Stantec

Memo

To:	Tim Blackman Wellington Water Ltd	From:	David Cameron Stantec Wellington
Project/File:	310003253	Date:	3 March 2025

Reference: Allocating TAS and CWO to Stormwater/WNO sub-catchments

This memo considers the application of target attribute states (TAS) and coastal water objectives (CWO) from Proposed Change 1 to the Natural Resourced Plan (PC1) in the management of local authority stormwater and wastewater networks.

Rivers

Boundary differences and assignment of TAS

Wellington Water Ltd (WWL) defined 35 hydrological sub-catchments within the boundaries of Wellington, Porirua, Hutt, and Upper Hutt cities during development of the global stormwater discharge consent application, the stormwater management strategy (SMS), and the wastewater network wet weather overflow (WNO) consent application. For the purposes of this memo the 35 sub-catchments are referred to as the 'sub-catchments'.

The sub-catchment boundaries are similar but not identical to GWRC's partial freshwater management units (part-FMU's) defined in PC1. The difference is because part-FMUs group similar land-use types and do not necessarily follow hydrological catchment boundaries.

PC1 assigns a river monitoring site to each part-FMU. It also sets targets for a range of water quality, habitat, and ecological attributes, known collectively as Target Attribute States (TAS). Where a TAS is not met, PC1 requires that the state of that attribute is improved in all rivers and river reaches in the part-FMU so that the TAS is met by 2040[1].

To give effect to PC1 in WWL's global stormwater consent and wastewater network overflow consent, where the part-FMU boundaries do not fully align with sub-catchment boundaries, we have assigned a TAS to each sub-catchment.

Attachment A to this memo overlays part-FMU and sub-catchment boundaries. It is evident that there is close to 100% alignment in some cases while other sub-catchments have poor alignment, and many don't include a TAS site. Our approach to ensuring that every sub-catchment has a matched TAS site is to identify the part-FMU with the greatest proportion of area in each sub-catchment, and to assign the corresponding TAS site to that sub-catchment.

Attachment B shows the output of this process, aligning Whaitua, Coastal Management Unit (CMU), Part-FMU, best matched sub-catchment, and the corresponding TAS sites.

[1] See for example Objective WH.O9 of Plan Change 1

Reference: Allocating TAS sites to SW sub-catchments

Gap between current state and target state

Attachment C expands the analysis by including the current state for copper, zinc and *E. coli*, the target state for those attributes, and the estimated reduction in contaminant load required to achieve each TAS[2].

Copper and zinc are key contaminants of stormwater. Their concentrations are almost always elevated in urban stormwater because their sources: brake wear and vehicle wear (copper), tyres, and galvanized iron roofing (zinc), are ubiquitous in urban areas. Consequently, their concentrations can be high in urban streams and in the sediments of sheltered marine habitats relative to their TAS or CWO.

E. coli in urban streams and enterococci in coastal waters are indicators of faecal contamination which, in urban areas, is sourced mostly from wastewater network faults, leaks and overflows (other sources in urban areas include waterfowl, gulls, domestic pets, possums, rats, etc.). *E. coli* concentrations are consistently and significantly elevated in urban streams relative to the TAS.

Attachment D indicates that a large reduction in copper loads (50 to 99%) is required in 10 of the 37 sub-catchments including Kaiwharawhara, Duck Creek, Taupo, Waiwhetū, Stokes Valley, Hulls and other Te Awa Kairangi urban catchments. Smaller reductions (4%) are required in an additional 9 sub-catchments including the Ngauranga, Karori, and Wellington urban catchments.

A large reduction in zinc loads (40 to 76%) is required in the same 10 sub-catchments as listed for copper. Smaller zinc reductions (8%) are required in an additional 12 sub-catchments including Black Creek, Porirua, and the Wellington urban catchments (Attachment E).

A large or very large *E. coli* reduction (17 to 99%) is required across 30 of the 37 sub-catchments including all urban catchments in the Hutt Valley, Porirua and Wellington. The only sub-catchments where reductions are not required are the predominately forested catchments of Akatarawa, Whakatikei, Pakuratahi, Te Awa Kairangi, Korokoro, Speedys, Dry Creek, Wainuiomata and Orongorongo. In these cases, the extent of the wastewater network is minimal to non-existent (Attachment F).

The challenge

Most copper and zinc in urban streams have been transported there by stormwater runoff from roofs, roads, carparks, and gutters in urban catchments. Indicative actions to reduce discharge loads include the treatment of impervious surface runoff via a range of facilities including proprietary treatment devices, swales, wetlands, and rain gardens, as well as the replacement of old zinc roofs, and offsetting of new developments. Reduced vehicle volumes and the uptake of cleaner transport options might also contribute to reductions in contaminant loads. However, there are serious practical challenges associated with implementing these improvements due largely to the sheer scale of the project. We understand that the resourcing and financial implications will be considered in an economic assessment of PC1 related wastewater and stormwater network upgrades being led by GWRC.

