fit within a wider work programme.

7.22. Vegetation removal for the “Windows to the Oroua” project in the form of spraying and mulching have been undertaken at the entrance to the Timona Park beach. This has been done to open up access to the beach and create a more inviting environment for the public.
This work will be done in conjunction with the Freshwater and Partnerships team, Ngati Kauwhata, **Manawatu District Council (MDC)** and AFFCO.

7.23. Aerial spraying was undertaken on the Oroua River, from the confluence with the Manawatu to the Kopane Bridge. This is undertaken to control channel congestion due to willow growth which leads to a reduced channel capacity. Spraying is achieved through the use of a helicopter, GPS tracked with digital records to record spray area. One of the spray booms is removed from the helicopter to increase the accuracy of spray application.

7.24. Mulching and layering has been undertaken at the top of the Oroua River on both the true left and true right banks. This is done to control the size of the willows while maintaining a strong root structure which provides cost efficient bank stability. This live vegetation provides the first line of protection against river bank erosion.

**LOWER KIWITEA STREAM**

7.25. The maintenance programme completed on the reach of the Kiwitea Stream within the extents of the LMS included the layering of the existing stream edge vegetation, the removing of flood debris from the beaches, clearing of any unwanted regrowth from the beaches and the relocating of gravel buildups causing erosion problems.

**MANGAONE STREAM**

7.26. The Mangaone Stream is inspected regularly by scheme engineers and overall, remains in a good condition.

7.27. Along with the ongoing maintenance task of mowing and spraying, several trees have been removed from the stream reserve area at the request of neighbouring property owners. A section of old fence line was also removed from a reserve area near the Amberley Avenue Bridge, enabling easier mowing and maintenance of the area.

7.28. A newly sprayed section of stopbank was discovered during a recent inspection of the lower reaches. The spraying had been undertaken by a neighbouring property owner who was new to the area. Staff approached the property owner at the time and discussed the risk of an un-vegetated batter and requested that spraying cease. Hydro seeding of this area will be undertaken in the coming weeks when it is more certain that the spray will not affect new growth.

**MAKINO STREAM**

7.29. During the reporting period, several erosion sites on the Makino Stream were repaired. Three using concrete blocks as retaining walls and another two using concrete riprap material. Wind-blown trees causing blockages in the stream channel were removed at two sites.

7.30. As part of the regular maintenance programme, approximately 7 km of stream channel downstream of Feilding township was machine cleaned, removing any flood debris, unwanted vegetation and any gravel buildups that might be adding to bank erosion or conveyance issues.

**LOWER KIWITEA STREAM SCHEME**

7.31. No major floods in the Kiwitea Stream over this reporting period.

7.32. The scheme held its annual Catchment Community meeting on 7 March. The previous year’s expenditure was discussed. Current years’ budget and works programme was
explained. The proposed budget and works programme for 2019-20 was discussed in detail.

7.33. A programmed maintenance run was completed, covering the full scheme length to prepare for the upcoming winter flows.

7.34. Several flood damaged sites were repaired.

7.35. The layering of existing front-edge willows has been completed over a 4 km reach of the stream. More to complete over the next reporting period.

**KAHUTERAWA SCHEME**

7.36. Each year over this period (February 1 March) a programme of maintenance works is undertaken. This year, works concentrated on the lower reaches of the scheme i.e from the NZ Defence Force property upstream to the state highway at Linton.

7.37. Works consist of the layering of existing willows, the removal of any flood debris in the channel, and the relocating of any gravel beaches causing erosion problems and/or poor river alignment.

**ASHHURST STREAM SCHEME**

7.38. A public “drop in” session was held on 25 February for the local community.

7.39. No works undertaken in this scheme over this reporting period.

8. **NORTHERN AREA**

**GENERAL**

![Northern Area Percent of Long Term Average Flow](chart.png)
8.1. The very dry summer weather along with the accompanying low river levels have allowed staff to complete a substantive amount of work over the past two months. Flood damage repairs from last winter are now well underway and planned works should be near completion by the end of April if favourable conditions continue.

8.2. 12 scheme meetings were held between 25 February and 22 March. These always require a high input from staff both in the time required to prepare presentations and the time spent at meetings. Feedback from our ratepayers through these meetings has reassured us we are providing the appropriate level of service to them and helps to build/maintain the relationships essential to what we do.

