Practice Note:
New Groundwater Take and Use Applications

Otago Regional Council

This practice note outlines what to consider when you are applying for a new groundwater take and use permit.

A new groundwater take is processed under the Chapter 12 rules in the Water Plan.

This practice note **does not** apply if you are seeking to **replace** a surface water permit or groundwater permit or if you are seeking a **new surface water permit**. Refer to the following practice notes:

- Replacement surface water and connected groundwater take and use applications
- Replacement groundwater take and use applications
- New surface water and connected groundwater take and use applications

What rules apply to the activity?

Permitted activities

- Small rates and volumes of water can be taken as permitted activities or under Section 14(3) of the RMA without the need for a consent. For more information about Section 14(3) refer to: Taking and using water: how to guide and Stacking of Water Takes Practice Note. The permitted activity rules can be found in Chapter 12.2.2 of the Water Plan. If all of the conditions of these rules can be met, then the activity does not require consent.

Prohibited activities

There are some groundwater take and use activities that are prohibited in Otago. This means that they cannot be applied for and undertaken. These include:

- Seeking a new consent for taking consumptive groundwater in a Schedule 4A aquifer[1] that is fully or over-allocated or where the application would cause the aquifer to become fully or over-allocated (12.0.1.3)[2].
- Taking and use of groundwater for nuclear power generation or nuclear weapon manufacturing (12.2.1.1).
- Taking and use of groundwater from within 100 metres of Lake Tuakitoto in particular circumstances.

[1] Schedule 4A aquifers are: Ardgour Valley Aquifer, Bendigo Aquifer, Cromwell Terrace Aquifer, Lower Tarras Aquifer and North Otago Volcanic Aquifer. You can find which aquifer you are located in by using Otago Maps – Consents in Otago and the Water Allocation layer.

[2] The only exceptions to this are where all of the take is allocated as surface water or the water is taken for temporary dewatering at a site for construction or repair of a structure.

Community Water Supply

Specific community water supplies detailed in Schedule 3B of the Water Plan can be considered under **controlled** activity rule 12.2.2A.1. The exception to this is a community water supply that is located in a Regionally Significant Wetland (see below).

Note: this rule is limited to the community water supplies in Schedule 3B only. If the community water supply take activity is not listed in this schedule, then standard rules apply.

Groundwater Takes fully allocated as surface water

Groundwater takes from a Schedule 2C aquifer[3] or from within 100 metres of any connected perennial surface water body are allocated as surface water only. These groundwater takes are **restricted discretionary** activities (12.2.3.1A) if the relevant surface water take rules for the taking and use can be met. For further advice on what is considered for these applications refer to the new surface water and connected groundwater take and use applications practice note.

If the restricted discretionary rule cannot be met, then the activity is **discretionary** (12.2.4.1)

Unconnected Groundwater Takes

Groundwater takes that are not fully allocated as surface water have three main consent pathways:

- **Non-complying** activity – Applies when a new consent is being sought for taking consumptive groundwater in a non-Schedule 4A aquifer that is fully or over-allocated or where the application would cause the aquifer to become fully or over-allocated (12.2.1A.3)[4]
- **Restricted discretionary** activity – This rule (12.2.3.2A) applies if:
    - the volume sought is within the allocation of the aquifer[5] or the volume specified on an existing resource consent (where an aquifer is fully or over-allocated)
    - if an aquifer restriction applies to the aquifer, the take will be subject to it[6]
    - where the rate of surface water depletion is greater than 5 L/s, primary surface water allocation is available and (for the Waitaki catchment only) allocation is available for the purpose of use.

  The Council cannot publicly notify an application under this rule unless special circumstances apply.

[3] Schedule 2C aquifers are the Cardrona Alluvial Ribbon Aquifer, Kakanui-Kauru Alluvium Aquifer, Lindis Alluvial Ribbon Aquifer, Lowburn Alluvial Ribbon Aquifer, Pomahaka Alluvial Ribbon Aquifer and Shag Alluvium Ribbon Aquifer. You can find which aquifer you are located in by using Otago Maps – Consents in Otago and the Water Allocation layer.
[4] The only exceptions to this are where all of the take is allocated as surface water or the water is taken for temporary dewatering at a site for construction or repair of a structure or the water is taken from a rock formation having an average hydraulic conductivity of less than 1 x 10-5 metres per second, which is not an aquifer mapped in the C-series of the Water Plan and is taken in connection with mineral extraction activities.
[5] An aquifer an aquifer in the C-series planning maps of the Water Plan (with the aquifer boundary defined by best available science) or, if not mapped, is based on best available science on aquifer boundaries. The default allocation limit for non-Schedule 4A aquifers is 50% of mean annual recharge (MAR). Mean annual recharge is determined by the Council's Science Team taking into consideration Schedule 4D of the Water Plan.
[6] Note: This entry condition only applies if the aquifer has aquifer restriction levels. If the aquifer does not have aquifer restrictions, then this entry condition does not need to be met.

