

Resource Consent Application Form 5

To Take and Use Groundwater



Otago
Regional
Council

This application is made under Section 88 of the
Resource Management Act 1991

Phone: 0800 474 082
Website: www.orc.govt.nz

IMPORTANT NOTES TO THE APPLICANT

Disclaimer:

If council accepts your application for processing this does not constitute a guarantee that groundwater allocation is available. You should contact the council's Resource Science Unit in regard to water availability **before** you lodge your application. If no allocation is available then the activity will be prohibited and no resource consent will be granted.

Ensure that you complete this application Form 5 **and** Resource Consent Application Form 1 **in full**

For any consent application to be processed efficiently in the minimum time and at minimum cost, it is critical that as much relevant information as possible is included with the application. If all the necessary information is not entered on the form or supplied with the application then Otago Regional Council may **return your application**, request further information or publicly notify your application. This will lead to delays in the processing of your application and may increase processing costs. The Council advises as a precaution, applications for replacement water permits should be lodged at least **6 months** prior to their expiry, to ensure allocation is retained. Please note that an application to replace an existing water permit that has not been lodged and received by the Council at least **3 months** prior to its expiry, may lose its allocation.

This application form, when properly completed, should provide an adequate "Assessment of Effects on the Environment" (AEE) where the adverse effects of a proposal are not significant. However, this can only be determined on application. Guidance for the minimum aquifer test requirements are located at the end of this form.

PART A: GENERAL

A.1 Is this application for (tick which applies):

- a NEW groundwater take; or
- an application to REPLACE a current Water Permit?

Water Permit number:

Expiry date:

If you are applying to transfer the point of a water take or vary a condition of an existing Water Permit, **stop now** and please use Form 16 or Form 22 instead.

A.2 If you are applying to replace an existing Water Permit, do you have evidence of the amount of water historically abstracted under the permit?

- Yes, my records are attached with the application _____ years of records attached
- Yes, the Otago Regional Council has my records. *Note: You will be charged for all time spent retrieving and analysing records held on Council files*

I don't have any records but have other evidence of historical use (e.g. description and photos of existing functioning infrastructure, aerial photographs of irrigated area, electricity records for pump). You must provide evidence of the previous use of the permit including how much water has been used each year over what period.

PART B: DESCRIPTION OF THE POINT OF TAKE

IF THE BORE IS NOT YET CONSTRUCTED, OR IS UNCONSENTED, **STOP** NOW AND APPLY FOR THE LAND USE CONSENT TO CONSTRUCT A BORE OR BORES AND OBTAIN THIS BEFORE YOU APPLY TO TAKE GROUNDWATER. FORM 9A IS AVAILABLE ON THE COUNCIL WEBSITE.

B.1 What are the consent and bore tag numbers for the bore(s) where water is proposed to be taken?

Bore 1: Consent Number: Bore tag number

Bore 2: Consent Number: Bore tag number

If more than 2, please provide details on a separate sheet

B.2 What are the GPS co-ordinates of the location of the bore(s) from which groundwater is proposed to be taken?

Bore 1: NZTM 2000 E N

Bore 2: NZTM 2000 E N

If more than 2, please provide details on a separate sheet

B.3 Tick the box next to the aquifer that the water is proposed to be taken from. If you are unsure refer to Maps C1-C17 in the Regional Plan: Water for Otago and maps contained in Plan Change 4A (they are available for viewing on www.orc.govt.nz, or at our offices). Information on the location of the 'others' list can be obtained from council's Resource Science Unit.