COMMUNITY INVOLVEMENT

8.3. Staff are heavily involved with the Communications team in the establishment of a Swimspot location in Taumarunui. Cherry Grove which is an area around the confluence of the Ongarue River and Upper Whanganui in Taumarunui won the last Swimspot spruce-up competition held by Horizons. The prize being to develop and enhance a recognized swimming spot by adding community facilities to improve access and enjoyment.

8.4. Following consultation with iwi, it was decided to move the Swimspot upgrade site to a reach on the Upper Whanganui called “The Channels”. This is a very popular location that provides a variety of swimming experiences for wide range of age groups. An on-site public consultation/open day was held on Saturday 9 February. It was attended by Cr Rollinson and approximately two dozen members of the public. Feedback from the community was collated and an idea of what the community, Ruapehu District Council (RuDC) and HRC envisage for the site started to develop. This updated proposal has now been forwarded to Ngāti Hauā for their review and recommendations.

RANGITIKEI RIVER CONTROL SCHEME

8.5. The annual Catchment Community meeting was held Friday 22 March.

8.6. The very favorable dry summer conditions have enabled staff to proceed uninterrupted on scheme works completing a substantive volume of work. We are now well underway with programmed maintenance work and in the repair of damage caused during last winter’s flood events. The largest of these works is the diversion of the river at Tonui bend and the associated bank protection works required to prevent an avulsion of the river into the corridor along the stopbank. Funding for these repairs is being assisted by a Council approved drawdown of $300,000 from reserves.
8.7. Staff continue to look at new and innovative options for channel management and erosion repairs. The establishment of field willow nurseries emphasizes the future direction towards soft engineering and vegetative solutions.

**RANGITIKEI MAINTENANCE WORKS**

8.8. **Taylor Road** - Through the Code of Practice, ZMR Aggregate have taken 1000 m⁢³ of gravel from the beach opposite the Taylor Road Rock lining that has just been repaired to take the pressure off the upstream edge of the rock lining. The remaining gravel extraction has been extracted under their consent. The current river alignment is threatening to out flank our new rock lining.

8.9. **Onepuhi** - Work to open up Paul Murphy’s existing irrigation channel as a high flow pathway is complete as is the addition of 20 m of tied tree work to prevent further scour near the road end. Piles of debris will be burnt when the fire restriction season ends.

8.10. Additionally, there have been discussions with Cathy Lee-Jones about enhancing a natural high flow channel through the beach at the 41.5 km distance and clearing some vegetation at the 41 km beach. This work will complement the high flow channel at Paul Murphy’s by better aligning upstream flow patterns.

8.11. **Spraying** - aerial spray of the Rangitikei has been completed with the aircraft track record to check accuracy. This annual exercise is essential to keep willow and other vegetation re-growth under control. Without this work, the encroaching vegetation populates the gravel beaches preventing the movement of gravel during high flow events. This ultimately narrows the channel and forces flows into the highly erodible banks along the river edges.

8.12. **Campion Road/ Tonui Farm Emergency Works** - Work is progressing very well at this site with the river now fully flowing through the first diversion channel allowing protection work to commence along the right bank interface with the stopbank berm. This work is essential to prevent the river cutting a new course that would, amongst other things, compromise the integrity of the Parewanui stopbanks.

8.13. **Mary Wilson Rock Lining** - Work at Mary Wilson’s bend has been completed. This includes the creating of a high flow channel downstream of the rock lining to help re-align the river, taking pressure off the lining. Gravel (19,300 m³) from the high flow channel was used to fill the scour hole behind the rock lining.

8.14. **Layering** - The river gang are part way through willow layering approximately 1 km of river bank at John McManaway’s 48-49 km.

8.15. **Rata Rubbish Dump, Putorino Road** - The consent application was lodged in early January and granted shortly afterward to create two diversion cuts to move the river away from the exposed rubbish dump. This work is essential to allow the Rangitikei District Council access to the site to undertake remedial work. Agreements have been signed with the gravel extractors and the first diversion opposite the rubbish dump has been pegged out. Work to extract the gravel has commenced.

8.16. **Planting & Nursery Maintenance** - The northern team are investigating a tow behind quad mower to keep maintain around the willow nurseries and make harvesting and spraying easier.

8.17. **Drains** - Spraying Amon Drain and other scheme drains has been scheduled for late March/ early April.
8.18. **Stopbanks**- A repair to one of the ramps at Tonui Farm has been completed. Spraying bamboo and fennel on the stopbanks has been scheduled for March. Another mow has been scheduled for late April/ May.