- **Discretionary** activity - all other groundwater takes (12.2.4.1 (i)), including takes from unmapped aquifers

Regionally Significant Wetlands

The taking of groundwater within any Regionally Significant Wetland[7] is a **non-complying** activity under Rule 12.2.1A.1 of the RPW. The National Environmental Standard for Freshwater (NES-FW 2020) prohibits[8] the taking and use of water from **natural inland wetlands** if it results, or is likely to result in, the complete or partial drainage of all or part of a natural inland wetland. This Regulation will prevent most taking of water from natural inland wetlands, including Regionally Significant Wetlands.

Waitaki Catchment

Water take and use activities in the Waitaki catchment are subject to specific rules and policies. Allocation of water from the main stem of the Waitaki River is the responsibility of the Canterbury Regional Council (Environment Canterbury), while allocation from tributaries on the south side of the main stem and groundwater are the responsibility of Otago Regional Council (ORC).

There are specific rules (and policies) in the Water Plan that apply to takes and uses in the Waitaki catchment. These include:

- **Non-complying** activities where the take and use will cause the allocations to specific activities to be exceeded in Table 12.1.4.2 (12.2.1A.2). These applications must show the effect of granting the consent on the entitlements to other allocations.
- **Restricted Discretionary –** if the restricted discretionary rule (detailed above) can be met and where the take and use will not cause the allocations to specific activities to be exceeded in Table 12.1.4.2 (12.2.3.2A). The Council cannot publicly notify an application under this rule unless special circumstances apply.
- **Discretionary** activity where the restricted discretionary activity cannot be met, and the take and use will not cause the allocations to specific activities to be exceeded in Table 12.1.4.2 (12.2.4.1 (ii))

Environment Canterbury maintain a database with current allocations. You will need to contact consent.enquiries@orc.govt.nz to confirm if the take and use is within the Waitaki catchment and whether there is allocation available for the specific activity you are proposing to undertake. The volumes in Table 12.1.4.2 apply to the whole catchment, including groundwater takes in the catchment boundary.

Taking of water from Springs

Water taken from springs is considered to be surface water (not groundwater) under the Water Plan. Groundwater is defined in the Water Plan as: *Water that occupies or moves through openings, cavities or spaces in geological formations under the ground.*

Refer to New surface water and connected groundwater take and use applications for information on what to include in a surface water take and use application.

[7] Unless it is permitted or prohibited
[8] Regulation 53 of the NES-FW 2020

Other activities that may require consent

The following situations may require additional consents. These activities will have their own consent requirements and may change the overall activity status of the application:

- **Bore construction consents for new bores or to replace an existing bore:** The Council requires that any bore consents are obtained, the bore constructed and aquifer tests performed before an application is made to take and use groundwater.
- **Natural inland wetlands:** Groundwater takes and/or uses (e.g. irrigation areas) located within 100 metres of a natural inland wetland – these groundwater takes and/or uses may require consent under the NES-FW 2020[9].

Description of the Activity

To assess the application, we need a clear understanding of the activity you are proposing, including **where it will occur** and **what it involves**. Please make sure the application includes details on the following:

- Bore/Wells Number and location of the take including any construction details and copies of bore logs (with static water level)
- Rates and volumes proposed to be taken
- Means and timing of the take, including seasonality
- Description of the infrastructure for taking, storing, distributing and using the water
- Details on the use of the water including the location of use
- The aquifer that water is to be taken from, if named and known
- Details on wetlands or Regionally Significant Wetlands in the locality
- Details on nearby streams or surface watercourses
- Neighbouring bore locations and details
- Neighbouring consented water takes
- Aquifer test details and analysed results
- Any known values of the aquifer or nearby surface watercourses
- Climate and soils

[9] Refer to Regulation 54 of the NES-FW 2020

Environmental Effects Assessment

The below headings outline key considerations for an environmental effects assessment for a new groundwater take. The table below summarises the key effects and when these need to be considered.

Environment effects assessment for new groundwater take and use activities

Effect	Restricted Discretionary activity	Discretionary activity	Non-complying activity
Aquifer allocation	Y	Y – bespoke assessment needed for unmapped aquifers and fractured rock aquifers	Y bespoke assessment needed for non-complying activities relying on best available science
Surface water allocation	Y – only if allocated as part or full surface water	Y – only if allocated as part or full surface water	Y – only if allocated as part or full surface water
Aquifer Restriction Levels	Y	Y	Y
Minimum flows	Y – only if allocated as part surface water	Y - only if allocated as part surface water	Y – only if allocated as part surface water
Effects on surface waterbodies including indigenous fish	Y – with some limitations	Y	Y
Natural inland wetlands	N – only if located within 100 m	Y	Y
Regionally Significant wetlands	Y	Y	Y
Other water users	Y – only existing water takers	Y – all water users	Y – all water users
Groundwater quality	Y	Y	Y
Efficiency of use	Y	Y	Y
Cultural effects	N	Y	Y
Cumulative effects	N	Y	Y

Allocation

Groundwater Allocation

The allocation of water from aquifers in the Otago Region is based on seasonal volumes (million cubic metres per year). There is a maximum allocation limit (**MAL**) for what can be allocated from each aquifer. There are default allocation limits, which currently apply to most aquifers in Otago, and bespoke allocation limits. You can check what aquifer you are located in and whether there is allocation available by contacting consent.enquiries@orc.govt.nz.

