AGENDA/KAUPAPA

Te Kaunihera o Te Tairāwhiti
GISBORNE
DISTRICT COUNCIL

P O Box 747, Gisborne, Ph 06 867 2049 Fax 06 867 8076
Email service@gdc.govt.nz Web www.gdc.govt.nz

MEMBERSHIP: Larry Foster, Tony Robinson, Rhonda Tibble, Nick Tupara and Tangata Whenua members Pene Brown, Ronald Nepe, Angus Ngarangione, LeRoy Pardoe

WASTEWATER MANAGEMENT/WHAKAHAERE WAIKINO Committee

DATE: Tuesday 12 March 2024

TIME: 1:00PM

AT: Te Ruma Kaunihera (Council Meeting Room), Awarua, Fitzherbert Street, Gisborne

AGENDA – OPEN SECTION

Wastewater Management

Reports to:	Council
Chairperson:	TBC
Deputy Chairperson:	TBC
Membership:	Cr Larry Foster, Cr Tony Robinson, Cr Rhonda Tibble and Cr Nick Tupara and four tangata whenua representatives.
Quorum:	Four members. Two to be Councillors and two to be tangata whenua.
Meeting Frequency:	Four times a year.

Purpose

The establishment of this Committee is a requirement of the conditions of the resource consents for the upgrade and discharge of Gisborne's municipal wastewater.

On 21 September 2007 the Minister of Conservation granted the coastal permit for the discharge of treated wastewater to the marine area subject to the same conditions as recommended by the Hearings Committee.

Terms of Reference

1. Ensure implementation, commissioning and monitoring of the Wastewater Treatment Plant is carried out in accordance with the consent conditions.
2. Monitor compliance with permit conditions and separated industry standards.
3. Explore feasible options for alternative use and disposal of domestic and industrial wastewater and recommend implementation.
4. Identify research, monitoring and planning projects to improve the mauri and water quality of Turanganui a Kiwa. Develop and administer the Turanganui a Kiwa Water Quality Enhancement Project.
5. Ensure development of educational information to encourage reductions in domestic and industrial wastewater.
6. Recommend membership of and receive reports from independent review panel (IRP).
7. Provide an annual report to the Chief Executive of the Gisborne District Council.
8. Carry out the functions required by the conditions of the resource consents and report them to Council.
9. The Committee has no delegated authority from Council other than the functions expressed in the conditions of the resource consents.

Collaborations

These arrangements are entered into by the Gisborne District Council and tangata whenua representatives of Turanganui a Kiwa, supported by other members of the Committee, in a spirit of goodwill and a pledge to act towards each other with the utmost good faith.

Each member to this protocol is committed to progressing and enhancing the overall wellbeing of the district's people, environment and heritage by acknowledging and accommodating each other's values and philosophies, where applicable.

The Committee will develop and maintain effective relations with other Council committees, Government and its departments, NGOs and other stakeholders to achieve its terms of reference, and in particular:

- Gisborne District Council officers
- Hauora Tairāwhiti (District Health Board)
- Department of Conservation
- Industry
- Recreational groups
- Environmental groups
- Federated Farmers.

Special Notes

a) Membership of the Committee comprises four councillors and four tangata whenua representatives and other members that the Committee itself shall determine from time to time.

b) The Committee may appoint, or invite participation in an advisory or consultative capacity, other persons from:
    - Gisborne District Council officers
    - Te Whatu Ora
    - Department of Conservation
    - Industry
    - Recreational Groups
    - Environmental Groups
    - Federated Farmers.
    - Others who may have a particular contribution to make to the workings of the Committee.

The Council agrees to remunerate members that the Committee appoints.

Power to Act

To make all decisions necessary to fulfil the role and scope of the Committee, subject to the limitations imposed.

Power to Recommend

To Council and/or any Council committee as it deems appropriate.

3.1. Confirmation of non-confidential Minutes 29 November 2023

MINUTES

Draft & Unconfirmed

Te Kaunihera o Te Tairāwhiti
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MINUTES of the WASTEWATER MANAGEMENT/WHAKAHAERE WAIKINO Committee

Held in Te Ruma Kaunihera (Council Meeting Room), Awarua, Fitzherbert Street, Gisborne on Wednesday 29 November 2023 at 2:00PM.

PRESENT:

Her Worship the Mayor Rehette Stoltz, Larry Foster, Rhonda Tibble, Nick Tupara, and Tangata Whenua Members Pene Brown, Ronald Nepe, Angus Ngarangione

IN ATTENDANCE:

Chief Executive Nedine Thatcher Swann, Director Lifelines Tim Barrie, Water Manager Leo Kelso Governance Advisor Heather Kohn, and Committee Secretary Teremoana Kingi

The meeting commenced with a Karakia.

1. Apologies

MOVED by Cr Foster, seconded by Cr Tupara

That the apologies from Cr Robinson, LeRoy Pardoe be sustained. **CARRIED**

2. Declarations of Interest

Cr Tupara and Cr Tibble declared interest as Mana Whenua.

3. Leave of Absence

There were no leaves of absence.

4. Acknowledgements and Tributes

There were acknowledgements of appreciation to the previous councilors Shannon Dowsing and Kerry Worsnop and all previous committee members for their services and contributions.

5. Public Input and Petitions

There were no public input or petitions.

6. Extraordinary Business

There was no extraordinary business.

7. Notices of Motion

There were no notices of motion.

8. Adjourned Business

There was no adjourned business.

9. Reports of the Chief Executive and Staff for INFORMATION

9.1 23-229 Wastewater Treatment Stage 2 Update

Leo Kelso Water Manager attended and spoke to the report.

Questions of clarification included:

- A 25-day trial period of the wastewater treatment plant (WWTP) The team are aiming to begin trial operations in December followed by 100 days of compliance testing to ensure consent conditions are being met. The WWTP can open during this trial period, but they would rather make sure there is a high degree of certainty that everything is working as it should. The opening of the WWTP was delayed due to extreme weather events.
- In a storm event where the wastewater network is surcharged, due to inflow and infiltration of stormwater, and cannot cope and wastewater overflows are imminent, scours/overflows to city rivers need to be opened. This wastewater is untreated but heavily diluted with stormwater. The acceptable levels are governed by the resource consents.
- The wastewater treatment plant has no capacity to mitigate outside of the plant this would be processed through the resource management consent.
- Data can be provided regarding the flow of rivers during a rain event versus the volume of wastewater that could be flowing through scour/overflow values to inform the ratio of untreated wastewater to water to help understand the dilution factor.
- There are scours and overflows in the system. The team prefer to use overflows as this moves the wastewater away from the land. This decision is motivated by flood flows. Scour valves would be opened to avoid overflows in the city. Considering the magnitude and scale of the weather events that have pushed the limits of what is tolerable, there have been improvements in relation to overflows. Previously an accumulated 60mm of rain fall would have overwhelmed the wastewater network, through the actions of the drainwise program. and the improved management of the network this has increased to an accumulated 120mm of rain .

- The significance of Te Mana o Te Wai was highlighted to ensure the life supporting capacity of freshwater.
- Judd's have the current contract for composting. They are required to meet their obligations under the terms and agreements of the contract. Solids go through an evolution process through the compost treatment process. The water manager was under the impression the subsequent compost did not go to food production. Study of the agreement has now informed the end composted product is freely sold as general compost for all growing uses. But we will talk to this in the next meeting.

MOVED by Ronald Nepe, seconded by Cr Tupara

That the Wastewater Management /Whakahaere Waikino Committee:

1. Notes the contents of this report

CARRIED

9.2 23-231 Alternative Use and Disposal Update

Leo Kelso Water Manager attended and spoke to the report.

Questions of clarification included:

- There have been progressive discussions regarding appropriate sites for effluent reuse. This was postponed until the new chair was appointed and the future course of the three waters was clear.
- Other countries including Australia do not use recycled water for food production. In Australia they recycle to major bodies which has also been investigated in Auckland. There is a perception around using recycled water for food production which is a discussion for communities.
- An environmental study including heavy metals will be conducted as part of the process to ascertain the environmental impact.
- If contaminates are entering the system, it is an indication that some members of the public are pouring contaminates down the drainpipes. There are industry standards for the industries using these pollutants.
- There are ongoing discussions around the location of the Wisconsin Mound. Approval is pending and the Kiwa Group will reconvene to conduct this work. There is no confirmed date when the Kiwa Group will come together again.
- The Wisconsin Mound is a bed that is elevated above the water table for processing in the mound. This kind of wastewater can be naturally treated in this way to get it back onto the land and out of the waterways. There was a suggestion to investigate potential cultural sites in our area for the Wisconsin Mound.
- Maintaining positive pressure in a freshwater aquifer is critical to ensure no saltwater can enter as this would ultimately destroy the aquifer. Due to the use of the aquifers for irrigation and water use purposes there is a risk of saltwater intrusion into the aquifer. Pumping water into the aquifer to replace water taken would help minimise this risk, this could be an alternative used for recycled water.
- Future infrastructure and finance for the water supply and wastewater management that will be needed to satisfy the demands of Kaiti has been anticipated. A model of the tools and programs related to the next development plan for funding infrastructure has been modelled. This is a component of the long-term planning for the areas anticipated infrastructure requirements.

MOVED by Pene Brown, seconded by Cr Tibble

That the Wastewater Management /Whakahaere Waikino Committee

1. Notes the contents of this report.

CARRIED

9.3 23-232 DrainWise Program Update

Leo Kelso Water Manager attended and spoke to the report.

Questions of clarification included:

- A complete round of inspections will be covered by the current funding. Although the program is sound, it is necessary to maintain its effectiveness. The plant is compliant with current regulation, and its consents are still in effect.
- Smoke testing has been actioned through all schools and a concise report has been sent to the ministry.
- There was a suggestion to include Tangata Whenua alongside Council in our risks with regard to meeting community expectations of having no overflows
- There is a future meeting with the Kiwa Group and more information regarding its members can be reported back to the committee at a later date.

MOVED by Cr Tibble, seconded by Angus Ngarangione

That the Wastewater Management /Whakahaere Waikino Committee:

1. Notes the contents of this report.

CARRIED

10. Close of Meeting

There being no further business, the meeting concluded at 3.47pm.

Larry Foster
ACTING CHAIR

3.2. Confirmation of non-confidential Minutes 6 December 2023

MINUTES

Draft & Unconfirmed

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MINUTES of the WASTEWATER MANAGEMENT/WHAKAHAERE WAIKINO Committee

Held in Te Ruma Kaunihera (Council Meeting Room), Awarua, Fitzherbert Street, Gisborne on Wednesday 6 December 2023 at 2:00PM.

