

Stormwater Facts

Stormwater quantity effects

What is the effect of stormwater on hydrology?

Increased development in the Auckland Region has changed the character of the natural landscape. It has resulted in the creation of impervious surfaces through housing, shopping centres and office buildings, as well as roads and car parks.

Although this infrastructure allows for the successful operation of the city, the extent of impervious surfaces have a major effect on hydrology.

Impervious surfaces stop water soaking into the ground, and instead divert it across the surface. This increases the quantity and rate of water discharging to streams, estuaries and the coast. These changes in the hydrological cycle may cause flooding, stream erosion, sedimentation, and sometimes loss of water for abstraction. Flooding and erosion can have direct effects on public safety, while erosion and sedimentation can affect the habitat of aquatic resources.

Flooding adjacent to streams occurs naturally, but urbanisation can increase flood levels due to either an increase in peak flows, or where an obstruction in the stream channel reduces the flow capacity. Filling in floodplains can also cause flood levels to rise.



Stormwater Detention Pond

How do we manage this?

The ARC aims to manage stormwater quantity effects by:

- Minimising changes to hydrology to prevent erosion and flooding
- Managing the volume of water to prevent erosion and flooding
- Preventing local scour at stormwater discharge outlets
- Preventing filling of and development within the floodplain to allow the safe passage of flood flows and prevent existing properties from being flooded

ARC technical publications outline several ways to achieve these aims:

- Use stormwater management devices (such as ponds, wetlands, rain gardens, swales, rain tanks) to reduce post-development peak flow rates for the 2, 10 and 100 year Average

Recurrence Interval (ARI) rainfall events to pre-development flow rates.

- Prevent future development from being allowed within the 100 year ARI floodplain and ensure that flood levels from a 100 year ARI storm do not rise within 0.5 m of a habitable floor level in any dwelling.
- Provide extended detention by attenuating rainfall and releasing it slowly in order to prevent downstream channel erosion (see Fact Sheet 4 for more information).
- Design erosion protection at stormwater outlets to prevent local scour.
- Stormwater volumes and flow rates can be calculated and analysed using the ARC Technical Publication 108: *"Guidelines for Stormwater Runoff Modelling in the Auckland Region"* (April, 1999).



Wairau Creek under low flows



Wairau Creek under storm flows

Further information

More information about stormwater calculations, management and devices, can be found in:

- ARC Technical Publication 108: *"Guidelines for Stormwater Runoff Modelling in the Auckland Region"* (April, 1999)
- ARC Technical Publication 10: *Stormwater Management Devices: Design Guidelines Manual* (second edition May 2003)

Both documents, as well as all the stormwater fact sheets, are available to download from the ARC website: <http://www.arc.govt.nz>

Alternatively, you can contact ENVIROLINE on (09) 366 2000 for more information regarding stormwater consents.

THE BIG CLEAN UP.
www.arc.govt.nz



Auckland
Regional Council
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