Schedule 4A Aquifers

Bespoke limits have been set for some aquifers in the region through a plan change process. There are currently bespoke limits (MALs) for the **North Otago Volcanic Aquifer**, **Cromwell Terrace Aquifer, Ardgour Aquifer, Bendigo Aquifer and Lower Tarras Aquifer**. These allocation limits are in Schedule 4A of the Water Plan. The Council cannot grant consents above these allocation limits.

Non-schedule 4A aquifers and best available science

There is a default allocation limit of 50% of mean annual recharge (**MAR**) that applies to all other aquifers in the region. This means that up to 50% of the calculated mean annual recharge of a defined aquifer can be allocated to groundwater takers. The aquifer boundary is either defined by the C-series maps in the Water Plan or is based on best available science.

The Council is regularly improving its understanding of the groundwater resource and is producing science reports/models that may redetermine/identify aquifer boundaries and calculate mean annual recharge. Published groundwater reports can be found on the Council's website: Reports and publications - water. The best available science will be used to determine the MAR for each aquifer. Understanding whether a new groundwater take is within 50% of MAR or not for an aquifer is an important step in determining the rules that apply to a new groundwater take and use activity.

Published science reports may also contain a recommended (or tailored) allocation limit (MAL) for an aquifer that is not based on 50% of the MAR. There are many aquifers where these have determined but not yet added to Schedule 4A. In these cases, the recommended MAL should not be used to determine the activity status of the application (50% of MAR is used for this purpose as detailed in the rules). However, this recommended MAL/best available science about the aquifer can be considered by both an applicant and Council when assessing the environmental effects of the activity. It is recommended that an application consider and reference the best available science when preparing an AEE for a non-complying application. If you would like direction on the best available science for your aquifer, please contact science.enquiries@orc.govt.nz.

Such applications will need to explain how they align with the recommended best available science limit and modelling and also include assessment in the application that addresses how the take and use of groundwater outside of the default 50% mean annual recharge limit will:

- maintain long term groundwater levels and water storage
- prevent permanent aquifer compaction
- prevent effects on connected waterbodies

- prevent contamination of groundwater/surface water.

Note: for restricted discretionary activities the Council is limited to the matters of discretion in Rule 12.2.3.4 of the Water Plan when considering best available science.

Unmapped aquifers

Not all aquifers in Otago are mapped in Consents in Otago nor does Council's Science Team know the boundaries of all aquifers in the region or have sufficient data to determine the mean annual recharge (MAR) for every aquifer. Without knowing the MAR, it is difficult to apply Policy 6.4.10A1 and 6.4.10A2 for the allocation of groundwater.

The Water Plan outlines that the key reasons for managing the taking of groundwater is to maintain long term groundwater levels and water storage in Otago's aquifers (Objective 6.3.2A). The objective seeks to avoid any long term or irreversible reductions in aquifer volume through appropriate management of groundwater taken, including effects on rivers, lakes or wetlands dependent on groundwater levels. There is also direction to avoid any contamination of groundwater or surface water and permanent aquifer compaction (Policy 6.4.10A5).

The primary and preferred approach to managing aquifer groundwater levels and water storage is to allocate based on 50% of MAR or to have a MAL that is the result of aquifer research (see Schedule 4A). Where the MAR isn't known for an aquifer, there is guidance in Schedule 4D of the Water Plan on what to consider when determining the MAR.

For applications to take and use groundwater lodged in unmapped aquifers, the Council currently uses a risk-based approach to managing groundwater levels and water storage. This considers who should provide evidence on the MAR (i.e. the applicant or Council's Science team) and includes circumstances when calculating the MAR may be disproportionate to the scale of the take and its effects (i.e. where it is very unlikely that the take will have any effect on long term groundwater levels and water storage or effects on connected waterbodies).

Assessing adverse environmental effects from unmapped aquifers

Maximum rate of take and annual volume proposed	Assessment required	Activity status	Considerations
Less than 2 L/s	No audit of the application by Science required if there are no other groundwater takes in a 1 kilometre radius of the proposed take or, if there are multiple takes in a 1 km radius, the combined maximum rate of take is less than 5 L/s	Discretionary under Rule 12.2.4.1	Term of consent - 6 years If there is more than one take within a 1 km radius then drawdown effects may need to be considered – this

	Aquifer test typically not required to be submitted with an application. Bore log and static water level to be provided (see below)		will depend on proximity between the take and average daily rates of take. Seek advice from Council's Science Team in this instance as an aquifer test will normally be required (see below).
Less than 5 L/s and annual volume no greater than 100,000 m^3/year	An audit of the application by Science is required – this is to confirm that the take will not impact on the maintenance of long-term groundwater levels and water storage and not cause permanent aquifer compaction. Application to include: • Bore log and static water level details • Aquifer test • Analysis of the above and consideration of the effects the take will have on the aquifer (water storage, compaction), neighbouring bores, surface water and contamination of the aquifer or surface water.	Discretionary under Rule 12.2.4.1	Term of consent - 6 years Consider the number of takes in the aquifer (you may need to seek advice on the aquifer boundary from Science) to consider cumulative effects
Annual volume greater than 100,000 m^3	Application to include the above (aquifer tests etc) and additional analysis on the aquifer including aquifer boundaries and determining a MAR in accordance with Schedule 4D of the Water Plan/best practice. The Council's Science team will audit the lodged application and provide comment on whether the take is within 50% of MAR, effects on surface water, effects on neighbouring bores, effects on water quality.	If take is within 50% of MAR. Restricted Discretionary Activity – Rule 12.2.3.2A (unless the take is 100 m from a connected perennial surface water body or the other entry criteria cannot be met)	Term of consent – 6 years Information required as per a standard groundwater take. See this practice note.

