BEFORE THE PROPOSED NATURAL RESOURCES PLAN HEARINGS PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of stormwater
AND

IN THE MATTER of Right of Reply evidence to matters raised during Hearing Stream 4

STATEMENT OF RIGHT OF REPLY EVIDENCE OF CLAIRE CONWELL ON BEHALF OF WELLINGTON REGIONAL COUNCIL

TECHNICAL – IN REGARDS TO:

1. **Stormwater from state highways (Rule R52)**
2. **Indicative costs for the proposed monitoring framework set out for Wairarapa Territorial Authorities (Rule R50).**

4 May 2018

TABLE OF CONTENTS

1. INTRODUCTION 3
2. CODE OF CONDUCT 3
3. RESPONSE TO NZTA TECHNICAL EVIDENCE 3
4. SHOULD THE STATE HIGHWAY NETWORK BE TREATED IN THE SAME MANNER AS PORTS AND AIRPORTS? 4
5. STORMWATER AND GWRC'S SOE REPORTING 5
6. DISSOLVED AND SEDIMENT-BOUND CONTAMINANTS 7
7. DATA PRESENTED IN MY ORIGINAL TECHNICAL EVIDENCE 8
8. FINDINGS OF NZTA'S MCI STUDY REQUESTED BY THE PANEL 8
9. INDICATIVE COSTS FOR WAIRARAPA TERRITORIAL AUTHORITY NETWORK MONITORING 11
10. REFERENCES 13
11. APPENDICES 14

1. INTRODUCTION

1.1 My name is Claire Elaine Conwell. I work for Council as a Senior Environmental Scientist (Coast) in the Environmental Science Department. My qualifications and experience are set out in my primary technical evidence.

1.2 My Right of Reply evidence relates to the approach taken by Council on the following specific matters:

(a) NZTA technical evidence presented 23 February 2018;

(b) Indicative costs for the proposed monitoring framework set out for Wairarapa Territorial Authorities for Rule R51.

2. CODE OF CONDUCT

2.1 I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note and that I agree to comply with the code. My evidence in this statement is within my area of expertise. I have not omitted to consider material facts known to me that might alter to detract from the opinions which I express.

3. ~~SCOPE~~RESPONSE TO NZTA TECHNICAL EVIDENCE

3.1 This Right of Reply evidence responds to points made in the written evidence and oral presentation of Dr John McConchie for NZTA in relation to stormwater discharges from state highways and in response to my primary statement of evidence. I continue to stand by the content of both my written evidence and oral presentation.

3.2 The premise of the evidence put forward by NZTA is based on the assertion that the assimilative capacity of the aquatic receiving environment is high and combined with the linear construct of the SH network this means that any contaminants are diluted and dispersed, thus reducing risk accordingly. This approach is equivalent to the 6 word mantra: 'The solution to pollution is dilution'.

3.3 Local as well as central body governments across New Zealand, as directed by legislation and national policy implementation, are now working to manage effects on receiving environments in more integrated, sophisticated and meaningful ways. This includes, but is

not restricted to, managing adverse effects that are chronic, sub-lethal and cumulative over long periods of time. It is therefore appropriate that management frameworks are flexible to account for differences in the scale and risk associated with a range of activities in a particular sub-catchment, and to account for activities that warrant a global consenting approach if an activity spans multiple sites across multiple sub-catchments. It is also appropriate that such frameworks can accommodate the principles of adaptive management and thus can respond appropriately as knowledge, understanding of risk, and application of new technologies also change over the duration or lifespan of a long-term consent. It is my understanding that this is the intent of the proposed large site rule R52 for managing stormwater discharges. The focus for this discussion is the management approach for the effects of long term discharge of contaminants derived from the state highway network that represent chronic, long term, sub-lethal and cumulative discharges.

4. SHOULD THE STATE HIGHWAY NETWORK BE TREATED IN THE SAME MANNER AS PORTS AND AIRPORTS?

4.1 The management framework is flexible and adaptive to be able to accommodate the activity specific requirements under a global consent structure. This has been the approach that GWRC has adopted throughout the process for stormwater related consents (i.e. large sites under Rule R52 as well as TAs under Rule 51 and Schedule N).

4.2 As an example of this approach, I cite specifically a consent NZTA holds for the application of the de-icing agent calcium magnesium acetate (CMA) under the global consent WGN130144[32925]. This used a flexible, adaptive, risk–based approach, that steered clear of the ‘monitoring for the sake of monitoring’ stance that was a concern for NZTA, but never an intention of GWRC. This resulted in a consent that was robust yet flexible, and that accommodated the intent and activities of both agencies.

