

what you need to know before you build a dam in the Auckland region

Damming is a popular water supply option in the Auckland region, where streams are often too small to support a satisfactory water supply. Auckland's dams range in size from the large municipal water supply dams in the Hunua and Waitakere Ranges to small farm stock watering dams.



Some dams are built in flood-prone areas not to store water for use, but to temporarily store stormwater runoff in order to reduce peak flows further downstream. This reduces the impact of heavy rain storms in areas prone to flooding or erosion. These 'detention' dams are often publicly owned. They must be designed, constructed and maintained to a high standard, especially when they are located upstream of housing areas or other types of urban activity where people could be at risk if the dam failed.

With the creation of 'lifestyle' properties, it has become common for dams to be created for purely aesthetic reasons. It can come as a surprise that many of these structures are not in fact an environmental enhancement, and can in fact be quite the opposite.

Most dams however are built for water supply purposes - they collect and store water during the winter period when there is ample rainfall, for use during times of low rainfall. This is particularly important in the Auckland region, where many of our small streams reduce to a mere trickle, or actually dry up during summer.

What authorisation do you need before you build a dam?

All dams require authorisation from ARC under the Resource Management Act before they are constructed. If a dam complies with certain criteria, it will be a Permitted Activity. If it does not, then you will need to apply for a Water Permit and a landuse consent to carry out the associated stream works, before you can build it.

The difference between a dam which is a permitted activity and one which needs a water permit depends on whether the dam site is stream an 'on or off-stream' location, the size of the dam, its catchment area and the extent of its effects on the environment.

Do you also need a water permit to take water from a dam?

YES - if the water is to be used for a purpose other than providing water for stock or firefighting, a separate water permit is required from ARC to take water out of your dam. Please check with us if you are not sure about your use. Call ENVIROLINE on 0800 80 60 40.

Do you need any other permits?

Check to see if your District or City Council requires a Building Permit for your dam - their interest will be with the integrity of the dam structure.

But remember that all dams require authorisation from ARC prior to their construction, because of the potential for them to cause adverse effects on other people or the environment.

Significance to Tangata Whenua

Your proposed dam could be located on a site of cultural and spiritual significance to Tangata Whenua, or affect traditions related to particular waterways. You need to consult with local Iwi to find out if your proposal will affect Tangata Whenua. ARC can provide guidance on the appropriate Tangata Whenua to contact and the most appropriate means of consultation.

Call Enviroline on 0800 80 60 40.

Cultural Heritage

Have you made an assessment of the effects of your proposal on historic places and historic areas? If any archaeological sites are located in the area, you will require an authority from the New Zealand Historical Places Trust to modify them. An

archaeological site survey may be necessary. Information relating to historic places and areas may be obtained from your Local District Council or ARC. Call Enviroline on 0800 80 60 40.

Before you go any further...

Before you apply for consents for your dam, consider the following:

Effects Dams can prevent the migration of native fish, cause reduced summer low flows, and contribute to degraded water quality and loss of freshwater habitat. The effect of several dams in any one catchment can be significant because streams in the Auckland Region are small.

Alternatives In view of these potential effects, ARC encourages landowners to consider other ways to enhance their properties. Fencing streams and planting their margins with appropriate native species is generally accepted as being the best way to improve stream habitats and ensure sustainability of our waterways.

Quantity Will the dam be able to store enough water to meet your needs? Many horticultural crops require at least 2,000 cubic metres (440,000 gallons) of stored water per season per planted hectare. Your dam will need to store more than this, to allow for losses from the impoundment due to evaporation or leakage.

Location in the catchment The ARC discourages the construction of dams in 'perennial' rivers or streams (which flow all year), unless there are no alternatives. Locating dams in an 'off-stream' location (usually not maked on a 1:50,000 scale topographical map) will generally have lesser environmental effects.

Catchment Yield Does the dam's catchment yield enough water to fill the dam before the start of the irrigation season? It should be able to be filled up by the start of November. Considering issues of dam location, it may not be worth building if the catchment above is not big enough to ensure there's water in it when you need it.

If your dam design has inadequate storage capacity and would rely on being replenished from the stream during periods of higher water demand, your water permit application may not be granted.

Water quality Will the water stored in the dam be of suitable quality for your intended use? Water quality can change when water is stored in a dam,

and it may then be unsuitable for some types of use.

Neighbours Will the dam affect any upstream or downstream neighbours? Dams constructed across streams block off stream flow to downstream neighbours who may rely on the stream for their water supply.

Spillways, or emergency overflows, are necessary to protect a dam during storms, but must be well designed to avoid damage to downstream property or the passage of fish. Upstream neighbours' properties can also be adversely affected by a dam where impounded water floods the land above it.

In either case, legal action to have the dam removed can result - so think ahead and don't build too close to boundaries! ARC have produced guidelines for construction of minimal hazard earth dams (ARC TP 109, June 2000). For details contact Enviroline on 0800 80 60 40.

Safe Construction Earth dams should be constructed by contractors experienced in this type of work - check that they have the correct equipment to achieve the compacting that is needed for earth dams to be stable and safe.