Fractured rock aquifers

A fractured rock aquifer is an aquifer that stores and transmits water through crevices, joints and fractures in an otherwise impervious rock mass. These are common throughout the mountainous areas of Otago.

The Council's Science Team have confirmed that it is difficult to reliably determine an aquifer boundary and the MAR for fractured rock aquifers. We currently consider take and use applications from fractured rock aquifers as a **discretionary activity** under Rule 12.2.4.1(i).

For applications from a fractured rock aquifer, a **constant rate pump test** must be provided to show that the rates and volumes sought can be taken. The application needs to assess effects on surface water and wetlands, any existing users (or show there is no connection with neighbouring groundwater takes) and assess whether the take will cause contamination of the aquifer. The proposal will also need to address efficiency of use and whether the take is from the nearest practicable source. A fractured rock aquifer take **will be audited by the Council's Science team**.

The allocation framework for groundwater (Policies 6.4.10A1 to 6.4.10A3) as outlined in the Water Plan will not be able to be consistent with for this activity. The application must demonstrate that the taking does not cause any of the effects in Policy 6.4.10A5 based on the best available information.

Surface Water Allocation

The Water Plan provides direction on when groundwater takes are allocated as surface water.

Surface water allocation only

Groundwater takes that are from **Schedule 2C aquifers or located within 100 metres of any connected perennial surface water body** are allocated as surface water only. They are processed under the groundwater rules and consideration is also given to the relevant surface water rule. Effects on surface water are the primary consideration for these groundwater takes although drawdown effects on neighbouring bores and contamination of waterbodies from the taking are relevant considerations.

Groundwater and part surface water allocation

For all other groundwater takes, allocation depends on the level of surface water depletion. This is determined using the methodology in Schedule 5A of the Water Plan. If the surface water depletion of a groundwater take is 5 L/s or more, then the take is **allocated as groundwater and part surface water**. The full quantity of the take (seasonal volume) is allocated from the aquifer and the calculated surface water depletion (in L/s) is allocated from the surface water catchment.

> *For example: if the proposed take is for 20 L/s and 100,000 m^3/year and the take has a 10 L/s surface water depletion effect then, 100,000m^3/year is allocated from the aquifer and 10 L/s from the surface water catchment allocation.*

Note: if the surface water catchment is fully/over allocated then a groundwater take that is connected to surface water can only be granted if the surface water depletion is less than 5 L/s.

Groundwater allocation only

If the calculated surface water depletion for a groundwater take is 5 L/s or less using the methodology in Schedule 5A of the Water Plan, than the take is allocated from groundwater only.

Aquifer Tests

An aquifer test is undertaken to understand the hydraulic characteristics of aquifers. This information is used to estimate potential adverse environmental effects of a groundwater take.

Aquifer tests consist of pumping a bore at a certain rate and recording drawdown in the pumped bore and nearby observations bores at specific times. There are two main types of aquifer tests: **step-drawdown tests and constant-rate tests**. More details on aquifer tests and how these be undertaken can be found in the Practice Note: Aquifer Test Requirements

Aquifer Test not required

An aquifer test is not required when:

1. The take is for 2 L/s or less; **and**
2. There are no neighbouring bores within a 1 km radius; **and**
3. The take is from an unmapped aquifer or an aquifer that has available allocation.

Note: If an aquifer meets (3) but the aquifer is near full allocation then an aquifer test may be required. It is recommended that you contact aquifertests@orc.govt.nz *to discuss whether an aquifer test is required before lodging the application*

An aquifer test is not required for a replacement groundwater take that is seeking rates and volumes that are equal or less than the current consent. More information can be found in the replacement groundwater take and use application practice note.

Aquifer Test always required

An aquifer test is always required when:

1. The take is for 5 L/s or more; and
2. There are neighbouring bores within a 100 metre radius; and
3. The take is from a mapped aquifer or an aquifer that has no available allocation.

Aquifer Test likely to be required

Where a proposal falls between the two criteria an aquifer test is **most likely to be required**. If there are special reasons why an aquifer test is not required, an individual assessment from Council's Science Team can be made. This request should be made by email to: aquifertests@orc.govt.nz .

Aquifer restriction levels

Aquifer restriction levels have been set for some aquifers in Otago. For these aquifers, if the restriction levels are reached all takes that are subject to that restriction level must cease taking. The restriction levels are detailed in Schedule 4B of the Water Plan.

The follow aquifers currently have restrictions on use of water from the aquifer:

- North Otago Volcanic
- Lower Taieri – West
- Lower Taieri – East
- Ettrick Basin
- Roxburgh Basin
- Cromwell Terrace Aquifer

If your take is located within an aquifer that has aquifer restriction levels, these will be applied to your consent.

Other Groundwater Users

When groundwater is abstracted a cone of depression in groundwater levels (drawdown) extends from the bore. This can result in lowering groundwater levels in neighbouring bores and prevent existing groundwater users from taking consented/permitted water rates and volumes.

