



# Wonderful Water Walks

## A History of Water Supply Dams in the Wellington Region



### Introduction

Dams have played a central role in the development of water supply in the Wellington area. Between 1874 and 1930, no fewer than nine dams were built (excluding Kaitoke weir – 1956) to supply the local water needs of various communities, which are now the cities of Hutt, Porirua Upper Hutt and Wellington. Today, water supply to the four cities is integrated. The Regional Council's bulk supply system encompasses three water sources and modern treatment plants, a network of pipelines and enclosed reservoirs, to ensure the supply needs of each city are met. Only one of the dams is now part of the regional water supply system, the others have been retired for various reasons.

Prior to the completion of the Karori water supply scheme, Wellington City's water reticulation was limited to a few pipes laid by the government to supply their various buildings and the naval vessels in port. For the residents, the only sources of water were from wells and streams.

### Karori Water Supply Scheme

Wellington's first public water supply, the Karori Waterworks, was completed in 1874. It was hailed as a long-term solution to the city's water problems. Just four years later however, there were severe water shortages in the city.

The Karori Supply Scheme comprised an earth dam in the Kaiwharawhara Stream, and water was piped through a tunnel into the head of Aro Street, filling a concrete basin. The lower Karori Dam construction began in 1871 and was completed in 1874. It was the first of four dams in the surrounding region designed to serve the Wellington water supply, and held approximately 4.5 million litres. This was the first dam in New Zealand to be built by a municipality, and used the British "puddled clay core" construction method (for detail see "Walls for Water" – R.E. Offer). The remaining lake is now a focus for the Karori Wildlife Sanctuary.

The Karori Supply Scheme was designed to provide water for a population of 7 – 8000, at 135 litres per day. By 1878 this supply was already inadequate. Part of the strategy for increasing supply was the Upper Karori Dam, completed in 1908. It is a concrete gravity dam built on a curve of 90 metres radius, the top water level being 20 metres above the bed of the stream below. The top water level of the new reservoir was 35 metres higher than the old reservoir and had a capacity of 284 million litres. It was decommissioned for safety reasons in 1991.

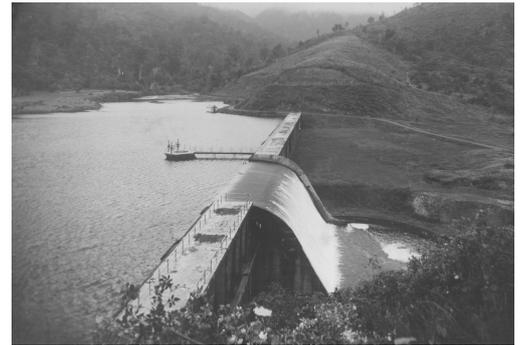
## Wainuiomata / Orongorongo Water Supply Scheme

In 1878 Wellington's railway station caught fire and there was no water in the pipes to fight the blaze, prompting the search for a new water source for Wellington. The Wainuiomata Valley, 27 km from Wellington, was chosen and land was purchased from 1878 to secure the catchment area - 8,400 acres were eventually bought to ensure the purity of the supply.

In 1878 work began to build a small concrete dam on the Wainuiomata River and 27 kilometres of pipe laid to Wellington. Flooding and pipe bursts created many problems during construction (1881-83) and in the years immediately following, but by 1887 the Wainuiomata Scheme provided 176 litres of water daily for 26,000 people and was expected to provide enough water for double that number.

Initial confidence in the abundance of the Wainuiomata supply led to water being used for all manner of schemes, including hydraulic lifts and street lighting. In addition, massive population growth and the development of new boroughs resulted in further water shortages. In 1900 the city council called on the City Engineer to find a means to increase water supplies.

A larger concrete dam at Wainuiomata was recommended as part of the solution, but ratepayers rejected the plan. In 1904 a series of earthquakes, floods and drought further highlighted the need for additional supplies, and the proposal was accepted. The completion of the dam (1911) and laying of a second pipeline from Wainuiomata to Karori (1912) increased the capacity of the Wainuiomata supply by almost 2.9 million litres per day. The dam, measuring 164 metres long by 12.5 metres high, was named The Morton Dam after the City Engineer.



The population of Wellington and surrounding boroughs continued to grow. The years 1915-17 were the three driest consecutive years on record and the city's reservoirs were almost emptied before the rains came. This happened again in 1919, resulting in the council being advised to develop the Orongorongo Valley as its next source of water.

Work commenced in 1921 to build weirs on the Orongorongo River and two smaller tributaries, a tunnel to link the Orongorongo Valley to the Wainuiomata Valley (3.2km) and a further 34km of pipeline to deliver the water to Karori reservoir. The major problem with the project was access. Light material was carried into the Orongorongo Valley over a 6.5km pack track, rising to 300 metres. Heavy materials had to be transported by truck to the mouth of the Orongorongo Stream, a distance of 45km. From there, horse teams hauled the material a further 22km up the bed of the river to the mouth of the tunnel. About 600 tons of steel water pipes, cement, timber and compressing plant were carried by this route. The project was completed in 1926, increasing supply to Wellington by 27 million litres per day.