PRESENT:

Larry Foster, Rhonda Tibble, Nick Tupara, and Tangata Whenua Members Pene Brown, Angus Ngarangione.

IN ATTENDANCE:

Chief Executive Nedine Thatcher Swann, Director Lifelines Tim Barry, Water Manager Leo Kelso Governance Advisor Heather Kohn, and Committee Secretary Teremoana Kingi

1. Apologies

Secretarial Note: Items were heard out of the order described in the agenda. For ease of reference the Minutes have been recorded in agenda order. Director of lifelines Tim Barry attended via visual audio.

MOVED by Cr Foster, seconded by Cr Tupara

That the apologies from Cr Robinson and LeRoy Pardoe be sustained. **CARRIED**

2. Declarations of Interest

There were no interests declared.

3. Leave of Absence

There was no leave of absence.

4. Acknowledgements and Tributes

There were acknowledgements and tributes to Keith Katipa for his contribution to the Kiwa Group.

5. Public Input and Petitions

There were no public inputs or petitions.

6. Extraordinary Business

There was no extraordinary business.

7. Notices of Motion

There are no notices of motion.

8. Adjourned Business

There was no adjourned business.

9. Reports of the Chief Executive and Staff for INFORMATION

9.1 23-286 Wastewater Treatment Stage 2 Update

Leo Kelso Water Manager attended and spoke to the report.

Questions of clarification included:

- The formation of the bund located at the wastewater treatment plant was formed with recycled soil that was extracted onsite.
- From a construction standpoint all plant and equipment are completed 100%. Trial operations and testing are included in the 10% performance-based components which covers ensuring resource consent requirements are met and the equipment is operating as intended. The overspend is beyond the contingency fund.

MOVED by Cr Tupara, seconded by Pene Brown

That the Wastewater Management/Whakahaere Waikino Committee:

1. Notes the contents of this report.

CARRIED

9.2 23-287 DrainWise Program Update

Leo Kelso Water Manager attended and spoke to the report.

Questions of clarification included:

- The last rain event overwhelmed the wastewater system, and the scours were open for 2 days. The driving factors were that the manholes were popping so by opening the scours this avoided wastewater overflows into the city.
- The 2023-2024 contract has been awarded to NZ Lining. The expected completion is the end of this financial year. The lining is designed to reinforce the pipe which extends the life of the pipe, this is a cost-efficient way to reseal the network.

Cured- in- Place Pipe lining of the wastewater pipes does have an impact on capacity but the dry weather flow capacity of the pipes is adequate for the city by sealing the network. By sealing the network, infiltration issues will be eliminated and will result in an efficient wastewater system.

- When removing downpipes from the gully traps, the water is then directed into the council's stormwater system. The gully trap repairs include sealing the gully traps to stop infiltration.
- The Tangata Whenua Reference group will need to be reunited.
- It is unknown whether the shellfish virus study methodology has progressed, but an update can be provided once verified.
- The total budget breakdown for DrainWise for 2024.
    - The Operational budget is $346k.
    - Public Drains on Private Property (PDPP) is $833k.
    - Stormwater Renewals is $1.607m
    - Wastewater Renewals is $2.426m This includes carry over of the 22/23 program plus the 23/24 program 23/24.
- A future project will include presenting a dashboard to share and overview of the progress and direction of the DrainWise program.

MOVED by Cr Foster, seconded by Angus Ngarangione

That the Wastewater Management/Whakahaere Waikino Committee:

1. Notes the contents of this report.

CARRIED

9.3 23-319 Appointment of the Wastewater Management Committee Co-Chairs

MOVED by Cr Foster, seconded by Angus Ngarangione

That the Wastewater Management/Whakahaere Waikino Committee:

1. Notes the contents of this report.

CARRIED

10. Close of Meeting

Secretarial Note: Angus Ngarangione closed the meeting with a karakia.

There being no further business, the meeting concluded at 2.30pm.

Larry Foster
ACTING CHAIR

3.3. Governance Work Plan

2024 Wastewater Management						Meeting Dates			
HUB	**Activity**	**Agenda item**	**Purpose**	**Report type**	**Owner**	**12-Mar**	**11-Jun**	**8-Oct**	**3-Dec**
Community Lifelines	Water	DrainWise Programme Update	This report is to update the committee on progress of the DrainWise Programme	Information	Leo Kelso				
Community	Water	Wastewater Treatment Plant Upgrade - Update	This report is an update on progress of the Wastewater Treatment Plant (WWTP) Stage 2 Upgrade.	Information	Leo Kelso				
Community Lifelines	Water	Alternate Use and Disposal (AUD) Update	This report is to update the committee on progress of AUD	Information	Leo Kelso				

Te Kaunihera o Te Tairāwhiti
GISBORNE
DISTRICT COUNCIL

23-329

Title: **23-329 DrainWise Programme Update**

Section: Water Manager

Prepared by: Leo Kelso - Water Manager

Meeting Date: Tuesday 12 March 2024

Legal: Yes	Financial: Yes	Significance: **Low**

Report to WASTEWATER MANAGEMENT/WHAKAHAERE WAIKINO Committee for information

PURPOSE - TE TAKE

The purpose of this report is to provide the Wastewater Management Committee (WMC) with an update on the DrainWise programme for the period 7 November 2023 – 31 January 2024.

SUMMARY – HE WHAKARĀPOPOTOTANGA

In this reporting period there was one wet weather overflow event. The impact of this rain event was exacerbated by the very wet ground conditions throughout 2023.

Date	Event	Hours
25 November 2023	Rain Event	56

Rapid inflow assessment

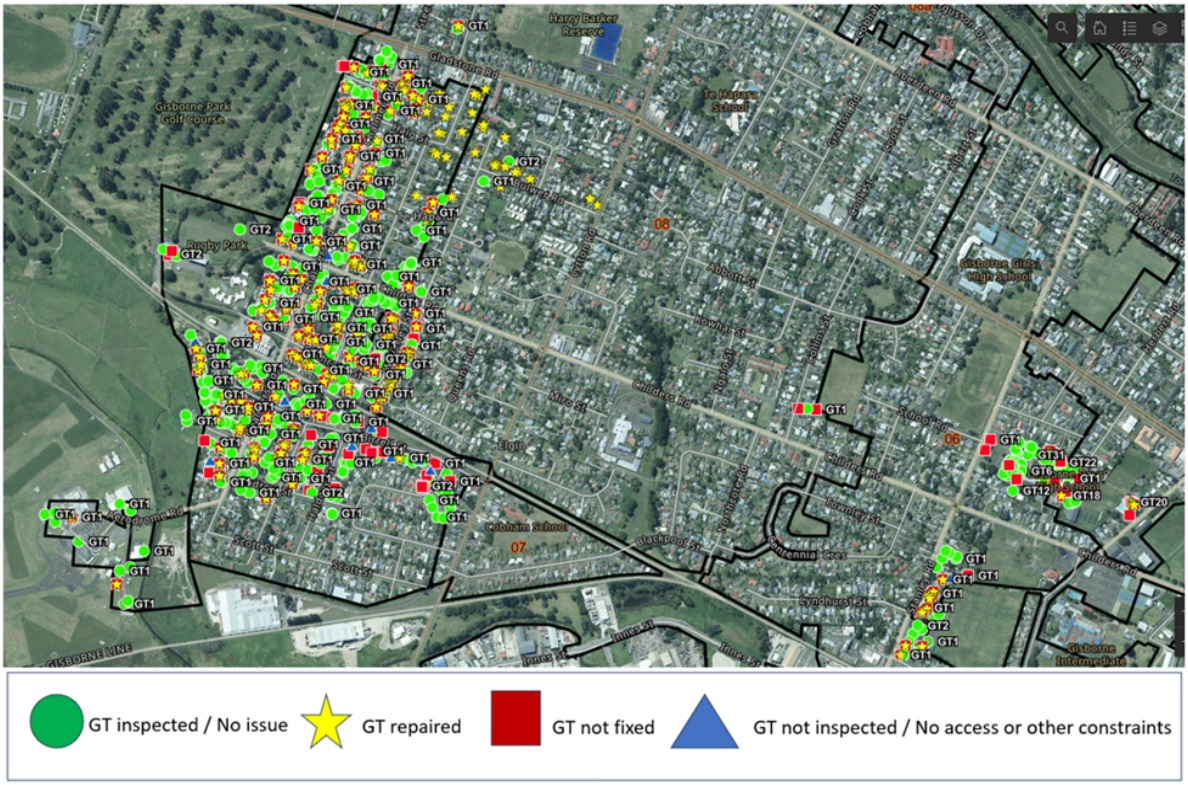
Rapid inflow assessment of private property is ongoing – from 07 November 2023 to 31 January 2024, 409 properties within the suburbs of Elgin, Gisborne Airport, Te Hapara, and Gisborne City have been inspected. 260 Gully traps were repaired, and 9 downpipes were removed.

DrainWise historical records to date show of 12,391 properties, 3,960 have been inspected, 1,729 gully traps have been repaired, and 64 downpipes into gully traps have been removed and connected to an approved outlet. This data excludes historical checks in Kaiti, inner Kaiti, outer Kaiti and Tamarau as these inspections are being reviewed to inform if property inflow/infiltration issues have been resolved. An initial inspection of 100 homes in Kaiti resulted in varying levels of confidence.