4.3 The stance GWRC has adopted in the assessment of the large sites requiring a separate management framework, compared with individual properties that are occupied for residential purposes, is

that these sites support activities at a very different scale and inherent risk, compared with the permitted activity status of an individual property occupied for residential purposes. This point of difference has not been explicitly noted by NZTA in their evidence.

5. STORMWATER AND GWRC'S SOE REPORTING

5.1 Dr McConchie states '*that if it was a significant problem then [stormwater contaminants from State Highways] would be a component of SoE reports*.'

5.2 GWRC carries out mandated monitoring requirements as set out under Section 35 of the Resource Management Act (1991). Monitoring under this section is commonly termed 'State of the Environment' monitoring. The purpose of the Rivers and Streams monitoring network for the Wellington region is to meet monitoring obligations as set out in S35 to be able to report data to standards set out for describing environmental state and determining trend detection, and to be done to consistent national reporting standards.

5.3 The overall objective of GWRCs Rivers Water Quality and Ecology (RWQE) monitoring programme is '*to provide robust information on state and trends in river and stream condition across the Wellington region*'. The monitoring network (i.e. long-term sites) was established to represent the major land uses and human activities, as well as to represent the natural diversity of rivers and streams across the Wellington Region. Thus it is broad-scale catchment based monitoring that describes the physico-chemical properties of water as well as in-stream ecological assessments (invertebrates and periphyton). Indicator microbial pathogens are also monitored. For a subset of sites in the urban region, water quality monitoring also includes metals, such as dissolved copper and zinc (monitored for ~10 years at select sites). More recently (since mid-2015), total metals have also been monitored. Monitoring and analyses for metals at these urban SoE sites can only be related to the broader scale sub-catchment assessments, not site specific point source discharge effects assessment. Site specific point source discharge assessments require a very different monitoring framework design at a smaller, localised activity-specific scale. It is therefore outside the scope of SoE monitoring to undertake such monitoring, and

physically not possible to represent catchment based sites for a single activity assessment.

5.4 One of the objectives of the RWQE programme monitoring is '*to provide information to assist in targeted investigations where remediation or mitigation of poor water quality or ecosystem health is desired*'. Similarly with the spatial scale of SoE monitoring network, these are generally at a wider spatial scale, such as sub-catchment with mixed land use, than wold be accommodated under a specific activity-based assessment of effects. For the 2016/17 period this included the following:

- Inaga spawning habitat assessment,
- Urban stream biodiversity monitoring programme scoping and implementation.

5.5 Previously investigations have also included a variety of sub-catchment based stormwater investigations aimed at assessing the receiving environment in mixed land use urban catchment settings. Examples include:

- Milne J and Watts L. 2008. *Stormwater contaminants in urban streams in the Wellington region*. Greater Wellington Regional Council, Publication No. GW/EMI-T-08/82, Wellington.
- Milne J and Morar S. 2017. *Stream and stormwater-related investigations in Te Awarua-o-Porirua Harbour catchment: Results of water quality monitoring carried out between July 2011and June 2014*. GWRC Unpublished report April 2017.

5.6 Thus targeted investigations conducted by GWRC under the SoE programme respond to a variety of catchment issues, often stemming from the high degree of mixed land use pressures, and encompass a wider range of ecological indices beyond MCI assessments. It is the purpose of the pNRP policies and rules to set out the requirements by which to manage activity specific effects, including the discharge of stormwater (from large sites and the TA managed network).

5.7 Thus the argument proposed by Dr McConchie that if GWRC identified a significant problem then it would respond by incorporating monitoring into SoE schedules is incorrect and incongruous with the purpose of State of the Environment reporting undertaken across the country under Section 35 of the RMA. The appropriate avenue for GWRC to respond to this issue of managing stormwater is via the shift in policy direction and hence rules to support these.

6. DISSOLVED AND SEDIMENT-BOUND CONTAMINANTS

6.1 Dr McConchie's stated in his evidence that, with respect to any potential environmental effects, the bioavailability of the dissolved fraction of a metal is critical, not the total concentration.

6.2 This is incorrect. Whilst the ANZECC (2000) guidelines default water quality trigger levels are based on the dissolved fraction of the contaminant in the water column, as set out in my evidence, for an assessment of the effects of stormwater on the catchment receiving environment, the total contribution and that associated with sediment are also important. I note that Dr McConchie has not referred to the importance or contribution of total contaminant loads in his evidence, which in my opinion is a significant oversight.

6.3 During his oral presentation, Dr McConchie referred to the relationship between sediment and dissolved contaminants and implied that sediment-bound contaminants were not of concern. He inferred that fine sediment could, in fact, be beneficial to the receiving environment as it mitigates the potential toxicity of dissolved metals in the water column.

