

TECHNICAL EXPERT WITNESS CONFERENCING

Proposed Natural Resources Plan

Topic: Community Drinking Water Supplies

Date: 18 June 2018

Venue: Wellington Water Ltd Petone Office, 1-3pm

Witnesses Present:

Name	For
Geoff Williams	Wellington Water Ltd (WWL)
Aslan Perwick (by phone 1-2pm)	On behalf of Wellington Water Ltd (WWL)
Mike Thompson	Greater Wellington Regional Council (GWRC)
Mike Toews	On behalf of Greater Wellington Regional Council (GWRC)

Note taking: Mike Thompson

Environment Court practice note:

It is confirmed that all present:

- Have read the Environment Court Practice Note 2014 Code of Conduct and agreed to abide by it

And in particular

- Have read the Environment Court Practice Note 2014 Code of Conduct Appendix 3 – Protocols for Expert Witness Conferencing and agreed to abide by it

Joint Conferencing Statement

Scope

- The scope of conferencing is limited to consideration of the following relief sought by WWL in their submission:
 1. *To extend the Groundwater Supply Protection Area to include all the valley floor to the foreshore of Wellington Harbour.*
 2. *To extend the Lower Hutt Groundwater Protection Zone to cover the Hutt catchment upstream of the infiltration zone;*
- Agreement that the outcomes of the conferencing ought not be applied or extrapolated to any other community drinking water supply catchments in the region. The submission points are unique to the Hutt catchment and the nature/mechanism of the groundwater abstraction from the Waiwhetu aquifer.

Extension of the Groundwater Protection area towards the Petone foreshore

Versions of protection areas

- The protection area notified in the PNRP is shown as the horizontal black hashed area in Figure 1. This is based on a modelled five year particle travel time from the land surface to the community supply bores.
- In the Section 42A report an extension to the notified protection area was proposed (pages 55-57) on the basis of more recently available geological data. This revised area is delineated by the green line in Figure 1.
- The modelled ‘full capture zone’ (shown in Figure 1 as the area encompassed by the pink line) is larger again than the notified PNRP and Section 42A versions. The full capture zone represents the maximum extent of the surface land area from which a contaminant pathway from any depth to the supply bores is predicted by the GWRC modelling to exist¹. The area covers most, but not all, of the valley floor. The main areas of exclusion are the margins of the valley floor to the west and east of the Petone shoreline.
- WWL seek an extension to the protection area beyond that proposed in the Section 42A report or shown by the full capture zone such that it covers the entire Lower Hutt valley floor (shown in yellow in Figure 1).

Arguments for extension

- WWL’s argument for this extension relates to technical uncertainty in the modelling and aquifer conceptualisation, primarily to do with:

¹ This boundary also includes the ‘deep CZ’ from other pumping wells in the Hutt Valley, shown in Figure 10 of Toews & Donath (2015)

- The whereabouts and nature of preferential flow/contaminant pathways in the aquifer (which may result in underestimates of modelled pathlines), and
 - The extent to which vertical hydraulic gradient reversal occurs under heavy pumping to allow groundwater to flow downwards to the Waiwhetu aquifer.
- Given this uncertainty, WWL's view is that extension of the protection area to cover the entire valley floor would help mitigate a real risk associated with pathogens as well as other forms of contamination with potentially greater persistence in the hydrological system.
 - WWL are also mindful in reaching their position that operational shifts in the 'centre of pumping' under the present abstraction consent and borefield configuration, as well as possible future well field configuration (including bore locations) is likely to change and therefore designating the entire valley floor is akin to future proofing the protection area for WWL and other resource users.
 - GWRC consider that modelling uncertainties are already adequately accounted for within the full capture zone boundary.
 - However, all parties agree that some doubt remains about (a) the numerous existing and historic bores that penetrate the aquitard that may create preferential flow pathways to the confined Waiwhetu aquifer, and (b) reversal of vertical hydraulic gradient from high pumping rates that may allow groundwater to flow downwards.
 - GWRC has reconsidered the scientific basis for including or excluding the outer margins of the valley floor to the protection area for the existing Schedule M2 wells. GWRC accepts that discharges to land in these areas may eventually flow to the Schedule M2 wells although the probability of this happening is considered to be lower than for other areas mapped by the groundwater modelling. The reason this probability cannot be confidently quantified from a groundwater flow hydraulics perspective is primarily that it is unknown how far the drawdown cones extend from the pump wells. Drawdown cones in confined aquifers may potentially extend laterally several kilometres from the pump well, particularly with fine-grained materials (e.g. fine sand). Furthermore, the HAM3 model used to simulate and map the full capture zone in Figure 1 has a coarse horizontal grid (around 100 m), which is not ideal to adequately represent the shape and extent of drawdown cones extending from each pump well.
 - The exact nature of the groundwater flow hydraulics relating to the outer margins of the valley floor is unclear without further work, and the extents cannot be mapped any further given the existing numerical models.