**RANGITIKEI CAPEX WORKS**

**2018-19 PAREWANUI STOPBANK UPGRADE**

8.19. This season’s upgrade work is located on the Walmac Farm near Scotts Ferry from river distance 3 km to 4 km, upgrading 500m of stopbank. The contract was awarded to Holland Earthmoving Ltd for a sum of $144,308.70. Contract work commenced on the 14 January 2019. All work has been completed and a practical completion certificate will be issued in the final week of March 2019.

8.20. A request for proposal was sent out on the 22 November 2018 for design of a concrete wall to span the section of stopbank that intersects the high pressure gas main. Interest was sought from five engineering firms with only interest from one, GHD. Their proposal was accepted and signed on 12 February for a value of $48,970. ROI’s for concrete wall construction will be sought in April with proposals being obtained following final design. Construction is planned for 2018-19 financial year. Staff will discuss this specific project with our insurer AON to ensure all related risks/ liabilities are adequately covered.

8.21. **Gravel Extraction Sites – GBC Winstone**- No gravel extracted from the scheme consent this reporting period.

8.22. **Rangitikei River Global Gravel Extraction Consent**- Good Earth Matters have been engaged to prepare and lodge a global resource consent application to enable gravel extraction, for river management purposes, from the Rangitikei River over a series of reaches extending from the Makahikato Stream to the mouth of the river. A draft application is being prepared and will be ongoing while consultation takes place.

**POHANGINA-OROUA RIVER CONTROL SCHEME**

8.23. The annual Catchment Community meeting was held Friday 22 March.

8.24. A substantial amount of flood repair work has been completed following the 12 June flood event. Currently we have spent close to $600,000 which is nearly 50% more than our normal annual budget with further work identified. At the annual scheme meeting it was recommended that a further $150,000 be drawdown from the emergency reserve fund and added to the previously approved $200,000 to ensure essential repair work to protect landowners property is completed before winter, with Council approval subsequently given.

**POHANGINA RIVER**

8.25. Work has started installing rock groynes on the Carroll property with material being sourced locally from the farm. This work will be further enhanced with the installation of a downstream TBPW and rock groyne.

8.26. Once completed, the contractor will move to the Passey property where there is 200 plus metres of exposed stopbank requiring a mixture of tree work and groynes to stabilize before winter.

**GRAVEL EXTRACTION**

8.27. 2,160 m³ of gravel extraction has occurred from the Pohangina River this reporting period.
OROUA RIVER

8.28. We are now largely on top of the required Oroua River flood repair work following the 12 June event last year. There does remain tree works to complete at the McDougal, Hoggard, and Genet properties. Due to the very dry nature of our summer, it was felt prudent to delay these works until later in the autumn when the trees would have a better chance of survival.

GRAVEL EXTRACTION

8.29. 9,147 m$^3$ of gravel extraction has occurred from the Oroua River this reporting period.

TOTARA RESERVE

8.30. Flood repair work at Totara Reserve has been proceeding well with the scour hole area east of the old campground backfilled with gravel and now awaiting the installation of rail irons, wire rope and tree bundles. This will occur later into autumn when there is more moisture around giving the trees a better chance of survival. Approximately 5,000 m$^3$ of gravel was relocated to widen the channel and provide material for the repair. We will also return to site in a few months to clear vegetation from an island opposite and so provide a wider channel cross section for flows that will take pressure off the repairs allowing time to for them to stabilize. Willow planting will follow in the next financial year.

UPPER WHANGANUI RIVER MANAGEMENT SCHEME

8.31. The annual Catchment Community meeting was held on Wednesday 20 March.

UPPER WHANGANUI SCHEME

8.32. Successful discussions over fencing have taken place with the leasee of land adjacent to the river at the end of Porou Street. This will enable the construction of a cattle proof fence along the river boundary that will keep stock out of the waterway.

RUAPAHU DISTRICT COUNCIL (RuDC) – MEMORANDUM OF UNDERSTANDING

8.33. A first draft of the MoU was completed in January. Comments were sought from RuDC and amendments made accordingly. Final sign off was 12 February 2019. The MoU is for RuDC work that has some operational interface with Horizons’ river management activity which requires river management expertise. The contracts will be managed by Horizons on behalf of RuDC.

