

ANNUAL VOLUMES AND SCHEDULE WQN9

WHAT THIS DOCUMENT PROVIDES:

1. A general introduction to Schedule WQN9v3 and annual volumes on resource consents
2. Information regarding policies and rules relevant to annual volume requirements
3. Guidance notes on how to calculate annual volumes under Schedule WQN9v3
4. Frequently asked questions (and answers) about annual volumes and Schedule WQN9v3
5. Examples of the application of relevant policies
6. Consent reviews
7. Glossary of relevant terms

WHAT THIS DOCUMENT DOES NOT PROVIDE:

1. The document is not a technical review of the Schedule WQN9v3 tool nor is it a comparison against other annual volume methodologies.

SECTION ONE:

INTRODUCTION

Schedule WQN9 of Environment Canterbury's PNRRP contains standards for peak and seasonal irrigation demand. The standards contained in Schedule WQN9 of the proposed Natural Resources Regional Plan (pNRRP) were based on an analysis of water use data. Since the notification of the pNRRP, concerns have been raised about the validity of the seasonal demand standards therein. As a result, additional monitoring has been undertaken and the seasonal demands reassessed to take into account the spatial variability of rainfall and the significance of the particular monitoring period in different parts of the region.



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Environment Canterbury's **Schedule WQN9 Revision Report U05/15** describes the results of the re-analysis and provides estimates of the total seasonal irrigation demand exceeded in only 20% of years and a description of the effective irrigation season rainfall exceeded 80% of the time.

The Schedule WQN9 revision provides estimates of total seasonal demand for both intensive pasture and arable land use. The total seasonal demand is the summation of effective rainfall, effective irrigation and the change in soil moisture adjusted to represent an irrigation season (nominally 1 October to 30 April) and the demand for the "year" exceeded 20% of the time. To obtain seasonal irrigation demand (allocation), effective irrigation season rainfall for the location is subtracted from the Total Seasonal Demand.

For further information refer to Report U05/15 – Schedule WQN9 Revision – Review of seasonal use approach included in Proposed NRRP.

SECTION TWO:

POLICY

The efficient use and allocation of water are requirements of regional planning documents. The relevant policies are outlined in the section below:

Regional Policy Statement (RPS)

Chapter 9 of the RPS deals with issues of competing demands for water, water quality and water quantity.

Policy 3

Policy 3 states:

"Promote efficiency in the use of water."

Efficient use of water enables existing and future needs to be more readily met.

Policy 6

Policy 6 states:



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“In considering a permit to take water, a consent authority should as part of the requirements of section 104 of the RM Act, consider the need to:

- (a) Specify maximum permitted water usage over specific time periods as well as maximum abstraction rates;*
- (b) Be based on actually and reasonable water needs ...”*

Policy 6 seeks to address issues relating to existing water allocations and reasonable water requirements.

Supporting comments in the RPS refer to efficiency involving both a technical evaluation and evaluation of allocative efficiency.

Proposed Natural Regional Resources Plan (PNRRP)

Chapter 5 of the PNRRP deals with water quantity.

Objective WQN4 Allocation of the available water resource

Policy WQN14 Allocation regimes for surface and groundwater

Objective WQN5 Efficient use of water

Objective WQN5 seeks to achieve a high level of efficiency in terms of resource availability and the use of water.

Policy WQN17 Reasonable and efficient use of water

Policy WQN17 of the PNRRP notes that the rates and volumes of abstraction shall be no more than reasonable for their intended use. Policy WQN17(3)(a) identifies Schedule WQN9 of the PNRRP as determining what is reasonable. Schedule WQN9 is based on actual soil moisture monitoring in Canterbury and is considered the best available information from which to determine actual water requirements to maintain soil moisture.

SECTION THREE:

CALCULATING ANNUAL VOLUMES

Environment Canterbury website contains a webpage that provides guidance on the calculation of annual volumes using WQN9v3. Please refer to:

<http://www.ecan.govt.nz/Resource+Consents/AnnualVolumeTool/>

SECTION FOUR:

FREQUENTLY ASKED QUESTIONS

What is an annual volume?

What is Schedule WQN9?

What are the inputs to the WQN9v3 model?

How are Schedule WQN9v3 volumes calculated?

What is system capacity?

What is the reduction factor and how is it calculated?

Has the Schedule WQN9v3 calculator been peer reviewed or field validated?

Are evapotranspiration rates included?

What should I do if I think the soil types on my property are not correct?

Is the rainfall calculated for the whole year?

Are all rainfall events included?

Where does the rainfall data come from and how accurate is it?