The Water Plan requires that effects on other groundwater users are considered and Schedule 5B provides a method for identifying groundwater takes potentially affected by bore interference. There are some key parameters about the aquifer that are needed for the Schedule 5B equation, and these can be determined from an aquifer test (see above for when an aquifer test is not required).

What to include in the application

Groundwater take and use applications need to identify neighbouring groundwater users and provide details on these users. This includes their location in relation to the proposed take, use of the water and depth of abstraction. The Council maps – Consents in Otago has a Wells Otago layer that has the location of all known bores in the region. It is recommended that these locations are confirmed, where possible. There are details about each well/bore in Otago Maps that can be used to support an application.

The application should include details about the aquifer tests undertaken, analysis and commentary on effects to neighbouring bores. An analysis in accordance with Schedule 5B must be undertaken by a suitably qualified professional and submitted with an application. If this analysis shows that there is likely to be significant interference on neighbouring bores, the application should outline mitigation measures to maintain existing bore holder's access to groundwater and/or undertake consultation with these bore holders.

Groundwater Quality

Effects from taking groundwater

The cone of depression created by groundwater abstraction may extend to areas where there could be the potential of groundwater contamination (i.e. from contaminated sites, landfills or effluent discharges), hastening migration or recharge of contamination through the aquifer.

What to include in the application

A groundwater take application should include the following to assess this effect:

- Identification of any potentially contaminated sites in the vicinity of the groundwater take (the *ORC HAIL Register layer* in Consents in Otago shows these sites with details of contamination status)
- Identification of any consented discharges in the vicinity of the groundwater take – use the *Resource Consents layer* in Consents in Otago)
- Identification of any known permitted activity discharges
- Assessment of potential contamination based on the location of the sites and cone of depression
- An outline of whether groundwater monitoring is proposed

Effects from using groundwater for irrigation

This will be most relevant where the water is proposed to be used for irrigation. Use of water for this purpose can increase contaminant loads within a catchment via drainage or overland flow, particularly when the use results in more intensive land use.

What to include in the application

- outline the existing known water quality of groundwater. The Council collects information on key water quality parameters for waterbodies in the region which can be found on the ORC Environmental Data Portal. Land, Air, Water Aotearoa (LAWA) also has information on water quality
- identify sources of diffuse discharges and assess how these discharges affect groundwater quality. This could include some form of nutrient modelling.
- outline measures to mitigate water quality effects from the use of water. This may include:
    - the installation of efficient application systems (which will limit overland flow and leaching),
    - the installation and use of targeted or precision irrigation that is timed with soil moisture conditions, weather forecasts and plant requirements
    - irrigation scheduling
    - limits on stocking intensity and nutrient inputs.

Stream/Surface Water Depletion

Groundwater takes that are hydraulically linked to surface water bodies can have adverse effects on the values of those waterbodies.

Calculating stream/surface water depletion

Stream and surface water depletion for a groundwater take is calculated by a suitably qualified groundwater scientist using the equations in Schedule 5A of the Water Plan. The outputs from these calculations determines whether the groundwater take is allocated from groundwater only or both groundwater and surface water.

Surface water allocated groundwater takes

Groundwater takes that are from Schedule 2C aquifers or located within 100 metres of any connected perennial surface water body are allocated as surface water only. Effects on surface water are the primary consideration for these groundwater takes. As these groundwater takes are allocated as surface water only, the application should follow the guidelines for surface water takes. See practice note: New surface water and connected groundwater take and use applications.

Groundwater takes allocated as part surface water

Where the stream depletion effect of a groundwater take is 5 L/s or more, then part of the take is allocated as surface water and the specific effects of taking that surface water needs to be assessed in the application. The application should address effects on flows, aquatic ecosystems, amenity values, recreational values, water quality and the spiritual and cultural values of the water body. See practice note: New surface water and connected groundwater take and use applications.

Groundwater takes with less than 5 L/s stream depletion effect

The Water Plan indicates that groundwater takes that have a less than 5 L/s stream depletion effect are not allocated as surface water. Such takes may have some effect on adjacent surface water and the level of these effects will need to take into consideration the flows and values of the surface water body and number of groundwater takes that may be having a stream depletion effect (i.e. cumulative effects). The permitted activity baseline can also be considered and applied to these effects. This means that the relevant permitted activity rule for taking from surface water can be noted and this portion of the take not considered when assessing the effects of the take.

> *E.g. A proposed groundwater take is for irrigation purposes. It is assessed under Schedule 5A as having a 3 L/s depletion effects on a nearby river and the river/aquifer are located in the Central Otago sub-region. The relevant permitted activity rule is 12.2.2.6. This allows up to 0.5 L/s to be taken as a permitted activity subject to terms and condition. If the permitted activity baseline is applied, the application could be assessed only considering the effects an additional 2.5 L/s take would have on the river.*

Groundwater takes where stream depletion is unlikely

In some situations, the nature of the aquifer or nearby surface waterbodies may mean that stream depletion is unlikely. This could be due to the following:

Adjacent surface water body

- Has an impermeable bed
- Is ephemeral, or dry for extended periods, containing or conveying water only in episodes of high runoff
- Is separated from the underlying water table by an unsaturated zone, decoupling the interaction into a one-way loss of surface water from the surface water body.

