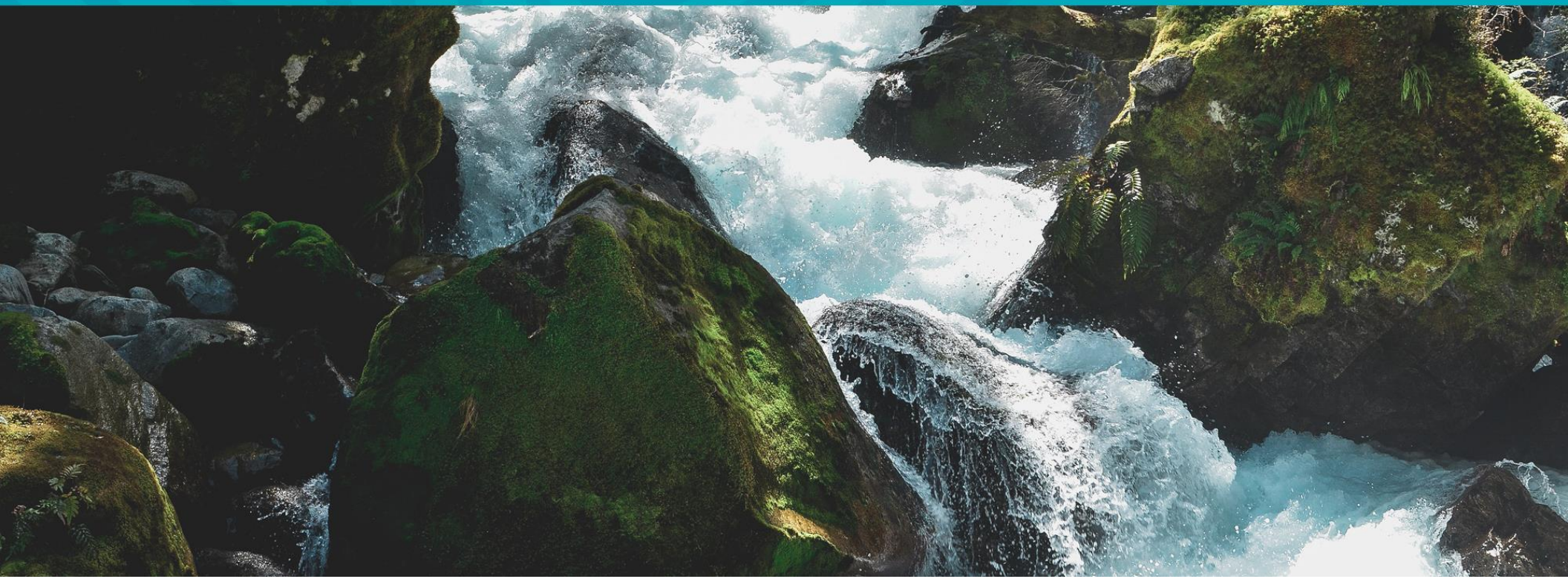
Wastewater Standards Technical Review Group

Discharge to water



Karakia tīmatanga

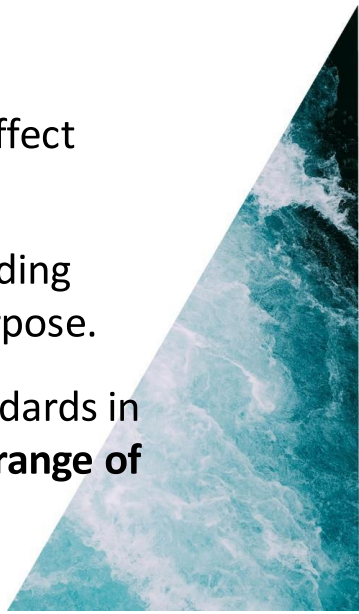
Whakataka te hau ki te uru
Whakataka te hau ki te tonga
Kia mākinakina ki uta
Kia mātaratara ki tai
E hī ake ana te atākura
he tio, he huka, he hau hū
Tihei Mauri Ora!

Cease the winds from the West
Cease the winds from the south
Let the breezes blow over the land
Let the breeze flow over the ocean
Let the red tipped dawn come with a sharpened air
A touch of frost, a promise of a day!
Sneeze, the breath of life!