Does this method take into account effects of climate change?

How many days irrigating is WQN9 based on 150 or 212?

What if my system is not 80% efficient?

How will I know that this will be enough water for my property?

Shouldn't I get water five years out of five?

Why should annual volumes be tied to land area?

TYPES OF APPLICATIONS THAT REQUIRE ANNUAL VOLUMES:

Based on the policies addressed in Section One of this information sheet, all new applications for groundwater takes require annual volumes to be adopted as conditions of consent. Some surface water applications also require annual volumes. See below for further details.

In what situations will I need to have an Annual Volume on my consent?

Applications to transfer groundwater consents

- full site to site
- partial site to site
- limited duration

The Table below summarises the type of transfer, the assessment needs, outcome and associated procedures.

TYPE OF TRANSFER	DESCRIPTION	ASSESSMENT	OUTCOME	NOTE
Full transfer person to person (change of name)	A change of name can occur when consent holder has been married and has changed their name (need an email or written confirmation of this from the consent holder), or when a company has changed its name and kept all of the same directors. These transfers do NOT change site	Transfer of consent form No AEE - no change, permitted baseline applies	1 x version (e.g. CRC086296.1)	Administrative procedure
Full transfer person to person (complete change of ownership transfer)	This occurs when a party sells their property or for any other reason, wishes to transfer their Resource Consent to another party. These are processed here and with the input of the EPO's who will monitor the consent. These transfers do NOT change site.	Transfer of consent form No AEE - no change, permitted baseline applies	1 x version (e.g. CRC086296.1)	Administrative procedure

TYPE OF TRANSFER	DESCRIPTION	ASSESSMENT	OUTCOME	NOTE
Partial transfers to person(s) (split consent)	This gives the right of the consent to more than one party. This can also happen for a limited duration of time. These transfers do NOT change site.	Partial transfer of consent form No AEE - no change, permitted baseline applies (exception when taking from new bore - well-interference and stream depletion assessments required as well as associated mitigation)	1 x version (e.g. CRC086296.1) [retained part of consent] 1 X new record (e.g. CRC09792) [transferred part of consent]	Administrative procedure CIA split rates & consult; assess efficiency
Partial transfer site to site	Change site	Transfer site to site form AEE required Effects: Well-interference Inefficient use of water Stream depletion Increase in nitrate (water quality)	1 x version (e.g. CRC086296.1) [retained part of consent] 1 X new record (e.g. CRC09792) [transferred part of consent]	CIO split rates & volumes; assess well-interference at new site
Full transfer site to site	Change site	Transfer site to site form AEE required Effects: Well-interference Inefficient use of water Stream depletion Increase in nitrate (water quality)	1 x version (e.g. CRC086296.1)	CIO audit annual volume; assess well-interference at new site
Partial transfer site to site limited duration	Change site	Transfer site to site form AEE required Effects: Well-interference Inefficient use of water Stream depletion Increase in nitrate (water quality)	1 x version (e.g. CRC086296.1) Amendment to current consent	CIO split rates & volumes; assess well-interference at new site
Full transfer site to site limited duration	Change site	Transfer site to site form AEE required Effects: Well-interference Inefficient use of water Stream depletion Increase in nitrate (water quality)	1 x version (e.g. CRC086296.1) Amendment to current consent	Case-by-case approach for requiring annual volume (determine scope of consent); assess well-interference at new site
Transfers of application still in progress	A consent holder can apply to transfer their consent whilst the consent is still in progress. The two parties need to agree on a payment			See above "types of transfer"

TYPE OF TRANSFER	DESCRIPTION	ASSESSMENT	OUTCOME	NOTE
	option for any prior work or future work carried out on the consent.			
Transfer of consent under review	A consent holder can apply to transfer their consent whilst their consent is under review however they would have to agree to go through with the transfer even though the conditions change following the review.			See above "types of transfer"

Applications to change conditions of groundwater consents

Any change in conditions where there is the potential for more water to be taken. For example these include but are not limited to:

- changing area to be irrigated
- changing in land use or other use of water (e.g. adding storage, dairymshed, industrial)
- increased rate or volume of take
- changing the location of abstraction (e.g. shallow bore previously subject to a minimum flow and changing to a deeper bore with no minimum flow requirement)

Applications for surface water consents

Surface water applications that require annual volumes include:

- storage

Please note that an annual volume would be based on annual volume attributable to the original application, land use, irrigation area and system capacity.

SECTION FIVE:

EXAMPLES

Adverse Effect of Inefficient Take on Other Groundwater Users

EXAMPLE 1

Policy 3 of Chapter 9 of the RPS aims to:

"Promote efficiency in the use of water."