[2] The approach used to estimate load reductions required to achieve relevant TAS's in Whaitua Te Whanganui-a-Tara is described by Dr Michael Greer in evidence prepared for Greater Wellington's Plan Change 1 to the NRP. Required load reduction estimates were determined from a daily timestep water quality model by manipulating the daily contaminant loads to achieve TAS's. Further estimates of load reductions were obtained from NIWA's Metals Urban Streams Tool. As load estimates varied depending on the method applied, Greer recommended that multiple methods be used for this purpose. For TAS sites in Te Awarua o Porirua, concentration/load relationships from the eWater Source model were used to calculate the load reduction that corresponds to the TAS being met...

Reference: Allocating TAS sites to SW sub-catchments

Most faecal contamination in urban streams is sourced from wastewater network faults, leaks and overflows. Indicative actions for reducing *E. coli* loads include fixing cross connections, replacing grade 4 and 5 (poor condition) pipes, and reducing wet weather overflows from wastewater networks. As noted above for copper and zinc, the scale of the works required to achieve the *E. coli* TAS is very large and, we understand, will also be included in the GWRC economic analysis.

Lakes

PC1 defines freshwater management units for lakes Kohangapiripiri and Kohangatera however there is no local authority stormwater or wastewater infrastructure within these catchments and consequently they are not discussed further in this memo.

Coastal

PC1 defines seven coastal management units (CMU's), these being Onepoto Arm, Pauatahanui Inlet, Open Coast (Porirua), Te Whanganui-a-Tara harbour and estuaries, Makara Estuary, Wainuiomata Estuary, and Wai Tai. PC1 also includes a series of 'Coastal Water Objectives' (CWO) and requires that the CWO's are met by 2040. Attachment B aligns the CMU's with their contributing sub-catchments.

PC1 includes policies to achieve the CWO's, including a 40% reduction in copper and zinc baseline loads to Pauatahanui Inlet and Onepoto Arm.[3] It is assumed that this would be largely delivered by the improvements within each contributing FMU needed to meet the part-FMU TAS. In other words, by achieving the load reductions necessary to achieve part-FMU TAS, the load reduction necessary to align with the Te Awarua o Porirua CMU policies will also likely be achieved. There is also scope for load reductions by treatment of stormwater discharges that go directly to the CMU's.

For the other CMUs PC1 does not set specific contaminant load reductions for copper or zinc. The policy requirement in these instances is to reduce copper and zinc loads to contribute to meeting the coastal water objectives to maintain or improve.[4]

Best regards,

Stantec New Zealand

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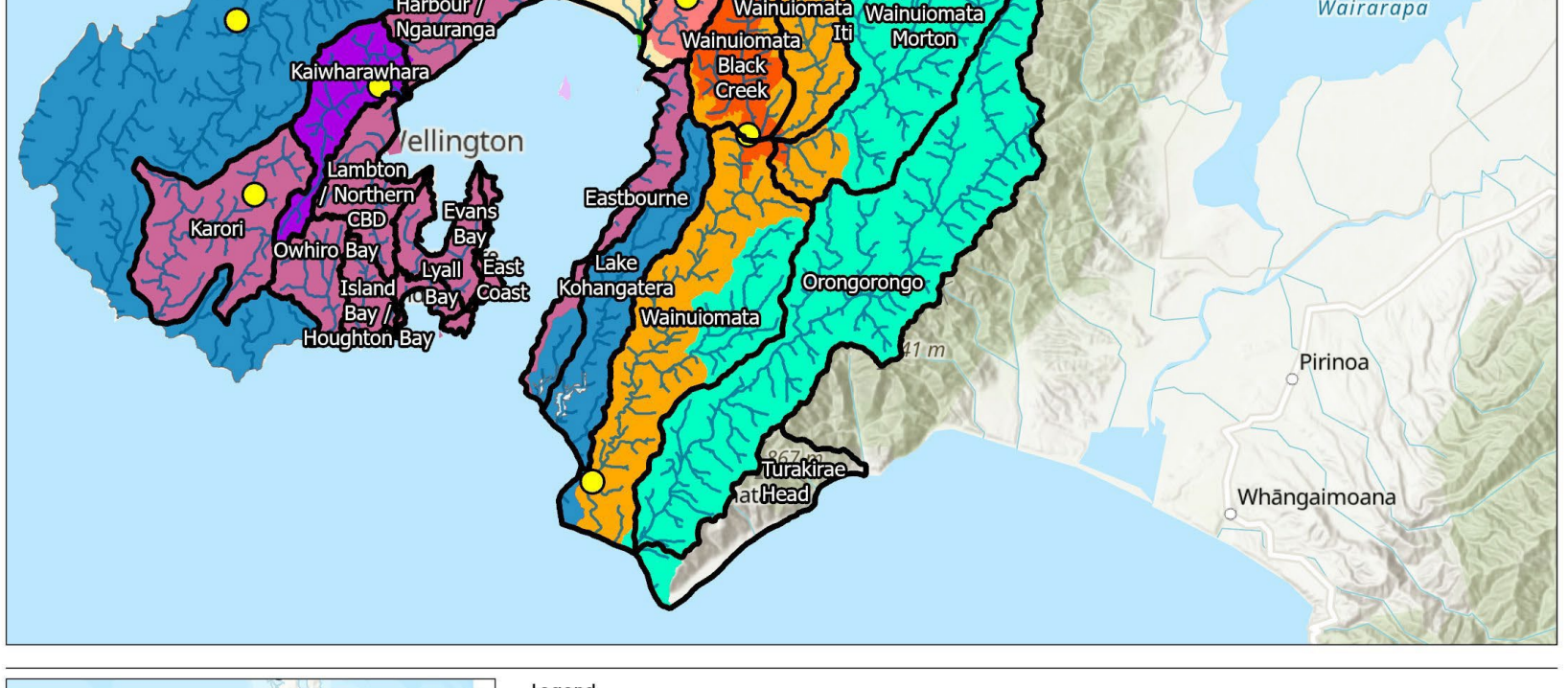
[3] Policy P.P4 sets contaminant load reductions for the Plan. Policy P.P12 then provides more specific direction for stormwater discharges from local authority networks (15% for copper and 40% for zinc) to contribute towards meeting the target attribute states and coastal water objectives for copper and zinc in the Onepoto Arm and Pāuatahanui Inlet.