PUNGAPUNGA BERM REPAIRS

8.34. The contract involves three compacted fill layers of gravel/rhyolite, clay substrate and topsoil plus a rock armour face over a length of approximately 60 m. Contract tender documents were out for the period four weeks prior to 12 February 2019. Two tenders were received and tender evaluation/selection conducted over the period 18 February to 18 March. The contract was awarded to Jilesen Contractors Ltd for a sum of $139,008.15. Contract work will commence before the end of March. This work is fully funded by RuDC.

MATARAWA FLOOD CONTROL SCHEME

8.35. The annual Catchment Community meeting was held Monday 25 February.

8.36. Vegetation clearance took place at the Alward property and along the lower reaches of the Mateongaonga Stream.
MATARAWA URBAN

8.37. 90% of the works program has been completed for the financial year, with only a few stretches of the Matarawa Stream to complete. One of these being just upstream of the Matarawa Stream Bridge on ANZAC Parade. It has been agreed that here all except a 1 m strip of bamboo at the top of the bank will be removed for now to retain privacy and a wind barrier. The landowners will look into other hedge type options themselves in the future with a view to complete removal of the bamboo at some point in the future.

TUTAENUI FLOOD CONTROL SCHEME

8.38. The annual Catchment Community meeting was held on Monday 18 March.

8.39. Gorse spraying and gravel relocation in both the urban and rural reaches of the stream has taken place over the last two months. We have received two stream realignment requests from landowners which were inspected and assessed.

MAKIRIKIRI FLOOD CONTROL SCHEME

8.40. The annual Catchment Community meeting was held Monday 25 February.

8.41. Willow spraying of the spillway and old loop channel have been completed. The lower channel clean and floodgate repairs has been scheduled for May when the maize will have been harvested.

MAKIRIKIRI FLOOD EGRESS GATE

8.42. It has been identified that the flood egress structure constructed in January 2017 requires modification. The gates are not sitting flush against the concrete walls. A solution has been established between Horizons and the contractor. The first half of the modifications were completed in June 2018 with further alterations to be completed in April/May 2019. A scribed rubber seal and additional bearing housings are being added to the structure for functionality.

POREWA FLOOD CONTROL SCHEME

8.43. The annual Catchment Community meeting was held Monday 18 March.

DAM INSPECTIONS

8.44. Remaining dam inspections have been completed following heavy rainfall over the Christmas break. Ponded water levels were surprisingly high – debris was removed from culvert inlets.

WHANGAEHU MANGAWHERO RIVER MANAGEMENT SCHEME

8.45. The annual Catchment Community meeting was held on Tuesday 19 March.

8.46. Work is underway preparing a new resource consent application for scheme aerial spraying.

TURAKINA RIVER MANAGEMENT SCHEME

8.47. The annual Catchment Community meeting was held on Tuesday 19 March.
8.48. Aerial spraying of willows and poplar along the Turakina River is set to take place the last week in March. An advert detailing that Horizons would be undertaking aerial spraying in the area was placed in the Whanganui Chronicle on 16 January. Letters and maps were circulated to affected parties and there have been no issues arising.

**LOWER WHANGANUI VEGETATION MANAGEMENT AND FLOOD PROTECTION PROGRAMME**

8.49. The annual Catchment Community meeting was held on Monday 25 February.

**SCHEME WORKS**

8.50. Repairs on Balgownie knee breakers, planterbox capping, stopbank ramps have been planned. Repairs to vehicle damage on the Kowhai Park stopbank by the Matarawa Stream have also been arranged.

8.51. We will shortly be undertaking a progressive replacement of the deteriorating rock riprap in front of the Sailing Club on Gilberd Street which is made up of power poles, concrete slabs and iron standards.

8.52. Monthly floodgate inspections were completed by contractor Bullocks. A number of tasks arising from these inspections have been flagged and a request sent to Bullocks to rectify. Issues include blocked floodgates, siltation and chain breakages.

8.53. Flood barrier training was held in Whanganui on 8 March.

**Lower Whanganui River Infrastructure**

8.54. The North Mole and South Spit Interface Wall investigations have been completed with design of both having commenced early July. Given the uncertainty around central government funding the construction and repair of the North Mole, Interface Wall and Trial Groyne will not commence until summer 2019-20 at the earliest.