Supporting comments in the RPS refer to efficiency involving both a technical evaluation and evaluation of allocative efficiency.

Objective WQN5 and Policy WQN17 of the PNRRP give effect to the above Policy. Objective WQN5 seeks to:

"achieve a high level of efficiency in terms of resource availability and the use of water".

Policy WQN17 of the PNRRP notes that the rates and volumes of abstraction shall be no more than reasonable for their intended use. Policy WQN17(3)(a) identifies Schedule WQN9 of the PNRRP as determining what is reasonable. Schedule WQN9 is based on actual soil moisture monitoring in Canterbury and is considered the best available information from which to determine actual water requirements to maintain soil moisture.

The area over which irrigation is sought is 50 hectares of the 81 hectare property, and the farm is proposed to be operated as an intensive beef finishing unit.

The consultant advises that the farm will be irrigated on a 7 day return period, and that the application rate per return period of 20 millimetres is considered efficient as this is less than half of the 75 millimetre water holding capacity of the lightest soils on the property.



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The consultant has used the methodology set out in Revised Schedule WQN9 (WQN9v3) to calculate an annual volume of 287,886 cubic metres per annum.

Given the above the consultant considers that the proposed abstraction represents a technically and allocatively efficient use of water.

I agree that the return period volume sought equates to a gross application that can be considered technically efficient, and that the average daily application of 2.76 millimetres is less than typical peak daily average evapotranspiration rates in Canterbury, which can exceed 5.5 millimetres.

I therefore agree with the consultant that the proposed abstraction represents a technically efficient use of water.

I have audited the annual volume proposed by the consultant, and note that the system capacity of 2.76 millimetres per day is considered to be constrained compared with the design requirements annual volumes calculated using WQN9v3 assume are being met.

While I agree with the consultant that the seasonal irrigation demand of the 50 hectares over which irrigation is sought is 287,886 cubic metres per annum, I consider that regard must be had to the constrained ability of the proposed irrigation system (in terms of consent) to meet the seasonal demand.

I have considered the limited system capacity and have calculated reduction factors derived from location specific data held by environment Canterbury, which uses rainfall and evapotranspiration data from NIWA virtual climate sites, the consented system capacity of the irrigation system, and the average profile available water of the soils on the applicant's property.

I discussed the annual volume with the consultant and advised that while I agree with their calculation of the seasonal irrigation demand for the 50 hectares being 287,886 cubic metres per annum, the constrained system capacity reduces this to 238,929 cubic metres. I explained that while 287,886 cubic metres was considered an allocatively efficient use of water in terms of the demand for the property, it is not reasonable to allocate this to the proposed abstraction given that the applicant is unable to satisfy the full water requirements of the property during periods of peak demand. The difference in what can reasonably be taken and the seasonal irrigation demand should be available for other abstractive uses.



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The consultant has considered the annual volume recommended and amended their application to adopt an annual volume of 238,929 cubic metres per annum.

Given the amendment to the annual volume I agree that the proposed abstraction represents an allocatively efficient take, and that the adverse effects of an inefficient take on other groundwater users will be *de minimis*.

EXAMPLE 2

Policy WQN17 of Chapter 5 of the PNRRP notes that the rates and volumes of abstraction shall be no more than reasonable for their intended use. Schedule WQN9 of the PNRRP is a tool used to determine what is considered a reasonable amount of water to be taken and used considering these environmental conditions.

The applicant has adopted a seasonal volume based on the requirements for irrigating 57 hectares of crops and pasture, with an average plant available water (PAW) of 150 mm. Using Schedule WQN9 (version 3) of the PNRRP, the volume of water required is 291,000 cubic metres per year.

Given the information above, I consider that the use of water will be efficient and that the allocation is reasonable, therefore any adverse effects as a result of an inefficient take will be no more than minor.

SECTION SIX:

CONSENT REVIEWS

The Environment Canterbury website contains a webpage that provides guidance to consent reviews. Refer to: <http://www.ecan.govt.nz/Resource+Consents/RakaiaSelwynReview/>

SECTION SEVEN:



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GLOSSARY

The Environment Canterbury website contains a webpage that provides guidance to the relevant terms (see below). Refer to:

<http://www.ecan.govt.nz/Resource+Consents/RakaiaSelwynReview/Glossary.htm>

Return period

Effective irrigation season rainfall

Soil moisture-effective rainfall

Intensive pasture

Arable

System capacity

Seasonal irrigation demand standard

Total seasonal demand

PAW

FAW