Scope of report

Scope of report

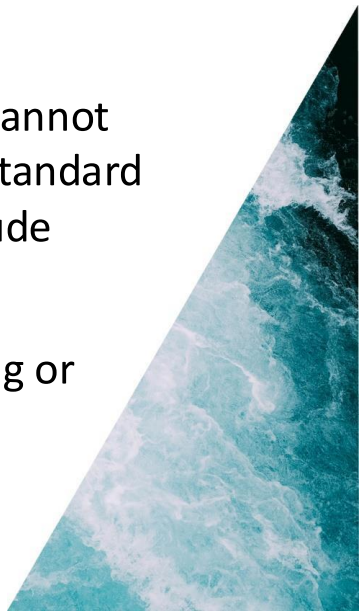
- The report was commissioned **to recommend wastewater environmental performance standards (including monitoring and reporting requirements) relating to discharge to water** that will apply to new resource consents for publicly operated wastewater treatment plants.
- Recommendations in the report must reflect:
  - international best practice approaches relating to national frameworks of consent-based standards, monitoring and reporting arrangements for WWTPs,
  - best practice approaches in existing resource consents, and
  - existing and proposed approaches in national direction or regional plans that may affect any future standards for WWTPs.
- The report should review standards set out in the earlier report (cost estimate for upgrading WWTPs, commissioned by DIA) and recommend whether these standards are fit-for-purpose.
- The report should also **consider timeframes to provide flexibility** for implementing standards in consents (for example, to allow for the progressive upgrade of a WWTP), and **present a range of options with a single recommendation**.



Legislation relating to wastewater standards

Current legislative framework

- Wastewater environmental performance standards are currently made **under section 138** of the Water Services Act 2021.
- They are made by the Water Services Authority.
- Wastewater standards may only apply to **public wastewater networks**. This means networks that are operated by a local authority or a council-controlled organisation, a government department, or the New Zealand Defence Force.
- Wastewater standards have **direct effect in resource consents**: a regional council cannot grant a consent that has conditions that are contrary to, or less restrictive than, a standard (section 104D, Resource Management Act. A consent authority may however include conditions that are more restrictive than a standard.
- The Water Services Authority **must give effect to Te Mana o te Wai** when exercising or performing all functions, powers, and duties.



Signalled changes to Wastewater Standards

The Minister of Local Government has announced proposed changes to the Water Services Act 2021, which will impact how wastewater standards are developed and implemented. In summary:

- **"Single standard approach":** this will mean consent authorities must implement any treatment requirements in a wastewater standard in new consents (no discretion to depart from requirements in a standard). Exceptions can be made to a standard – where there is an exception, standard RMA processes will apply.
- **Cost effective regulation:** when exercising regulatory functions, the Water Services Authority must ensure that requirements are cost effective for councils to implement, and result in affordable services to consumers.
- **Change in approach to Te Mana o te Wai:** The Water Services Authority will not be required to give effect to Te Mana o te Wai. Instead it will need to take account of the National Policy Statement for Freshwater Management, and any regional plans prepared under the Resource Management Act that relate to freshwater.
- **Standards made by Order in Council:** Wastewater standards will be made through Order in Council (made by Cabinet on recommendation of Minister of Local Government rather than the Water Services Authority) and will be required to have a detailed regulatory impact analysis.

How will wastewater standards fit into the resource management system?

Water Services Authority

Sets the standards

Development

- Standards relate to **quality of discharges** to the environment.
- Standardise aspects of **infrastructure design** and operation nationally.
- Reduce consenting costs, time and complexity, and increase cost certainty for water industry.
- Test and refine draft standards through formal consultation (required by the Water Services Act 2021).

Network operators take account of relevant standards and apply for a resource consent.

Regional councils issue consent, monitor and enforce.

Regional councils and territorial authorities

Applied through resource consenting

Territorial authorities
Take account of standards and include them in planning and consent applications.

Regional councils

- Implement standards through resource consents
- Staggered approach to implementing infrastructure standards: applied as consents come up for renewal.
- Greater consistency in how wastewater treatment plants are consented and enforced.

Phased implementation

- Apply over time as discharge consents lapse and need renewing.