6.4 The presence of sediment-bound stormwater-derived contaminants are well documented in near shore urban coastal areas across New Zealand, including Porirua Harbour and Wellington Harbour. Analysis of benthic sediments is routinely applied for assessment of catchment effects and relationship to land use types, and in New Zealand we apply recognised risk-based sediment quality guidelines (e.g. ANZECC (2000), ARC (2004) to assess potential effects of sediment-bound metals on the receiving environment.

6.5 For the assessment of catchment loads, and ultimately the

contribution to the receiving environment, understanding the relationships between the differing states of a contaminant (as labile, bound to dissolved organic matter, sediment bound in the water column, or sediment bound in receiving depositional zones) is required. Reducing any discussion of effects of stormwater to just the dissolved fraction in the water column is simplistic and understates the complexity of this topic.

6.6 Sediment is also recognised as a contaminant in itself, particularly in our estuarine environments (Porirua Harbour is the largest estuarine system in the lower North Island and is particularly susceptible to the effects of sedimentation). It is my understanding that the Ministry for the Environment is currently discussing the inclusion of a NOF sediment attribute under the NPS-FM (Evan Harrison, pers. comm), and sedimentation is also subject to draft ANZECC guideline development (discussed during the Coastal Special Interest Group meeting, Wellington 10 April 2018).

7. DATA PRESENTED IN MY ORIGINAL TECHNICAL EVIDENCE

7.1 Dr McConchie asserted that I 're-analysed these data with different assumptions to reduce the load from low density residential properties'. I refute this assertion and stand by the data presented in both my written evidence an oral presentation.

7.2 Dr McConchie contends that the information set out in Table 3 of my written evidence is concentrations based, not effects based. I do not agree. Alongside the concentration data sourced from the NIWA URQIS database, I present the corresponding ANZECC (2000 and draft 2016) water quality guideline trigger levels for dissolved copper and dissolved zinc. These guidelines are risk-based. The revised guidelines, as drafted in 2016, will most likely be finalised later this year, and incorporate the most up to date species sensitivity calculations that underpin the risk based trigger values.

8. FINDINGS OF NZTA'S MCI STUDY REQUESTED BY THE PANEL

8.1 The hearing panel requested a NZTA commissioned report that was mentioned by NZTA during the hearing. This brief discussion refers to the following report:

- Shaver E, Suren A. 2011. *Assessing impacts of state highway stormwater runoff on stream invertebrate communities*. NZTA report October 2011.

http://www.nzta.govt.nz/assets/resources/stormwater-management/docs/impacts-of-stormwater-runoff-on-stream-invertebrate.pdf

Supplementary information sheet:

- NZTA. 2012. State highway stormwater sensitivity project information sheet. NZTA website publication

http://www.nzta.govt.nz/assets/resources/stormwater-management/docs/mci-information-sheet.pdf

8.2 The objective of the study was 'to assess whether the macroinvertebrate community index (MCI) could be used to assess the long-term impacts of stormwater run-off from the state highway network on water quality in New Zealand streams.

8.3 Overall the study concluded there was no difference between upstream and downstream MCI scores, and concluded that stormwater discharges form the SH network did not have an adverse ecological effect.

8.4 I requested additional advice from the freshwater experts of GWRC's Marine and Freshwater Team (Drs Evan Harrison and Mark Heath) regarding the field methods, analytical methods and results presented in this report. Overall they were in agreement that the methods and results presented were sound and supported the conclusion that there was no difference between the upstream and downstream condition of the macroinvertebrate communities. For the one site that showed a difference in MCI scores, this was attributed to the presence of a sheep track immediately upstream of the stormwater discharge monitoring point.

8.5 It is also noted that this study, whilst technically sound for the specified field campaign in December 2010, represents a once-off field campaign event, thus a snap shot in time. It does not extend to a temporal analysis of whether these same findings persist over

time (Dr Harrison, pers. comm). Therefore, whilst there was agreement that the methods and approach to applying the MCI and QMCI was technically sound, the paper doesn't address the original hypothesis to determine whether macroinvertebrate communities can be used assess long term impacts of stormwater run-off from the state highway network; this question of temporal suitability was not addressed in the field monitoring design.

8.6 The authors also stated that an absence of a stronger result was 'surprising', citing a range of New Zealand literature reviews that have documented stormwater runoff from roads. For this study, the authors attributed the notable absence of stronger results to the presence of roadside mitigations such as vegetated strips and swales.

8.7 The authors also calculated theoretical risks for the study sites – and found very little correlation between the results of stream invertebrate monitoring and the calculated risk scores. This discrepancy remains to be resolved.

