

Martinborough E.coli Incidents



Martin Gronback – Wellington Water

Introduction:

Until the 13th of May 2019, The Martinborough water supply consisted of UV Treatment of three ground water bores.

Due to high levels of dissolved Manganese in the majority these bores, chlorination was not undertaken for this water supply as this would result in discoloured water.

In 2019, two boil water notices were issued for the supply due to multiple instances of low levels of E.coli contamination.

This presentation provides an overview of the response and the challenges faced.

Thursday January 30th 2019:

Routine network sampling results showed a low level E.Coli detection at Martinborough School:

2 MPN/100mL E.coli

5 MPN/100mL total Coliforms

All other samples were clear.

Friday January 31st 2019:

A second low level E.coli result from the Martinborough Reservoirs was detected:

2 MPN/100mL E.coli

12 MPN/100mL total Coliforms

After discussing the positive E.Coli detections with Regional Public Health, South Wairarapa District Council issues a Boil Water Notice for the township of Martinborough.

SOUTH WAIRARAPA DISTRICT COUNCIL



NOTICE TO HOUSEHOLDERS WATER SUPPLY - MARTINBOROUGH

Users of the Martinborough Township water supply are advised that E.coli has been detected in the township. While the results were very low, in consultation with Regional Public Health, a Boil Water notice has been issued for the supply.

BOIL WATER

Water for drinking, food preparation and oral hygiene (brushing teeth) should be boiled to ensure the water is safe for consumption.

Council will be clearing pipelines of water and carrying out further investigations. Council will also be testing the supply to identify the source of the contamination and will keep you informed and advise when the boiling of water is no longer necessary.

If you have any queries, please contact SWDC on 06 30 69611.

South Wairarapa District Council undertook several measures in order to raise awareness in the community of the Boil Water Notice;

- A mass email notice was sent out via the Ratepayers Data-base.
- All available Council staff were mobilized to undertake door knocking and deliver copies of the Boil Water Notice advisory.
- Direct contact with vulnerable groups such as health centres, elderly care facilities and schools were undertaken.
- Loud-hailers were deployed around the township advising of the BWN.
- Radio and Print Media notices were also arranged.

The Boil Water Notice is issued at 3pm the day before the ***Martinborough Fair*** which could draw up to an additional 20,000 people to the town.

As well as raising awareness in the community, additional efforts were directed to ensure this event could proceed safely.



Water tanks were deployed throughout the town and bulk water tankers were brought in to provide safe drinking water for the influx of visitors over the weekend.



Hand Sanitizer was provided to all stall holders as a way of ensuring hygiene without using potentially contaminated water as well as avoiding the use of limited potable water available.

A light-up road sign was deployed at the entrance to the town advising of the Boil Water Notice.



‘Push Alerts’ to mobile phones were utilized in order to advise visitors that a Boil Water Notice was in affect when they came into range of the Martinborough Cellular network.

Further Information: Newshub – <https://www.newshub.co.nz/home/new-zealand/2019/02/e-coli-in-water-supply-threatens-martinborough-fair.html>

Sunday 3rd February:

Wellington Water offers assistance with E.coli response.



Additional emergency water bladders were provided by Wellington Water and deployed around Martinborough.

Additional sample results from the Martinborough Reservoirs show persisting E.coli detections;

3 MPN/100ml

4 MPN/100ml

1 MPN/100ml

Monday 4th February:

Additonal positive E.coli detections were found:

Martinborough golf course:

1 MPN/100mL

Fairway Drive:

1 MPN/ 100mL

A formal request from South Wairarapa District Council was made to Wellington Water for assistance.

Tuesday 5th February:

After reviewing operational trends of the Water Treatment Plant that supplies Martinborough – The Ruamahanga WTP, Engineering Staff at South Wairarapa District Council found that while the UV Disinfection system was ‘operating’, no UV Disinfection was occurring.

Further investigation found this coincided with a wide-spread power supply outage on the **23rd of January 2019** which caused the UVT Monitor to loose all calibration.

When power was restored to site, the blank UVT Monitor input signal was still interpreted as a viable value by the Treatment Plant Control System which allowed the bore pumps to operate despite the UV System not dosing.

This resulted in the supply of untreated water and the Control System not initiating a shutdown to what should have been a Critical Fault condition.



Staff from South Wairarapa District Council and Wellington Water discussing response actions.

Response:

Initial response actions included:

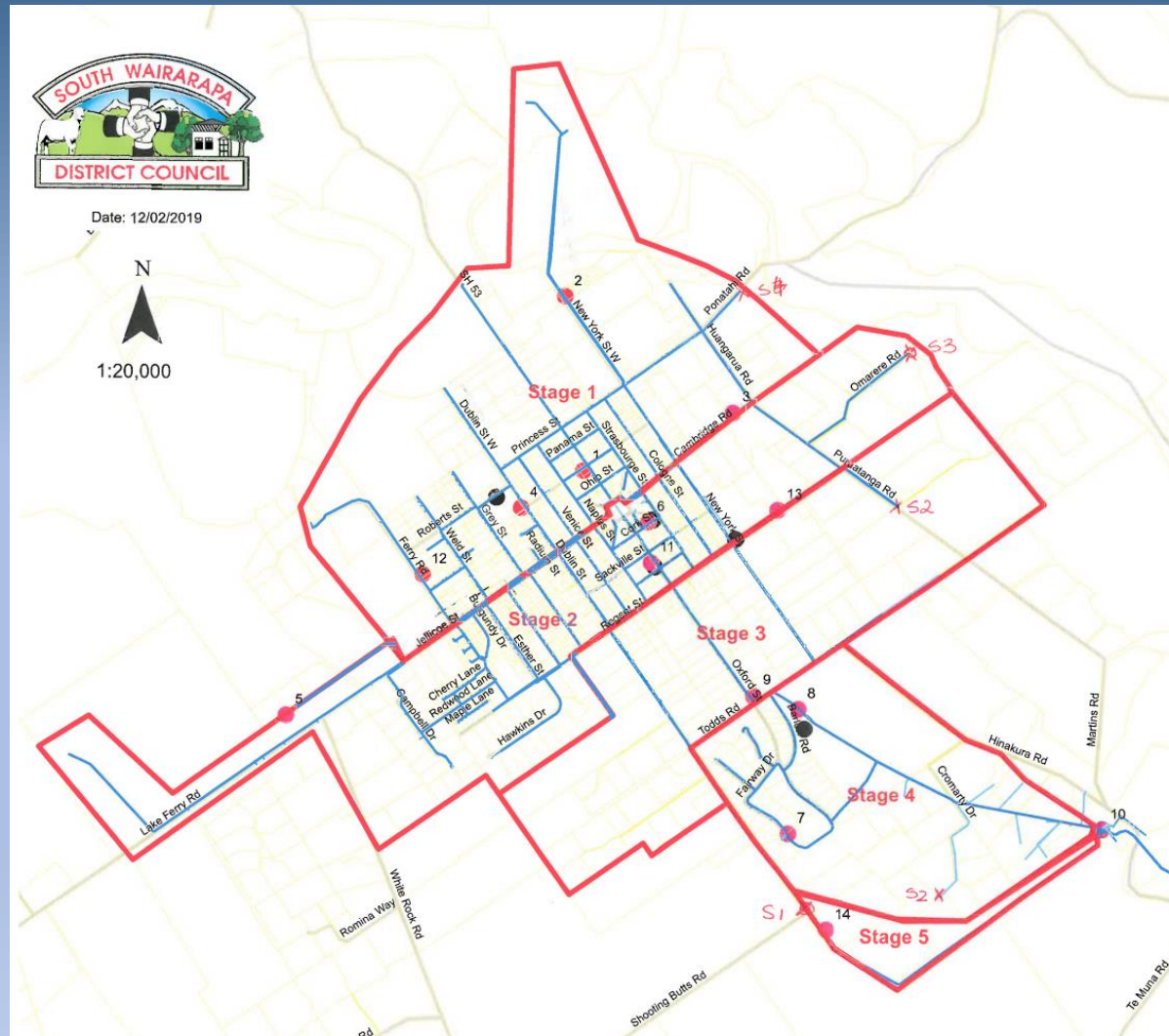
- Re-validation of the UV system;
- Addressing numerous deficiencies in the control system;
- Compliance data auditing;
- Installation and checking of a limited number of 'high risk' backflow prevention devices;
- Cleaning and super-chlorination of the reservoirs, and
- Flushing of the entire network with DWSNZ compliant treated water after re-validation of the UV system.



Reservoir inspections



Draining of reservoirs showing manganese deposits and Reservoir Cleaning



Flushing plan of the Martinborough reticulation network.



Flushing of the Network

Network flushing was completed on February 17th, with three days of clear samples following.