Groundwater system/aquifer

- Has very low permeability (e.g. schist fractured rock aquifers)
- Has very steep gradients or perched water tables adjacent to surface water body boundaries
- Does not influence surface water due to the depth of the bore or well screen

If any of the above is likely to be present the application should outline this and provide justification and assessment for why there is unlikely to be stream depletion from the groundwater take.

Note: where an application seeks to not apply Policy 6.4.1A and be allocated as groundwater only, the activity is considered ***discretionary***[10].

Wetlands

Regionally Significant Wetlands

The application will need to identify if there are any Regionally Significant Wetlands or wetlands with regionally significant wetland values in the locality of the proposed take. If identified, the application must include an assessment of whether the proposed groundwater take could affect these wetlands. You can find more information on Regionally Significant Wetlands and wetlands here: Regionally Significant Wetlands.

Natural Inland Wetlands

For **discretionary and non-complying** groundwater take applications, you will need to identify any natural inland wetlands within the vicinity of the site. If there are natural inland wetlands that could potentially be impacted by the proposed take, effects on these wetlands will need to be assessed and considered in the application.

Efficiency of Water Use

The Water Plan directs that the quantity of water granted to take is no more than that required for the purpose of use. Rates and volumes that are efficient will be recommended to be imposed on the consent. You can undertake this assessment yourself or ask Council to undertake this when we process your application. Below is advice on how to assess efficiency for different uses of water:

Irrigation

The Council uses guidelines prepared by Aqualinc to assess efficiency for different crops. This takes into consideration the local climate and soils within the irrigation area. A copy of the guidelines can be found here: Aqualinc guidelines

Aqualinc provides recommended seasonal volumes based on an average year; a one and two-year drought (80th percentile); a one in ten-year drought (90th percentile); and a maximum situation. For Otago it is

[10] See wording in Schedule 5B of the Water Plan

considered that a one in ten-year drought or 90th percentile is most appropriate when considering efficient water use. This aligns with other regional councils.

There are four main inputs to determine what is efficient volumes of water for irrigation purposes:

1. Geographical zone (Central and Lakes District, Maniototo, North Otago, Coastal & South Otago)
2. Mean annual rainfall (MAR)
3. Plant available water (PAW)
4. Crop type category (Pasture, Viticulture, Cherries and Apricots, Vegetables)

How do I find the geographical zone and MAR for my land?

The MAR is the mean annual rainfall class for your land. You can find this on the Council maps Consent Locations using the layer: *Aqualinc Mean Annual Rainfall Class*. When you click on this layer at the property it will also show you which geographical zone you are located in.

How do I find the PAW for my land?

- **Log into S-Map online:** Maps | S-Map Online | Manaaki Whenua - Landcare Research. You may need to set up an account.
- **Find the property using the search function:** Make sure the Soils Box is checked on the left under Layers and also the NZSC Soil Order.
- **Click on the area where water is to be used for irrigation:** A feature report box will appear on the right hand side. Click the link to the soil description report and download the factsheet. Find the profile available water figures under the Soil Physical Properties. Example below:

Profile available water		
(0–30 cm or root barrier)	(0–60 cm or root barrier)	(0–100 cm or root barrier)
Moderate (31 mm)	Low (47 mm)	Moderate to low (62 mm)

- **Find the relevant PAW for your crop type:** Plants can only abstract water where their roots grow and different types of plants have different rooting depths:
    - Pasture: 60 cm
    - Viticulture: 90 cm
    - Horticulture: 100 cm
    - Vegetables: 50 cm

  In the example above for pasture, the PAW would be *Low (47 mm)*

- **Find the Aqualinc PAW class:** Use Appendix C of the Aqualinc report to find the PAW class. For the example above, Table C.1 shows that for a PAW range of 20-50 mm a PAW class of 40 mm is used.

How do I use the table in Aqualinc to find the volumes?

- Go to Chapter 6 of the Aqualinc report and select the relevant table based on the crop type

- Find the relevant Zone, MAR and PAW category and record the maximum monthly demand (mm/month) and 90% annual demand (mm/year). Add a zero to each of these numbers to convert them from mm/month to cubic metres per month/year.
- Multiply these numbers by the land area (in hectares) to be irrigated to calculate the efficient monthly and annual irrigation requirements.

What if I have site specific soil information?

If you have site specific soil information (i.e. from soil samples on the property), this is considered to be the best available information for soils at the site. You will need provide evidence that the samples represent the irrigation area that is being applied for. The PAW value of the soils will then need to be considered based on the crop type and rooting depth. Appendix C of Aqualinc can then be consulted to determine the PAW class in Aqualinc.

What if the crop type is not in Aqualinc?

Aqualinc does not consider all crop types. You will need to consider the rooting depth of the crop with the key crop types modelled in Aqualinc. We recommend that the closest available crop type is used. Alternatively, research data regarding crop water usage could be used to support an application.

What if I have different crop types and/or PAWs on my site

You will need to undertake this assessment for each area of different crop type and/or soils on the site. We suggest you create a table/use a spreadsheet to show the workings.