Regional councils undertake compliance, monitoring and enforcement

- Standards incorporated into consent conditions.
- Consents and conditions monitored and enforced by regional councils.
- Consent applicant required to report on environmental monitoring to regional council.

Data collected through regional council compliance, monitoring and enforcement role used to inform national reporting

Water Services Authority

National reporting

National reporting

- Annual reporting to provide public transparency on performance of wastewater networks.
- Nationally-applied standards helps benchmark performance.

Problem definition

Current state in New Zealand

- There are many symptoms of regulatory failure. RMA consenting is complex, and consent applications take long times to process - many wastewater treatment plants must go through multiple consenting processes over decades.
- Wastewater plant infrastructure and processes vary widely – this is disproportionately driven by the regulatory system (high degree of variability in consent conditions) rather than the requirements of plant infrastructure.
- Nearly 15% of WWTPs are operating on expired consents, typically for 4 years (and some up to 20 years).
- Across the next 10 years, up to 70% of resource consents are due for renewal.
- There is not transparency around regulatory compliance, and enforcement where consent conditions are breached is not consistent.
- The majority of plants serve small populations (50% serve fewer than 1000) – this only represents 6% of the serviced population.

Current state in New Zealand (2)

- The National Stocktake of Municipal Wastewater Treatment Plants (2019) investigated resource consents to understand compliance, monitoring and enforcement, and found:
  - "contaminant monitoring often occurs in a **piecemeal** way, without systematic regulation across WWTPs",
  - many existing consents outline specific monitoring parameters but do not stipulate numeric limits, and
  - for discharges to freshwater, the four **most frequently measured parameters were human health indicators** (e.g., *E. coli*), biological oxygen demand, suspended solids and ammoniacal nitrogen.

Wastewater standards will interact with **existing or future national directions** (for example, the NPS-FM or NZCPS). Separate work is underway to ensure national settings are consistent. Our focus for this work to ensure that discharge to water standards are a fit for purpose regulatory intervention, based on the new framework that is proposed by the Government.

Opportunities of wastewater standards

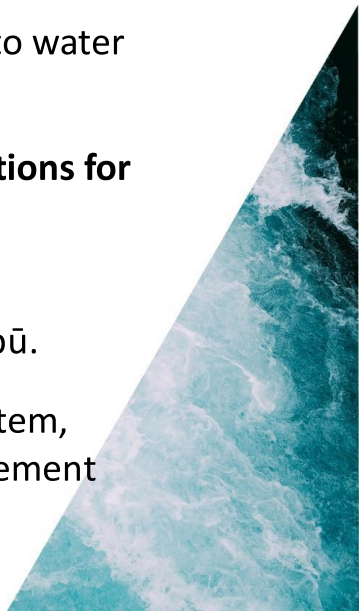
Wastewater performance standards provide an opportunity target system failure by:

- give clear expectations to communities about wastewater treatment without lowering environmental impact
- streamline consent processes, engagement and infrastructure design
- reduce the burden on iwi and hapū to consult and feed into lengthy and costly consenting processes which can be a point of frustration
- provide certainty to territorial authorities as owners of networks so they can plan for cost of infrastructure
- opportunities for economies of scale in plant design, procurement and operator capability / training (significant benefits to infrastructure pipeline)
- make compliance and enforcement easier, by standardising the main contaminant limits, and monitoring and reporting requirements in consents for wastewater discharges
- require transparency around compliance
- enable benchmarking of performance, to further improve efficiencies over time.

Case studies

Iwi and hapū values and perspectives

- The report notes:
  - Human waste is **inherently tapu** (prohibited) due to the impacts of human waste on the health of people and the environment, which means wastewater must undergo a process of whakanoa (cleansing) before it can be safely integrated back into the environment.
  - It is culturally abhorrent to mix wastewater to freshwater and coastal water due to its tapu nature, and the practical risks to human health. It is particularly offensive to discharge wastewater to areas where food is gathered.
  - As a **first principle**, Māori do not support the discharge of treated or untreated wastewater to water and prefer land-based discharge.
  - There are examples of mana whenua working with local authorities to reach **pragmatic solutions for water-based discharges** that are culturally appropriate and lead to improved environmental outcomes. *(These examples are covered in detail in the case study report).*
  - Such solutions should also be viewed in light of the imbalance between councils and iwi/hapū.
- There are a range of formal tools to support Māori participation in the resource management system, including Joint Management Agreements, Cultural Impact Assessments and Iwi and Hapū Management Plans.