The Boil Water Notice lasted 20 days and was lifted February 21st.

On the 8th of April a public meeting was held to de-brief the community and local businesses...

...The following day, lab results confirmed further E.coli detections and a second Boil Water Notice was issued on the 9th of April 2019.

SOUTH WAIRARAPA DISTRICT COUNCIL



NOTICE TO HOUSEHOLDERS WATER SUPPLY - MARTINBOROUGH

Users of the Martinborough Township water supply are advised that E.coli has been detected in the township. While the results were very low, in consultation with Regional Public Health, a Boil Water notice has been issued for the supply considering the recent event.

BOIL WATER

Water for drinking, food preparation and oral hygiene (brushing teeth) should be boiled to ensure the water is safe for consumption.

Council will be clearing pipelines of water and carrying out further investigations. Council will also be testing the supply to identify the source of the contamination and will keep you informed with advice you when the boiling of water is no longer necessary.

If you have any queries, please contact SWDC on 06 30 69611.

Next Steps:

- The UV Disinfection system performance was reviewed and in light of the improvements and safeguards in place in response to the initial BWN, was subsequently discounted as the source of contamination.
- The positive E.coli detections were from the reservoir sample taps as well as the closest supply line to the reservoir site.
- Investigations focused on all potential sources of contamination within the reticulation network itself.
- Subsequent sampling showed inconsistent results;
 - The location of positive detections and the level of E.coli contamination varied.

Chlorination was deemed to be the only viable way forward to address what was becoming apparent;

Connections within the reticulation network were introducing contaminants into the supply.



Boil water notices have been placed around the Martinborough Town Square.
PHOTO/HAYLEY GASTMEIER

Backflow possible cause of E.coli

Backflow issues at private properties could be the cause of Martinborough's second E. coli outbreak in months, which prompted a boil water notice to be put in place last Tuesday.

South Wairarapa District Council's acting chief executive Jennie Mitchell said investigations into the contamination continued to be focused at the reservoir as well as private connections with the mains water supply.

She said some Martinborough residents and plumbers had come forward with information about potential backflow issues at private properties where water could have flowed back into the mains supply.

"We're keen to hear from anyone who might have information about faulty or missing backflow

prevention mechanisms, particularly where there are connections to water tanks or other water supplies.

"There will be no negative consequences for property owners coming forward," Mitchell said. Backflow prevention mechanisms should be installed to all connections to prevent this from happening.

Martinborough water is vulnerable because unlike most town water supplies in New Zealand, it is not chlorinated.

A UV disinfection system is used to treat the water at the point of entry into the system, providing a single barrier of protection.

Mitchell said a "multi-barrier approach" would be required to ensure safe drinking water for the future.

"It's essential that we identify and address all the possible sources of contamination.

"The boil water notice cannot be lifted while there is ongoing risk of recontamination within the network."

Test results from samples taken on Wednesday showed no signs for E. coli as the areas that previously showed contamination had been chlorinated.

The boil water notice remains in place and residents are advised to boil all drinking water for making up formula, juices, ice, washing fruit and vegetables, and other cooking needs, or brushing teeth.

• For updates, visit www.swdc.govt.nz.

Multi-barrier protection needed for

Martinborough water

**SOUTH
WAIRARAPA
MAYOR**

**Viv
Napier**



Providing safe drinking water and protecting public health is council's number one priority.

Our responsibility is to make the best decision possible to resolve the current boil-water situation, for now and in the future.

Martinborough water is vulnerable because, unlike most town water supplies in New Zealand, it is not chlorinated.

A UV disinfection system is used to treat the water at the point of entry into the system, providing a single barrier of protection.

On April 9 a second boil water notice since the start of the year was issued for all users on the town water supply, following positive results for E.coli.

Of course, council is very disappointed by this and is sorry for the inconvenience this

is causing residents, business owners and visitors.

In the February incident malfunction in the UV disinfection system was identified to probable cause of contamination.

Much work was done on the UV system at that time, to test it to confirm it was working correctly. Following this event, investigation into the UV disinfection system rules it out as the cause of contamination this time.

While it's a relief that the UV system has been working well, this leaves us again with needing to find the source of contamination.

Council, with consultants Luttrell Health and Wellbeing, has been focusing in the area of contamination and on backflow prevention mechanisms to surrounding areas.

A private company's water supply network poses a risk for contamination if water is allowed to flow back into the mains network. This is why backflow prevention mechanisms

"...We are urging anyone who has information about faulty or missing backflow prevention mechanisms to contact council..."



"There will be no negative consequences for any property owner coming forward. Our focus is to find and fix the source of contamination, because without that, the boil water notice cannot be lifted."

on our website swdc.govt.nz.

We are grateful to the residents and plumbers who have already come forward with information about potential

about faulty or missing backflow prevention mechanisms to contact council on 06 306 9611 or email martinboroughwater@swdc.govt.nz.

There will be no negative consequences for any property owner coming forward. Our focus is to find and fix the source of contamination, because without that, the boil water notice cannot be lifted.

It's clear from this recent contamination Martinborough's water supply network, with its single barrier of protection, is not able to provide a secure environment for supplying drinking water to the town.

A multi-barrier approach is required, which means council needs to look at chlorinating the town's water supply.

In the wake of the Havelock North incident, where hundreds of people got sick, authorities and councils are required to provide a higher level of care for the health and safety of their communities.

The manganese extraction plant to allow for potential chlorination of Martinborough's water in future has been brought forward; the council is also considering whether the decision to chlorinate also needs to be brought forward.

During the early days of the second boil water notice, an amnesty was issued in which people were encouraged to come forward with concerns about water connections where there would be no public notification of their concerns in order to rectify any potential sources of contamination entering the network.

Roadblocks:

Two of the three supply bores, Bores 1 and 3 had high manganese content that would result in discoloured water if chlorination was undertaken;

Chlorine would cause the dissolved manganese to come out of suspension.

Bore 4 had a low enough level of manganese to allow chlorination in the short term with a Manganese Reduction Plant (MRP) required in the medium term to allow for use of the remaining bores.



Aerial view of the Ruamahanga WTP and bore field

Mitigations and Next Steps:

24th April 2019

Council commit to implement Temporary Chlorination of the supply.

Due to established Brewery's and Vineyards not being set up to use chlorinated water and its potential impacts on their products, a longer implementation timeframe along with additional support for local businesses was provided.

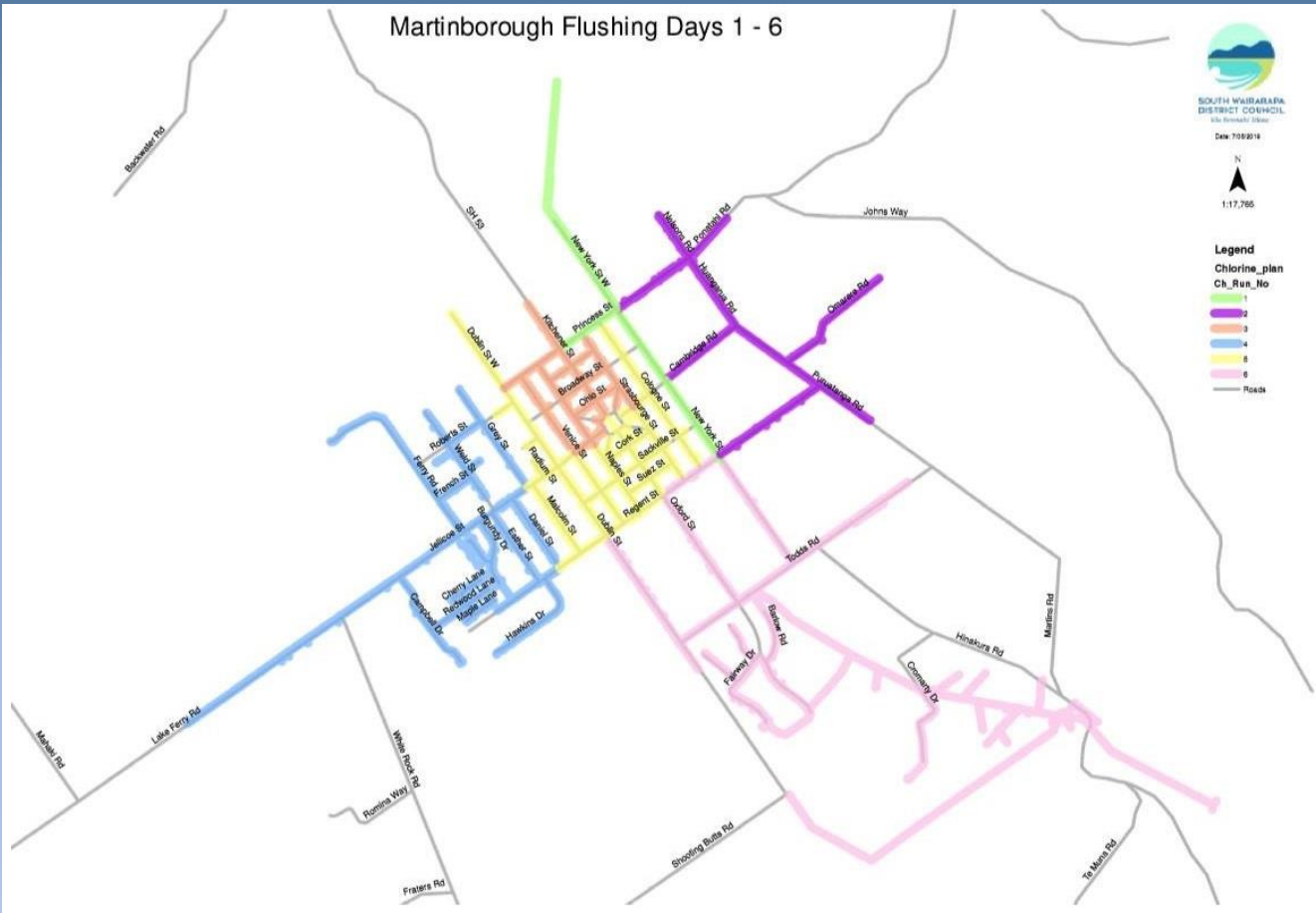
Mitigations and Next Steps:

6th May – 11th May

To enable chlorination without discolouration occurring, regardless of the use of the low manganese bore, accumulated manganese deposits and biofilm accumulation had to be removed as to avoid likely taste and odour issues once chlorination was established.

Air scouring immediately followed by flushing was decided as the method to achieve this.

Date	Zone	Affected streets include
Monday 6 May 10 am to 4 pm	Green	New York St up to #88 (Regent St) & New York St West. Princess St from corner New York to Kitchener St
Tuesday 7 May 10 am to 4 pm	Purple	Nelson Rd, #39-74 Princess St, Ponatahi Rd, Huangarua Rd, Puruatanga Rd. Omarere Rd, #57 and above Cambridge Rd, #131-210 Regent St (Regent St from corner New York St & Puruatanga Rd)
Wednesday 8 May 12 noon to 6 pm	Orange	Jellicoe St from Memorial Square to Venice St, Venice St & Naples St from Jellicoe St, Princess St from cmtc Dublin St to Kitchener St, Panama St, Broadway, Ohio St, Kitchener St, Strasbourg St from Princess St to Cambridge Rd, Kansas St from Memorial Square to Strasbourg, Memorial Square from Wairarapa Winemaker Services around to back of P&K, including Texas St from Square to Ohio St.
Thursday 9 May 10 am to 4 pm	Blue	Grey St, Weld St, Waka Lane, Roberts St from Weld St to Grey St, Ferry Rd, French St, Daniel St, Esther St, Campbell Drive, Cottage Grove, Pinot Grove, Jellicoe St from Grey St and above, Lake Ferry Rd, Regent St from Daniel to Esther St, Hawkins Dr
Friday 10 May 12 noon to 6 pm	Yellow	Malcolm St, Jellicoe St from Venice St to corner of Malcolm St, Regent St from Oxford St to Daniel St, Venice St from Regent St to Jellicoe St, Naples St from Regent St to Jellicoe St, Oxford St from Regent St to Memorial Square, Strasbourg St from Regent St to Memorial Sq, Cologne St, Cambridge Rd from Memorial Square to New York St, Texas St from Square to Strasbourg, Kansas St from Square to Naples St, Sackville St, Cork St, Suez St, Greenaway Pl, Radium St, Roberts St from Dublin St to Grey St, Dublin St up to Regent St and Dublin St West
Saturday 11 May 10 am to 4 pm	Pink	New York St from Todds Road to Regent St, Oxford St from Todds Road to Regent St, Todds Rd, Martinborough Estate & Golf Club, Dublin St from Regent to #18 Shooting Butts Rd, Cromarty Drive and Shooting Butts Rd (those on town water)



Air-scouring and flushing dates advisement to the Martinborough Community and

Air scouring and flushing plan

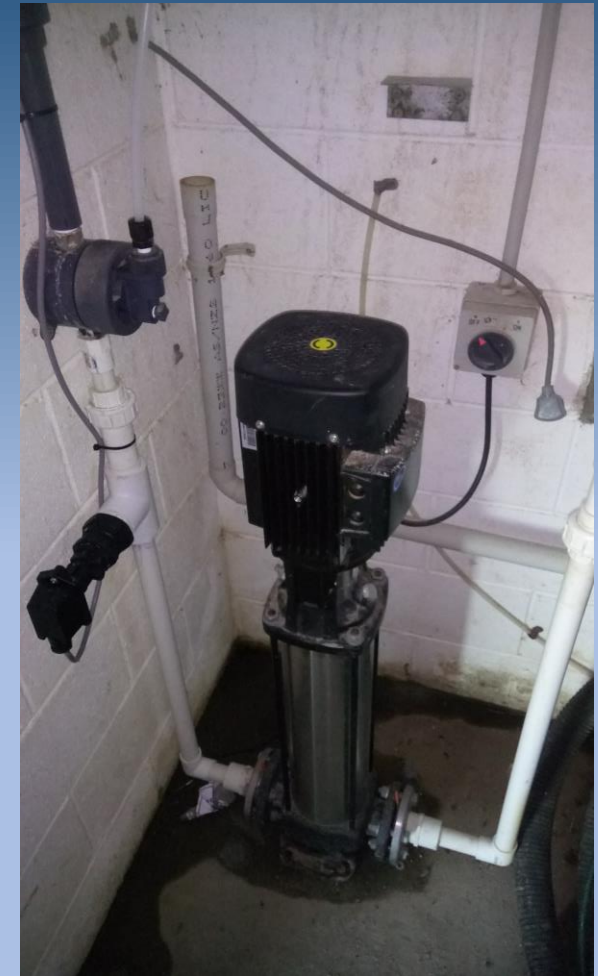
The removal of the accumulated manganese and biofilm required air scouring of the entire network by isolating zones of the reticulation network, isolating every individual connection in that particular zone and then injecting compressed air into the isolated network sections from a compressor via a hydrant stand.

This agitated the manganese that had built up over time on the pipe walls and was vented out by hydrants.

Once the air scouring was complete, the section was then flushed until clear and the properties connections turned back on with residents encouraged to flush their outside taps until the water ran clear.



Flushing of agitated manganese due to air-scouring of network



On the 13th May temporary chlorination commenced enabled by a newly installed chlorination system which allowed for flow proportional dosing.

The new chlorination system included load-cells, leak detection, automatic safety shutoff valves, a new carrier water pump and Depolox 5 Analyzer.

After chlorination commenced, network flushing was undertaken in order to draw the chlorinated water through the network.

After three days of clear lab results, the second boil water was lifted on the 17th of May.

The second Boil Water Notice lasted a total of 38 days.

Counting the cost

The approximate cost of the contamination events was \$300,000.

- \$100,000 spent of equipment;**
- \$55,000 spent on contractors;**
- \$47,000 on sampling alone;**
- the remaining \$98,000 split between recommissioning, reporting, consultants and communications.**

This does not include costs incurred to private businesses for bottled water, point treatment systems installed, purchasing of ice and impacts on regional economic activity.



Local business using bottled water to make coffee



Several local businesses installed their own water treatment equipment

6 Wairarapa Midweek Local News Wednesday, April 17, 2019

MARTINBOROUGH WATER CRISIS

Water frustrations boil over

Hayley Gastmeier

Martinborough's community leaders are in disbelief and wait answers after the town was hit with E.coli contamination for a second time this year.

At least two Martinborough businesses have taken water treatment into their own hands as a result, and proprietors say they are concerned the town's reputation is being tarnished.

A boil water notice was issued by the South Wairarapa District Council (SWDC) at 6pm last Tuesday night following positive results for bacteria at the reservoirs and a testing site at Shooting Butte Rd.

The council says the water supply network surrounding the sites has since been chlorinated and more tests have been carried out.

This comes after a damning report revealed regular non-compliance from SWDC in meeting Drinking Water Standards for New Zealand (DWSNZ).

The report, written by expert water consultancy Lutra, was commissioned in the wake of a three-week boil water notice for the town in February, with a malfunction at the UV treatment plant pinpointed as the likely source of contamination.

Since then a multitude of experts have been assisting the council in safeguarding it's Martinborough water supply.

So, community leaders are now scratching their heads asking how another contamination event has occurred.