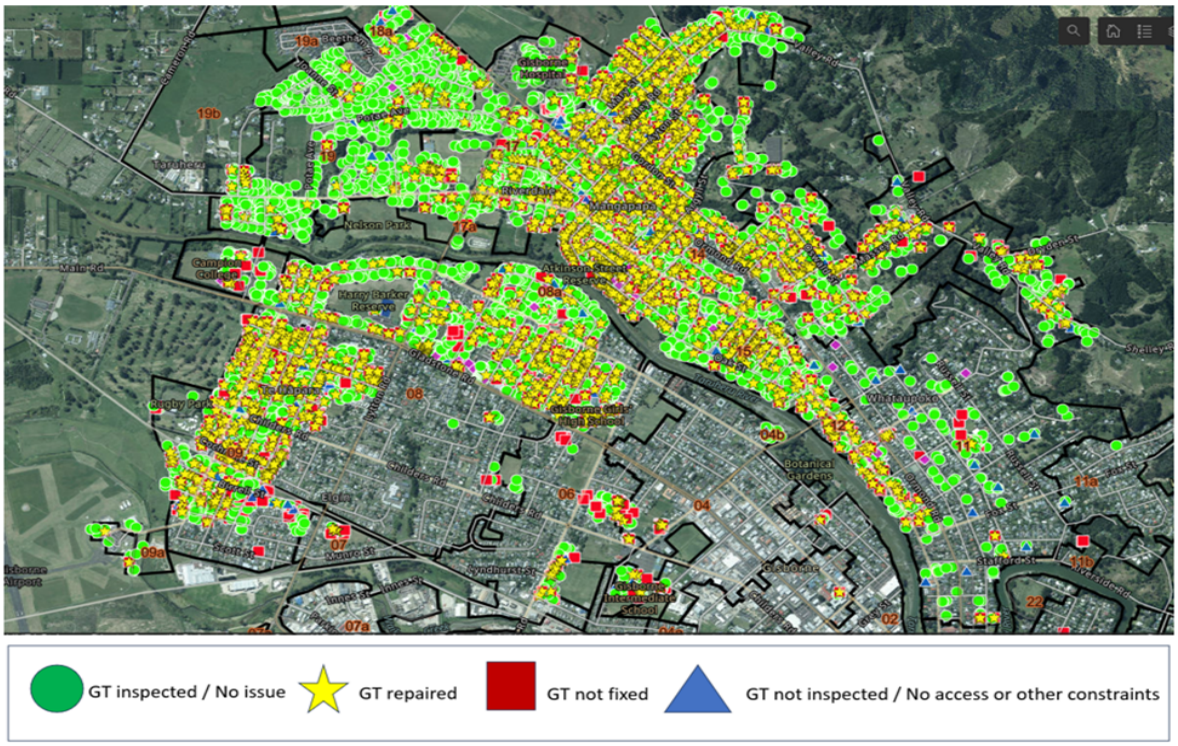
Suburb	Pilot Area/ Road	Number of GTs inspected in Dec 2023	Estimated Level of confidence for the inspections done (2016 - 2021)
Inner Kaiti	Kelvin Street	42	≥ 80%
Kaiti	Jackson Street	38	≥ 95%
Kaiti	York Street	21	≥ 80%
Outer Kaiti	Tyndall Road	39	≥50%
Tamarau	Matthews Road	52	≥ 70%

Following further assessments, we will have a comprehensive view of DrainWise property inspection performance to date and the balance of inspections to complete the city.

Map 1- Properties inspected and repaired from 7 November 2023 to 31 January 2024



Map 2 - Properties inspected and repaired from DrainWise project start to 31 January 2024



Rapid inflow assessment budget status

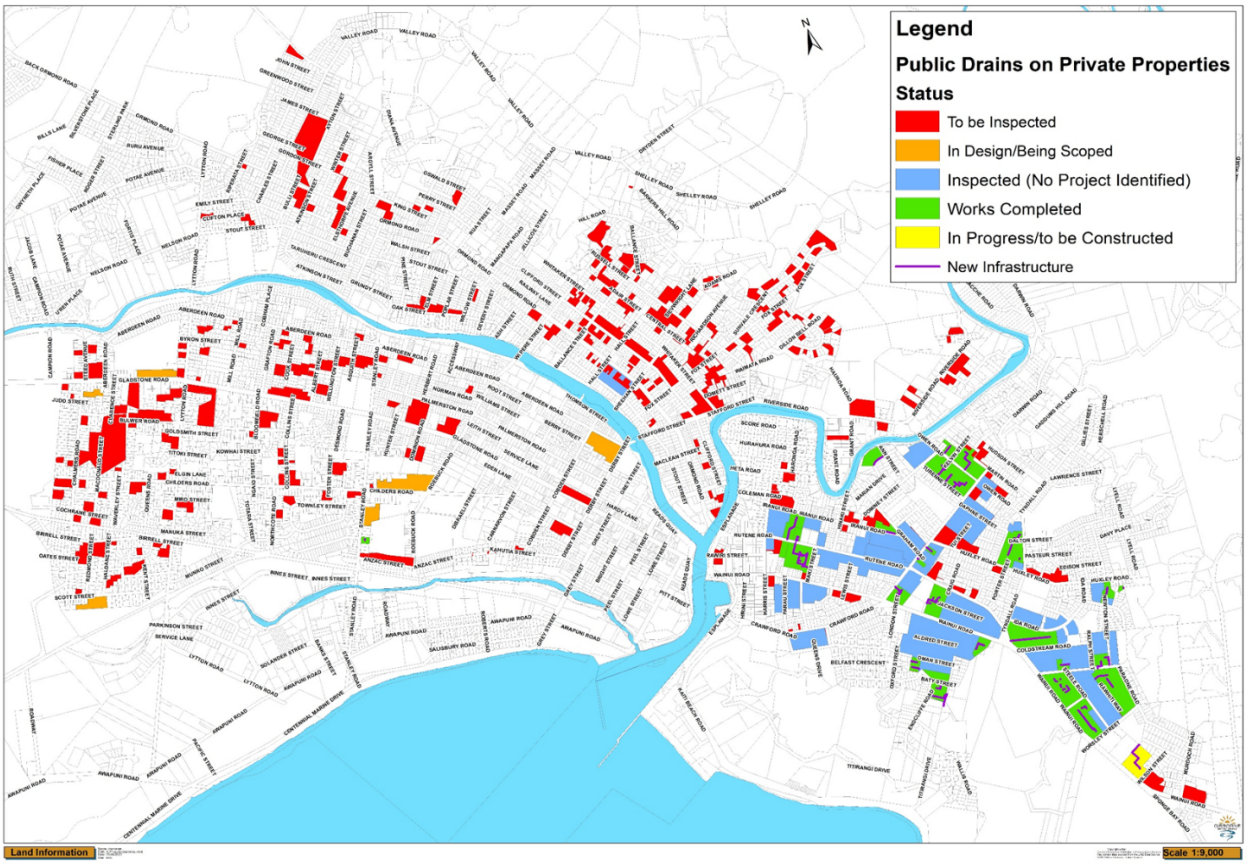
Year to Date	Annual Budget	Budget Remaining
$186.4k	$339.7k	$153.3k

Public drains on private property (PDPP)

The Ida/Coldstream project has been completed. 608-610 Wainui Road PDPP project design completed, property-owners approval given, resource consent progressing. 818 Gladstone Road, preliminary plan completed and design process underway. Harry Barker Reserve and Scott Street projects concept plans completed, now moving to design stage.

Since the start of the DrainWise programme 34 PDPP projects have been completed to date, six projects are in the scope, design, or resource consent phase. The map below illustrates the areas that have been investigated but not translated into projects (light blue) and those areas that will be investigated to inform if a PDPP is required (red).

With the projects currently in progress the budget is forecast to be spent / committed by financial year end.



Public Drains on Private Property budget status

Year to Date	Annual Budget	Budget Remaining
$192.2k	$833.5k	$641.3k

Stormwater Renewals

158A Stout Street project completed. Disraeli / Childers Road stormwater channel (archway) lining completed. Preliminary work commencing in February for 2024/25 programme. Graham Road project to be retendered for the 2023/24 financial year, subject to submission for additional budget. Cost of project increased following Geotech testing results and subsequent additional work required. Taruheru / Waru / Haisman project deferred as developers have withdrawn.

Stormwater renewals, inclusive of commitments, remains on track to spend the forecasted budget.

Stormwater renewals budget status

Year to Date	Annual Budget	Budget Remaining
$351.4k	$448.3k	$96.9k

Wastewater Renewals

2022/23 Pipeline renewal contract completed. 2023/24 Pipeline renewal tender awarded, and work commenced December 2023, work on track for completion in the 2023/24 financial year. Lytton / Ormond Road manhole replacement completed. Pipeline replacement project in Nelson Road completed.

Budget is on track to be spent by financial year end with the pending costs for the 2023/24 linings renewal contract and the charges for the Lytton and Nelson Road projects.

Camera assessments on the status of private property laterals will be undertaken on some properties in Iranui Road to inform the condition of the oldest pipes in the lateral network. This information will be used to help inform a plan for how to approach private property infiltration issues.

Wastewater renewals budget status

Year to Date	Annual Budget	Budget Remaining
$1.118m	$2.426m	$1.308m

Wastewater renewals spend projection.

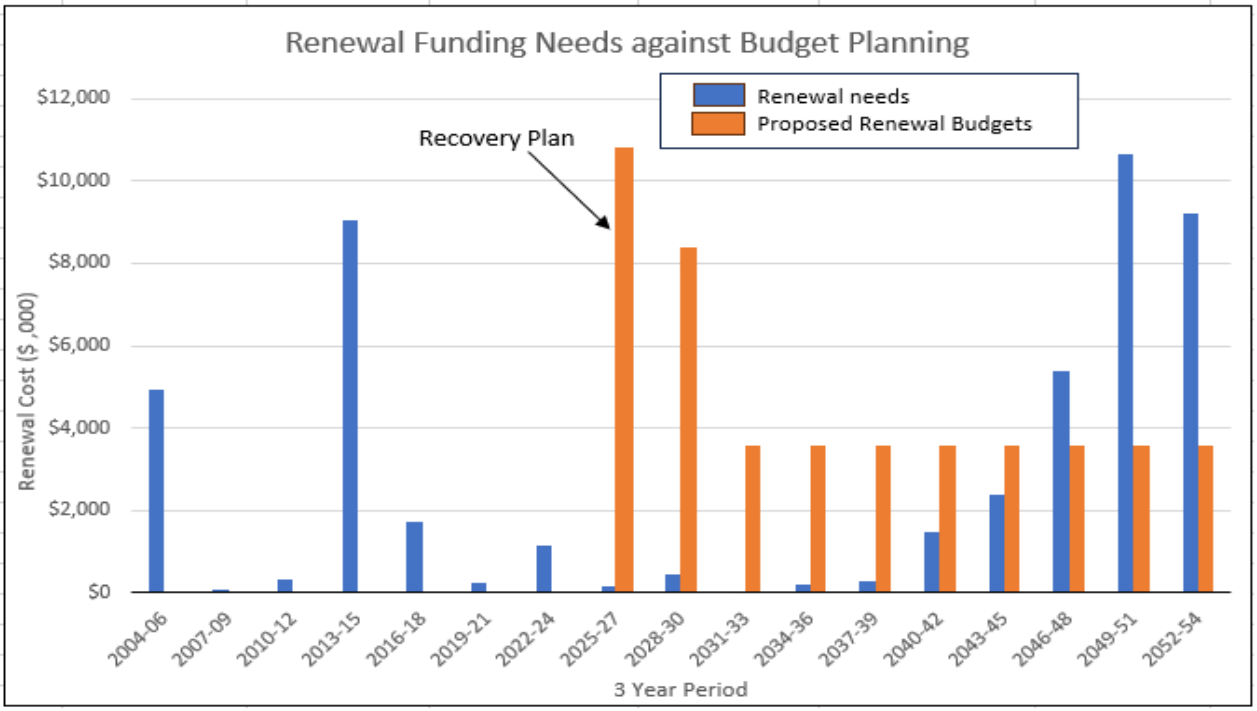


Table shows forecast spend for 2025-2030 to address historical underspend in renewals, from 2031 onwards a consistent annual renewals program will maintain the network going forward.