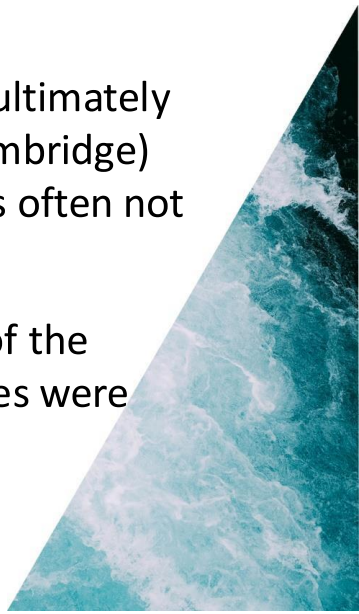
Case studies matrix

The case studies were selected based on their differing characteristics outlined below:

		Technical factors							iwi / hapū involvement			Population		
	WWTP	discharge to land	discharge to water (marine)	discharge to water (freshwater)	reuse of biosolids	disposal of biosolids	innovative technologies / solutions	network overflow issue	high level of iwi involvement	low level of iwi involvement	broad community involvement	size	urban growth area	Contact
Upper North Island	**Taipā** Northland	✓		✓			✓		✓		✓	1500		EY
	Rawene Northland		✓				✓	✓		✓	✓	590		TA
	Wellsford Auckland		✓			✓	✓			✓	✓	2000	✓	TA
	Cambridge Waikato*	✓		✓	✓		✓		✓		✓	21,794	✓	TA
Central, Lower North Island	**Rotoiti East Rotomā** Bay of Plenty	✓							✓		✓	1500		EY
	Gisborne Tairāwhiti		✓			✓	✓			✓		35,000	✓	TA
	Porirua Wellington		✓					✓		✓	✓	62,000	✓	TA
South Island	**Akaroa** Canterbury		✓		✓				✓		✓	650		EY
	Tahuna - Otepoti Otago		✓			✓	✓			✓		84,447	✓	TA
	Te Anau Southland	✓		✓			✓		✓			2,628		EY

Summary of case study insights

- Six recently consented WWTPs were selected for case studies**:** Gisborne, Taipā, Rotoiti-Rotomā, Cambridge, Porirua and Pukekohe.
- The report notes engagement shows a strong preference for **'at-place' decision-making** to ensure that mana whenua are involved in decisions affecting them, but also highlights that the experience of iwi and hapū in working with Councils is highly variable and at-place decision-making is not always effective, often due to a lack of early and meaningful engagement, inadequate resourcing, and changes in council staff.
- While Māori strongly prefer discharge to land, there are examples where mana whenua ultimately agreed to shift to water-based discharge following **quality engagement** (for example, Cambridge) and assurance about improvements to environmental outcomes. Land-based discharge is often not seen as feasible due to topography and financial constraints.
- Wastewater discharges should not have a detrimental impact on the health and quality of the receiving environment or the people that use the environment. Pre-treatment approaches were highlighted in one case study as a mitigation for overflows.



Summary of case study insights (cont.)

- The report notes mana whenua seek active participation in all phases of the wastewater treatment process, from **design and consenting through to monitoring and enforcement**. Proactive engagement reduces the risk of additional costs through protracted consenting or litigation. Mana whenua should be resourced to do this.
    - The report recommends that the standards include requirements to support greater levels of mana whenua participation in decision-making, throughout the process.
- Some groups identified the importance of having a **technical wastewater expert** to support mana whenua, to build confidence in the outcomes and to enable mana whenua to engage with councils in both a mātauranga Māori based, and western science-based manner.
- Mana whenua support **stringent limits and frequent monitoring**. This includes using mātauranga Māori informed approaches to monitoring (as used in Cambridge and Porirua).
- Mana whenua reported that they lack information through **routine reporting**. The report recommends specific reporting requirements for Māori, alongside public reporting.