[4] See for example Policy WH.P13(a).

Attachment A: Part-FMUs and stormwater sub-catchments



Legend

- SMS catchment
- Target attribute state site
- River

Freshwater management units - Te Whanganui-a-Tara

- Islands
- Kaiwharawhara Stream
- Korokoro Stream, Speedys Stream and Dry Creek
- Parangārehu catchment streams and South-west coast rural streams
- Te Awa Kairangi lower mainstem
- Te Awa Kairangi rural streams and rural mainstems
- Te Awa Kairangi urban streams
- Wainuiomata rural streams
- Wainuiomata urban streams
- Waiwhetu Stream
- Wellington urban
- Ōrongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mainstems

Freshwater management units - Te Awarua-o-Porirua

- Mana Island
- Pouewe
- Takapū
- Taupō
- Te Rio o Porirua and Rangituhi
- Wai-o-hata

WWL SMS Catchments - GWRC Fresh Water Management Units

OVERLAY

Project: GSC Stage 2 consent

Client: Wellington Water Limited
Project Code: 310003253
Drawn By: jw, Checked By: dc
Rev: 1
Date: 15-11-2024

Notes:
1. Map displayed in NZTM2000

References:
1. LINZ, ESRI
2. SMS catchments Wellington Water Limited (WWL)
3. All other layers GWRC

0 4 8 12 16 20 km

Scale at A4: 1:325,000

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Reference: **Allocating TAS sites to SW sub-catchments**

Attachment B: Alignment of Whaitua, CMU's, Part-FMU's, Sub-catchments, and TAS sites