The spend does not include private property laterals which represent 50% of the lateral pipework network.

Gisborne District Council Dry/Wet Weather Consent

Deliverables required within six months of the commencement of the consent were completed by 16 May 2022. These included appointing a Tangata Whenua Reference Group (TWRG), Operating Maintenance Plan (OM Plan), Response Plan, and shellfish virus study methodology.

The decisions or matters in this report are considered to be of **Low** significance in accordance with the Council's Significance and Engagement Policy.

RECOMMENDATIONS - NGĀ TŪTOHUNGA

That the Wastewater Management/Whakahaere Waikino Committee:

1. **Notes the contents of this report.**

Authorised by:

Tim Barry - Director Lifelines

Keywords: Wastewater management, DrainWise programme, storm water, public drains, rain events.

BACKGROUND - HE WHAKAMĀRAMA

1. The DrainWise programme is made up of the following work streams:

   Property Inspections

   - Minor public-funded works on properties (fixing gully traps and broken downpipes).
   - Compliance and enforcement; removing stormwater from downpipes, and property flooding that enters or tops gully traps or wastewater pipes.

   Stormwater Network Upgrades and Renewals

   - Stormwater public network extensions into private property.

   Wastewater Network Upgrades and Renewals

   - Focus projects.

   Education and Awareness

   - Public awareness and education programme for the DrainWise programme through website, videos, billboards, infographics news stories, and DrainWise Art competitions in schools.

   Engagement

   - Tangata Whenua Reference Group.

2. The above workstreams aim to prevent wastewater overflows by reducing the amount of rainwater getting into the wastewater network. Rainwater can get into the wastewater network either by:
   - direct inflow, e.g., through gully traps or downpipes into gully traps
   - flooding on private property topping gully traps, or
   - ground water infiltration seeping through the soil and into broken private pipes or Council's pipes that are underground.

3. When too much rainwater gets into the wastewater network, our wastewater pipes become full and struggle to transport wastewater to the treatment plant. When this occurs, Council opens the scour valves to allow wastewater to discharge into the rivers to prevent wastewater overflows onto private property and out of manholes.

4. Half of the wastewater network is on private property and privately owned. It has become apparent that a greater focus on this portion of the network is required if further reduction in overflows is to be achieved. A key success factor will be property owners fixing problems on their privately owned wastewater and stormwater infrastructure. The Project Team is working to inspect and assist homeowners and educate residents about fixing issues with gully traps, downpipes, and laterals on their properties.

5. At the same time Council is making sure that public infrastructure has adequate capacity and is in an acceptable condition, and it is looking for solutions that help with reducing the problems on private property (e.g., public stormwater network extensions).

6. Council also manages a focused education and awareness programme that includes a revamped DrainWise website, videos, posters, billboards, infographics, news stories and a DrainWise Art Competition in schools. It also uses social media when appropriate.

DISCUSSION and OPTIONS - WHAKAWHITINGA KŌRERO me ngā KŌWHIRINGA

DrainWise Activity

7. In this reporting period there was one weather overflow event.

Date	Event	Hours
25 November 2023	Rain Event	56

Activity	From starting time to 06 Nov 2022	This period 07 Nov 2023 – 31 Jan 2024	Total (excl Historical Kaiti)
Properties inspected (rapid assessment)	3337	517	3854
Properties full inspection including smoke testing, CCTV	13 x Schools	3 x Schools	16 x Schools
Gully traps repaired	1463	265	1728
Number of downpipes into gully traps identified	55	9	64
Downpipes into gully traps removed (last three months)	55	9	64

Public Drains on Private Property

8. Ida/Coldstream project has been completed. 608-610 Wainui Road PDPP project design completed, property-owners approval given, resource consent progressing. 818 Gladstone Road, preliminary plan completed and design process underway. Harry Barker Reserve and Scott Street projects concept plans completed, now moving to design stage.

9. 23% budget spent year to date (YTD). The budget is forecast to be spent / committed by financial year end with the projects currently underway.

10. PDPP status summary:

Activity	Completed from program start to 06 Nov 2022	Completed this period 07 Nov 2023 – 31 Jan 2024	Projects in process
PDPP Projects	33	1	6

Current status of On Property projects is:

Activity	Status
Ida Road/Coldstream Road	Completed
608/610 Wainui Road	Resource consent in process
818 Gladstone Road	Design process underway
Scott Street	Concept plan completed
Harry Barker Reserve	Concept plan completed
Temple Street	Preliminary stage
Aberdeen Road	Preliminary stage

Dry and Wet Weather Discharge Consent

11. As a requirement of Council's resource consent for dry and wet weather discharges, a number of documents and actions needed to be provided/undertaken by 16 May 2022 (six months following the consent being granted). These included appointing a Tangata Whenua Reference Group (TWRG), Operating Maintenance Plan, Response Plan, and shellfish virus study methodology. These were provided on time.

12. As part of the consent WMC has appointed the KIWA Group to the role of TWRG. A Memorandum of Understanding (MoU) has been developed and provided to the TWRG for review. Once agreed a copy will be tabled for this Committee's information.

Network Performance Monitoring

13. Council is increasing its wastewater network performance monitoring equipment with the deployment of 15 smart manholes which incorporate level sensing devices. This will provide greater granularity for identifying if the problem is inflow and/or infiltration and allow more focused investigations leading to further reduction of stormwater into the wastewater network. Consultants were engaged to assist with this, and their recommendations have been provided and have informed the locations below.

HYNDS SMART MANHOLES
Grey Street (#204) just before bridge
Gisborne intermediate playing field
Maitai Street (#6)
Harris Street
Graham Rd / De Lautour rd
Wainui Road
Tyndall / Huxley intersection
Tyndall Road
Stout Street
Stout Street (above Oak 1)
Stout Street (above Oak 2)
Lytton Optional
Cnr of Stout and Hall Street
Stout / Sheenan
Ormond Rd

Stormwater Renewals

14. 78.4% of Stormwater renewals budget spent year to date. The budget is forecast to be spent / committed by financial year end.

Wastewater Renewals

15. 46% of Wastewater renewals Budget is on track to be spent by financial year end with the pending costs for the 2023/24 linings renewal contract and the charges for the Lytton and Nelson Road projects.

Gisborne District Council Dry/Wet Weather Consent:

16. Cawthron technical specification for a survey of viruses in shellfish following wet weather wastewater overflows draft report is attached for review. The estimated budget for the survey, following a wet weather overflow event is $140k. No budget has been assigned or approved.

ASSESSMENT of SIGNIFICANCE - AROTAKENGA o NGĀ HIRANGA

Consideration of consistency with and impact on the Regional Land Transport Plan and its implementation
Overall Process: **Low** Significance
This Report: **Low** Significance

Impacts on Council's delivery of its Financial Strategy and Long Term Plan
Overall Process: **Low** Significance
This Report: **Low** Significance

Inconsistency with Council's current strategy and policy
Overall Process: **Low** Significance
This Report: **Low** Significance

The effects on all or a large part of the Gisborne district
Overall Process: **Low** Significance
This Report: **Low** Significance

The effects on individuals or specific communities
Overall Process: **Medium** Significance
This Report: **Low** Significance

The level or history of public interest in the matter or issue
Overall Process: **Medium** Significance
This Report: **High** Significance

17. The decisions or matters in this report are considered to be of **Low** significance in accordance with Council's Significance and Engagement Policy.

TANGATA WHENUA/MĀORI ENGAGEMENT - TŪTAKITANGA TANGATA WHENUA

18. Further engagement is achieved through WMC appointed technical working groups – the KIWA Group and the TWRG.

19. Meetings will be scheduled for TWRG meetings in 2024, dates to be advised.

COMMUNITY ENGAGEMENT - TŪTAKITANGA HAPORI

20. The community has been consulted as part of the Long-Term Plan 2021–2031 (LTP) process and gives a high priority to the DrainWise Programme.

CLIMATE CHANGE – Impacts / Implications - NGĀ REREKĒTANGA ĀHUARANGI – ngā whakaaweawe / ngā ritenga

21. Rising sea levels and higher intensity rainfalls will impact the performance of the stormwater network. Any new or renewal works have adopted 2090 climate change levels.

CONSIDERATIONS - HEI WHAKAARO

Financial/Budget

22. Budgets for the 2025-2027 3year LTP have been submitted and following consultation and confirmation will determine the aims for the LTP period.

Legal

23. Council has a challenging dry/wet weather discharge consent, requiring regular interaction and a number of procedural processes that need to be managed to ensure compliance.

POLICY and PLANNING IMPLICATIONS - KAUPAPA HERE me ngā RITENGA WHAKAMAHERE

24. The requirements of the DrainWise Programme are likely to influence the LTP and spatial planning given the current constraints on the wastewater and stormwater capacity in places, until such a time as inflow and infiltration is reduced sufficiently to not cause wastewater overflows.

RISKS - NGĀ TŪRARU

25. There are legal risks associated with not complying with Council's resource consent.
26. Not meeting community expectations of having no overflows can impact adversely on Council's reputation.
27. On-property overflows will continue to pose health risks for property owners.
28. Overflows to our rivers will continue to present health and environmental risks.

NEXT STEPS - NGĀ MAHI E WHAI AKE

Date	Action/Milestone	Comments
11 June 2024	WMC Meeting	
TBA	TWRG Hui to review MoU, Mortuary waste	TWRG to be consulted regarding a meeting date.
TBA	Alternative Use and Disposal workshops	Workshops to set the next options for investigation.

REPORT NO. 3768

TECHNICAL SPECIFICATION FOR A SURVEY OF VIRUSES IN SHELLFISH FOLLOWING WET WEATHER WASTEWATER OVERFLOWS IN GISBORNE / TŪRANGANUI-A-KIWA

DRAFT

By receiving this draft report the Client acknowledges the following points:

- This draft report has not necessarily been through the Cawthron editing, peer review or sign–off processes.
- The Client review of this report should be limited to suggested amendments to incorrect technical aspects (rather than comments about editing or formatting). Use the Adobe Acrobat ‘sticky note’ function to provide input and feedback.
- This draft report is not for circulation to other parties unless it is with permission from the Cawthron Institute author and is for the purpose of consultation with stakeholders.