Frost Fighting

The Council does not have published recommendations for water requirements for frost protection in the Otago region. The Council uses recommendations by Environment Bay of Plenty (EBOP) of 2.5 to 3.0 mm of water per hour per hectare (usually applied for up to 10 hours), up to a maximum of 30 days per year.

A condition will typically be imposed that requires the consent holder to record the duration and volume of water used during each frost event. This is to obtain a better understanding of frost fighting requirements at that specific location. This data will be helpful for future applications.

How do I calculate the total water volumes and consent conditions?

Irrigation is usually not occurring during periods when there are frost events. The irrigation and frost fighting volumes will be separated out on the consent so that the frost fighting water can only be used for that purpose. Below is an example calculation.

> *Example: 10 frosts a year, over 10 hectares, 5 hour duration each frost, 3 mm/ha application, equals 1,500 m^3 per event, and if there are 10 events this equates to 15,000 m^3 required in total. This means that the frost fighting requirements are:*
> - *1,500 m^3 needed a day*
> - *15,000 m^3 needed in a month (all ten events could happen in a month)*
> - *15,000 m^3 a season.*

Domestic Supply

The following is considered efficient for domestic water supply per household:

- 1,000 L/day for winter and later autumn/early spring
- 3,000 L/day for summer and the growing season. This provides for minor curtilage irrigation (gardens etc) around a house. It does not provide for irrigation of paddocks or orchards on a lifestyle block. Specific irrigation water needs to be sought for this.
- Equals an average of 2,000 L/day throughout the year.

Some local authorities may require through their subdivision consents a requirement to have access to greater daily volumes than this. If extra water is required to meet local authority subdivision consents this will need to be obtained from other sources (e.g. rainwater tanks).

Stock Water Supply and Dairy Shed Supply

The following rates are considered to be reasonable and efficient for the stated animals.

Sheep	5 litres per day per head
Beef cattle	45 litres per day per head
Dairy cows	70 litres per day per head
Deer	15 litres per day per head
Dairy cow and Dairy shed use	95-140 litres per day per head

If you are seeking to take more water than this, you will need to provide evidence and explanations as to why this is necessary for the site and animals.

Do I need a water permit for conveying stock water?

In some cases, additional water may be required to transport water to the stock drinking end point (i.e. water to enable conveyance). This should not form part of a new stock water supply scheme.

If water is being taken for conveyance this is a separate 'use' of the water and Council will need to consider what happens to this additional water at the end of the conveyance system. If it is being used for irrigation or other consumptive purposes, then this needs to be factored into the efficient quantities for those purposes. If it is discharged into the same or a different water body, then discharge permit requirements will need to be considered as well as overall efficiency of this use of the water.

If stock are drinking direct from a river is a permit required for taking and using stock water?

As there is no control of this taking of water, no defined point of take and no ability to measure the take, stock drinking directly from a river do not require a consent. The s14(3) requirements of the RMA may be relevant in this instance.

If water is taken out of a water body at a defined point or points and into distribution infrastructure for stock water supply then water is being taken and used for stock drinking. Section 14(3) of the RMA, the permitted activity rules in the Water Plan and consent requirements in the Water Plan need to be considered.

Will stock drinking water be included on the consent if it is a permitted activity or if I can meet s14(3) of the RMA?

In most cases, if stock drinking water is being taken at the same point of take as water being taken for other consumptive purposes that require consent, then the stock drinking (and any domestic water) is

considered and included on the consent. This ensures that measuring records are not complicated i.e. if the meter captured all water taken and the stock water supply was not part of the consent rates and volumes the consent holder may end up with potential breaches of their consent and it would be challenging to prove/disentangle the stock and domestic portion from the consented portion.

Other Drinking Water Supplies

The Wastewater Guidelines (AS/NZS 1547:2012) provide an indication of wastewater volumes for a variety of drinking water supplies. These guidelines can be referred to for different sources. It may be appropriate in some situations to provide a small additional allowance for volumes that will not enter the wastewater system.

If you have actual use data, this should be provided and summarised with the application. It is recommenced that details on any projected population growth over the proposed consent term are included and that volumes sought reflect this.

Source	Volume allowance (L/person/day)
Motels/Hotels	
Guests, resident staff	220
Reception rooms	30
Bar trade (per customer)	20
Restaurant (per diner)	30
Restaurant/Bar/Cafe	
Per dinner patron	30
Per lunch patron	25
Per bar patron	20
Lunch Bar	
Without restroom facilities	15
With restroom facilities	25
Community Halls	
Banqueting	30
Meetings	15
Marae	
Day only visitors	40
Day plus overnight visitors	150
Schools	
Pupils plus staff	50
Public toilets	
Including hand washing	20
Camping Grounds	
Fully serviced	130
Recreation areas	65
Care Facilities	
Rest homes	250
Hospitals	450
Retirement Home	
Per resident	220
Per day staff	50
Day staff	
High water use e.g. factories	60
Standard facilities	40
Facilities with full water fixtures Reduction	30

Other Uses

You will need to consider and reference any relevant industry standards, research or other information to support the efficiency of the volumes of water requested. Other uses will be considered on a case-by-case basis.

Cumulative effects

Cumulative effects only need to be considered for **discretionary and non-complying** groundwater takes. It is not a matter of control or discretion for the controlled activities and restricted discretionary activities in the Water Plan.