Whaitua	CMU	Part_FMU	Sub-catchment	%FMU present in each sub-catchment	TAS_site
TAoP	Onepoto Arm	Te Rio o Porirua and Rangituhi	Porirua	80.9	Porirua Stream at Milk Depot
TAoP	Pauatahanui Inlet	Pouewe	Horokiri	98.8	Horokiri Stream at Snodgrass
TAoP	Pauatahanui Inlet	Pouewe	Kakaho	83.7	Horokiri Stream at Snodgrass
TAoP	Pauatahanui Inlet	Takapu	Pauatahanui	98.5	Pauatahanui Stream at Elmwood
TAoP	Pauatahanui Inlet	Wai-o-hata	Duck	80.8	Duck Creek at Trade Winds Drive
TAoP	Poririua Open Coast	Taupo	Taupo	97.8	Taupo at Plimmerton Domain
TAoP	Poririua Open Coast	Te Rio o Porirua and Rangituhi	Porirua Coast	50.3	Porirua Stream at Milk Depot
TWT	Te Whanganui-a-Tara harbour and estuari	Kaiwharawhara Stream	Kaiwharawhara	97.2	Kaiwharawhara Stream at Ngaio Gorg
TWT	Te Whanganui-a-Tara harbour and estuari	Korokoro Stream, Speedys Stream and Dry Creek	Hutt Speedys	98.7	Kororkoro Stream at Cornish Street
TWT	Te Whanganui-a-Tara harbour and estuari	Korokoro Stream, Speedys Stream and Dry Creek	Korokoro	95.7	Kororkoro Stream at Cornish Street
TWT	Te Whanganui-a-Tara harbour and estuari	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forest	Hutt Akatarawa	98.0	Whakatiki River at Riverstone
TWT	Te Whanganui-a-Tara harbour and estuari	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forest	Hutt Headwater	94.1	Whakatiki River at Riverstone
TWT	Te Whanganui-a-Tara harbour and estuari	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forest	Hutt Pakuratahi	70.8	Whakatiki River at Riverstone
TWT	Te Whanganui-a-Tara harbour and estuari	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forest	Hutt Whakatiki	99.6	Whakatiki River at Riverstone
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi lower mainstem	Lower Hutt North	1.8	Hutt River at Boulcott
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi lower mainstem	Lower Hutt South	2.7	Hutt River at Boulcott
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi rural streams and rural mainstems	Hutt Mangaroa	50.7	Mangaroa River at Te Marua
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi urban streams	Hutt Hulls Creek	99.8	Hulls Creek at Reynolds Bach Drive
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi urban streams	Lower Hutt South	87.3	Hulls Creek at Reynolds Bach Drive
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi urban streams	Stokes Valley	98.8	Hulls Creek at Reynolds Bach Drive
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi urban streams	Upper Hutt North	94.8	Hulls Creek at Reynolds Bach Drive
TWT	Te Whanganui-a-Tara harbour and estuari	Te Awa Kairangi urban streams	Upper Hutt South	94.1	Hulls Creek at Reynolds Bach Drive
TWT	Te Whanganui-a-Tara harbour and estuari	Waiwhetu Stream	Waiwhetu	90.2	Waiwhetu Stream at Whites Line East
TWT	Te Whanganui-a-Tara harbour and estuari	Wellington urban	East Coast	98.1	Karori Stream at Makara Peak MBP
TWT	Te Whanganui-a-Tara harbour and estuari	Wellington urban	Eastbourne	69.2	Karori Stream at Makara Peak MBP
TWT	Te Whanganui-a-Tara harbour and estuari	Wellington urban	Evans Bay	99.5	Karori Stream at Makara Peak MBP
TWT	Te Whanganui-a-Tara harbour and estuari	Wellington urban	Island Bay / Houghton Bay	99.8	Karori Stream at Makara Peak MBP
TWT	Te Whanganui-a-Tara harbour and estuari	Wellington urban	Lambton / Northern CBD	98.2	Karori Stream at Makara Peak MBP
TWT	Te Whanganui-a-Tara harbour and estuari	Wellington urban	North Harbour / Ngauranga	98.3	Karori Stream at Makara Peak MBP
TWT	Wai Tai	Wellington urban	Karori	98.5	Karori Stream at Makara Peak MBP
TWT	Wai Tai	Wellington urban	Lyall Bay	98.9	Karori Stream at Makara Peak MBP
TWT	Wai Tai	Wellington urban	Owhiro Bay	99.1	Karori Stream at Makara Peak MBP
TWT	Wainuiomata Estuary	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forest	Wainuiomata Morton	84.0	Whakatiki River at Riverstone
TWT	Wainuiomata Estuary	Wainuiomata rural streams	Wainuiomata	69.6	Wainuiomata River DS White Bridge
TWT	Wainuiomata Estuary	Wainuiomata rural streams	Wainuiomata Iti	98.3	Wainuiomata River DS White Bridge
TWT	Wainuiomata Estuary	Wainuiomata urban streams	Wainuiomata Black Creek	71.8	Black Creek