TECHNICAL SPECIFICATION FOR A SURVEY OF VIRUSES IN SHELLFISH FOLLOWING WET WEATHER WASTEWATER OVERFLOWS IN GISBORNE / TŪRANGANUI-A-KIWA

DRAFT

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ABBREVIATIONS

GI	Genogroup I
GII	Genogroup II
GDC	Gisborne District Council
NoV	Norovirus
PCR	Polymerase chain reaction
RNA	Ribonucleic acid
WWO	Wet weather overflow
WWTP	Wastewater treatment plant

1. INTRODUCTION

1.1. Background to the survey

Gisborne District Council (GDC) owns and operates approximately 50% of the wastewater network that services the city of Gisborne. The other half of the network is on private land and is managed by the property owners. The network collects and transports domestic and industrial wastewater, and limited volumes of stormwater and infiltrated groundwater, via underground pipes and pump stations for treatment at the Gisborne Wastewater Treatment Plant (WWTP). The wastewater network includes a number of controlled primary, secondary and tertiary overflow points and uncontrolled overflow points (e.g. manholes), as well as a number of 'scour' valves used for maintenance (cleaning, flushing) and repair of the network (Dever & Mayhew 2020) (Figure 1).

During wet weather, the combined volume of wastewater and stormwater entering the network may exceed its capacity, causing the discharge of excess flows to land or surface waters. Such wet weather overflows (WWOs) may require manual opening of the scour valves to relieve the pressure in overloaded pipes at certain points in the network. Overflows may also occur during dry weather due to mechanical or power failures, fractures of network components or blockages. This type of overflow is called a dry weather overflow. These are generally of much smaller volumes than WWOs.

Wastewater overflows contain untreated wastewater and stormwater and contribute microbiological and other types of contaminants to receiving environments (Botturi et al. 2020; Petrie et al. 2021). The potential environmental effects of overflows include contamination of surface and groundwater, algal blooms, beach closures, shellfish bed closures, and fish deaths (USEPA 2004). From a human health perspective, the main concern is gastrointestinal illness from infection with enteric viruses and bacteria via ingestion of contaminated waters or consumption of contaminated bivalve shellfish (Campos & Lees 2014; Jagai et al. 2017).

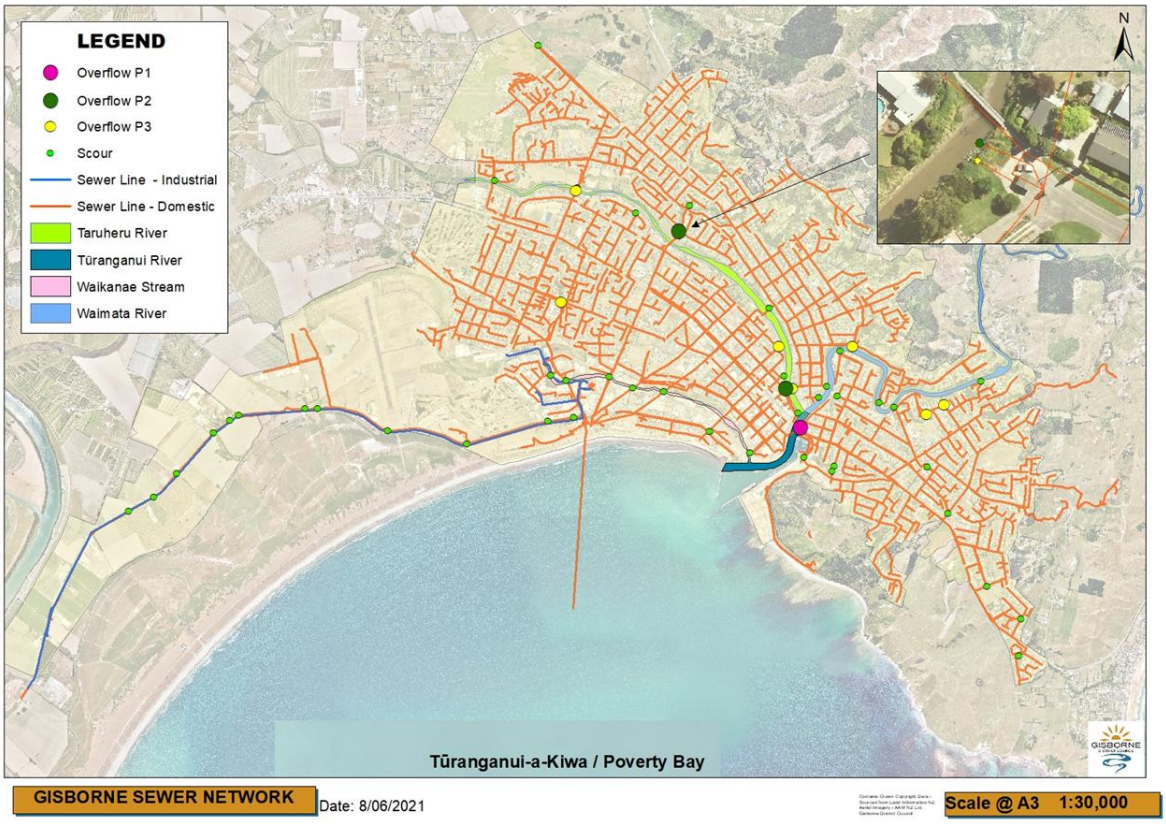

Figure 1. Wastewater network showing primary (pink dot), secondary (dark green dots) and tertiary (yellow dots) overflow points and scour valves (light green dots) in the Gisborne catchment. The sewer line running into Poverty Bay represents the discharge of treated effluent from Gisborne WWTP via a long sea outfall. Source: Gisborne District Council.

GDC has obtained a resource consent that authorises the discharge of wastewater overflows to land and fresh water during wet weather conditions, subject to a range of conditions. The consent requires the council to progressively reduce the frequency of wastewater overflows while also improving the management / mitigation of adverse effects and risks of overflows to the environment and human health.

Consent conditions 23 and 24 (full text in Appendix 1) require that GDC develops and implements a survey to determine the persistence of viruses in shellfish following a WWO event (GDC 2020).

Condition 23 prescribes certain requirements for the survey methodology (see Section 1.2). Essentially, the survey should comprise the collection of shellfish samples at nearshore sites where shellfish are harvested for human consumption, and at set intervals following an overflow event to understand the persistence of viruses in the shellfish.

The survey data could inform the imposition and duration of rāhui, and the harvesting of mahinga kai, as determined by tangata whenua.

4Sight Consulting Ltd., on behalf of GDC, requested assistance from the Cawthron Institute in preparing a methodology for the shellfish survey, according to the scope provided in Section 1.2. The client anticipates that Cawthron will work alongside Council staff and members of the Tangata Whenua Reference Group to implement the methodology and ensure that the survey provides appropriate information to manage public health risk.

1.2. Terms of reference as provided by the client

4Sight Consulting provided a list of the survey requirements as per Condition 23 together with commentary on how the requirements may be met:

- *"*A definition of the type of WWO event for which a survey should be undertaken*."* This primarily relates to the scale of an overflow event. Once sample locations have been identified, GDC will identify a scale (discharge volume/duration) that is required to materially affect water quality at the subject sites (based on previous modelling).
- "The locations of at least four sampling sites spanning both river and nearshore coastal waters where shellfish are regularly collected and the overlying water quality is likely to be influenced by WWO discharges." This is to be determined in conjunction with the project manager and the Tangata Whenua Reference Group[1]. Provision should be made for two meetings with representatives to identify potential locations. These could be on-line.
- "Details of shellfish species and the minimum number of individuals of each species to be collected at each site." This may require an initial assessment to identify species that are present at each location.
- "The timing of sample collection, including initial sampling following the onset of discharge and subsequent sampling on at least two occasions following an overflow event (or such other frequency as recommended)." The consultant should advise an appropriate interval for sampling, consistent with the purpose of the assessment.
- "The number of WWO events that sampling will follow and consideration of the merits of comparative sampling following wet weather in the absence of a WWO." As indicated, consideration should be given to whether multiple events should be sampled and, if so, how many. As per the condition, analysis of a stormwater only discharge event should be considered, but only to the extent that such sampling contributes to the purpose of the assessment.

[1] This is meant to be KIWA Group.

- "The list of indicator pathogens and representative viruses (including but not limited to *Escherichia coli* and enteric viruses) that will be tested in shellfish flesh and the laboratory and analytical methods that will be used."
- "An overview of how the shellfish virus assessment results will be evaluated and reported." A brief overview should be provided. This is not required to be a detailed discussion.

2. ENVIRONMENTAL TRANSMISSION OF ENTERIC VIRUSES

Untreated wastewater contains many types of enteric viruses. The groups of greatest relevance to foodborne disease are adenovirus, enterovirus, hepatitis A and E, norovirus (NoV), and rotavirus (Wyn-Jones and Sellwood 2001). Most outbreaks of gastrointestinal illness associated with the consumption of shellfish contaminated with wastewater are attributed to NoV (Bellou et al. 2013). NoV are currently classified into ten genogroups, of which three are commonly associated with shellfish-borne illness: GI, GII and GIV. GI and GII infect humans[2] and are commonly detected in untreated wastewater, with the latter occurring at higher concentrations (Eftim et al. 2017). A winter seasonal peak of NoV prevalence has been reported in many overseas studies (Eftim et al. 2017) and this seasonality is consistent with the higher number of illness outbreaks during the winter (Campos & Lees 2014). However, the epidemiological data available for Aotearoa New Zealand does not suggest a strong seasonality in NoV gastroenteritis, with peak months varying among years (Greening et al. 2012; Hewitt et al. 2020).

There have been few outbreaks of NoV illness associated with shellfish in New Zealand. During the period 2009–2015, a total of 172 foodborne outbreaks caused by NoV were reported to national epidemiological surveillance. Of these, shellfish were the suspected vehicle of infection for 13 outbreaks (8% of total; 104 cases) (Hewitt et al. 2020). Large outbreaks caused by contamination of shellfish growing areas following sewage spills have been reported in the international literature (Bellou et al. 2013; Fitzgerald et al. 2014; Miller et al. 2018). In 2009, two outbreaks of gastrointestinal illness in Waikato were linked to the consumption of oysters contaminated with wastewater. Epidemiological and environmental investigations identified a common growing area which had been contaminated with wastewater from a leaking pipe during maintenance works at a WWTP (Wall et al. 2011). This indicates that the risk of shellfish-related gastrointestinal illness in New Zealand is low but not negligible.

Data from environmental monitoring studies indicate that, when present in the local community, NoV genomic material (RNA) is commonly detected in wastewater and can persist in discharge receiving environments for extended periods (weeks–months)

[2] Genogroup II also infects pigs.