- | | | |
|---|--|---|
| <input type="checkbox"/> Cardrona Alluvial Ribbon | <input type="checkbox"/> Lowburn Alluvial Ribbon | <input type="checkbox"/> Shag Alluvium |
| <input type="checkbox"/> Cromwell Terrace | <input type="checkbox"/> Lower Taieri | <input type="checkbox"/> Wanaka Basin
Cardrona Gravels |
| <input type="checkbox"/> Dunstan Flats | <input type="checkbox"/> Lower Waitaki Plains | <input type="checkbox"/> Wakatipu Basin |
| <input type="checkbox"/> Earnsclough Terrace | <input type="checkbox"/> Maniototo Tertiary | <input type="checkbox"/> Unknown |
| <input type="checkbox"/> Ettrick Basin | <input type="checkbox"/> Manuherikia Alluvium | Others: |
| <input type="checkbox"/> Hawea Basin | <input type="checkbox"/> Manuherikia Claybound | <input type="checkbox"/> Bendigo |
| <input type="checkbox"/> Inch Clutha River/Mata-Au Gravel | <input type="checkbox"/> North Otago Volcanics | <input type="checkbox"/> Clydevale |
| <input type="checkbox"/> Kakanui-Kauru Alluvium | <input type="checkbox"/> Roxburgh Basin | <input type="checkbox"/> Glenorchy |
| <input type="checkbox"/> Kuriwao Basin | <input type="checkbox"/> Papakaio | <input type="checkbox"/> Strath Taieri |
| <input type="checkbox"/> Lindis Alluvial Ribbon | <input type="checkbox"/> Pomahaka Basin | <input type="checkbox"/> Tarras |
| | | <input type="checkbox"/> Wairuna |

B.4 Do you have a bore log for your bore(s)?

- Yes and it is enclosed with this application, go to **Part C**.
- Yes and it was provided to the Otago Regional Council after the bore was constructed, go to **Part C**
- No, go to B.5

B.5 Please complete the following if no bore log is available.

Date bore drilled:
 Driller:
 Total depth of bore:
 Diameter of bore:
 Static water level:

If more than one bore, please provide the information on a separate sheet.

PART C: VOLUME AND RATES OF TAKE

C.1 What quantity of water do you propose to take and at what rate will it be taken? Note: 1,000 litres = 1 cubic metre

- (a) maximum rate of take litres per second
- (b) maximum daily volume litres per day; **or**
 cubic metres per day
- (c) maximum weekly volume cubic metres per week
- (d) maximum monthly volume cubic metres per month
- (e) maximum annual volume cubic metres per year

C.2 What is the frequency of your proposed water take?

- | | Average | Maximum |
|-------------------------------|----------------|----------------|
| (a) How many hours per day? | | |
| (b) How many days per week? | | |
| (c) How many weeks per month? | | |

(d) In which months do you expect to take water? (*tick those relevant*)

	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Average												
Dry year												

C.3 Over what part of the day will you typically take water?

- During the day
- During the night
- Other *please specify*
- 24 hours
- 'on demand'

C.4 Are you intending to harvest water for storage before subsequent use?

- No, go to question **C.6**.
- Yes: Capacity of water storage reservoir(s) cubic metres

C.5 Is your water storage reservoir 3 metres or more in depth and impounds more than 20,000 cubic metres of water?

- No.
- Yes, a building permit may be required, contact the Duty Resource Management Administration Officer or visit the Council website www.orc.govt.nz.

C.6 Is your proposed take from a Schedule 2C Aquifer (of the Regional Plan: Water)?

Schedule 2C Aquifers:

Kakanui Kauru Alluvium Aquifer, Shag Alluvium Aquifer, Lindis Alluvial Ribbon Aquifer, Cardrona Alluvial Ribbon Aquifer, Lowburn Alluvial Ribbon Aquifer

- Yes: which one
- No, go to question **C.9**.

C.7 For Schedule 2C Aquifers what is the name of the surface water body connected to your proposed point of take?

e.g. for Kakanui-Kauru Alluvium Aquifer is it the Kakanui River, Kauru River, a tributary of these or another named water course?

.....

C.8. Is your proposed point of take(s) within 100 metres of a connected perennial surface water body?