8.55. To that end:

- Investigation and surveying of existing rock structure below and above water has been completed;
- Wave height modelling and assessment for rock sizing calculations has been completed;
- Conceptual design profile sketches for various batter treatment of the North Mole have been completed;
- Development of plans for the repair/strengthening of the South Spit Interface Wall and the reinstatement of the Tanae Groyne have been completed;
- The survey and associated construction drawings for the interface wall and Tanae Groyne are completed;
- Further community engagement has taken place;
- The identification of resource consent requirements is completed and the draft consent application is substantially complete; and
- Final design of the North Mole and revetment will be completed by the end of July 2019.
8.56. Tasks that will be progressed over the next two months include:

- Development of construction methodologies and estimates;
- Obtain firm expressions of interest for rock supply;
- Notification of identified claimants for customary marine title and seek opinions;
- Seek opinion and approval from Te Pou Tupua around specific proposals at the two works sites;
- Consultation with Maritime NZ; and
- Input as required to progress the Port Revitalisation and River training Infrastructure Business Case.

8.57. Concerns that have arisen are:

- Availability of suitable rock in large volumes; and
- Potential consenting/consultation issues or timeframes.

PAKIHI SCHEME

8.58. The annual Catchment Community meeting was held Thursday 21 March.

8.59. Work scheduled for the year is renewal of the Frew Dam inlet screen. Measurements have been taken and grill is being fabricated. Installation in April 2019.

FOREST ROAD DRAINAGE SCHEME

8.60. The annual Catchment Community meeting was held Wednesday 20 March.

8.61. Drain spraying scheduled for April.

HAUNUI DRAINAGE SCHEME

8.62. The annual Catchment Community meeting was held on Monday 18 March.

8.63. No work undertaken this reporting period. Drain spraying to clear the waterways before winter is due to commence in early April.

OTHER WORKS

NORTHERN ANNUAL SCHEME REPORT

8.64. Each year an annual report is prepared outlining the activities, and financial standing of the 14 schemes in the northern area for the previous financial year. Work on the 2016-2017 report remains underway.

ENGINEERING ADVICE

8.65. During the last two months, there have been continued requests for advice on a variety of issues including rural flooding in non-scheme areas, involving clearing blocked culverts, clearing stream channels of vegetation and fallen trees, diversion queries and flood damage work. Two requests that are taking up considerable time are neighborly drainage issues in Westmere, Whanganui and on Raumai Road, south of Bulls.
9. **EASTERN AREA**

**GENERAL**

![Graph showing long-term average flow percentages for various locations in the Eastern Area.](image)

![Graph showing rainfall amounts and long-term means for different locations in the Eastern Area.](image)
9.1. After a very wet start to the summer, the district has settled into a period of almost no rainfall and hot temperatures. This has led to a general drying off of the landscape, and very low flows through all rivers within the district. The largest rainfall event occurred on the 24 February, with the heaviest rainfalls on the east coast. This rainfall event had little effect on river levels and as such, river levels remain very low.

9.2. Staff have been busy undertaking the works programme for the Mangatainoka and Tararua River Management Schemes. The bulk of the work in both of these schemes has been planned to be completed in 2019.

9.3. During February, the Activity Management Plan for the Tararua River Management Scheme was presented to the Tararua District Council (TDC) at a workshop session. The focus of the workshop was to discuss the concept of a modified scheme liaison group and for TDC to advise as to who they wished to have represent them. The outcome of the workshop was that TDC were broadly in favour of the structure of the liaison group as presented, that they nominated Peter Johns as the TDC councillor representative.
9.4. On 1 February, Gordon Kuggeleijn retired from his role as Engineering Officer with the eastern River Management team. Gordon had been in the role for 30 years and over that time had worked in all in the schemes within the district. Gordon is well known in the district as he lives just south of Dannevirke and has been instrumental in the development of club cricket and other sporting groups. A farewell barbeque was held for him at the Woodville office on 1 February, which was very well attended.

9.5. Gordon has been replaced by Jordan Taylor, who has taken the role of Engineering Cadet. Jordan started on 4 February. Jordan is originally from Southland and has previously worked at Massey University. She is quickly getting to understand the challenges associated with the schemes and has been active, in her first few weeks, in getting out and meeting the community.

9.6. Requests for miscellaneous issues and engineering advice has continued over the last two months, with some of the issues raised being around debris removal, erosion, fencing and the removal of landslide debris from waterways.