Martinborough councillor Pip Maynard said, "I'm angry this has happened a second time to my community, and 24-hours prior to this being advised, we were sitting in a public meeting for the Martinborough community hearing from experts from around the Wellington region about what measures had been put in place to make our water safe."

"I want to know how this new event occurred under the watch of this expert panel of specialist water advisors who were overseeing our water system."

Maynard said she now had "serious concerns" over SWDC's ability to oversee its own water supplies.

Martinborough businesswoman Dudley-Anne Hill, of Neighbourhood Coffee, said the first contamination had resulted in her spending about \$10,000.

She didn't want to take any more chances so she, along with Kitchener's Cafe, had UV filter systems installed.

This means Hill's business is relatively unaffected by this latest event, however she has serious concerns about how the contamination will affect the town's image.

"It's impacted the brand of our community that we work hard to uphold. 'Something like this brings it down and it's hard to rebuild.'"

Adam Newell, of Union Square at Martinborough Hotel, agreed that Martinborough's positive image would be tarnished.

He said if people suffered food poisoning from a restaurant it would simply be shut down, yet he questioned how the council was being held to account for risking its constituents' health.

The ordeal was stressful for staff as well, Newell added, having to be bearers of bad news to customers.

Marty Davis, who owns The Wine Bank, summed up the ordeal as "gross incompetence" of the council.

Martinborough Community Board chairperson Lisa Cornelissen said this second event was of huge concern to all residents, particularly the vulnerable.

"There's a sense of disbelief that it could happen again."

Having said that, we have a strong community and people will pull together to help those that need it."

She said SWDC staff were doing all they could to resolve the issue.

"I'd ask people to let them get on with it and not to take out their frustrations on the front-line team."

Cornelissen owns Martinborough Top 10 Holiday Park and said keeping guests safe was her priority.

"From a business perspective, we're hugely frustrated, particularly coming up to school holidays and Easter, our last big push before the season slows down."

She also had concerns around the effect on Martinborough's reputation.

Pain and Kershaw manager Conor Kershaw said having a boil water notice in place created more work and costs for businesses.

"It's just frustrating that there's no real answer."

Martinborough School board of trustees' chairperson Kirsty Shepherd said the council had done a good job of getting the news out to the public.

"I think it's incredibly unfortunate that this has happened again, but at the meeting they did say that no water supply is free from risk."

She said the council was lucky there were no associated illnesses or deaths to date, and the town deserved answers.

Councillor Pam Coleman said she was devastated and sorry that a second incident had occurred.

"I'm sad because it affects so many people, especially the vulnerable, but officers and staff are working so hard to find the cause and to correct it."

She said it was good that SWDC had fast-tracked the installation of a manganese removal plant which would give the council the opportunity to chlorinate if required in future.

Councillor Ross Vickery said clearly the council did not have adequate resourcing or knowledge to manage the three waters [drinking, storm, and waste] in its district.

"[This incident] underlines that we need more expertise in this space."

He said a shareholding partnership with Wellington Water could be the answer.

Water bladders providing safe water have been installed at Martinborough School, the rugby club and golf club, the Town Square, and the Waihanga Centre.

Martinborough businesswoman Dudley-Anne Hill with the UV system she had installed at her cafe, Neighbourhood Coffee, following the February E.coli contamination scare.

PHOTO/HAYLEY GASTMEIER

Martinborough School board of trustees' chairperson Kirsty Shepherd says the community wants answers.

PHOTO/SUPPLIED

Sources: Wairarapa Times Age, Newshub

Elaboration on Backflow:

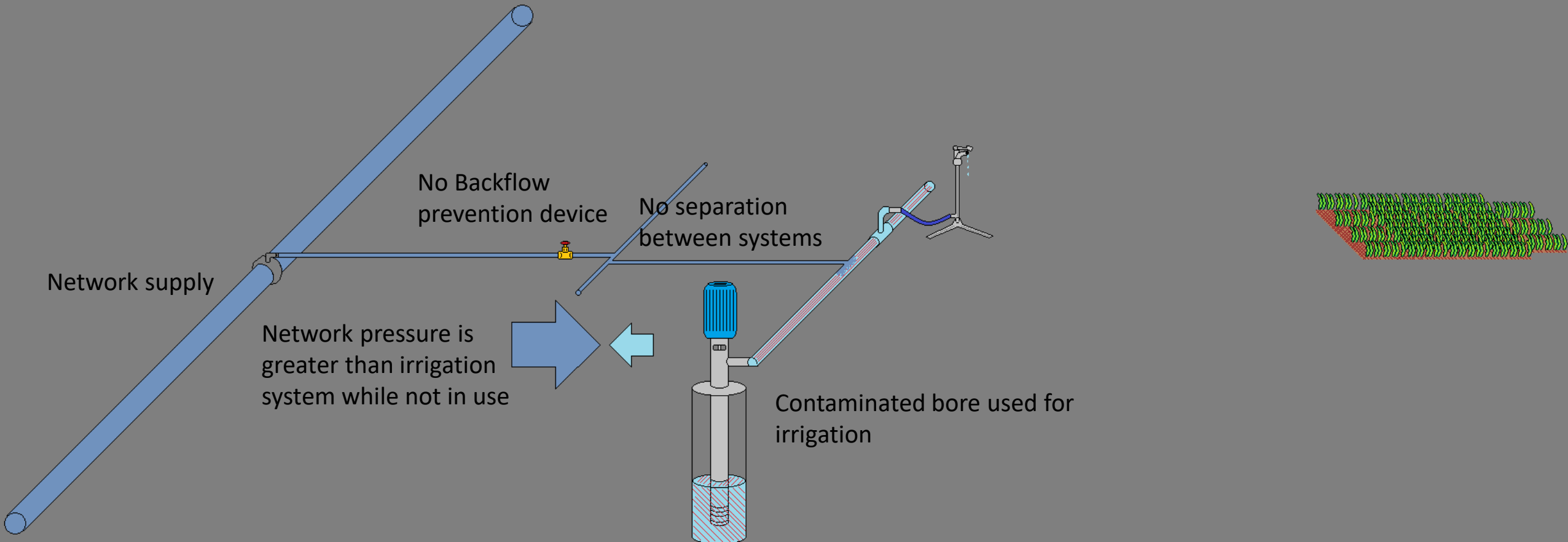
Commercial irrigation from the network was and still is undertaken from the Martinborough water supply.

These larger users along with some private households, have blended supplies - simultaneous connections to the urban water supply as well as their own private bores or rain water collection systems along with pumping systems.

With faulty, failing or non-existent backflow preventors, these systems could push untreated and contaminated water into the network. This would also explain why the contamination was intermittent and not consistent to one location.