- No, go directly to **Part D**
- Yes, go to question **C.10**

C.9 What is the name of the surface water body within 100 metres of your proposed point of take?

i.e. Lake Dunstan, Waiareka Creek or a tributary of Stoney Creek, etc

.....

C.10 Maximum Allocation Volume – Note to applicant

The Regional Plan: Water manages the volumes of water taken from aquifers to prevent long term depletion of base flow to surface water bodies and salt water intrusion of the aquifer. It does this by either assigning a Maximum Allocation Volume for specific aquifers or by considering the maximum annual take and the expected recharge and requiring that a take should not exceed 50 % of the mean annual recharge of the aquifer.

An assessment of the maximum allocation volume for the Aquifer relevant to your take will be undertaken in processing your application and restrictions may be imposed in accordance with Schedule 4B of the Regional Plan: Water

C.11 For Rivers, Streams, modified water courses, springs or drains answer questions (a)-(g), for Lakes, ponds and wetlands go to Question C.13.

(a) What type of water course is identified in C.9 above. *Tick those relevant*

- River
- Modified watercourse
- Drain
- Stream
- Spring

(b) Is the water course:

- Perennial (flows all year around)
- Ephemeral (flows only as a result of rainfall)

(c) What is the average channel **width** nearest to your proposed point of take? metres

(d) What is the average channel **depth** nearest to your proposed point of take? metres

- (e) What is the estimated average water flow velocity? metres/second
- (f) How would you describe the bed of the water course? *Tick those relevant*
 Muddy Boulders Gravels and cobbles Sandy Hard rock
- (g) Are you able to supply estimated minimum and maximum flow rates for the water course?
 No, go to **Part D**
 Yes, please complete the following
 Minimum: litres per second
 Maximum: litres per second
 Location of estimate:
 adjacent to proposed point of take Other
 Source of flow data:

C.11 For Lakes, Ponds and Wetlands, answer points (a)-(f) below.

- (a) What type of water body is identified in C.10 above. *Tick those relevant*
 Lake Pond Wetland
- (b) Has the water body been formed by artificial means?
 Yes No
- (c) What is the surface area of the lake/pond/wetland?
- (d) How deep is the lake/pond/wetland?
- (e) Does the lake/pond/wetland have an outlet? i.e. does water flow out of it?
 Yes No
- (f) What is the main source of water that fills the lake/pond/wetland? *Tick as many boxes as is relevant*
 Direct rainfall
 Springs Groundwater Runoff from surrounding land
 Stream/rivers name:.....
 Other consented water takes:
 consent numbers:.....

PART D: WATER MEASURING AND REPORTING INFORMATION

The Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 apply to water permits where water is taken at more than 5 litres per second. The Regulations require continuous measurement of the water taken and for the daily records to be provided to the Otago Regional Council at the end of the water year. It also requires verification of the device or systems installed.

Note: According to the Regulations the water year is from 1 July through to 30 June in the following year. It is also the Council's policy to require water measuring devices or systems and dataloggers to be fitted on **all** water takes.

D.1 What is the maximum capacity of the pump you propose to install?

D.2 Is a water measuring device or system...

- Proposed to be installed; or Already installed

D.3 Is a data logger installed, or proposed to be installed, as part of your water measuring device or system?

- No Yes

If a data logger is required by a Water Permit, it will need a minimum of 24 months data storage.

D.4 Please indicate on a map or aerial photograph, the following details:

- o The location of the bore(s) from which water is to be taken
- o The location, or proposed location of the water measuring device or system; and
- o The location of pipe work and infrastructure associated with the water take, specifically between the point of take and the measuring device, and include distances.

Installation of a Water Measuring Device or System

The Otago Regional Council has Standard Installation specifications for water measuring devices and systems. The Standard Installation of a water measuring device or system is:

The water meter shall be installed in a straight length of pipe, before any diversion of water occurs. The straight length of pipe shall be part of the pump outlet plumbing, easily accessible, have no fittings and obstructions in it. The water meter shall be installed at least 10 times the diameter of the pipe from the pump and at least 5 times the diameter of the pipe.