Overview of limits in case study consents

	BOD5 (mg/L)	TSS (mg/L)	TN	TP	Pathogens (cfu/100mL)	Other	Comments
Gisborne (coastal)		30	Analysis required for TKN, NH4-N, NO3-N, NO2-N, DIN and TP provided in g/m³ and kg/d, every 3 months		1,000 (Enterococci)	Industrial WW discharge TSS 600 mg/L Monitoring for $cBOD_5$, metals (with trigger limits), SVOC and VOCs	Compliance based on <x# / 26 samples exceeding limit
Taipa (freshwater)	20 / 40	20 / 30	12 / 16 mg/l	10 /15 mg/L	1,000 / 1,500 (Faecal coliforms)		Median / 85th percentile
Porirua (coastal)	30	30	Sampling for NH4-N, NO3-N, DRP, TN and TP – no limits		UV transmissivity conditions. Trigger limit for enterococci to be set.	Limits for metals and phenol Receiving environment enterococci sampling	Mean value for 90 daily samples.
Cambridge*	20 / 50 5 /10	20 / 50 5/10	385 kg/day 45 (summer) 95 (winter) kg/day	15 / 30 kg/day 11 kg/day	126 (*E.coli*) 14 (95th percentile)	Also monitor, NH4-N, NO3-N, NO2-N , DRP	Values median or mean / 90th percentile

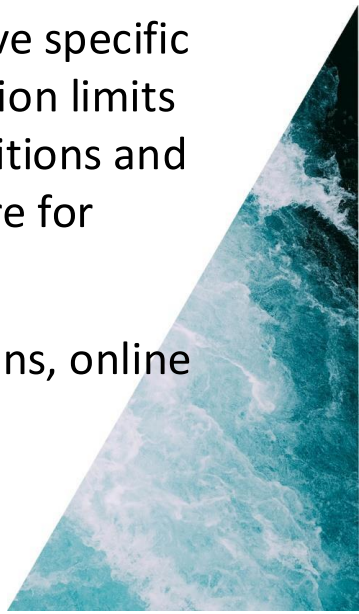
International experience and options

Review of international practice

- The consultants looked at wastewater disposal guidelines and standards for discharge to water in other jurisdictions. The report analyses the parameters measured and how these differ with receiving environmental or equivalent populations, and how frequently these parameters are monitored and reported.
- The report predominantly looks at jurisdictions in the European Union and commonwealth countries. Regulatory systems in these countries function differently to the resource management system in New Zealand (for example, the EU Directive operates in tandem with several other directives).
- Internationally, **minimum standards are common** and typically operate as performance standards for wastewater discharges. This is intended to provide clear requirements about national level upgrade of poorly maintained infrastructure, certainty about regulatory settings, and to reduce pollutants in waterways.
- **Phasing of standards is common to prioritise** certain upgrades: for example, the EU applied standards to different sizes of treatment plants over different timeframes.

Review of international practice (cont.)

- While there are different approaches to setting, implementing and enforcing standards, there is widespread use of **central parameters, particularly TSS, BOD and COD**. Other parameters (e.g., nutrients) are used in more targeted ways, depending on the receiving environment, and the scale of discharge.
- Monitoring is generally specified as flow-proportional or time-based 24-hour samples.
- The England, Wales and Scotland Urban Wastewater Treatment Regulations have specific provisions that allow for a limited number of samples exceeding the concentration limits based on sampling frequency. Samples are taking under normal operating conditions and extreme values for water quality are not taken into consideration where they are for unusual situations, such as periods of heavy rain.
- While the report doesn't investigate reporting arrangements in many jurisdictions, online reporting is used in the European Union and Canada.



Standardised treatment parameters in other jurisdictions

	NPS-FM	ARMCA NZ	Canada (Federal)	British Colombia	United States	European Union	Netherlands	Germany	Austria	Switzerland	Dubai
Population trigger						✓	✓	✓	✓	✓	
Receiving environment				✓		✓	✓			✓	✓
Biochemical Oxygen Demand (BOD5)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chemical Oxygen Demand (COD)						✓	✓	✓	✓	✓	✓
Total suspended solids (TSS)		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Total ammonium nitrogen (unionised)			✓								✓
Ammonia	✓							✓	✓	✓	
Total Residual Chlorine			✓								
Total nitrogen (TN)	✓	✓				✓	✓	✓	✓	✓	✓
Total phosphorous		✓		✓		✓	✓	✓	✓	✓	
Dissolved organic carbon (DOC)											
Organic trace substances											