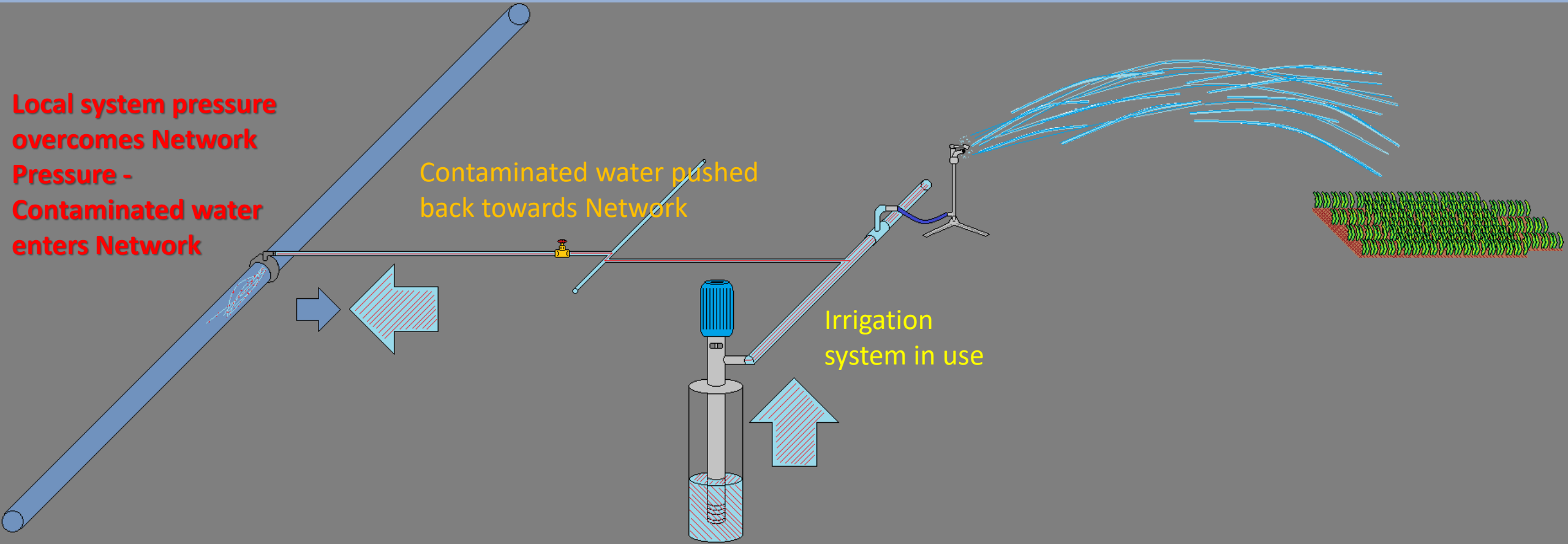
Potential Backflow Scenarios

Blended supplies where irrigation systems are in use



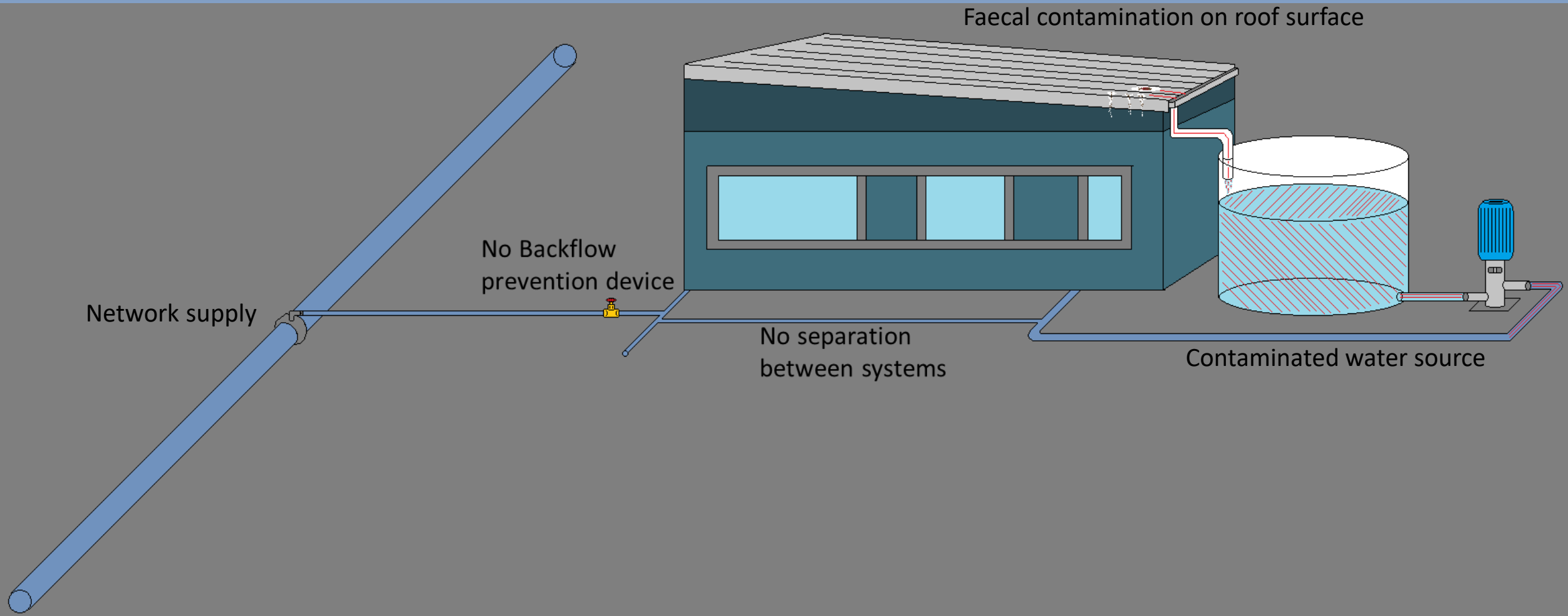
Potential Backflow Scenarios

Blended supplies where irrigation systems are in use



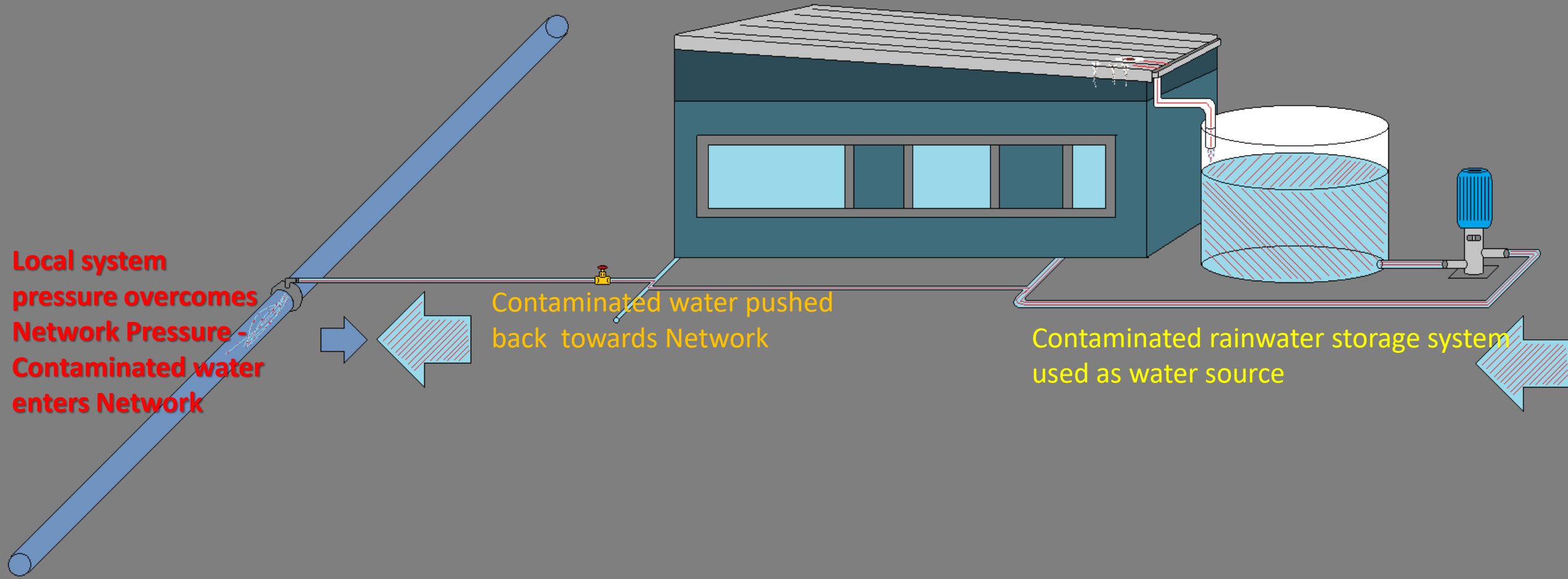
Potential Backflow Scenarios

Blended domestic supplies – Rainwater Collection System



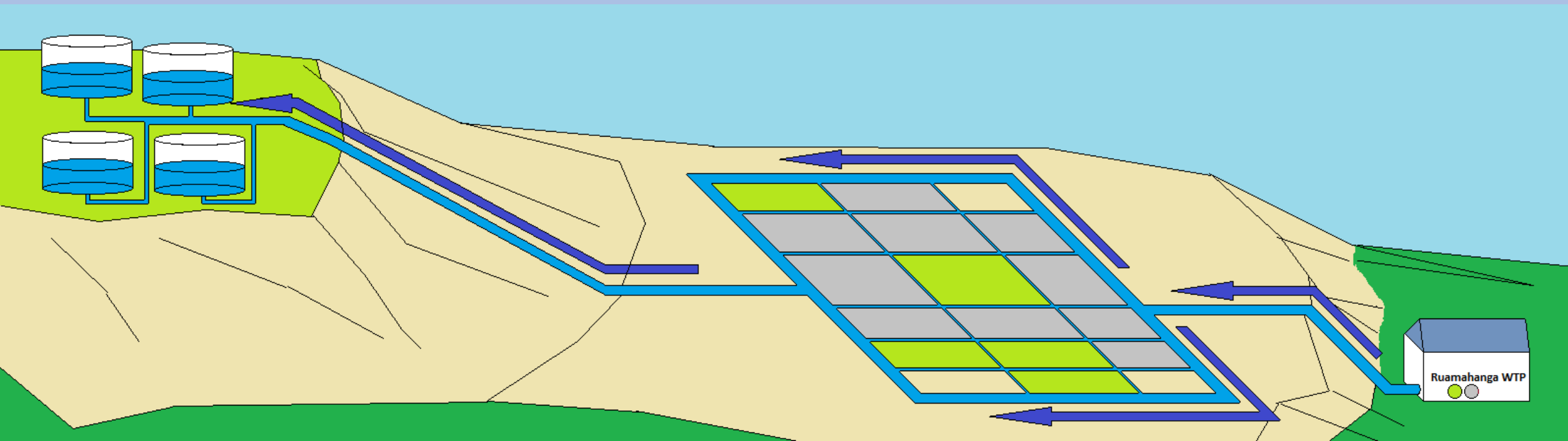
Potential Backflow Scenarios

Blended domestic supplies – Rainwater Collection System

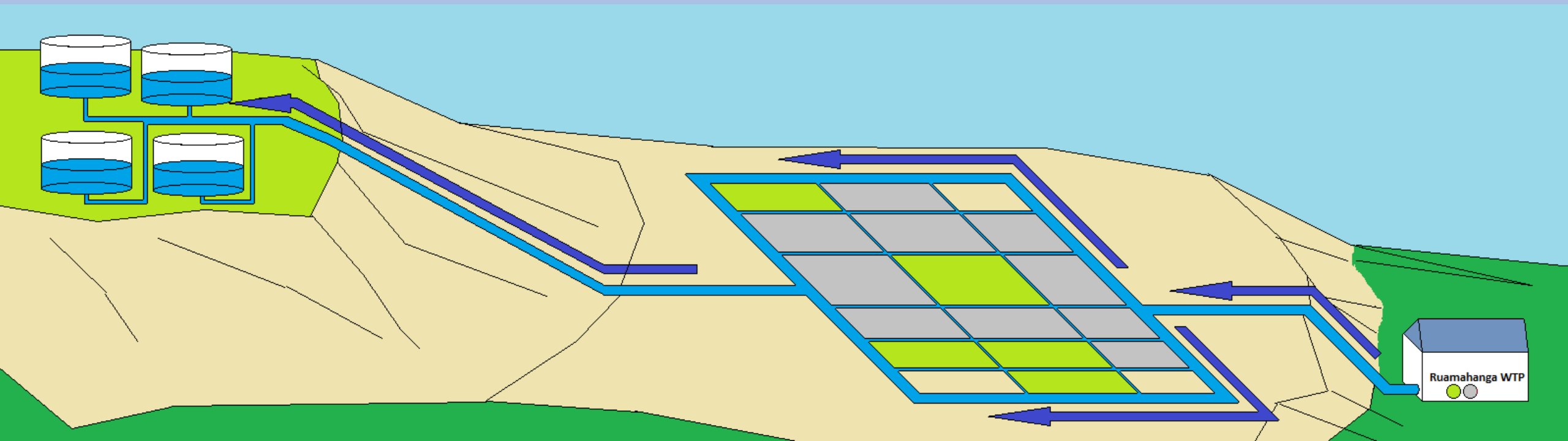


Martinborough Network:

Another complicating factor was due to the network in Martinborough not having a bulk main directly to the reservoirs, water must move through the town in a 'ring main' configuration before reaching the reservoirs.

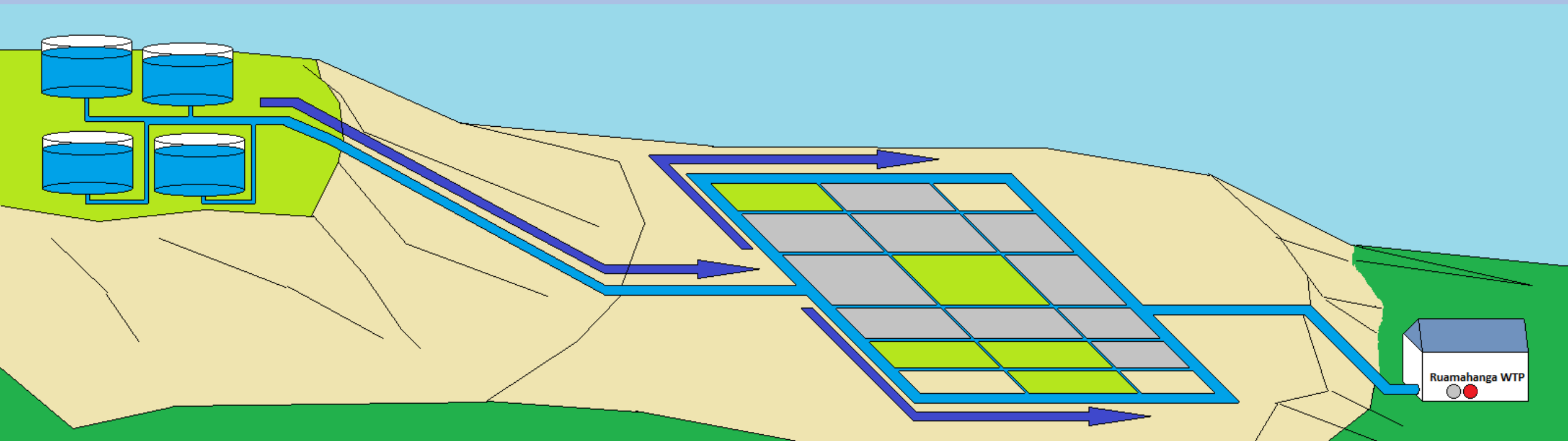


Water is pumped from the treatment plant where instantaneous demand is met, with the surplus filling the reservoirs.



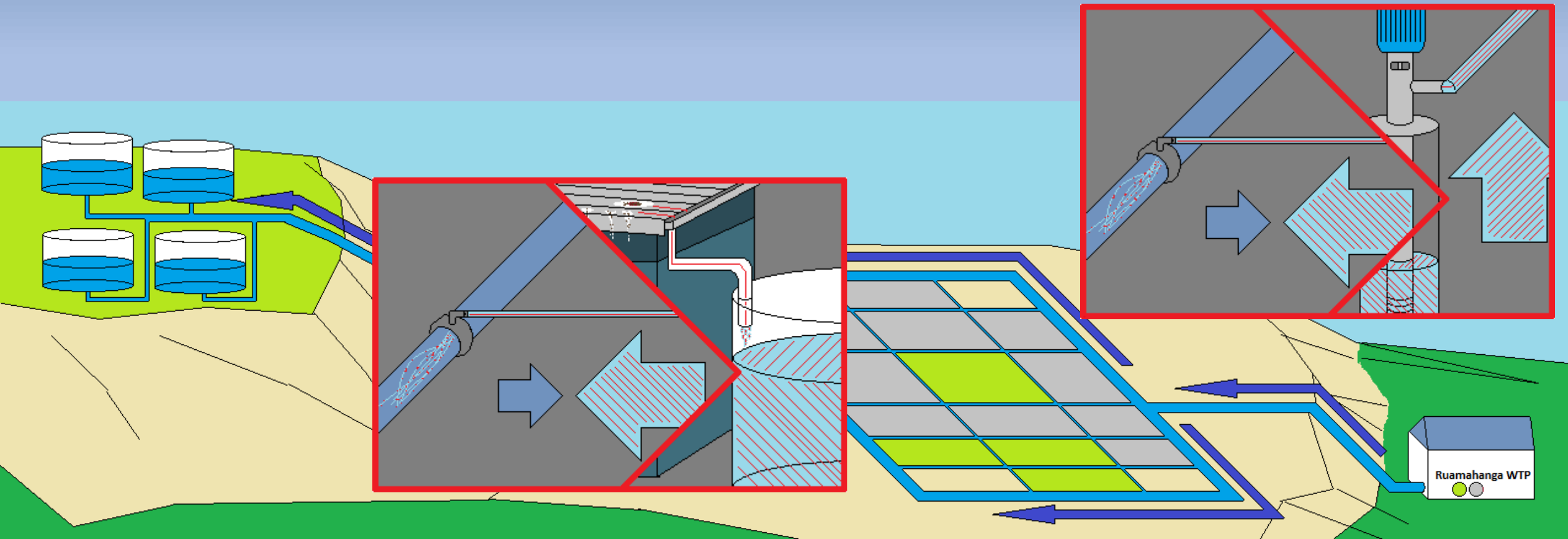
Once the reservoirs are full, the treatment plant stops and the supply is fed from the reservoirs only.

This continues until the treatment plant is called to operate again once the reservoirs reach the start setpoint.