D.5 Are you proposing to install your Water Measuring Device in accordance with the Otago Regional Council Standard Installation specifications outlined in the paragraph above?

- Yes No

If your answer is NO, you need to fill out and attach to this application form a **Non-Standard Installation Form** for Water Measuring Devices available on our Website or through the Environmental Services Unit of the Otago Regional Council.

D.6 The Regulations require the taking of water to be measured at the point of take unless an Exemption is approved by the Otago Regional Council. Is your water measuring device or system installed at the point of take?

- Yes No

If your answer is no, you need to apply for an Exemption by filling out *Application form 24 – Application for Exemption to use a device or system near the location from which water is taken*, which is available on our website www.orc.govt.nz and from our offices.

D.7 The Regulations require the taking of water to be recorded on a daily basis unless an Exemption is approved by the Otago Regional Council. Will you be keeping daily records of your water use?

- Yes No

If your answer is no, you need to apply for an Exemption by filling our *Application form 25 – Application for Exemption to record water use on a weekly basis*, which is available on our website www.orc.govt.nz and from our offices.

D.8 For applications to take water for non-consumptive purposes which are at a rate of less than 5 litres per second, please explain why a water measuring device should not be installed.

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PART E: WATER USE AND MANAGEMENT

E.1 Will the water take be managed as part of an existing Water Allocation Committee or Water Management Group?

- Yes – Water Allocation Committee
 Yes – Water Management Group
 No

E.2 Please describe the property(s) on which the water is to be used.

(a) Name of owner(s)

(b) Address/location

(c) Legal description (as shown on certificate of title attached to this application)
.....

If there is more than one property (legal description) please provide these details on a separate sheet.

E.3 Attach Certificates of Title for all properties where water is to be used. They must be less than 3 months old at the time of lodging the application.

- Yes - my Certificates are attached No - the Council may obtain them at my expense

E.4 Show on a map (no smaller than A4 size) or a coloured aerial photograph the following details:

- The location of the bore(s) or proposed bore(s)
- The location of the water measuring device or system
- The total property area boundary
- The area(s) to be irrigated (if relevant)
- Area of the community supply
- Distances to any discharge activities
- Closest neighbouring bore(s)
- Surface water bodies and wetlands and distances from the point of take(s) to them
- The coastline and the distance to it
- Location of any dairy shed

Efficiency of water use

In this section you are required to only answer the questions relevant to your intended use of water. As a guide the questions are as follows:

- | | |
|---|------------------------------------|
| E.5 Irrigation of land (pasture etc) | E.9 Private community water supply |
| E.6 Irrigation of crops or horticulture | E.10 Public community water supply |
| E.7 Frost fighting | E.11 Stock and/or dairy shed use |
| E.8 Industrial use | E.12 Other |

E.5 Irrigation of land– not crops or horticulture

(includes pasture, turf (golf courses), lifestyle blocks and sports fields)

(a) How many hectares of land will be irrigated?

(b) What is the total property area (not just that proposed to be irrigated)?

- (c) What type of irrigation system is or is proposed to be used?
 K-line Centre pivot Travelling irrigator
 Border-dyke/flood irrigation Other
- (d) How many hectares will be irrigated in one day?
- (e) For how many hours per day?
- (f) What is the target (net) application rate?
- (g) How many days are there between irrigating the same block?
- (h) Please describe the soil types of the areas to be irrigated and state the source of this information.