Reference: **Allocating TAS sites to SW sub-catchments**

Attachment C: Sub-catchments, current state, TAS, and required load reductions

Whaitua	Part_FMU	Sub-catchment	%FMU present in each sub-catchment	TAS_site	Attribute	Current State	TAS	Required load reduction
TAoP	Pouewe	Horokiri	98.8	Horokiri Stream at Snodgrass	Copper	A	A	0%
TAoP	Pouewe	Horokiri		Horokiri Stream at Snodgrass	Zinc	A	A	0%
TAoP	Pouewe	Horokiri		Horokiri Stream at Snodgrass	E. coli	E	B	67%
TAoP	Pouewe	Kakaho	83.7	Horokiri Stream at Snodgrass	Copper	A	A	0%
TAoP	Pouewe	Kakaho		Horokiri Stream at Snodgrass	Zinc	A	A	0%
TAoP	Pouewe	Kakaho		Horokiri Stream at Snodgrass	E. coli	E	B	99%
TAoP	Takapu	Pauatahanui	98.5	Pauatahanui Stream at Elmwood	Copper	A	A	0%
TAoP	Takapu	Pauatahanui		Pauatahanui Stream at Elmwood	Zinc	A	A	0%
TAoP	Takapu	Pauatahanui		Pauatahanui Stream at Elmwood	E. coli	E	B	96%
TAoP	Taupo	Taupo	97.8	Taupo at Plimmerton Domain	Copper	D	B	78%
TAoP	Taupo	Taupo		Taupo at Plimmerton Domain	Zinc	C	A	56%
TAoP	Taupo	Taupo		Taupo at Plimmerton Domain	E. coli	E	B	99%
TAoP	Te Rio o Porirua and Rangituhi	Porirua	80.9	Porirua Stream at Milk Depot	Copper	C	C	0%
TAoP	Te Rio o Porirua and Rangituhi	Porirua		Porirua Stream at Milk Depot	Zinc	D	C	0%
TAoP	Te Rio o Porirua and Rangituhi	Porirua		Porirua Stream at Milk Depot	E. coli	E	C	92%
TAoP	Te Rio o Porirua and Rangituhi	Porirua Coast	50.3	Porirua Stream at Milk Depot	Copper	C	C	0%
TAoP	Te Rio o Porirua and Rangituhi	Porirua Coast		Porirua Stream at Milk Depot	Zinc	D	C	0%
TAoP	Te Rio o Porirua and Rangituhi	Porirua Coast		Porirua Stream at Milk Depot	E. coli	E	C	92%
TAoP	Wai-o-hata	Duck	80.8	Duck Creek at Trade Winds Drive	Copper	C	A	99%
TAoP	Wai-o-hata	Duck		Duck Creek at Trade Winds Drive	Zinc	B	A	56%
TAoP	Wai-o-hata	Duck		Duck Creek at Trade Winds Drive	E. coli	E	C	83%
TWT	Kaiwharawhara Stream	Kaiwharawhara	97.2	Kaiwharawhara Stream at Ngaio G	Copper	C	B	53%
TWT	Kaiwharawhara Stream	Kaiwharawhara		Kaiwharawhara Stream at Ngaio G	Zinc	B	A	76%
TWT	Kaiwharawhara Stream	Kaiwharawhara		Kaiwharawhara Stream at Ngaio G	E. coli	E	C	89%
TWT	Korokoro Stream, Speedys Stream and Dry Creek	Korokoro	95.7	Kororkoro Stream at Cornish Stree	Copper	A	A	0%
TWT	Korokoro Stream, Speedys Stream and Dry Creek	Korokoro		Kororkoro Stream at Cornish Stree	Zinc	A	A	0%
TWT	Korokoro Stream, Speedys Stream and Dry Creek	Korokoro		Kororkoro Stream at Cornish Stree	E. coli	B	B	insufficient data
TWT	Korokoro Stream, Speedys Stream and Dry Creek	Hutt Speedys	98.7	Kororkoro Stream at Cornish Stree	Copper	A	A	0%
TWT	Korokoro Stream, Speedys Stream and Dry Creek	Hutt Speedys		Kororkoro Stream at Cornish Stree	Zinc	A	A	0%
TWT	Korokoro Stream, Speedys Stream and Dry Creek	Hutt Speedys		Kororkoro Stream at Cornish Stree	E. coli	B	B	insufficient data
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Akatarawa	98.0	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Akatarawa		Whakatiki River at Riverstone	Zinc	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Akatarawa		Whakatiki River at Riverstone	E. coli	A	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Headwater	94.1	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Headwater		Whakatiki River at Riverstone	Zinc	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Headwater		Whakatiki River at Riverstone	E. coli	A	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Pakuratahi	70.8	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Pakuratahi		Whakatiki River at Riverstone	Zinc	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Pakuratahi		Whakatiki River at Riverstone	E. coli	A	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Whakatiki	99.6	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Whakatiki		Whakatiki River at Riverstone	Zinc	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Hutt Whakatiki		Whakatiki River at Riverstone	E. coli	A	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Wainuiomata Morton	84.0	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Wainuiomata Morton		Whakatiki River at Riverstone	Zinc	?	A	0%
TWT	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Wainuiomata Morton		Whakatiki River at Riverstone	E. coli	A	A	0%
TWT	Te Awa Kairangi lower mainstem	Lower Hutt North	1.8	Hutt River at Boulcott	Copper	A	A	0%
TWT	Te Awa Kairangi lower mainstem	Lower Hutt North		Hutt River at Boulcott	Zinc	A	A	0%
TWT	Te Awa Kairangi lower mainstem	Lower Hutt North		Hutt River at Boulcott	E.coli	D	C	17%
TWT	Te Awa Kairangi lower mainstem	Lower Hutt South	2.7	Hutt River at Boulcott	Copper	A	A	0%
TWT	Te Awa Kairangi lower mainstem	Lower Hutt South		Hutt River at Boulcott	Zinc	A	A	0%
TWT	Te Awa Kairangi lower mainstem	Lower Hutt South		Hutt River at Boulcott	E.coli	D	C	17%
TWT	Te Awa Kairangi rural streams and rural mainstems	Hutt Mangaroa	50.7	Mangaroa River at Te Marua	Copper	?	A	0%
TWT	Te Awa Kairangi rural streams and rural mainstems	Hutt Mangaroa		Mangaroa River at Te Marua	Zinc	?	A	0%