(Campos and Lees 2014; Campos et al. 2016) and contaminate shellfish beds over large areas (several kilometres) downstream of discharge points (Campos et al. 2015; Brake et al. 2017). NoV is very infectious, shed in large quantities by infected persons, and occurs sporadically in communities. Because of the intensive sampling required to detect robust quantitative information on virus occurrence and the high costs associated with testing, studies of NoV persistence in the marine environment are resource intensive.

2.1. Definition of viral persistence

In the context of environmental virology, the term 'persistence' is used to describe the capacity of a virus to infect new hosts following release in the environment (Bosch et al. 2006). New infections may occur when humans are exposed to viable viruses, i.e. those that have all their components unaltered and therefore have not lost their basic properties.

Many physical, chemical, and biological factors influence virus viability in the marine environment, including temperature, light, pH, salinity, organic matter, and predation by protozoa (Sánchez & Bosch 2016). Therefore, an important consideration for any virus surveillance study in shellfish harvesting areas is whether viable viruses are present, can *persist* long enough, and are in high enough concentrations to cause disease in consumers. Given the volumes and frequency of wastewater overflows relative to the treated effluent from Gisborne WWTP, the NoV impact areas are expected to extend a few kilometres from the overflow points and possibly be confounded by other sources in the catchment (e.g. septic tank discharges).

It is important to consider the advantages and disadvantages of the testing methods. Culture-based methods for detection and quantification of NoV have only recently been described (Estes et al. 2019) and are not yet offered as commercial service by laboratories testing wastewater and shellfish. The gold standard method for NoV quantification is based on polymerase chain reaction (PCR), which targets genes of the virus and quantifies viral nucleic acid (RNA). The most common method is the reverse transcription quantitative real-time PCR (RT-qPCR) which measures RNA levels through the use of a targeted DNA molecule in a quantitative PCR reaction and allows rapid detection of gene expression changes (Farkas et al. 2020). It is a similar technique to that used for SARS-CoV-2 virus testing. There are other methods (e.g., isothermal amplification, high-throughput sequencing) available, but these are laborious and require comparative validation studies and definition of quality control parameters before they can be used with confidence.

Results of PCR-based methods indicate the presence of virus genomic material in a sample, but do not provide information on the proportion of infectious viruses. A cost-effective way of determining NoV infectivity is to compare the PCR results from NoV to

the results of PCR and culture testing of other markers of viral contamination such as organisms that indicate the presence of faecal contamination. Based on the latest science, the best candidate for this is F-specific RNA bacteriophage (Lowther et al. 2019). For the purposes of this survey, I recommend the use of the 'infectivity ratio' method proposed by Lowther et al. (2019).

3. SURVEY METHODOLOGY

3.1. Type of wet weather overflow for sampling

Rainfall influences the levels of microbiological contamination in coastal waters because it provides connectivity between the sources of contamination and the receiving waters (Campos et al. 2013). Rainfall also increases the likelihood of wastewater spills and enhances the transport of microbiological contamination via river flows. However, the association between rainfall and microbiological contaminants is not linear because there are many confounding factors (rainfall intensity/duration, catchment characteristics). A statistical analysis of the relationships between wastewater overflows (as indicated by the opening of the scour valves) and rainfall in Gisborne found no obvious relationships between rainfall intensity / duration and the point at which the valves were required to be opened (Bosworth 2020). The analysis also showed that there is no critical rainfall level that leads to an overflow event and that both short duration/high intensity and long duration/low intensity rainfall events can cause overflows (Bosworth 2020; Dever & Mayhew 2020). Presumably, this is because the wastewater network has the capacity to accommodate considerable volumes of rainwater. Based on these results, the use of rainfall triggers for deciding on a WWO for sampling is not recommended.

The analysis of environmental risk factors for NoV GI and GII, and *E. coli* reported by Campos et al. (2017) provides additional factors for consideration. Their study used data from 31 shellfish growing areas in the United Kingdom and found that while rainfall is strongly associated with *E. coli* concentrations in the shellfish, the best predictive parameters for NoV are river flows, catchment area, volume of continuous sewage discharges, and the number of wastewater spills. The study also found NoV concentrations above the limit of quantification of the RT-qPCR method (100 copies/g) when the average number of spills was greater than 14 per year and the volume of sewage discharged was greater than 3,200 m^3. Considering the lack of association between overflow events and rainfall in Gisborne, I recommend that the duration of spills and / or volume spilt be used to decide on a WWO for sampling. GDC suggests that a spill duration threshold set at 24 h may be appropriate. Alternatively, the historical overflow data for 2009–2018 reported by Dever and Mayhew (2020) suggests that the 3,200 m^3/day threshold is often exceeded for overflows when they occur and would be a good marker to start sampling.

Ideally, the selected overflow(s) would coincide with an outbreak of NoV in the local community since this increases the likelihood of detecting the virus in the environment. Liaison with the local District Health Board may be required to obtain information on illness cases / outbreaks in local hospitals at the time of the survey.

3.2. Sampling

3.2.1. Sites

Shellfish samples should be taken from the seven sites represented in Figure 2. These sites were identified based on the areas where shellfish are harvested for human consumption, the proximity of these areas to overflow discharges, water flows in Poverty Bay, access to sampling sites and other logistical factors. The rationale for selecting these sites is as follows:

- Taruheru River at Peel Street Bridge: this site represents the northern and northwestern parts of the sewerage catchment and in proximity to a secondary overflow point.
- Waimata River opposite ANZAC park: this site represents the northern part of the sewerage catchment with hydrodynamic modelling predicting that overflows may reach this area under certain climatic and tidal conditions.
- Turanganui River (railway bridge): this site represents the southeastern part of the sewerage catchment in proximity to the primary overflow point in the Turanganui River
- Turanganui River Breakwater at Butlers Wall: this site is further downstream of the previous site in the lower Turanganui River at a point where freshwater from the catchment mixes with seawater during heavy rainfall events. It has been suggested that this may be an area of deposition / accumulation, and mussel collection is known to occur here.
- Kaiti Beach: this is a marine site in Poverty Bay, located approximately 1 km from the mouth of the Turanganui River. No overflow points discharge in the vicinity of this site, but hydrodynamic modelling predicts that overflows will reach this area under certain climatic and tidal conditions
- Midway Beach at Stanley Road: this is a marine site in Poverty Bay, located approximately 3.4 km from the mouth of the Turanganui River; no overflow points discharge in the vicinity of this site, but hydrodynamic modelling predicts that overflows will reach this area under certain climatic and tidal conditions
- Control: this is a marine site in Poverty Bay, located just to the west of Tuamotu Island, approximately 4 km from the mouth of the Turanganui River; an alternative control site could be Tuaheni Point.

If sufficient shellfish cannot be obtained from the recommended sites or if there are concerns over sampling / access, caged shellfish should be used (see Section 3.2.4).

Figure 2. Recommended sampling sites for the survey.

3.2.2. Shellfish species

Different species of bivalve shellfish concentrate contaminants to differing extents. Comparative data on average concentrations of microbiological contaminants in different species of shellfish are not available for New Zealand. In the United Kingdom, clams, cockles and mussels generally bioaccumulate *E. coli* to higher concentrations than oysters (Younger & Reese 2013). These differences occur because of morphological and physiological characteristics of the individual species. In Tūranganui-a-Kiwa, a range of shellfish species (pāua *Haliotis iris*, cockle *Austrovenus stutchburyi*, pipi *Paphies australis*, rock oyster *Saccostrea glomerata*, mussels [blue mussel *Mytilus edulis* or the greenshell mussel *Perna canaliculus*]) and other kaimoana occur on intertidal and subtidal areas and are important mahinga kai for Māori. For the purposes of this survey, mussels are the preferred species for sampling because they are more abundant in the study area and more resistant to environmental stress factors when transplanted to other sites (see Section 3.2.4). However, it is important that all samples taken during the survey are of the same species to ensure comparability of results.

There is evidence that immature / juvenile shellfish concentrate *E. coli* to concentrations that are not representative of mature stock harvested for human consumption. Consequently, commercially-sized shellfish should be sampled in this survey.

3.2.3. Sample size

The following sample sizes are recommended (number of harvestable size live animals by species and per sample):

- Pāua: 12–15 (shell length = 125 mm)
- Rock oyster: 20–30 (shell length = 58 mm)
- Mussels: 20–30 (no minimum size)
- Cockle and pipi: 35–60 (no minimum size).

During certain times of the year, it might not be possible to sample an ideal number of animals. In these circumstances, at least 20 individual shellfish should be collected to provide a minimum quantity of flesh and intravalvular liquid (approximately 200 g) for the recommended testing.

3.2.4. Sampling method

Samples should be collected manually from the natural growing areas using a commonly used harvesting method. However, finding resident populations in the natural environment is not always possible. An alternative is to place shellfish in bags / cages and deploy them at the sites shown in Figure 2. This would involve collection of shellfish from a nearby ‘clean’ environment and transplanting the animals to the experimental sites placing them in cages, where they are expected to be exposed to the wastewater. Caged shellfish should be allowed to acclimatise to the new environment over at least one week. The main advantage of caged shellfish is that the transplanted shellfish can be placed exactly where they are needed and therefore there is more certainty that enough animals are available for sampling during the survey. The caged shellfish can also be placed in areas that are more easily available for retrieval. The downside of caged mussels is that artificial structures such as moorings, lines, and chains are required to suspend the cages within the water column. Some species that inhabit sandy or muddy substrata (e.g. cockles) may become stressed and therefore may not filter feed normally when suspended in the water column. However, mussels and oysters normally adapt well to these ‘new’ environments. Shellfish sampled from the control site at Tuamotu Island or Tuaheni Point are unlikely to be affected by wastewater overflows, or at least are unlikely to be subject to significant virus loads.

3.2.5. Sample preparation and transport

Sediment, mud and epifauna that might be present on the shells should be removed as soon as practicable. This is best achieved with a nylon-bristle brush (or similar) and by rinsing the animals with clean seawater or fresh water of potable quality. If clean seawater / potable water is not available, seawater from the nearest area of sampling may be used. The shellfish should not be re-immersed during washing because this may cause them to open and become contaminated. The shellfish should be allowed to drain before placing them in a sample bag. The bag should be labelled with sample details (site name and location, species and collection date and time). Dead animals and animals with damaged or open shells should not be included in the sample.

Upon collection, samples should be placed as soon as possible in an appropriate coolbox ('chilly bin') and maintained at a temperature not exceeding 10 °C during transport to the testing laboratory. Care should be taken to ensure that the sample is not frozen because this will reduce bacterial concentrations in the sample. Sample submission forms should be completed as soon as possible and accompany the samples in transit to the testing laboratory. Links to sample submission forms used by Cawthron and ESR are listed in Appendix 2.