- (i) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

- (j) Is the area to be irrigated:
 Presently irrigated/developed
 Partly irrigated/developed (..... ha complete ha under development)
 Proposed to be irrigated/developed (..... likely completion date)

E.6 Irrigation of crops or horticulture

- (a) What is the total area to be irrigated?
- (b) Show the area of land to be irrigated on the map specified in E.4 and attach to this application.
- (c) What is the total property area (not just that proposed to be irrigated)?
- (d) If glass/plastic houses are used, what area do they cover?
- (e) What type of crops will be irrigated or are proposed to be used?
 Grain/wheat Pip fruit Stone fruit
 Market garden Flowers Nursery

- Viticulture (vines/hectare)
- Nuts
- Other

(k) What type of irrigation system is or is proposed to be used?
 Trickle Sprinkler Other

(f) How many hectares will be irrigated in one day?

(g) For how many hours per day?

(h) What is the target (net) application rate?

(i) How many days will there be between irrigating the same block?

(j) Please describe the soil types of the areas to be irrigated and state the source of this information.

(k) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

- (l) Is the area to be irrigated:
- Presently irrigated/developed
 - Partly irrigated/developed (..... ha completeha under development)
 - Proposed to be irrigated/developed (..... likely completion date)

E.7 Frost Fighting

(a) List the crops, and the area (ha) of each crop, for which frost fighting may be undertaken.

(b) How many hours a day?

(c) How many days per year?

(d) How many days on average do you expect a frost?

- (e) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

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E.8 Industrial Use

- (a) What type of industry/process will be using the water?

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- (b) How will the water be used?

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- (c) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

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E.9 Private Community Water Supply

As a guide only the council considers efficient water use for a household is 1,000 litres per day in winter and 3,000 litres per day in Summer (average 2,000 litres per day). This is derived from wastewater volumes in ASNZ 1547:2000.

- (a) What type of institution uses the water?

- Households – number of households to be supplied:
- Camping grounds – maximum number of visitors and staff per year:
- Schools - maximum number of students and staff per year:
- Other:

- (b) For applications to supply water to households what is the minimum, maximum and average lot size?

..... Square metres (minimum)

..... Square metres (average)

..... Square metres (maximum)

- (c) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

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E.10 Private Community Water Supply

As a guide only the council considers efficient water use for a household is 1,000 litres per day in winter and 3,000 litres per day in Summer (average 2,000 litres per day). This is derived from wastewater volumes in ASNZ 1547:2000.

- (a) What population will be served by the supply?
 General location of population
 Approximate number of households
- (b) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

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E.11 Stock Water and / or Dairy Shed Use

The Council considers the following values as efficient use of water for stock.

Sheep	5 litres per day per head
Beef cattle	40 litres per day per head
Dairy cows	70 litres per day per head
Deer	1.5 litres per day per head
Dairy shed use	50 litres per day per head

- (a) What type and how much stock will be supplied with water?
- Sheep number:water required:litres/head/day
- Beef cattle number:water required:litres/head/day
- Dairy cows* number:water required:litres/head/day
- Other number:water required:litres/head/day
- * excluding dairy shed usage
- (b) If you have dairy cows, and require water for your dairy shed, please state the estimated volume required

.....Litres/head/day

E.12 Other

- (a) Please describe the proposed water use:

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(b) How have you calculated the amount of water you need? (a separate sheet may be needed and attached to this application form)

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PART F: ASSESSMENT OF ENVIRONMENTAL EFFECTS (AEE)

An AEE should be proportional to the scale and significance of the proposed activity. Where your proposed take could have significant effects on the groundwater resource a more detailed environmental assessment is required.

Note: Environment includes ecosystems, people, communities, all natural and physical resources and amenity values, and social and economic, aesthetic and cultural conditions that affect them.

F.1 An Aquifer test (pumping test) is required to be submitted with your application. Instructions on the minimum requirements are attached to this application form.