The definition of 'effect' in the RMA 1991 includes cumulative effects:

> *(d) Any cumulative effect which arises over time or in combination with other effects*

Cumulative effects include the effects that may arise over time if the take is approved and in combination with other takes or activities (e.g. discharges). *E.g. when there are multiple takes that result in the abstraction of water from the same aquifer the adverse effects of each individual take may be acceptable but when all takes are considered together these effects could be significant.*

For groundwater, cumulative effects are typically managed by the allocation limit and any aquifer restriction levels that have been set for the aquifer. The bespoke or default allocation limit is intended to ensure there is adequate groundwater in the aquifer for maintaining natural and human use values in the aquifer and connected surface water. Take and use activities from these aquifers are typically considered restricted discretionary activities and cumulative effects do not need to be considered.

Assessing cumulative effects

The following factors can be considered when assessing cumulative effects for a new groundwater take that is **discretionary or non-complying**:

- Identifying the known characteristics of the aquifer
- Identifying whether the proposed take is located within an aquifer defined in the C-series maps of the Water Plan and whether recent science or data has updated our understanding of this aquifer
- Identifying how many other groundwater takes are taking from the aquifer within the receiving environment[11] (this includes permitted activities and consents that have not yet been exercised but are granted)? The Council's mapping system shows the location of all consented groundwater takes and bores.
- Considering whether the take will have any actual or potential adverse effects on the aquifer, neighbouring bore owners, surface water (non-consumptive takes may have limited effects)
- Considering the timing of the existing take and use activities in the aquifer and whether these overlap and/or are at a times of low flows in a river/low water levels in a wetland?
- Considering what effects the combined takes will have on water availability from the aquifer

[11] More information on the receiving environment can be found here in the Practice note: Baseline and existing environment

- Considering what the likely nature and degree of additional cumulative effect caused by the new proposed take is, the reliability of the evidence to such effects and significance of effects
- Considering whether there are conditions that can be imposed to sufficiently avoid, remedy or mitigate the adverse cumulative effects (e.g. conditions that relate to the location or timing of the take)

Cultural Values

Effects on cultural values is not a matter of control or discretion for activities processed under the **controlled or restricted discretionary** rules and **does not need** to be assessed for these activities.

For **discretionary or non-complying activities** the application will need to identify cultural values that could be affected by the groundwater take and assess the effects on them. Where there is connection to surface water, there is a greater potential for effects. It is suggested that consultation be undertaken with iwi prior to lodging an application in that instance.

In the Otago region there are two main iwi organisations that liaise with runaka: Aukaha (across the region) and Te Ao Marama Incorporated (activities south of the Clutha River/Mata-Au).

More information about documents that can be considered to determine values and lodging an application for review with these iwi organisations can be found on their websites:

- Mana Taiao - Aukaha – Kia kaha, aukaha
- Services — Te Ao Marama
- Resources — Te Ao Marama

For activities in the Waitaki catchment, there is the Waitaki-iwi-management-plan to consider.

Measuring of the Take

The Water Plan requires water takes to be measured unless it is 'impractical or unnecessary to do so'. The Water Measuring and Reporting Regulations 2010 and amendments 2020 prescribe the minimum requirements for measuring consumptive takes of 5 L/s and above.

The Council requires all consented groundwater takes to have a water meter, a datalogger to record the information and for the data to be sent daily to Council via telemetry. Standard measuring conditions aligned with the Regulations are imposed on a groundwater permit.

Telemetry exemptions

Telemetry exemptions can be applied for when it is not possible to get cell service at the point of take. These exemptions are issued on an annual basis. They must be applied for between July and December each year for the following water year.

Types of measuring devices

Council is currently phasing out the use of mechanical or clamp on water meters as they are less reliable and prone to measuring errors.

More information on measuring requirements

More information about water measuring and water measuring exemptions can be found here: Water metering and measuring | Otago Regional Council

Statutory Assessment

The application forms have details of the potentially relevant objectives and policies in the national instruments and regional plans that apply to groundwater takes. You can consider these provisions individually and provide a summary of how the activity is consistent with each. Alternatively, you can consider the relevant provisions in each document and provide a summary statement for each document.

Policy direction for groundwater takes

In addition to the above, the application should provide an assessment on:

- Alternative water sources – what are these and why they are not suitable
- If the water is used for irrigation – avoiding irreversible or long-term degradation of soils arising from the use of water for irrigation
- Water management groups/rationing regimes – do any of these exist in the aquifer and will the consent be operated in accordance with them
- Positive effects of the activity

Consent Term

All water take and use applications in the Otago Region are limited to a **maximum 6-year consent term**. This is in accordance with s127B of the Resource Management Act. This 6-year term typically applies from the issue date.

It is recommended that replacement applications are made at least 6 months before the consent expires. Advice on replacement groundwater take use applications can be found in the Practice Note Applications To Take And Use Groundwater.

Ready to Apply?

Details on application forms, fees and changes and how to lodge an application can be found here: Apply for a Consent – Resource Consent Applications & Support.

Form 1 and Form 5 can be used to lodge a groundwater take application.

What if I have other questions?

If you would like clarification on the above or have any additional questions, please get in touch with us via consent.enquiries@orc.govt.nz