By-passes On-stream dams interrupt flows providing water for users further downstream, or they may block important fish migration routes. In either case, construction of a special by-pass will be necessary to maintain instream habitats, enable movement of fish, and to pass water downstream.

Consider relocating your proposed dam to an alternative off-stream site which will have a lesser impact on water resources or instream ecological values.

Permitted activities If your proposed dam is off-stream, its catchment area is small and will not have a serious impact on the environment or other users, the dam may qualify for a Permitted Activity Authorisation.

But you need to contact us before you start construction, so we can assess whether or not your proposal meets our criteria for permitted activities.

Lead times Processing permit applications to construct dams which may have greater effects on the environment or on other users can take several months, because of the processes the law obliges us to follow. If submissions are received, processing your consent could take over three months.

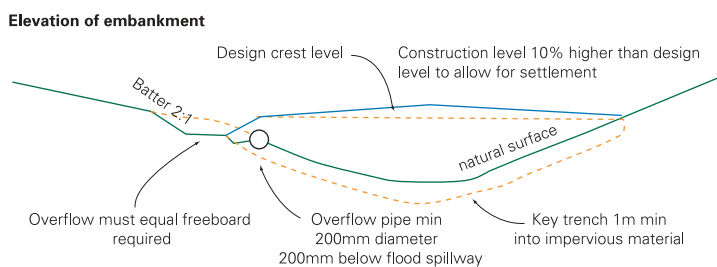
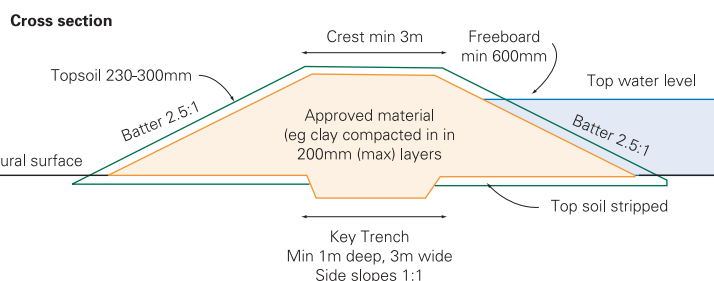
It's a good idea to apply for your water permit and land use consent at least three months before you want to build the structure.

Maintaining you dam

Should your dam fail, you are responsible for any consequent effects. To reduce the risk of the dam collapsing, you need to take some simple precautions.

Floods Your dam needs to be in a fit state to resist damage by floods, so you need to ensure that both the dam and the spillway are adequately maintained at all times. Check for cracks, surface erosion, movement or leaks and call your engineer immediately if you see any.

Trees Do not grow trees or large vegetation on or near the embankment, because they can weaken the dam's structural stability and inhibit routine monitoring of the condition of the embankment.



Other Points To Note...

Engineering Checks Most dams, depending on their size and location, will require some form of engineering evaluation. The spillway must be designed to cope with the 100 year return period flood flows from the upstream catchment. In some cases, a registered engineer will be required to design and supervise construction of the dam. Once constructed, ARC are likely to require checks to ensure the dam remains in a good state of repair.

Stock You should fence your dam to prevent livestock trampling the structure and causing erosion of the dam face.

Aquatic weeds

If you are building, altering or clearing a dam, please ensure that any machinery coming onto your property is clear of any aquatic plant material, to help prevent the spread of noxious water weeds. Similarly, make sure any machinery leaving your property is free of aquatic plant material.

Clean machinery thoroughly with a high pressure hose or water blaster, in a place where plant material can't enter a waterway.

When cleaning sediment and other material from a dam, dispose of it in a place where it can't run-off into a waterway, in order to prevent the spread of any noxious plants. Try to put cleared material in secure places, such as a hollow in a paddock well away from water bodies. Check with ARC beforehand to find out whether any authorisation is required.

Wetlands - A 'real' alternative to dams!

Sometimes people ask us if they can drain a "nasty swamp" in order to replace it with a "nice pond" behind a dam. Often they want to create a wildlife habitat or look out over a pond for aesthetic purposes. But some of the many habitat values wetlands have include:

- reduce peak flood levels during storms
- store water and maintain summer water flows downstream
- allow sediment to settle out, improving downstream water quality
- provide recreational opportunities such as bird watching
- provide habitat for some of New Zealand's rare and vanishing plant and animal life
- enhance wildlife values and landscape appeal in farming areas, and much more.

If you have a wetland on your property, observe it for a while and you will see an enormous variety of bird and other wildlife. If it looks a bit untidy to the eye, try fencing it to prevent stock access and you will see the plant cover thicken up at the edges, improving its appearance and reducing erosion and stock loss at the same time. Wetlands are scarce in the Auckland region and deserve our protection.

For more detailed information on wetlands in the Auckland Region, contact ENVIROLINE on 0800 80 60 40.

Thinking of building a dam?

For further information, call Enviroline on 0800 80 60 40, contact your local District Council or a consulting engineer.