TWT	Te Awa Kairangi rural streams and rural mainstems	Hutt Mangaroa		Mangaroa River at Te Marua	E. coli	D	B	61%
TWT	Te Awa Kairangi urban streams	Hutt Hulls Creek	99.8	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Te Awa Kairangi urban streams	Hutt Hulls Creek		Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
TWT	Te Awa Kairangi urban streams	Hutt Hulls Creek		Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
TWT	Te Awa Kairangi urban streams	Lower Hutt North	68.6	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Te Awa Kairangi urban streams	Lower Hutt North		Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
TWT	Te Awa Kairangi urban streams	Lower Hutt North		Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91
TWT	Te Awa Kairangi urban streams	Lower Hutt South	87.3	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Te Awa Kairangi urban streams	Lower Hutt South		Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
TWT	Te Awa Kairangi urban streams	Lower Hutt South		Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91
TWT	Te Awa Kairangi urban streams	Stokes Valley	98.8	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Te Awa Kairangi urban streams	Stokes Valley		Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
TWT	Te Awa Kairangi urban streams	Stokes Valley		Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
TWT	Te Awa Kairangi urban streams	Upper Hutt North	94.8	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Te Awa Kairangi urban streams	Upper Hutt North		Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
TWT	Te Awa Kairangi urban streams	Upper Hutt North		Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
TWT	Te Awa Kairangi urban streams	Upper Hutt South	94.1	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Te Awa Kairangi urban streams	Upper Hutt South		Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
TWT	Te Awa Kairangi urban streams	Upper Hutt South		Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
TWT	Wainuiomata rural streams	Wainuiomata	69.6	Wainuiomata River DS White Bridg	Copper	?	A	0%
TWT	Wainuiomata rural streams	Wainuiomata		Wainuiomata River DS White Bridg	Zinc	?	A	0%
TWT	Wainuiomata rural streams	Wainuiomata		Wainuiomata River DS White Bridg	E. coli	B	A	18%
TWT	Wainuiomata rural streams	Wainuiomata Iti	98.3	Wainuiomata River DS White Bridg	Copper	?	A	0%
TWT	Wainuiomata rural streams	Wainuiomata Iti		Wainuiomata River DS White Bridg	Zinc	?	A	0%
TWT	Wainuiomata rural streams	Wainuiomata Iti		Wainuiomata River DS White Bridg	E. coli	B	A	18%
TWT	Wainuiomata urban streams	Wainuiomata Black Creek	71.8	Black Creek	Copper	C	C	0%
TWT	Wainuiomata urban streams	Wainuiomata Black Creek		Black Creek	Zinc	D	C	8%
TWT	Wainuiomata urban streams	Wainuiomata Black Creek		Black Creek	E. coli	E	C	91%
TWT	Waiwhetu Stream	Waiwhetu	90.2	Waiwhetu Stream at Whites Line Ea	Copper	C	A	80%
TWT	Waiwhetu Stream	Waiwhetu		Waiwhetu Stream at Whites Line Ea	Zinc	D	B	76%
TWT	Waiwhetu Stream	Waiwhetu		Waiwhetu Stream at Whites Line Ea	E. coli	E	C	90%
TWT	Wellington urban	Karori	98.5	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	Karori		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	Karori		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	East Coast	98.1	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	East Coast		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	East Coast		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	Eastbourne	69.2	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	Eastbourne		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	Eastbourne		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	Evans Bay	99.5	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	Evans Bay		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	Evans Bay		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	Island Bay / Houghton Bay	99.8	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	Island Bay / Houghton Bay		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	Island Bay / Houghton Bay		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	Lambton / Northern CBD	98.2	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	Lambton / Northern CBD		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	Lambton / Northern CBD		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	Lyall Bay	98.9	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	Lyall Bay		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	Lyall Bay		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	North Harbour / Ngaurang	98.3	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	North Harbour / Ngauranga		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	North Harbour / Ngauranga		Karori Stream at Makara Peak MBP	E. coli	E	C	96%
TWT	Wellington urban	Owhiro Bay	99.1	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Wellington urban	Owhiro Bay		Karori Stream at Makara Peak MBP	Zinc	D	C	8%
TWT	Wellington urban	Owhiro Bay		Karori Stream at Makara Peak MBP	E. coli	E	C	96%