Options presented in report

Option One

Single set of treatment requirements for all WWTPs

- The first option in the report is a single set of treatment requirements for all wastewater treatment plants. The treatment requirements apply to all plants regardless of size or receiving environment.
- While this approach could provide national consistency, it is the bluntest option and is not responsive to significant differences between receiving environments. This may result in inefficient investment, place financial pressure on smaller plants, and potentially impose lower or more stringent limits than required. The consultant team advised these requirements should not apply to plants serving populations under 1000.
- The consultant team advised a population threshold (varying treatment requirements based on size of plant) was not necessary – this is only used in jurisdictions as a transitional measure.

Parameter	Plant serves >1,000
BOD5 (mg/l)	<10 (or a COD limit of <75)[5]
TSS (mg/l)	<20[6]
TN (mg/l)	<5[6]
TP (mg/l)	<1[7]
E. coli (cfu/100ml)	≤ 130[7]
Enterococci (cfu/100ml)	≤ 40[8]

Option Two

Treatment requirements that vary by receiving environment

- The second option is a set of standards where treatment requirements vary based on the type of receiving environment. This approach aligns with some international examples.
- The advantage of this approach is enables treatment requirements to be differentiated according to receiving environment. The consultants advised that treatment standards would need to be set at a level that protect environmental outcomes and public health, because "at place" decisions could not be made about treatment.
- The consultants advised a population threshold was not necessary – this is only used in jurisdictions as a transitional measure. Further work is also required on how to classify types of receiving environment so there are clear, objective criteria for consent authorities to apply the standards.

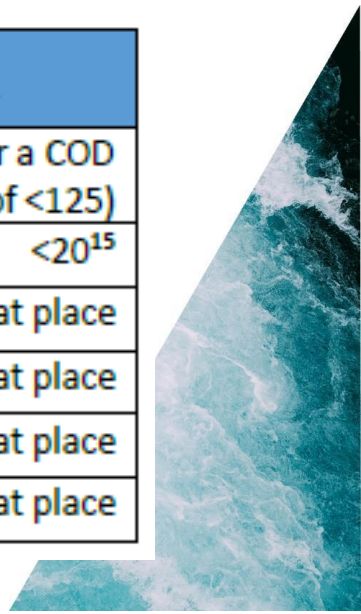
Parameter/Receiving Environment	Open coast	Inshore Waters	Static Freshwaters	Flowing Freshwater
BOD5 (mg/l)	<25 (or a COD limit of <125)[8]	<25 (or a COD limit of <125)[9]	<10 (or a COD limit of <75)[9]	<25 (or a COD limit of <125)[9]
TSS (mg/l)	<35[9]	<20[10]	<20[9]	<20[9]
TN (mg/l)	<15[10]	<10[10]	<5[11]	<10[10]
TP (mg/l)	<10	<10[10]	<1[12]	<10[10]
E. coli (cfu/100ml)	-	-≤ 130[12]	≤ 130[13]	≤ 130[13]
Enterococci (cfu/100ml)	1,000[13]	≤ 40[13]	-	-

Option Three

Standards with treatment for BOD and TSS based on broad receiving environment

- This option proposes standards that vary based on broad receiving environment types, aligned with the European Water Directive Framework. Treatment requirements for nutrients and pathogens would continue to be set through resource consents.
- This option would mean that, for all plants, standard resource consenting processes would continue to apply for the majority of contaminants on reconsenting.
- The consultants advised a population threshold was not necessary – this is only used in jurisdictions as a transitional measure.