9.7. Issues around the confluence of the lower Tiraumea and the Manawatū River, just above the Ngawaparua rail bridge, have been brought to the attention of staff. In 2017, KiwiRail altered the course of the Tiraumea River to protect the downstream Ngawaparua rail bridge. Further migration of the Tiraumea has resulted in the erosion of adjacent land, formerly owned by DoC and now owned by Ngāti Rangitāne. The erosion is continuing and there are concerns that this will have a direct impact on the Manawatū River and accordingly the Upper Manawatū Scheme. Staff have been discussing the situation with KiwiRail.

TARARUA DISTRICT RIVER MANAGEMENT SCHEME

9.8. The one major job completed in the southern half of the Tararua River Management Scheme over this period, was the clearing of a section of the Mangamaire Stream. This involved a contractor working over several properties around the Mangamaire community, carrying out a combination of tree and shrub removal, mulching, and bank shaping/cleaning. The exposed banks that were left have been seeded with grass. The channel has opened up substantially and the drop in the water level has been significant. In the past, it had been causing flooding issues for several properties, and had threatened to flood houses.

9.9. Spraying and drain clearance was also completed on the Ihuraua Stream in the old Ihuraua Scheme. This completed the annual maintenance programme for this part of the original scheme.

9.10. In the northern area, large scale works have been undertaken clearing the Manawatū River from Bolton Road, south of Ormondville, through to SH2. This has been significantly congested and there had been reports of slips and fallen trees which were blocking the river. This stretch of waterway has been outside of any scheme – being north of the old Eastern Manawatū and south of the South Eastern Ruahine Schemes. The works took over four weeks and commenced in January.

9.11. Work was also completed on the lower final section of the Oruakeketaki River prior to its confluence with the Manawatū River. This area was outside of both the South Eastern Ruahine and Upper Manawatū Schemes and as such was heavily congested.

9.12. Meetings have also been held about the development of the Bluff Road site as a multi-use recreational site. This is being coordinated by a trust under the governance of Ngāti Rangitāne and includes members of DoC, Fish and Game, community groups and the TDC. Horizons Regional Council’s involvement has been multi-party, with Freshwater and
Biodiversity teams being involved in planting and site establishment. The River Management team will be involved vegetation control and amenity access to the waterway.

**MANGATAINOKA SCHEME**

9.13. There has been a wide variety of works completed and started across the Mangatainoka Scheme in the last two months. A number of tree groynes have been constructed in vulnerable parts of the Makakahi. The willows required for this work were able to be sourced from very near to the affected areas and this made the work fast moving and the contractor was able to easily move to the next site. This was followed up with mulching, layering and clearing the channel of debris. Most of the Makakahi that is covered by the scheme was worked on. A lot of the areas had not seen work in a long time and access proved quite difficult at times. The channel is now more open, and less likely to cause significant issues in a flood event. Through the process of the channel clearing, a few weak spots in the banks were identified and these will be put into a later works programme.

9.14. The lower reach of the Mangatainoka also had some channel clearing and mulching completed. This was undertaken while a contractor was on site to install a series of PMU groynes in a section of the bank that has seen significant erosion and was starting to undercut large macrocarpas. Some of these trees had to be removed as a safety precaution.

9.15. Our contractors have also started two jobs in the southern end of the scheme. One has started removing tall gum trees that are being undercut, and will follow this up with installation of PMU groynes. The other is the installation of tied tree groynes at a sharp outside bend that has deteriorated over the last 12 months. This will be followed up with a rock lining to protect the downstream half of the damaged bank.

**SOUTH EASTERN RUAHINE SCHEME**

9.16. Work has been undertaken on the South Eastern Ruahine Scheme, with approximately 95% of the programmed works completed.

9.17. A review of the position of the scheme activities has found some further areas which require works to be completed before the end of April. Presently these works are being scoped, costed and prioritised – with the most urgent works being completed this financial year. It is still envisioned that the scheme will finish on budget and with the budgeted allocation to go into reserves. This will be the first time in two years that the scheme will be in a position to deposit funds into the scheme reserves.

9.18. Drain maintenance is programmed for a late March start.

**TAWATAIA - MANGAONE SCHEME**

9.19. All work has been completed on this scheme for this financial year.

**UPPER MANAWATU – LOWER MANGAHAO SCHEME**

9.20. Work has essentially finished for the year on this scheme. Just over 90% of the budget has been spent so far and the remainder is being held back in contingency for any flood damage that may occur later in the year. It is predicted that the scheme will be in a financial position at the end of the year to make the budgeted contributions to the reserve fund, which it has not been able to achieve over the last two years.