Attachment D: Required load reductions for copper

Whaitua	Sub-catchment	Part_FMU	TAS_site	Attribute	Current State	TAS	Required load reduction
TAoP	Duck	Wai-o-hata	Duck Creek at Trade Winds Drive	Copper	C	A	99%
TWT	Waiwhetu	Waiwhetu Stream	Waiwhetu Stream at Whites Line East	Copper	C	A	80%
TAoP	Taupo	Taupo	Taupo at Plimmerton Domain	Copper	D	B	78%
TWT	Hutt Hulls Creek	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Lower Hutt North	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Lower Hutt South	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Stokes Valley	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Upper Hutt North	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Upper Hutt South	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Copper	C	B	69%
TWT	Kaiwharawhara	Kaiwharawhara Stream	Kaiwharawhara Stream at Ngaio Gorg	Copper	C	B	53%
TWT	East Coast	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Eastbourne	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Evans Bay	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Island Bay / Houghton Bay	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Karori	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Lambton / Northern CBD	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Lyall Bay	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	North Harbour / Ngaurang	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TWT	Owhiro Bay	Wellington urban	Karori Stream at Makara Peak MBP	Copper	D	C	4%
TAoP	Horokiri	Pouewe	Horokiri Stream at Snodgrass	Copper	A	A	0%
TWT	Hutt Akatarawa	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mainstem	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Hutt Headwater	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mainstem	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Hutt Mangaroa	Te Awa Kairangi rural streams and rural mainstems	Mangaroa River at Te Marua	Copper	?	A	0%
TWT	Hutt Pakuratahi	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mainstem	Whakatiki River at Riverstone	Copper	?	A	0%
TWT	Hutt Speedys	Korokoro Stream, Speedys Stream and Dry Creek	Kororkoro Stream at Cornish Street	Copper	A	A	0%
TWT	Hutt Whakatiki	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mainstem	Whakatiki River at Riverstone	Copper	?	A	0%
TAoP	Kakaho	Pouewe	Horokiri Stream at Snodgrass	Copper	A	A	0%
TWT	Korokoro	Korokoro Stream, Speedys Stream and Dry Creek	Kororkoro Stream at Cornish Street	Copper	A	A	0%
TWT	Lower Hutt North	Te Awa Kairangi lower mainstem	Hutt River at Boulcott	Copper	A	A	0%
TWT	Lower Hutt South	Te Awa Kairangi lower mainstem	Hutt River at Boulcott	Copper	A	A	0%
TAoP	Pauatahanui	Takapu	Pauatahanui Stream at Elmwood	Copper	A	A	0%
TAoP	Porirua	Te Rio o Porirua and Rangituhi	Porirua Stream at Milk Depot	Copper	C	C	0%
TAoP	Porirua Coast	Te Rio o Porirua and Rangituhi	Porirua Stream at Milk Depot	Copper	C	C	0%
TWT	Wainuiomata	Wainuiomata rural streams	Wainuiomata River DS White Bridge	Copper	?	A	0%
TWT	Wainuiomata Black Creek	Wainuiomata urban streams	Black Creek	Copper	C	C	0%
TWT	Wainuiomata Iti	Wainuiomata rural streams	Wainuiomata River DS White Bridge	Copper	?	A	0%
TWT	Wainuiomata Morton	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mainstem	Whakatiki River at Riverstone	Copper	?	A	0%

Attachment E: Required load reductions for zinc

Row	Whaitua	Sub-catchment	Part_FMU	TAS_site	Attribute	Current State	TAS	Required load reduction
41	TWT	Kaiwharawhara	Kaiwharawhara Stream	Kaiwharawhara Stream at Ngaio Gorge	Zinc	B	A	76%
110	TWT	Waiwhetu	Waiwhetu Stream	Waiwhetu Stream at Whites Line East	Zinc	D	B	76%
2	TAoP	Duck	Wai-o-hata	Duck Creek at Trade Winds Drive	Zinc	B	A	56%
89	TAoP	Taupo	Taupo	Taupo at Plimmerton Domain	Zinc	C	A	56%
23	TWT	Hutt Hulls Creek	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
59	TWT	Lower Hutt North	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
65	TWT	Lower Hutt South	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
86	TWT	Stokes Valley	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
92	TWT	Upper Hutt North	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
95	TWT	Upper Hutt South	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	Zinc	C	B	40%
5	TWT	East Coast	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
8	TWT	Eastbourne	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
11	TWT	Evans Bay	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
38	TWT	Island Bay / Houghton Bay	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
47	TWT	Karori	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
53	TWT	Lambton / Northern CBD	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
68	TWT	Lyall Bay	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
71	TWT	North Harbour / Ngauranga	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
74	TWT	Owhiro Bay	Wellington urban	Karori Stream at Makara Peak MBP	Zinc	D	C	8%
101	TWT	Wainuiomata Black Creek	Wainuiomata urban streams	Black Creek	Zinc	D	C	8%
80	TAoP	Porirua	Te Rio o Porirua and Rangituhi	Porirua Stream at Milk Depot	Zinc	D	C	8%
83	TAoP	Porirua Coast	Te Rio o Porirua and Rangituhi	Porirua Stream at Milk Depot	Zinc	D	C	8%
14	TAoP	Horokiri	Pouewe	Horokiri Stream at Snodgrass	Zinc	A	A	0%
17	TWT	Hutt Akatarawa	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Whakatiki River at Riverstone	Zinc	?	A	0%
20	TWT	Hutt Headwater	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Whakatiki River at Riverstone	Zinc	?	A	0%
26	TWT	Hutt Mangaroa	Te Awa Kairangi rural streams and rural mainstems	Mangaroa River at Te Marua	Zinc	?	A	0%
29	TWT	Hutt Pakuratahi	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Whakatiki River at Riverstone	Zinc	?	A	0%
32	TWT	Hutt Speedys	Korokoro Stream, Speedys Stream and Dry Creek	Kororkoro Stream at Cornish Street	Zinc	A	A	0%
35	TWT	Hutt Whakatiki	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Whakatiki River at Riverstone	Zinc	?	A	0%
44	TAoP	Kakaho	Pouewe	Horokiri Stream at Snodgrass	Zinc	A	A	0%
50	TWT	Korokoro	Korokoro Stream, Speedys Stream and Dry Creek	Kororkoro Stream at Cornish Street	Zinc	A	A	0%
56	TWT	Lower Hutt North	Te Awa Kairangi lower mainstem	Hutt River at Boulcott	Zinc	A	A	0%
62	TWT	Lower Hutt South	Te Awa Kairangi lower mainstem	Hutt River at Boulcott	Zinc	A	A	0%
77	TAoP	Pauatahanui	Takapu	Pauatahanui Stream at Elmwood	Zinc	A	A	0%
98	TWT	Wainuiomata	Wainuiomata rural streams	Wainuiomata River DS White Bridge	Zinc	?	A	0%
104	TWT	Wainuiomata Iti	Wainuiomata rural streams	Wainuiomata River DS White Bridge	Zinc	?	A	0%
107	TWT	Wainuiomata Morton	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mai	Whakatiki River at Riverstone	Zinc	?	A	0%