Parameter/Receiving Environment	Open coast	Inshore Waters	Static Freshwaters	Flowing Freshwater
BOD5 (mg/l)	<25[13] (or a COD limit of <125)	<25[14] (or a COD limit of <125)	<10[14] (or a COD limit of <75)	<25[14] (or a COD limit of <125)
TSS (mg/l)	<35[14]	<20[15]	<20[15]	<20[15]
TN (mg/l)	set at place	set at place	set at place	set at place
TP (mg/l)	set at place	set at place	set at place	set at place
E. coli (cfu/100ml)	set at place	set at place	set at place	set at place
Enterococci (cfu/100ml)	set at place	set at place	set at place	set at place



Focus questions

- We are interested in a discussion about how we can develop an option that best meets Government policy priorities.
- It is important that treatment requirements implemented as part of a standard do not lower environmental outcomes and protect public health. We are interested in a discussion about the treatment requirements that are proposed in options, and whether they are at a level that will ensure these outcomes.
- Should treatment requirements be standardised regardless of size of plant as recommended by the consultant team, or should we consider requirements that differ according to size of plant and receiving environment? Are there other factors that we should consider?
- Under the Government's proposals, standards will apply to consents for all wastewater treatment plants unless an exception applies (this is specified as part of the standard). We are interested in a discussion about particular receiving environments where an exception might be necessary (for example, a pristine water body, or one that is significantly degraded).
- We are interested in a discussion about how monitoring requirements are articulated in standards, so they are applied unambiguously and consistently as part of a consent.

Monitoring and reporting options

Approach	Commentary
Continuous monitoring	• May be unaffordable for smaller WWTPs. • Not aligned with international best practice for all sizes of treatment plants. • Not available for all parameters (e.g., BOD).
Continuous monitoring with percentile limit compliance and a 'must never be exceeded maximum'	• May be unaffordable for smaller WWTPs. • Not available for all parameters (e.g., BOD). • Not aligned with international best practice for all sizes of treatment plants. • Never exceed values may be easier for the public to understand when reporting.
Periodic spot monitoring: 'must not exceed' limit	• Likely to be more affordable and aligns with best practice for smaller plants. • Spot monitoring is more manual and may be forgotten if compliance is not enforced. • Opportunity for more frequent sampling to correspond with risk to receiving environ.
Periodic spot monitoring: percentile limit	• Aligns with international best practice, case studies and consents (note, the EU allows a specified number of samples to fail but not a percentile per se). • Percentile limits add a layer of complexity for community members to understand.
Periodic spot monitoring: average limit	• Larger sample set/more frequent sampling may be required to ensure that the average limit represents the typical discharge quality. • Typically specified in conjunction with a percentile limit.
Seasonally based standards for nutrients and pathogens (m. stringent in summer)	• Takes a risk-based approach to enable appropriate discharge quality. • Appropriate when public contact with discharge environment is higher. • Does not align with best practice and is not seen in case studies or consents.
Combination of monitoring approaches	• Aligns with best practice and takes a risk-based approach depending on volume discharged. • Targeted monitoring may mean more affordable options for communities.

Approach	Commentary
Live reporting of results	• Very different to current approach and requires reporting infrastructure to be set up. • Only suitable if continuous monitoring is occurring.
Monthly reporting	• Increases transparency of wastewater quality. • Increase the burden on smaller WWTP operators. • Likely better aligned with community and iwi/hapū expectations.
Yearly reporting	• Aligns with other reporting requirements from Taumata Arowai (NEP measures). • Aligns with international best practice, and case studies and consents assessed.
Two-yearly reporting	• May be insufficient to increase transparency. • Aligns with international best practice, and case studies and consents assessed.
Seasonally-based reporting (more frequent during summer)	• Increases transparency of wastewater quality. • Likely better aligned with community and iwi/hapū expectations. • May be more difficult to enforce than other approaches.
Combination of different reporting	• Does not drive consistency or align with international best practice. • May be more complicated to enforce than other approaches.

Focus questions

- Do you support seasonally-based standards that are more stringent when public contact with the discharge environment increases? How practical would this be to implement?
- Are you aware of examples of mātauranga based monitoring and reporting requirements?
- Should monitoring and reporting requirements vary depending on the size and scale of the wastewater treatment plant, or other factors?
- We are interested in a discussion about how monitoring requirements are articulated in standards, so they are applied unambiguously and consistently as part of a consent.

Karakia whakakapi

Unuhia, unuhia
Unuhia ki te uru, tapu nui
Kia wātea, kia māmā
Te ngākau, te tinanga
Te wairua I te ara tangata
Tīhei Mauri Ora

Draw on, draw on
Draw on the supreme sacredness
To clear, to free the heart
The body, and the spirit of people
Sneeze, the breath of life!