Yes a copy of the results are attached

F.2 Provide details of all known neighbouring bores assessed under Schedule 5B* of the Regional Plan: Water which may be potentially affected by your application or within 1 kilometre of the proposed point of take.
** within the calculated interference radius based on the aquifer properties from testing and proposed volume*

Owner name	Bore number (if known)	Distance (m)	Depth (m)	Use (e.g. domestic irrigation etc)

F.3 Have you undertaken an assessment of effect on water availability to neighbouring bores in accordance with Schedule 5 of the Regional Plan: Water for Otago? (available on our website www.orc.govt.nz)

Yes and it is attached to the application No, go to F.6

F.4 If the answer to F.3 was yes, then at what distance may calculated effects on water availability be experienced?

.....metres

F.5 Are there any of the following present within 500 metres* of the proposed point(s) of take:

** or within the calculated interference radius based on the aquifer properties from testing and proposed volume*

- (i) Surface water bodies? Yes No
- (ii) Natural wetlands or springs? Yes No

If you have answered 'yes' to any of the above, describe what adverse effects your take may have and the steps you propose to mitigate these effects:

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For water takes in Schedule 2C Aquifers or within 100 metres of a surface water resource only

If your groundwater take is not from a Schedule 2C Aquifer or within 100 metres of a surface water resource, go to **F.8.**

F.6 Will the taking of water have an effect on surface water availability to neighbouring properties?

- Yes No Unknown

F.7 Are there any of the following present within 500 metres of the proposed point of take?

- (i) Obvious signs or known aquatic biota? Yes No
- (ii) Areas where food is obtained from a water body? Yes No
- (iii) Natural wetlands? Yes No
- (iv) Waste discharges? Yes No
- (v) Recreational activities? Yes No
- (vi) Areas of special aesthetic value? Yes No
- (vii) Areas or aspects of significance to iwi? Yes No
- (viii) Other water takes (ground or surface)? Yes No

If you have answered 'yes' to any of the above, describe what adverse effects your take may have and the steps you propose to mitigate these effects:

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F.8 Has any water quality analysis been undertaken on groundwater taken from your bores??

- Yes – *attach a copy of the results* No Unknown

F.9 Are there any waste disposal sites (e.g. septic tanks, offal pits, landfills etc) within 100 metres of your proposed point of take(s) ?

- Yes – *show on the site plan required by question E.4 and state distances*
 No

F.10 Is your proposed take point(s) (bores) within 1 kilometre of the coastline?

- Yes – *show on the site plan required by question E.4 and state distances*
 No

F.11 Do you anticipate that your proposed water take will affect the water quality of the groundwater resource? (e.g. contamination from septic tanks or saltwater intrusion)

- Yes No

If you have answered 'yes', describe what adverse effects your take may have and the steps you propose to mitigate these effects:

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F.12 Can your maximum abstraction rate (litres per second) be reduced by increasing the length of time over which water is taken?

- Yes

Over what time period would you take water and at what rate?

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- No

Why not?

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F.13 What are the positive effects of your proposed take and use? This could include any environmental, social and economic benefits that management by a Water Management Group could provide.

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F.14 What measures are you proposing to minimise wastage of water and maximise its efficient use?

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PART G: ALTERNATIVE WATER SUPPLIES

G.1 Does your property have alternative water sources available? (such as other water bodies, reticulated supplies, groundwater bores, other water permits, irrigation schemes?)

No

Yes

If yes, Please detail the sources, quantities, uses and any current Water Permit numbers or any takes authorised by permitted activity rules in the Regional Plan: Water for Otago.

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G.2 Have you considered the option of using other sources of water?

No

Yes

If yes, Please detail the sources, quantities, uses and any Water Permit numbers

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G.3 Explain why you have decided to take water from the proposed groundwater source rather than any alternative source?

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PART H: CONSULTATION

H.1 Please describe any consultation undertaken with persons/parties potentially affected by your proposed groundwater take. This should include parties you identified in F.2 and using Schedule 5B of the Regional Plan: Water.

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Schedule 5B of the Regional Plan: Water for Otago provides a method to identify groundwater takes potentially affected by bore interference. Use this Schedule (found on our website) to assist you in determining who may be affected by your application and thus who to obtain written approval from.