Agreement reached

- Agreement that, in the absence of more concrete data about the potential role of the valley floor margins, there is technical justification for taking a more cautious interpretation of the protection area boundary (as opposed to full reliance on the modelled results).
- There is agreement that the protection area should be extended to cover the entire Lower Hutt valley floor. For the purposes of this joint statement, that area can be considered to equate to the yellow area in Figure 1. However, it is noted that a finer scale verification of the boundary using a suitable digital terrain layer would be worthwhile (only very minor boundary refinements from the area in Figure 1 are expected).

Extension of the Groundwater Protection area upstream of the infiltration zone

Conceptual understanding of risk from the wider catchment

- Agreement that this conferencing point relates to risks posed by chemicals which are persistent in the environment and have known adverse health impacts on humans.
- WWL presented Figure 2 showing the areas in the Hutt River catchment referred to in their submission. Of particular concern to WWL with respect to mitigating contamination risk are the 'Unprotected Catchment' areas.
- The potential benefit of extending the groundwater protection area into the wider upstream catchment does not relate to reducing pathogenic risks; there is sufficient attenuation capacity in the Waiwhetu aquifer down-gradient of the infiltration zone for this.
- Agreement that, conceptually, a persistent chemical contaminant discharged to land in the furthest reaches of the Hutt River surface water catchment could migrate to the infiltration zone, and from there to the Waiwhetu groundwater supply points.
- Agreement that the ready exchange of shallow groundwater on the Upper Hutt valley floor with surface water systems creates a potential for contaminant movement from land into the Hutt River and from there into the Lower Hutt Aquifer system². However the specific nature of such pathways is not known.
- Agreement that the presence of BPAs (an industrial chemical used in plastics manufacture) in the Hutt Aquifer system indicates that the risk of persistent contaminant travel to the supply points is real rather than theoretical. However it is also acknowledged that there is no evidence as to origin (i.e. whether from the surrounding Lower Hutt area or upstream of the infiltration zone or both).

² This refers to system of aquifers that carry groundwater through Lower Hutt and into the Wellington harbour (and includes the shallow unconfined Taita alluvium as well as the deeper more confined Waiwhetu aquifer)

- Agreement that the landscape upstream of the infiltration point poses a relatively unique risk profile in that it is heavily urbanised on the Upper Hutt valley floor with rural/lifestyle land use beyond that.

Arguments for extending the Lower Hutt groundwater protection zone upstream

- Two options for extending the protection of the groundwater community supply were considered:
 1. Increasing the spatial coverage (and rules pertaining to it) of the existing groundwater protection area;
 2. Introducing a new rule and associated spatial coverage to the PNRP that specifically targets contaminants, activities and risks of concern to WWL in the wider catchment.
- The first option is definitely within scope of the relief sought by the WWL submission. The second was raised in the conferencing by WWL has been assumed to be within scope for the present exercise, however this is subject to confirmation.
- Agreement that, in principle, the second option would be preferable to the first from a technical point of view because it would actually address specific concerns and only exert control over activities of agreed risk. Whereas simply extending the spatial coverage of the existing set of PNRP rules relating to drinking water supply catchments would probably unnecessarily capture some activities and miss others.
- However, no agreement could be reached on whether either option is technically justifiable in this case.
- Parties agree that there is insufficient information beyond the conceptual and theoretical characterisation of risk to meaningfully consider the merits of extending the groundwater protection area. In particular it is unclear:
 - What specific activities are of most concern (i.e. with potential to discharge persistent harmful chemicals in quantities of concern);
 - Whether these activities fall under some sort of regulatory control irrespective of whether they occur in a drinking water protection area, and therefore,
 - What the likely residual risk to a drinking water supply of such activities is.
- This characterisation of the residual risk needs to be a precursor to any technical assessment of whether a greater level of drinking water supply protection is justifiable.
- Furthermore, in this case it seems that technical and planning aspects of the submission are inextricably linked and conferencing one in isolation of the other is problematic.

Joint conferencing recommended

- More specificity around some of the questions above can likely be achieved in the overall timeframes of conferencing but there is agreement that a joint technical/planning conference would offer the best chance of progress in this respect.
- It is suggested that population of the table in Appendix 1, jointly by WWL and GWRC technical and planning experts, could be a useful way to support and inform a joint conferencing session.