Reference: **Allocating TAS sites to SW sub-catchments**

Attachment F: Required load reduction for *E. coli*

Row	Whaitua	Sub-catchment	Part_FMU	TAS_site	Attribute	Current State	TAS	Required load reduction
45	TAoP	Kakaho	Pouewe	Horokiri Stream at Snodgrass	E. coli	E	B	99%
90	TAoP	Taupo	Taupo	Taupo at Plimmerton Domain	E. coli	E	B	99%
6	TWT	East Coast	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
9	TWT	Eastbourne	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
12	TWT	Evans Bay	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
39	TWT	Island Bay / Houghton Bay	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
48	TWT	Karori	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
54	TWT	Lambton / Northern CBD	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
69	TWT	Lyall Bay	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
72	TWT	North Harbour / Ngauranga	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
75	TWT	Owhiro Bay	Wellington urban	Karori Stream at Makara Peak MBP	E. coli	E	C	96%
78	TAoP	Pauatahanui	Takapu	Pauatahanui Stream at Elmwood	E. coli	E	C	96%
81	TAoP	Porirua	Te Rio o Porirua and Rangituhi	Porirua Stream at Milk Depot	E. coli	E	C	92%
84	TAoP	Porirua Coast	Te Rio o Porirua and Rangituhi	Porirua Stream at Milk Depot	E. coli	E	C	92%
60	TWT	Lower Hutt North	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
66	TWT	Lower Hutt South	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
24	TWT	Hutt Hulls Creek	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
87	TWT	Stokes Valley	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
93	TWT	Upper Hutt North	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
96	TWT	Upper Hutt South	Te Awa Kairangi urban streams	Hulls Creek at Reynolds Bach Drive	E. coli	E	C	91%
102	TWT	Wainuiomata Black Creek	Wainuiomata urban streams	Black Creek	E. coli	E	C	91%
111	TWT	Waiwhetu	Waiwhetu Stream	Waiwhetu Stream at Whites Line East	E. coli	E	C	90%
42	TWT	Kaiwharawhara	Kaiwharawhara Stream	Kaiwharawhara Stream at Ngaio Gorg	E. coli	E	C	89%
3	TAoP	Duck	Wai-o-hata	Duck Creek at Trade Winds Drive	E. coli	E	C	83%
15	TAoP	Horokiri	Pouewe	Horokiri Stream at Snodgrass	E. coli	E	B	67%
27	TWT	Hutt Mangaroa	Te Awa Kairangi rural streams and rural mainstems	Mangaroa River at Te Marua	E. coli	D	B	61%
99	TWT	Wainuiomata	Wainuiomata rural streams	Wainuiomata River DS White Bridge	E. coli	B	A	18%
105	TWT	Wainuiomata Iti	Wainuiomata rural streams	Wainuiomata River DS White Bridge	E. coli	B	A	18%
57	TWT	Lower Hutt North	Te Awa Kairangi lower mainstem	Hutt River at Boulcott	E.coli	D	C	17%
63	TWT	Lower Hutt South	Te Awa Kairangi lower mainstem	Hutt River at Boulcott	E.coli	D	C	17%
18	TWT	Hutt Akatarawa	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mains	Whakatiki River at Riverstone	E. coli	A	A	0%
21	TWT	Hutt Headwater	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mains	Whakatiki River at Riverstone	E. coli	A	A	0%
30	TWT	Hutt Pakuratahi	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mains	Whakatiki River at Riverstone	E. coli	A	A	0%
36	TWT	Hutt Whakatiki	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mains	Whakatiki River at Riverstone	E. coli	A	A	0%
108	TWT	Wainuiomata Morton	Orongorongo, Te Awa Kairangi and Wainuiomata small forested and Te Awa Kairangi forested mains	Whakatiki River at Riverstone	E. coli	A	A	0%
33	TWT	Hutt Speedys	Korokoro Stream, Speedys Stream and Dry Creek	Kororkoro Stream at Cornish Street	E. coli	B	B	insuffient data
51	TWT	Korokoro	Korokoro Stream, Speedys Stream and Dry Creek	Kororkoro Stream at Cornish Street	E. coli	B	B	insuffient data