Written approvals are required from parties who are considered by the Otago Regional Council to be affected by your proposed water take. To reduce costs and processing times, it is recommended that written approval is obtained, and submitted with the application, for parties who may be affected.

H.2 Provide any written approvals using the Council's standard Form 1 – Resource Consent Application available on our website.

PART I: CHECK LIST

I.1 In order to submit a complete application, have you remembered to?

- Fully completed this application form and Form 1?
 - For replacement applications, provide evidence of how much water has historically been accessed under that consent (unless held by Council). *refer A.2*
 - Attached a bore log (unless held by Council)? *refer B.4*
 - Attached a Non-Standard installation form if required? *refer D.5*
 - Attached an Exemption Application Form for the point of take? *refer D.6*
 - Attached an Exemption application form for weekly records? *refer D.7*
 - For water management groups, provide evidence that the group meets the requirements of Appendix 2A of the Regional Plan: Water for Otago? *refer E.1*
 - A detailed site map or aerial photograph? *refer E.3*
 - A copy of an Aquifer test (pumping test) results? *refer F.1*
 - A copy of the Regional Plan: Water Schedule 5 Assessment? *Refer F.3*
 - A copy of water quality analysis? *refer F.8*
 - Attached any written approvals? *refer H.2*
 - Paid your deposit or attached a cheque? *refer I.1*
 - Attached Certificate of Title(s) less than 3 months old? *refer E.3*
- Or**
- Council to obtain Certificate of Title(s) at your expense

To keep consent processing costs to a minimum it is strongly recommended that the checklist is complete and all items required are attached **before** you lodge your application to the Otago Regional Council.

Otago Regional Council - minimum aquifer test requirements

1.1 Why do I have to do an aquifer test?

Aquifer tests are required by the Otago Regional Council as part of the information requirements for a resource consent application to take and use groundwater. This information sheet outlines the Otago Regional Council's minimum aquifer test requirements to support resource consent applications. Aquifer tests are required for two reasons. First to demonstrate that you can actually take the amount of water you are seeking and second for information on aquifer parameters which are used to assess the potential effects of the proposed take.

1.2 What is an aquifer test?

Aquifer tests consist of pumping a bore at a certain rate and recording drawdown in the pumped bore and nearby observation bores at specific times. There are two main types of pump tests; step-drawdown tests and constant-rate tests.

A **step-drawdown** test occurs when a bore is pumped at successively greater discharge rates for relatively short periods of time. These tests are used to describe bore performance which is a function of the construction of the bore and aquifer characteristics.

A **constant-rate** test occurs when a bore is pumped for a significant length of time at one rate and often includes monitoring of groundwater level recovery once pumping has ceased (a recovery test). These tests are used to provide information on aquifer parameters such as transmissivity, storativity and leakage.

1.3 Doing an aquifer test

The aquifer test must be of sufficient quality to demonstrate to the Council you are able to take the amount of water you are seeking and to provide a reliable assessment of aquifer properties to support an assessment of environmental effects. If the pump test is not of sufficient quality your application may not be accepted.

It is recommended that you discuss your aquifer test with a groundwater scientist and or the Otago Regional Council Resource Science Unit before proceeding.

The aquifer test data should be designed and analysed by a suitably qualified and/or experienced groundwater scientist. It is recommended that they are contacted before undertaking a pump test so that they can advise you on aquifer test design.

If for some reason you are unable to meet the recommended minimum aquifer test requirements, then it is advisable to contact either the Otago Regional Council or your consultant to discuss appropriate alternatives to ensure that your application will be accepted.

1.4 Do I need resource consent?

Under our Regional Water Plan, aquifer tests are a permitted activity the pumping rate does not exceed 2,000,000 litres per day (23.15 litres per second) and they do not exceed three consecutive days duration. If you are planning an aquifer test that does not meet these requirements you will need to obtain resource consent. However, you can apply for a water permit for the aquifer test at the same time you are applying for your bore permits.