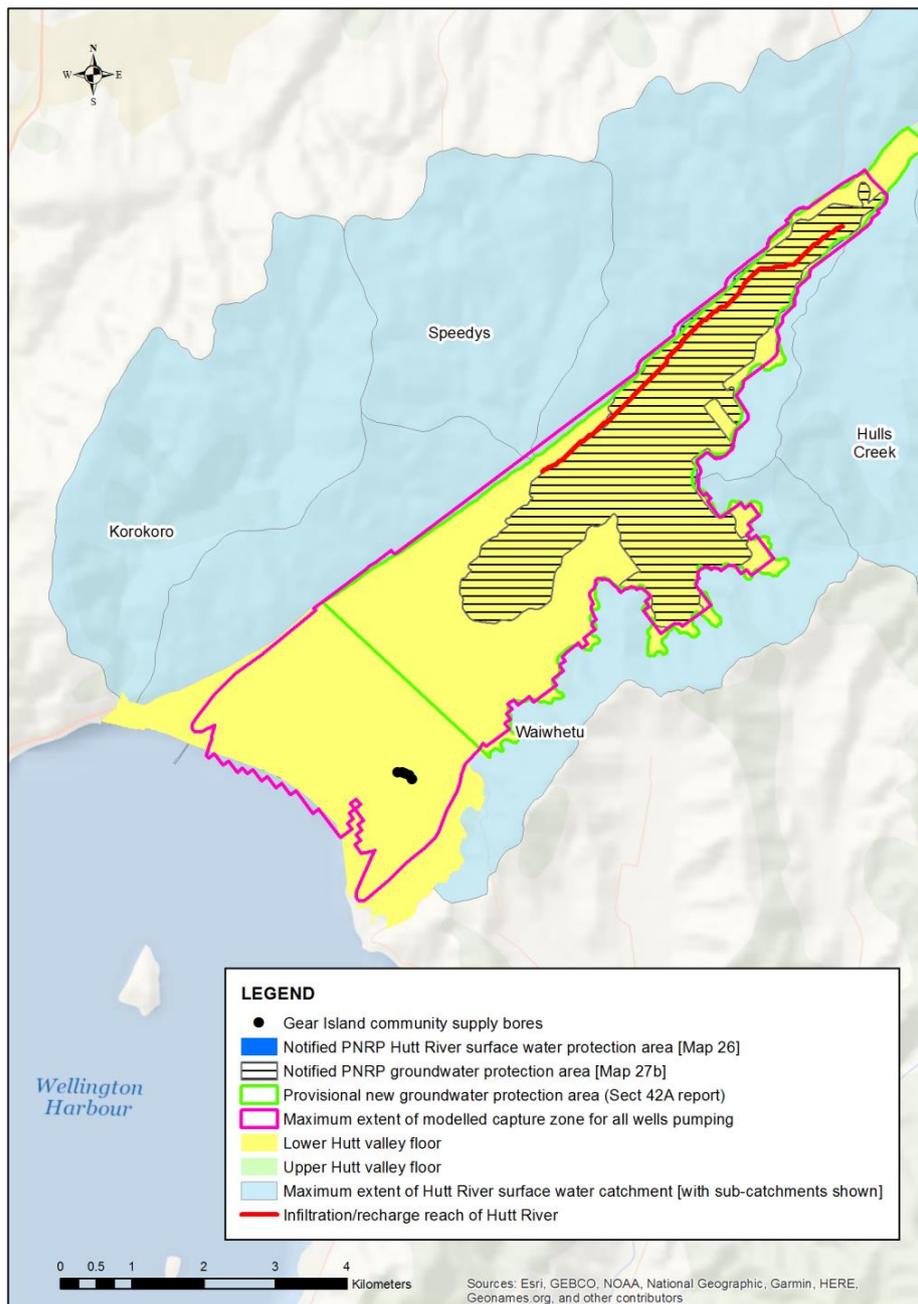


Figure 1. Map of the Lower Hutt area showing the notified PNRP groundwater protection area (black hashed), a subsequent revised proposal from the Section 42A report (green boundary) and versions referred to in this conferencing statement; the yellow area is the ‘Lower Hutt valley floor’ and the slightly smaller area defined by the pink line represents the maximum extent of the modelled capture zone for with all known wells pumping.