9.21. The only work completed in this last two month period was a small amount of tree removal works on the Manawatū by River Road.
10. SOUTHERN AREA

GENERAL
10.1. Settled weather over the period has allowed our spray contractors to make good headway into the autumn inspection and maintenance program.

10.2. Staff continue to work closely with the Freshwater and Partnerships team around enhancement of scheme drains.

10.3. The southern team is at full capacity with success around recruiting to fill the two vacant skilled labourer positions.

10.4. Request for engineering advice has continued over this period including a number of request from district council staff and consultants regarding the replacement of infrastructure over scheme rivers and drains.

10.5. Staff continue to work closely with various other teams from within Council and consultants regarding the implementation of the new AMIS.
10.6. Staff have also been busy preparing for and presenting at scheme/ Catchment Community meetings. Nine were held over the period - six formal public meetings and three drop in sessions. All were well attended, in particular the Hokio and Foxton East where attendees had a particular interest in the health of Lake Horowhenua and the works planned to provide relief from flooding for Foxton.

**OHAU-MANAKAU SCHEME**

10.7. This period has been quiet for the scheme with the main areas of activity being investigating issues and organising scheme meetings.

10.8. This was the first year for the Ohau-Manakau Scheme to have a drop-in session for its annual scheme ratepayer meeting rather than a formal meeting. The session had good ratepayer attendance with a range of issues discussed.

10.9. Landowners have reported that the Haines Ohau gate was letting water back through when the river was in high flow. This has been investigated and the issue could not be found. There have not been many high flow events this period so the issue has been able to be replicated. Investigations are ongoing.

10.10. Drain inspections are underway with autumn drain maintenance to be undertaken next period.

**MANAWATU DRAINAGE SCHEME**

10.11. A meeting was held on 14 February for those with an interest in the operation of the Burkes Pump Station and the part of the drain network in the immediate vicinity. Those present were provided with an update on the list of issues previously captured. In order to progress matters a site visit will be arranged for later in the year to look at some of the key areas of concern.

10.12. A meeting was held with representatives from PNCC to discuss slumping issues along Flyers Line between Rangitikei Line and Gillespies Line adjacent to Whiskey Creek. During the June 2015 flood event significant flows in this drain along with the operation of the Mangaone Spillway resulted in some significant slumping of the roadside and ultimate the partial closure of Flygers Line.

10.13. Meetings with staff from PNCC following the event identified several options to resolve the situation varying from complete closure of the road to the construction of significant retaining structures along the road edge. Since that time PNCC staff have engaged a consultant to investigate options to retain the road edge. PNCC staff are now seeking funding from Horizons to allow the road to be fully reinstated.

10.14. A large tree stump that had fallen into a section of the Taonui Stream adjacent to Campbell Road was removed. A 200 m section of the stream directly above the block was machine cleaned due to a large build-up of gravel.

10.15. Maintenance work has been carried out on two sections of the Whiskey Creek drain. Firstly, a section of the drain above Milson Line was severely blocked by large trees that had fallen into the channel. A machine was brought into remove the trees with the 300 m section of the drain then re battered and cleaned.

10.16. A further section of the Whiskey Creek drain adjacent to Kairanga-Bunnythorpe Road has had two concrete block retaining walls constructed. Two large slumps had formed due to a large tree which had fallen in. The wall on the true left bank of the drain, was constructed using interlocking blocks, extending 16 m long, and railway irons driven into the front of the
blocks to prevent movement these irons were also tied back to irons driven in behind the blocks using wire rope. The true right bank retaining wall was constructed using the same principle except power poles were used instead of interlocking concrete blocks.

10.17. A 250 m section of G L Hanson’s drain was machine cleaned.

10.18. A further 300 m section of Aorangi No.1 Drain has been machine cleaned with the adjoining fence moved to ensure suitable access for maintenance.

10.19. This period has seen 40 km of drain was sprayed with herbicide and 1.5 km machine cleaned.

**MAKEURA DRAINAGE SCHEME**

10.20. A 300 m section of old tailings were levelled out along Boundary Drain to allow the drain to be sprayed.

10.21. The berm along the opposite side of Ashlea Road pump on the Linton Main Drain was being eroded away due to the discharge from the station. A retaining wall was constructed to limit further erosion using power pole and railway irons.