1.5 Further information

For more information please contact either a suitably qualified and/or experienced person in hydrogeology or Otago Regional Council.

1.6 References

Aitchison-Earl, P. and Smith, M. 2008. *Aquifer test guidelines (2nd Edition)*. Environment Canterbury Technical Report R08/25, Environment Canterbury, New Zealand.

Kruseman, G. P. and de Ridder, N. A. 1994. *Analysis and evaluation of pumping test data (2nd Edition)*. Publication 47: International Institute for Land Reclamation and Improvement, Wageningen, the Netherlands.

1.7 Acknowledgements

This document is based on the Aquifer Pump Tests Information Sheet from Environment Southland (ES). ORC would like to thank ES for the sharing of information and ideas.

General requirements	
<ul style="list-style-type: none"> The pumping rate should be kept constant within +/- 5% and measured to within +/- 5% accuracy. It is recommended that a data logging electronic flow meter be used to achieve these requirements. After step and constant rate aquifer tests, recovery should be measured to within 10% of the initial static water level. After the start of pumping and during recovery, at a minimum, water levels in the pumping and observation wells should be measured at 30 second intervals during the first 5 minutes, 1 minute intervals between 5 and 15 minutes, 5 minute intervals between 15 and 60 minutes and 15 minute intervals thereafter. It is recommended that data logging pressure transducers be used to achieve these requirements. Pumped water should be discharged at a location where it won't cause recharge of the aquifer and influence the aquifer test. Aquifer pumping tests should be conducted during stable weather conditions. Significant rainfall, barometric pressure changes, high or variable river flows and other factors may influence the results of your test. Be prepared to delay the test if required. 	
Specific requirements	
Takes less than 250 m³/d	2 hour pumping at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumping well.
Takes between 250 to 750 m³/d	<ol style="list-style-type: none"> Static water level to be monitored for at least 24 hours prior to start of test in the pumping and observation wells A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. The maximum pumping rate should be equal to the maximum proposed rate. A 24-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumping bore and in at least one observation bore within the area of localized drawdown.
Takes greater than 750 m³/d	Confined or leaky aquifers
	<ol style="list-style-type: none"> Static water level to be monitored for at least 24 hours prior to start of test. A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. Maximum pumping rate should be equal to the maximum proposed rate. A 72-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumped bore and at least two observation bores in the source aquifer and one observation well in the overlying aquifer within the area of localized drawdown.
	Unconfined aquifers
	<ol style="list-style-type: none"> Static water level to be monitored for at least 24 hours prior to start of test. A step-drawdown aquifer test comprising a minimum of 4, 1 hour pumping steps followed by measurement of recovery. Maximum pumping rate should be equal to the maximum proposed rate. A 48-hour constant-rate aquifer test undertaken at the maximum proposed rate. Water level monitoring should include drawdown and recovery in the pumped bore and at least two observation bores within the area of localized drawdown.
Information requirements to be included with the aquifer test results	
<p>The following information should be provided with the aquifer test results:</p> <ul style="list-style-type: none"> A map of the site with key features including the pumping and observation bores, surface water features and pumped water discharge location identified Coordinates for pumping and observation bores used in the aquifer test Surveyed elevations for pumping and observation bores used in the aquifer test and for nearby surface water level Bore logs and construction information, including depth and diameter for the pumping and observation bores Information on the location of pumped discharge, the method used to measure discharge and the discharge monitoring records in electronic format (Excel). Records of measured groundwater levels in the pumping and observation bores in electronic format (Excel) Records of measured or observed of rainfall, barometric pressure and river flows Analysis of aquifer test results to provide estimates of relevant aquifer parameters to support the effects assessment. This should include details of any data corrections used, analysis methods, plotted data , calculations used and discussion of data and analysis reliability 	