Water temperature and salinity should be taken at the time of sampling and recorded on the sample collection form using a multiparameter sonde. Ideally, the internal temperature of the coolbox should also be recorded on receipt at the laboratory. This can be achieved by placing a small bottle of water in the coolbox alongside the sample(s)[3]. The bottle should have been filled with water at ambient temperature at the time of sample collection and be clearly marked 'for temperature check on receipt'.

Samples should be sent to the laboratory by overnight courier (ideally not on Fridays as packages tend to wait until Monday to be delivered). The recommendation is that testing for culture-based microorganisms (*E. coli*, F-RNA bacteriophage) be initiated within 24 h of sample collection. Testing for viruses by PCR can be delayed longer but ideally within 48 h of sample collection. When planning a sampling event, consider the availability of the testing laboratory. Samples should arrive at the laboratory during the working week.

3.3. Timing of the survey

It must be acknowledged that any survey of this kind represents a snapshot in space and time of the potential microbiological contamination risk occurring throughout the year. Overseas surveillance studies for NoV in shellfish indicate that the number of positive samples increases when new variants emerge (Lowther et al. 2018). Liaison with the Ministry of Health and / or ESR (EpiSurv team) may be required to confirm that

[3] Alternatively, sensor technology such as iButton could be used (https://www.ibuttonlink.com/products/ds1921z).

the survey is not undertaken during an atypical year from an epidemiological perspective.

The wastewater network in Gisborne is vulnerable to inflow and infiltration (I&I) of stormwater into the wastewater network in parts of the catchment (Dever & Mayhew 2020). Despite substantial investments made by GDC to upgrade / renew public infrastructure and reduce I&I in recent years, there is still the potential for wastewater to enter the stormwater system, or otherwise discharge to freshwater, for example through leaky pipes or illegal cross-connections. In addition to WWOs, viral contamination may originate from areas affected by I&I, as well as the Gisborne WWTP discharge, which may confound the survey results. Therefore, I recommend a baseline survey of viral contamination in shellfish to provide comparative data and inform the viral risk assessment. The baseline survey would consist of two samples taken from each site during no-overflow conditions (under dry weather and wet weather) as represented in Figure 3. Both baseline and event-based sampling should be undertaken at low tide (±2 h) to ensure maximum distance travelled by the freshwater / wastewater discharges in the receiving environment.

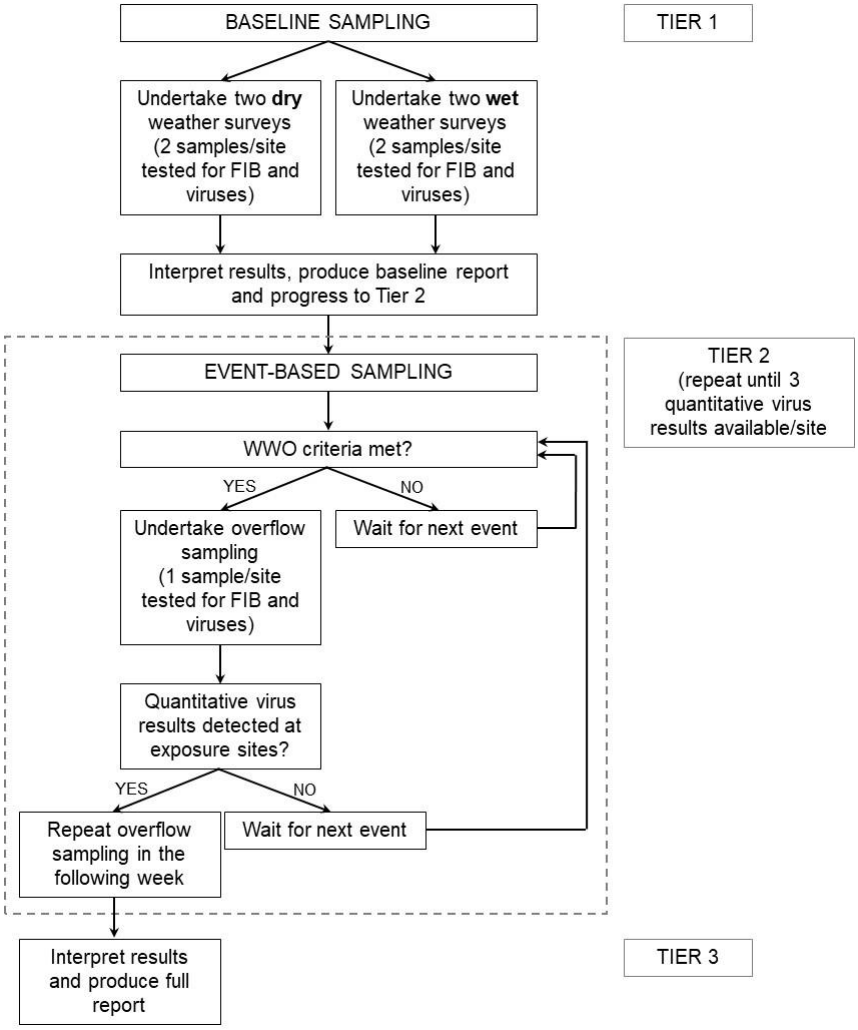

Figure 3. Proposed flow diagram for the survey. FIB-faecal indicator bacteria; WWO-wet weather overflow. Exposure sites-intertidal or subtidal areas where shellfish are harvested for human consumption.

3.4. Laboratory testing

I recommend testing the shellfish samples for faecal indicator bacteria (faecal coliforms, *E. coli* and enterococci) by using standard culture-based methods (APHA 1985). *Escherichia coli* is a good indicator of faecal contamination in freshwater environments while enterococci is a better indicator in marine environments (McBride et al. 2019). In brackish waters, either indicator may be suitable. Concerning viral parameters, I recommend that samples be tested for NoV GI and GII by PCR, and F-RNA bacteriophage GII by culture and PCR using methods described by Mooijman et al. (2002) and Gyawali et al. (2021).

Cawthron Analytical has IANZ accreditation for the bacteriological methods. ESR is also accredited for PCR testing of enteric viruses. Testing of F-RNA bacteriophage by culture at ESR is not accredited. Indicative testing costs are provided in Section 3.6.

3.4.1. What do the microbiological tests tell us?

Elevated concentrations of faecal indicator bacteria in shellfish indicate contamination of faecal origin (human and / or animal) in the environment and the possible presence of enteric pathogens. Samples positive for NoV GI and / or GII indicate that viral genomic material originating from human faecal contamination is present in the environment. Samples positive for F-RNA bacteriophage GII provide further reassurance that the contamination is of human origin because this genogroup is also found in environments contaminated with human waste.

Currently, there is no 'threshold' infectivity concentration for NoV as detected by PCR methods. The probability of becoming infected increases with the viral dose, but infection probability depends also on the individual characteristics of the consumer (genetics, immunity status). Furthermore, the relationship between the number of infectious viruses and the number of genome copies detected by PCR is not a constant. However, in testing the use of the infectivity ratio (defined in Section 3.5) to estimate the proportion of infectious NoV, Lowther et al. (2019) included both retail and outbreak-related samples of shellfish and found that the method is reliable and provides a better estimate of health risk than testing of viruses by PCR alone.

3.5. Reporting of survey results

For each sample, the following information should be reported by the testing laboratories:

- customer / project reference
- type of sample
- details of the sampling site
- date and time of sample collection
- date and time of laboratory test
- microbiological result (positive / not detected / no result)
- for positive results, whether the sample was quantifiable or not quantifiable
- for quantifiable positive results, the quantity determined in CFU/100 g, genome copies/g or pfu/g
- for positive but not quantifiable results, whether this was due to failure to provide an acceptable RT-PCR amplification efficiency or extraction efficiency
- the limit of quantification that applies to the result
- the limit of detection that applies to the result, if available.

Residual digestive glands of the tested shellfish should be archived over at least one year following completion of the testing to allow re-testing, if required. This should be agreed with the testing laboratories.

A report with statistical analysis and interpretation of microbiological results should be prepared on completion of the survey. I recommend that the statistical analysis of survey results comprises, as a minimum:

- summary statistics of microbiological results per sampling site (number of samples, minima, maxima, geometric means, number and percentage of *E. coli* results exceeding regulatory shellfish standards)
- graphical display of microbiological data distributions per site
- scatterplots of quantitative microbiological results per sampling site as a function of distance from the overflow sites
- tabulated virus infectivity ratios per site calculated as follows:
  - Infectivity Ratio=(F-specific RNA bacteriophage by culture)/(F-specific RNA bacteriophage by PCR)
  - Infectious norovirus=(norovirus by PCR)*(Infectivity Ratio)
- correlation analysis between microbiological survey results and other environmental monitoring data collected during / following a WWO (concentrations of faecal indicator bacteria, nutrients, water temperature, salinity, tidal state, river flow, wind intensity and direction).

3.6. Survey costs

Table 1. Indicative survey costs for caged shellfish.
NB. This estimate assumes that quantitative virus results are obtained in the first overflow sampling round.

Establishment and maintenance of sampling sites		
(man-hour costs assuming 2 h per site for two staff at $150/h)		$2,100.00
Set up and deployment of cages		$14,000.00
Sampling		
(assuming four baseline [two wet-weather and two dry-weather] and three sampling rounds for a single wastewater overflow event; man-hour costs for sample collection: 1 day (7 hours) for 2 staff at $150 each over 7 sampling rounds)		$14,700.00
Data assessment		
(assuming 24 h at $250/h)		$6,000.00
Sample testing		
(assuming total of 49 samples with costs per test as follows: Norovirus human genogroups I and II = $1,200.00 F-RNA bacteriophage human genogroup II = $400.00 *E. coli* = $49.00 Enterococci = $52.00)		$83,349.00
	Subtotal	$120,149.00
Contingency (15%)		$18,022.35
	Total	**$138,171.35**

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APPENDIX 1. CONSENT 2: WET WEATHER OVERFLOWS - DW-2020-109732-00 / WD-2020-109733: FULL TEXT OF CONSENT CONDITIONS 23 AND 24

Virus Assessment

23. Within six months of the granting of this consent, the Consent Holder shall submit to the Consents Manager, Gisborne District Council, for certification, a proposed survey methodology to assess the persistence of viruses in the flesh of bivalve shellfish following a WWO event. The survey methodology shall be designed by a suitably qualified and experienced expert and, as a minimum, shall comprise:

    a) A definition of the type of WWO event for which a survey should be undertaken;
    b) The locations of at least four sampling sites spanning both river and nearshore coastal waters where shellfish are regularly collected and the overlying water quality is likely to be influenced by WWO discharges.
    c) Details of shellfish species and the minimum number of individuals of each species to be collected at each site.
    d) The timing of sample collection, including initial sampling following the onset of discharge and subsequent sampling on at least two occasions following an overflow event (or such other frequency as recommended).
    e) The number of WWO events that sampling will follow and consideration of the merits of comparative sampling following wet weather in the absence of a WWO.
    f) The list of indicator pathogens and representative viruses (including but not limited to Escherichia coli and enteric viruses) that will be tested in shellfish flesh and the laboratory and analytical methods that will be used.
    g) An overview of how the shellfish virus assessment results will be evaluated and reported.