10.22. A meeting was held with landowners to discuss their concerns regarding the degree of protection provided from Linton Main Drain flooding upstream of Tane Road and issues experienced over the Christmas break. Issues discussed included the overtopping of the banks on Lynch’s Drain, issues with the draining flood water following spill from both the Linton and Lynch’s Drains, and the low spots along the left bank of the Linton Main Drain.

10.23. Note that the stopbanks adjacent to Linton Main Drain are mainly Lower Manawatu Scheme assets, with only the few kilometres at the upstream end being identified as Makerua Scheme assets. The transition point is where flood protection shifts from being governed by backwater effects from the Manawatu to where the stopbanks are providing for the conveyance of flood flows in the channel.

10.24. Options to resolve some of the issues at this location include raising several low spots alongside Lynch’s Drain and the upgrading of a culvert pipes to aid with the removal of flood waters from Argyles property back into Lynch’s Drain. Additional options discussed were the construction of an additional floodgated culvert downstream of Lynch’s Drain to help with the removal of floodwaters and the levelling of the a 700 m section of the left bank of Linton Main Drain to remove some of the isolated low spots along this section of bank while increase the length of bank that would overtop during a 1%AEP flood event in this drain.

10.25. This option is similar to a proposal put to the landowners a few years ago and then declined because of concerns around having a designated spillway on their property. While these landowners have now agreed to this option, we are currently waiting for feedback from landowners on the opposite (right) bank of Linton Main Drain. Those landowners have previously expressed concerns around what effect work to the left bank might have on the level of flood protection for those on the other side (technical work concluding that there will be no effect has previously been provided).

10.26. This period has seen 60 km of drain was sprayed with herbicide.

10.27. Work was carried out to the Mangaore Pump Station access track to ensure year round access for maintenance vehicles.
KOPUTAROA DRAINAGE SCHEME

10.28. The autumn drain maintenance program has been complied with works to be undertaken during the next period.

10.29. Work was completed around Koputaroa No. 3 Pump Station to keep the surrounding ground level away from the building. The soil pile up against the exterior has caused some degradation to the structure. Concrete has been poured around the outside to ensure there is a gap between the cladding and the surrounding ground.

MOUTOA - WHIROKINO DRAINAGE SCHEME

10.30. A header tank was installed above Pleuger drainage pump. This tank will add a positive pressure to the internal parts of the pump. This work was done to ensure no external water could work its way into the pump which occurred last year and repairs were required. The autumn drain maintenance program have been complied with works to be undertaken during the next period.

TE KAWAU DRAINAGE SCHEME

10.31. This period the scheme drains are on to their second spray of the season with 25 km completed to date.

10.32. Culvert s10 has been replaced due to the old butt jointed pipes separating. It has been replaced with a new 600 mm culvert and alloy floodgate.

10.33. A meeting was held at the Lean Road Bridge with several concerned landowners and members of the Scheme Liaison Committee to discuss landowners concerns regarding the performance of the section of Sluggish Main Drain between Main Drain Road and Kaimatarau Road. Issues discussed included ongoing maintenance of the drain, whether the drain still complied with the original design standard and option to improve flow through this section of the drain. As a result of the discussion, it was agreed to undertake a detailed survey of the drain to determine if it still complied with the original design, and to spot clean the drain to remove weed buildup and remove any slumps that were restricting the flow of the drain.

10.34. The section of Sluggish Main Drain from Lean Road right through to Main Drain Road was machine cleaned with the long reach excavator, to remove slumps and major weed blockages.

10.35. Two gauge boards have been placed along Sluggish Main Drain, one being at the top end adjacent to lean road the other at 100 m above the where Main Drain passes under Main drain road. These have been installed to allow more accurate monitoring of the performance of this part of the network.

HOKIO CATCHMENT DRAINAGE SCHEME

10.36. The completion of the midway drain extension was constructed. This work will allow flows to be diverted past the end of Whelans Road and into the newly upgraded Boulton Drain. The work this period was the construction of 300 m of open drain and the installation of a crossing.

FOXTON DRAINAGE SCHEME

10.37. This period has seen the third spray completed on drains within this scheme with a total of 3 km of drains being sprayed with herbicides. Inspections of the drains continue to be undertaken to identify potential blockages in the drainage network.
10.38. This period has seen 25 km of drain was sprayed with herbicide.

11. SIGNIFICANCE
11.1. This is not a significant decision according to the Council’s Policy on Significance and Engagement.

Ramon Strong
GROUP MANAGER RIVER MANAGEMENT

ANNEXES
There are no attachments to this report.