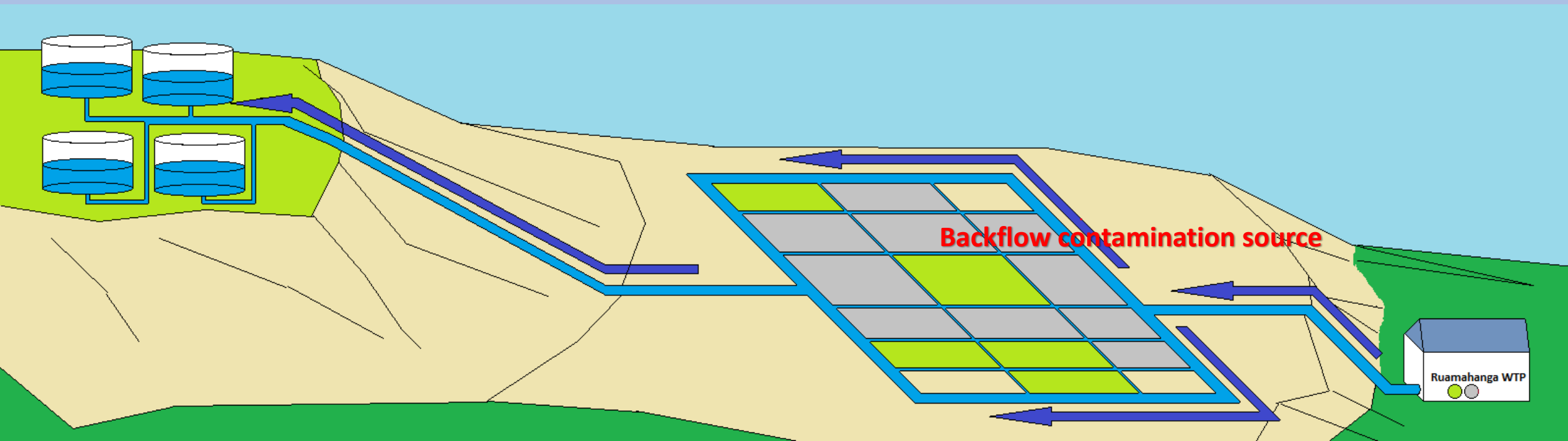
This results in water moving back and forth within the network.

If contamination is introduced into the network, the same situation occurs.



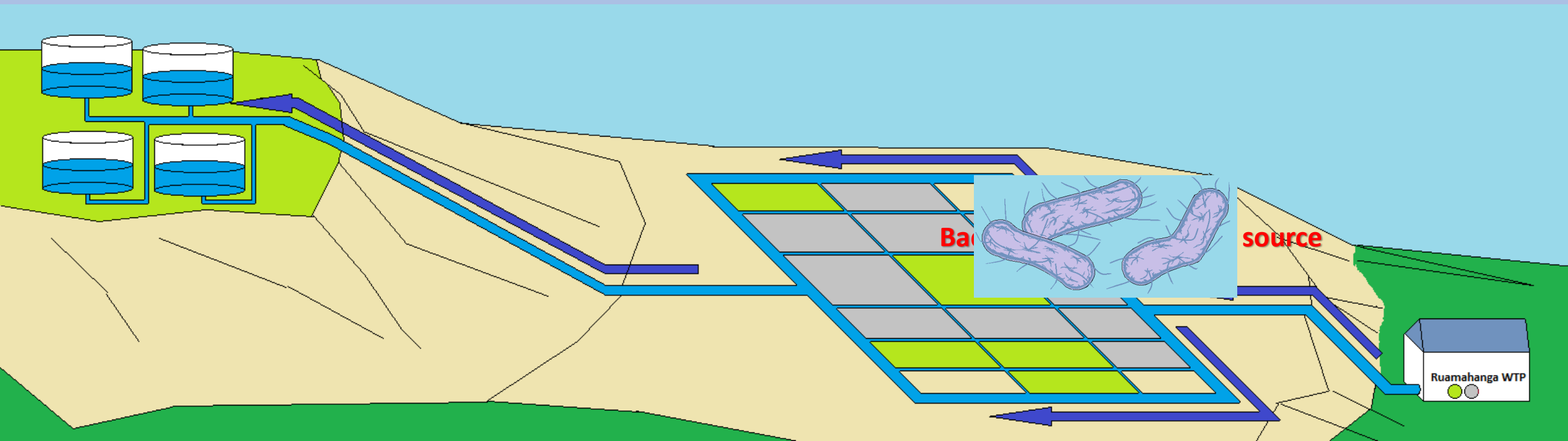
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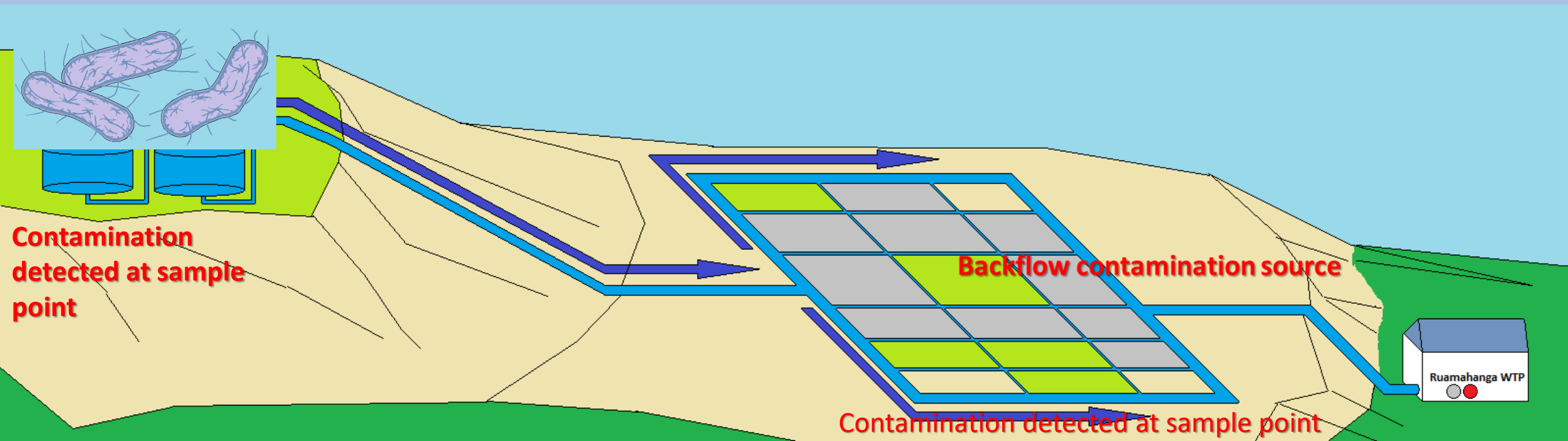
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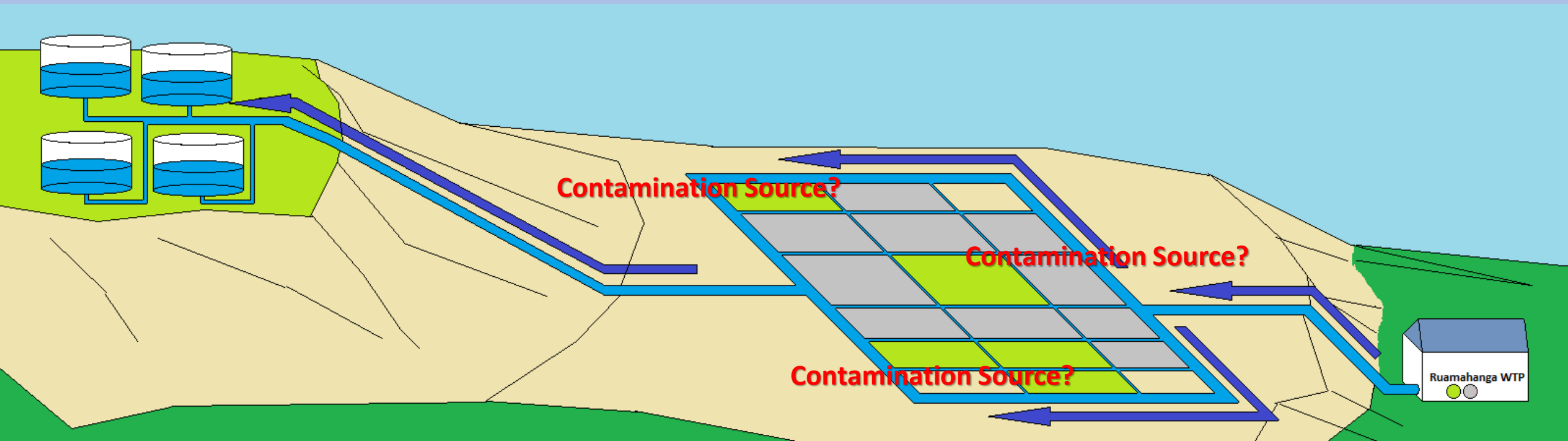
This results in water moving back and forth within the network.

If contamination is introduced into the network, the same situation occurs.