9. INDICATIVE COSTS FOR WAIRARAPA TERRITORIAL AUTHORITY NETWORK MONITORING

9.1 Cost estimates for stormwater monitoring are set out in Appendix 1, and are based on recent analytical laboratory costs charged to GWRC for a range of analytical parameters (sediments, microbiological pathogen indicators, surface water parameters for stormwater monitoring). For the purpose of this evidence these costs should be regarded as high-level indicators only, i.e. to demonstrate that stormwater monitoring does not need to be done at every discharge point, and can be scaled and tiered in accordance with an adaptive management framework. Thus the approach taken here is not 'monitoring for the sake of monitoring', and can be tailored to be cost effective and affordable.

9.2 For totalling costs, I estimated a number of sites to be monitored based on my local knowledge of the urban areas and potential locations. Final site selection and number of monitoring points would require a more comprehensive desktop assessment that takes into account the local area land use (i.e. include reference and impact sites), discharge points and receiving environments.

9.3 Sites should be selected to represent a range of land use types in the urban zone – i.e. from residential to commercial/industrial areas. Selecting representative sites is an important step, as it needs to be inclusive of potential land use contributions to the stormwater network. This avoids the requirement to monitor at every identified stormwater outlet discharging to the receiving environment, and is consistent with the approach adopted by both Kapiti Coast District Council and Wellington Water Ltd.

9.4 For a sediment based monitoring framework, sediment costs are estimated on the basis of one sample event per year. In my previous experience, if sediment contaminant concentrations remain unchanged (i.e. stable between consecutive years), then monitoring frequency is reduced (e.g. it is currently at five-yearly intervals at harbour and estuary SoE sites).

9.5 For a surface water sampling framework, costs are estimated on the basis of four low-flow/baseline sample times (i.e. quarterly baseflow

sampling) as well as four rainfall event based sampling events per year. Surface water sampling to monitor for the purpose of pathogen concentrations requires more frequent sampling than once-yearly monitoring that can be done for sediment sampling. This is to account for the inherent variability in pathogen loads that respond under different weather conditions that can't be accounted for from a single annual grab sample. This will be used to assess if there are any potential acute human health effects associated with stormwater (e.g. wastewater entering stormwater) , as opposed to long term cumulative effect that may be assessed via the sediment monitoring framework.

9.6 On the basis of the above an indicative cost for monitoring a selection of sites for sediment and surface water quality across the main Wairarapa towns is estimated to be $34000 per year. As mentioned above, it is important to note that costs for sediment monitoring may be reduced to a low frequency (e.g. five yearly) over a long term consent, and surface water sampling can be tailored to target any land-use changes under an adaptive management framework approach.

10. REFERENCES

Australian and New Zealand Environment Conservation Council. 2000. Australian and New Zealand guidelines for fresh and marine water quality, Volume 1, the guidelines. Agriculture and Resource Management Councils of Australia and New Zealand, Canberra.

Australian and New Zealand Environment Conservation Council. 2016. Australian and New Zealand guidelines for fresh and marine water quality, Default guideline values for toxicants [Zinc] and [Copper]-Freshwater. September 2016.

Auckland Regional Council. 2004. Blueprint for monitoring urban receiving environments. Auckland Regional Council Technical Publication No. 168 (revised), Auckland.

11. APPENDICES

Appendix 1: Indicative sampling and reporting costs for the Wairarapa stormwater monitoring framework

Table 1 Indicative costs per sample for sediment, pathogen and surface water sample analysis

Analysis	Cost per sample
Sediment	$250
Particle size, organic content, Metals, PAHs	
Pathogen indicators	$40
Faecal coliforms, E. coli	
Surface water quality	$80
Total and dissolved metals, nutrients	

Table 2 Indicative costs per Wairarapa township for sediment based sampling only

Location	No. sites	Approx. cost per township
Masterton	10	$2500
Carterton	6	$1500
Greytown	6	$1500
Featherston	6	$1500
Sediment TOTAL		**$7,000**

Table 3 Indicative costs per Wairarapa township for water pathogen and surface water based sampling only

Location	No. sites*	No. per year**	Pathogen costs per year	Surface water cost per year
Masterton	10	8	$3200	6400
Carterton	6	8	$1920	3840
Greytown	6	8	$1920	3840
Featherston	6	8	$1920	3840
Surface water TOTAL			**$8,960**	**$17,920**

*Number of sites is an estimate only and would need to be confirmed via a comprehensive desktop assessment
**Number of samples per year is based on quarterly grab samples at baseflow and four rain events per year

Table 4 Indicative annual costs for sediment, pathogen and surface water sampling

Full suite (sediment, pathogen, surface water)	
Laboratory costs	$33,880.00
Data Management & reporting*	10000
Annual TOTAL	**$43,880.00**
Sediment & pathogens only	
Laboratory costs	$15,960.00
Data Management & reporting*	10000
Annual TOTAL	**$25,960.00**

*Estimated costs for ongoing data management and annual reporting. Note these costs do not include staff time for field sampling and processing.