Water supplies from the Wainuiomata-Orongorongo catchment area were first chlorinated in 1963. A permanent chlorination and fluoridation plant was installed in 1965.

In 1989 the Morton Dam was decommissioned in response to concerns about its ability to withstand a major earthquake or flood. The reservoir was drained and the dam breached at its western end to allow passage of water from the Wainuiomata River and George Creek. At the same time, weirs and intake structures were built on the Wainuiomata River and George Creek to retain water supplies from those sources.

### **Wainuiomata Treatment Plant**

Today, five river intakes supply water to a modern 'full treatment' plant at Wainuiomata (completed 1993), next to the Morton Dam site. The Wainuiomata treatment plant has a capacity of 60 million litres daily (ML/d), however normal production from the plant is around 30 ML/d. Weirs on the Wainuiomata River and George Creek provide around 15 percent of our annual water supply volume. In the Orongorongo Valley, weirs on the Orongorongo River, Big Huia Creek and Little Huia Creek provide around 5 percent of annual supply.

Normally, water from Wainuiomata treatment plant is supplied to Wainuiomata and, via pipes along the Petone foreshore and Hutt Road, to central Wellington and its southern and eastern suburbs. Our distribution system allows for water treated at Wainuiomata to be supplied to Porirua and Upper Hutt if necessary. This helps to provide security of water supply to Wellington's four cities.

### **The Hutt River Scheme**

The Hutt River was first recommended for a water supply scheme in 1929, but the estimated cost of the project resulted in the plan being shelved in favour of developing cheaper artesian sources beneath the Hutt Valley. By 1943, growth of new urban areas (Tawa, Johnsonville and Porirua) and the offer of government funds saw planning commence for the Hutt River Scheme, which was completed in 1957. Water was first supplied to Upper Hutt City in 1954.

An eight metre high weir was built on the river at Kaitoke, designed to raise the river's height by four metres and allow flow by gravity into a 0.7km tunnel. The tunnel connected to a strainer house, consisting of rotary strainers to remove sediment and larger material. From there the water enters a 3km long tunnel and emerges in a chamber at the foot of the hills north of Upper Hutt. A supply pipeline was progressively extended southward to the lower Karori dam. A chlorine disinfection plant was built at Kaitoke in 1965 to disinfect water supplied from the Hutt catchment, and fluoride was introduced in the same year.

The Hutt water catchment area covers 8,963 hectares of mountainous terrain at the southern edge of the Tararua Ranges. Rainwater collects in streams that flow into the Hutt River.

## ***Te Marua Treatment Plant***

In the early 1980's, planning began for a modern treatment plant and water storage facility at Te Marua, which were completed in 1987. The treatment plant has a maximum capacity of 140 million litres daily (ML/d) but normally treats around 60 ML/d.

Normally, water treated at Te Marua is supplied to Upper Hutt, over Haywards Hill to Porirua and on to Wellington's northern and western suburbs. The Te Marua-Wellington pipeline is 56 kilometres long and has major pumping stations at Te Marua, Haywards Hill and Ngauranga.

Two purpose-built storage lakes provide a reserve of water for treatment when river levels are too low to meet demand, when the water is highly discoloured or when the river is in flood and the intake is closed to prevent large debris from entering the intake. The lakes are topped up after use by piping water to them from the Hutt River. They are 16 metres deep and have a combined capacity of almost 3,400 million litres; enough for 20 days average supply to metropolitan Wellington.

## ***The Korokoro Dam***



The Petone Borough Council needed to add to its existing artesian water supply. In 1902, it settled on the Korokoro Stream as the site for their supply, but had harsh terms placed on its usage from the Woollen Company, who claimed riparian rights over the stream. To facilitate this, not one, but two dams were built. A small concrete dam had to be built 3 kilometres downstream by the Petone Borough to store water for the woollen mill. The Korokoro Dam was completed in 1903 and is, as far as is known, New Zealand's first concrete gravity dam. The crest of the dam is 37 metres long and the maximum height is 8 metres.

The water supply from the dam was discontinued in 1962 but the dam remains as a focal point in the Belmont Regional Park.

## ***The Birchville Dam***

In the 1930's the Upper Hutt Borough as it was then, drew its water from the Clarkes Creek area via the Birchville Reservoir. The Birchville Dam was the second arch dam built in NZ. It was made of unreinforced concrete and was built for water supply to Upper Hutt City. The crest length is 46 metres and has a radius of 27.4 metres. The maximum height is 15 metres.



The dam operated until the Kaitoke Scheme commenced supply in 1954. The dam continues to retain a lake, however the volume of the dam has decreased over the years because of silting. In 1988 the dam was drained and silt was measured to 6.3 metres below the spillway. Eels and some brook trout now inhabit the lake.