This is one of the main reasons why locating a definitive source of contamination was so difficult.

With the combination of the amnesty and subsequent chlorination, its unknown to operations staff if the original source or sources of contamination were addressed.



Additional Challenges:

When the second Boil Water Notice was lifted in May 2019, the original timeline for the installation and completion of the Manganese Removal process was December 2019. This meant the town would only have a single bore to supply all its water for 7 months. As this was during the lower demand period, this was not seen to be an issue in the short term.

However, delays resulted in this timeline being pushed back.

This situation required demand management where consumption was actively tracked and communicated to the public, along with conservation messaging to avoid the need to bring the remaining bores online and supply discoloured water to the township.

Water consumption

The below meter indicates daily water consumption in Martinborough for the last two days. This will be updated every two days.



Green – less than 1200m³/day

Amber – between 1200 m³/ and 1700m³/day

Red – over 1700m³/day

Current state: Amber

The below table indicates the consumption in the Martinborough Township.

Last updated: 9/3/2020

Consumption	Date	Status
1630m ³	8 Mar	Amber
1670m ³	7 Mar	Amber
1460m ³	6 Mar	Amber
1390m ³	5 Mar	Amber
1280m ³	4 Mar	Amber
1420m ³	3 Mar	Amber
1520m ³	2 Mar	Amber
1550m ³	1 Mar	Amber
1480m ³	29 Feb	Amber
1540m ³	28 Feb	Amber

Martinborough Water Consumption updates from Wellington Water website

Efforts to avoid discoloured water also required removing the Bore 1 pump for use as a critical spare as well as replacing the Bore 4 pump and Variable Speed Drive which failed in early December 2019.



Manganese Reduction Plant Upgrade:

Originally planned for completion in December 2019, the Manganese Reduction Plant (MRP) was subject to several delays such as re-wiring and upgrading the control system at the WTP to allow the two sites to work in conjunction. The MRP went live in December 2020, a year later than originally planned.

This allowed use of Bores 1 and 3 and increased total production from 18l/s - supplied from Bore 4, up to 30l/s from Bore's 1 and 3 and has addressed supply concerns for Martinborough.

The MRP, situated on a separate site from the Ruamahanga WTP, reduces manganese from the UV disinfected water.

This is achieved by pre-chlorinating the treated water to 1.5-2.0ppm.

This begins to oxidize the manganese, forming larger particles which are captured in a mixed media filter. The filters are backwashed and the manganese is discharged into the wastewater network.



Summary:

The contribution of the Martinborough Boil Water Notices to the wider conversation of Drinking Water Safety in a post Havelock North environment is that we need to be wary of jumping to conclusions during contamination of drinking water supplies.

Initially, the cause of the contamination was believed to be the failure of the water treatment plant. While deficiencies were definitely uncovered, it was not the only issue as contamination was found within the network again weeks later.

Of particular note and relevance regarding the Martinborough Contamination Events is Principle 3 from the Havelock North enquiry:

Principle 3: Maintain multiple barriers against contamination.

Any drinking water system must have, and continuously maintain, robust multiple barriers against contamination appropriate to the level of potential contamination. This is because no single barrier is effective against all sources of contamination and any barrier can fail at any time. Barriers with appropriate capabilities are needed at each of the following levels: source protection; effective treatment; secure distribution; effective monitoring; and effective responses to adverse signals. A “source to tap” approach is required.

Actions and investigations initially focused solely on failings of the Treatment Plant.

This highlights that focus needs to be not only on the treatment plants and source water but on the **water network as a whole – Source to Tap**.

This should be reflected in your organizations Water Safety Plan/s for each supply.

While prior residual disinfection (chlorination) may have avoided the BWN, it would not have addressed the fact that somewhere within the network, contamination was being introduced due to backflow.

Backflow Prevention

Network security, as in physical measures to avoid the introduction of contamination including backflow prevention for blended supplies or high risk activities is critically important in order to maintain drinking water safety.

Ensuring backflow preventors are maintained, tested and installed where activities or blended systems pose a risk to the network is paramount.

The situation in Martinborough was hampered by this activity 'falling off the radar' due to responsibility shifting between staff & departments, changes in roles and responsibilities as well as staff and their knowledge passing out of the organisation coupled with poor record keeping.

Questions you need to be asking:

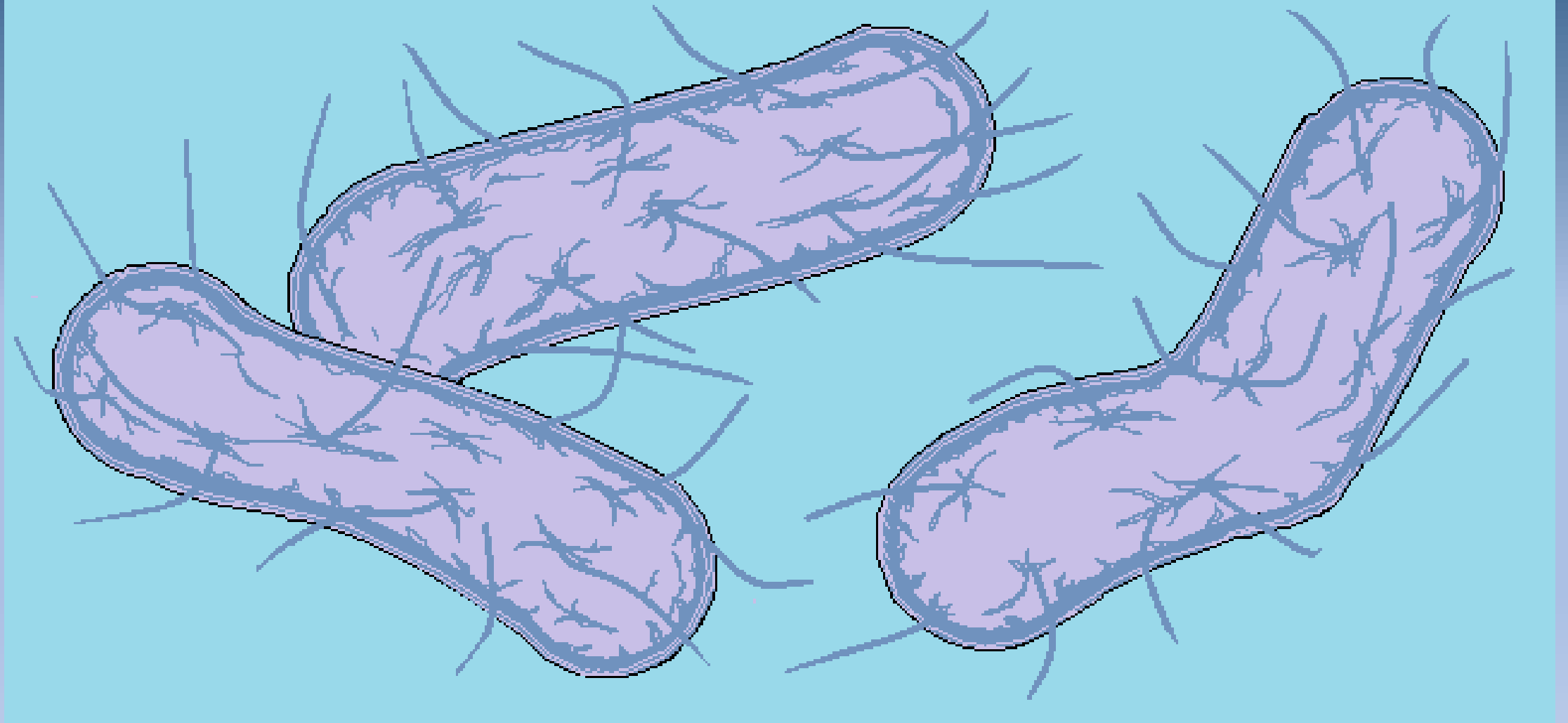
Who is responsible for checking and testing backflow preventors in your area?

Building Services, Environmental Health, Operations, Third-party contractors or Service Providers?

Have things changed overtime?

How accurate, robust and up-to-date are your records?

Closing remark:



How secure is your network?

Acknowledgements and Thanks:

Stuart Gridley and David Viggars,

Daniel Paulo,

Leuma Wilson,

Hazel Turner,

Jade-anna Gronback,

Lawrence Stephenson

Nick Hower-Hewitt,

All staff at South Wairarapa District Council involved

Wellington Water

Lutra

Citycare Water

Sources:

South Wairarapa District Council – Martinborough Water Incidents – Lessons Learned

Lutra – Martinborough Water Incident Technical Report

Newshub – <https://www.newshub.co.nz/home/new-zealand/2019/02/e-coli-in-water-supply-threatens-martinborough-fair.html>