    Advice Notes:
    (a) It is recognised that the potential for health risk associated with the consumption of raw shellfish may be affected by other (non-overflow) discharges. Accordingly, the Consent Holder may extend the monitoring to other shellfish gathering sites and/or liaise with public health agencies regarding more general signage at its discretion.
    (b) The Consent Holder is encouraged to consult with the Tangata Whenua Reference Group, Hauora Tairāwhiti and Gisborne District Council's Environmental Science Department for opportunities to extend the monitoring to other shellfish gathering sites.

24. The shellfish virus assessment shall commence in accordance with the certified survey methodology with the first available WWO that meets the requirements set

in the methodology (Condition 23). The laboratory analytical results from each sampling event shall be submitted to the Consents Manager, Gisborne District Council within 30 days of receipt. The results of each sampling event shall be included within the Annual Report required under Condition 44.

APPENDIX 2. EXAMPLE SAMPLE SUBMISSION FORMS

Sample submission form for microbiological testing at Cawthron Institute:
https://www.cawthron.org.nz/wp-content/uploads/2021/11/Microbiology-Submission-Form-Nov-2021.pdf.
To submit a sample, download a submission form, fill it in and email it to samples@cawthron.org.nz. Please send a printed copy of the form with the sample and dispatch to Cawthron Institute, Sample Reception, 98 Halifax Street East, Nelson 7010.

Sample submission form for microbiological testing at ESR:
https://www.esr.cri.nz/assets/Test-Forms/ESR02-Non-human-single-specimen-request-form.pdf
To submit a sample, download a submission form, fill it in and email it to specimen.reception@esr.cri.nz. Please send a printed copy of the form with the sample and dispatch to Institute of Environmental Science and Research Ltd, Kenepuru Science Centre, 34 Kenepuru Drive, Kenepuru, Porirua 5022, PO Box 50348, Porirua 5240.

Te Kaunihera o Te Tairāwhiti
GISBORNE
DISTRICT COUNCIL

Title: **24-57 Wastewater Treatment Plant Upgrade Stage 2**

Section: Water Manager

Prepared by: Leo Kelso - Water Manager

Meeting Date: Tuesday 12 March 2024

Legal: No	Financial: Yes	Significance: **Low**

Report to WASTEWATER MANAGEMENT/WHAKAHAERE WAIKINO Committee for information

PURPOSE - TE TAKE

The purpose of this report is to provide the Wastewater Management Committee (WMC) with an update on progress of the Wastewater Treatment Plant (WWTP) Stage 2 Upgrade.

SUMMARY – HE WHAKARĀPOPOTOTANGA

Of note in the **attached** report is:

- Trial operations yet to commence due to variations in the condition of the influent coming from the Stage 1 biological trickle filter (BTF), which has made it difficult to obtain steady and useable test data.
- The project team continue to work with the designers and principal procured equipment suppliers to resolve the process-related matters preventing us from moving on.
- Stage 2 plant is fully operational therefore domestic wastewater is being treated through milli-screens, grit removed, biological trickle filter (BTF), clarifier, tertiary filter, and ultra-violet disinfection, and solids removed and taken off site for composting.
- Contract is over budget due to additional time to resolve process issues to achieve design performance, plus additional costs associated with site safety fencing, bund planting (excess spoil that remains on site).
- Milestone dates for hot commissioning and trial operations completion now targeting June 2024.

The decisions or matters in this report are considered to be of **Low** significance in accordance with the Council's Significance and Engagement Policy.

RECOMMENDATIONS - NGĀ TŪTOHUNGA

That the Wastewater Management/Whakahaere Waikino Committee:

1. Notes the contents of this report.

Authorised by:

Tim Barry - Director Lifelines

Keywords: Wastewater Treatment Plant, Stage 2 Upgrade, trial operations, milestones

BACKGROUND - HE WHAKAMĀRAMA

1. The outfall discharge consent July 2007, and subsequent amendments in 2009 and 2015, set conditions for the treatment of wastewater. The stage 2 upgrade project adds a clarifier, tertiary filtration, ultra-violet disinfection, and solids removal post the stage one project which consisted of milli-screening, grit removal, and biological trickle filter treatment.

SIGNIFICANCE - AROTAKENGA o NGĀ HIRANGA

Consideration of consistency with and impact on the Regional Land Transport Plan and its implementation
Overall Process: **Low** Significance
This Report: **Low** Significance

The effects on all or a large part of the Gisborne district
Overall Process: **Medium** Significance
This Report: **Low** Significance

The effects on individuals or specific communities
Overall Process: **Medium** Significance
This Report: **Low** Significance

The level or history of public interest in the matter or issue
Overall Process: **High** Significance
This Report: **Low** Significance

ATTACHMENTS - NGĀ TĀPIRITANGA

1. Attachment 1 - 24-57 GWWTP WMC Update Report 20240209 [**24-57.1** - 2 pages]

Wastewater Management Committee Update Report

Project: Gisborne Wastewater Treatment Plant Upgrade Stage 2

Project Manager: Ben McArthur **Report Date:** 9 February 2024

Health and Safety

The site is now running under full control of the GDC WWTP Operations team and falls under their Health and Safety plan and protocols. Signing in is as per plant register.

General Update

We are still unable to move into the Trial Operations phase of plant optimisation completely. This is largely because of variations in the condition of the influent coming from the Stage 1 BTF which has made it difficult to obtain steady and useable test data. There is a new and more targeted testing regime in place, and we expect that we will have enough of a dataset in the coming weeks.

In the meantime, we have started conversations with both Smith and Loveless, and Veolia, suppliers of the lamella clarifier and tertiary filters. Extracts of the data which show normal operational conditions have been sent to both companies for discussion on their respective performances.

The project team continue to work with the designers and principal procured equipment suppliers to resolve the process-related matters preventing us from moving on. During this time the Stage 2 plant is fully operational however, and while we aren't optimised, the end product of the effluent is considerably improved from the Stage 1 plant alone.

The main risks that the project now faces relate to process and performance. The first of these is meeting the requirements to move from hot commissioning to allow trail operations – resolving the issues with the principal procured equipment. From there the risk is on how much the plant can be optimised and how does it respond to adverse weather events and peak flows to maintain compliance.

Construction Progress

November 2023 – January 2024

- Daily toolbox meetings with operators have been pulled back to progress meetings as required, these are continuing internally with GDC WWTP staff.
- Performance proving of process units.
- Planting of completed bund.
- Verification testing in field for Tertiary Filters and other equipment.
- Virtual meetings held with suppliers and manufacturers of Tertiary Filters.
- Review of the testing and SCADA information.
- Operations and maintenance manual final version complete.
- Complete hot commissioning.
- Minor defects remedied by MCD.
- Operational changes to fixtures by ThinkWater.
- Removal of southern boundary fencing for replacement.
- Optimisation of the solids dewatering process, polymer trials.
- Re-alignment of the kerbing at the UV access.
- Tertiary filters chemical cleaning trials (different chemicals).

Wastewater Management Committee Update Report

Forward Programme

February – March 2024

- Collect full dataset for performance proving.
- Engage with suppliers and designers to review and make necessary adjustments.
- Southern boundary fencing reinstatement.
- Trail operations and plant optimisation.
- Close out of supplier contracts.

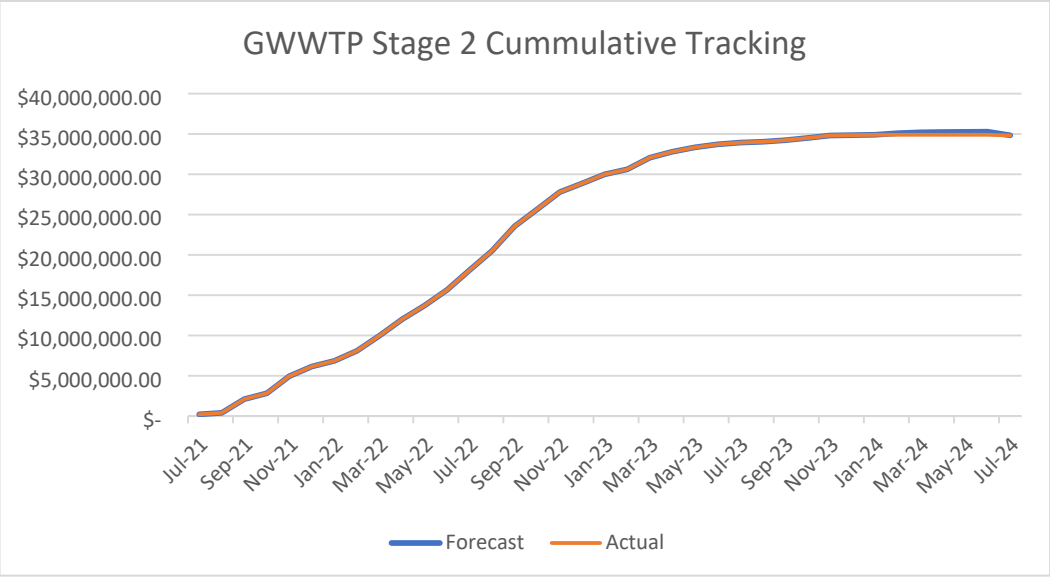
Project Milestones Forecasted Dates

Below are the updated Project Milestones Forecasted Dates which account for the most recent changes in the procurement, construction progress and commissioning programmes.

Construction period *(non-critical path items to complete)*	Aug 2021 – *Aug 2023*
Cold commissioning	Jul 2023
Contingency allowance (mandatory 25 days)	Utilised
Hot commissioning	Aug 2023 – Jan 2024
Practical Completion	*granted 7 Sep 2023*
Trial operating period (forecast)	Apr – Jun 2024

Financial Update (to end of Jan 2024)

At the completion of construction, the $34.6M council budget had been met. Following this however costs have continued to be incurred as we work through the process related issues of the plant which will see us exceed this budget. Current forecasts, working on resolving the issues by March 2024, completing the trial operations and optimisation in June 2024 have a forecast overspend of 400K (1.2%).



Progress Photos

None this period.