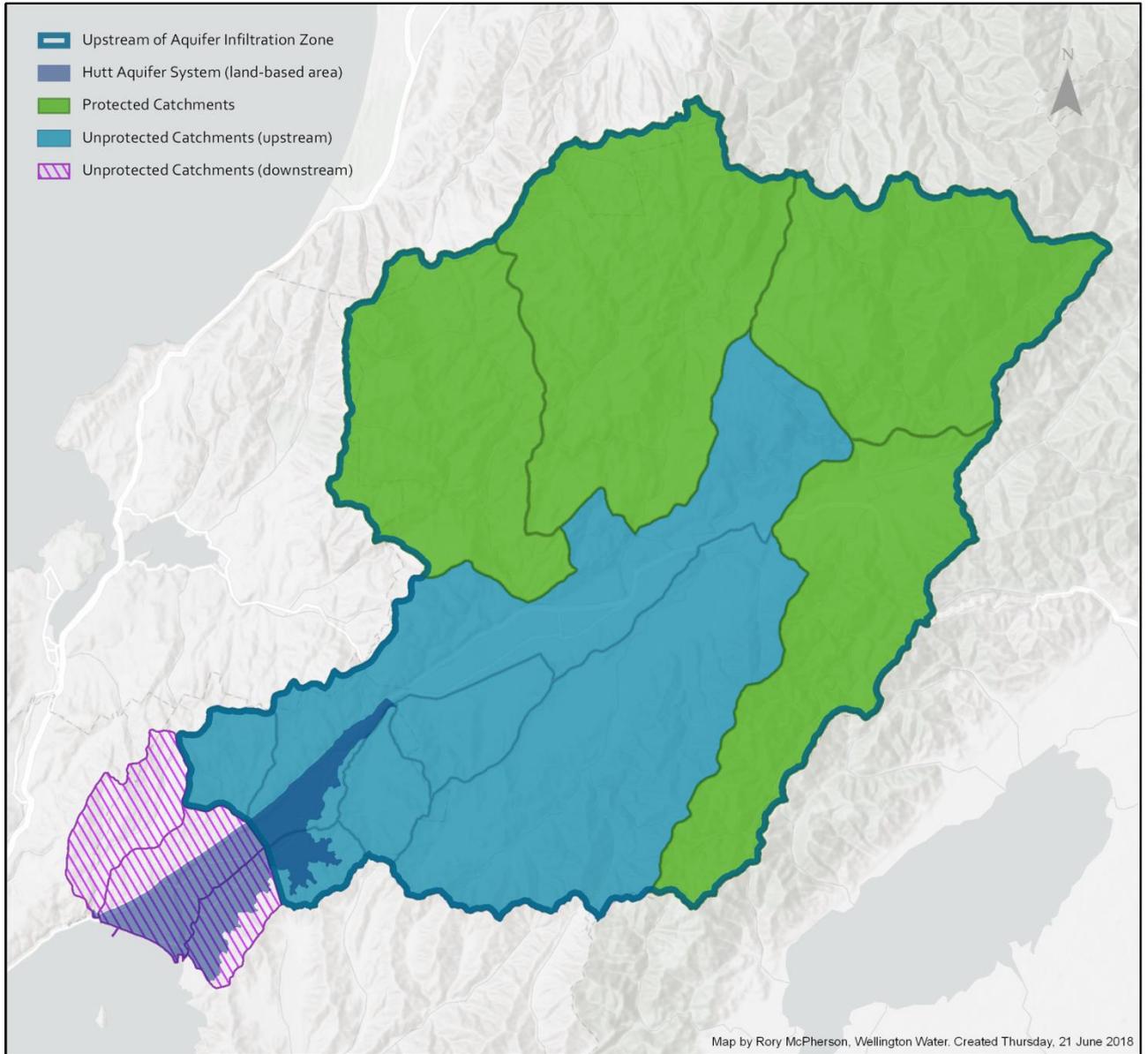


Figure 2. Map of the Hutt Catchment showing areas referred to in the Wellington Water submission and highlighting areas upstream of the aquifer recharge (infiltration) zone that are owned by GWRC and managed as existing or future water collection areas (labelled as “Protected Catchments”).

Signed

Name	Date	Signature
Geoff Williams	22 June 2018	
Aslan Perwick	22 June 2018	
Mike Thompson	22 June 2018	
Mike Toews	22 June 2018	

Appendix 1.

Information to support a joint technical/planning conference

Type/group of contaminant	Typical activities in which a significant discharge of this contaminant might be expected	Would activity already be subject to resource consent (or other form of extra control) via the PNRP?	What is the residual risk?