

Old & New Victoria Dams

- History & Statistics

(- photographic copies of public information panels previously at Old Victoria Dam)



New Victoria Dam
(opened Nov. 1991)



Old Victoria Dam (part of original wall)
(opened Oct. 1891)

Perth's First Permanent Water Supply

The original Victoria Dam was completed in 1891, thereby forming the source of Perth's first permanent city water supply. The reservoir capacity was 'considerably over a year's supply for a population of 10 000 persons'.

Private Ownership

The dam, pipelines and associated reservoir at Mt Eliza in King's Park were constructed and operated by a private company, the City of Perth Waterworks Company.

Innovative Design

In 1887 when the Victoria Dam was designed, the use of concrete for construction of dam walls was a relatively new phenomenon. The dam relied on a combination of arching and gravity for its stability.

Construction Materials Imported from England

21 000 casks of cement (each weighing about 60 kilogrammes) and the mains and distribution pipework were imported from England.

Government Ownership

Following widespread complaints over water pressure and quality, together with the high incidence of typhoid in Perth, the entire scheme was purchased by the Government in 1896.

Leakage Through the Dam Wall

Leakage through the dam wall was leaching lime and forming voids, thus reducing the strength of the concrete. Repairs to reduce this leakage were carried out as early as 1912. In 1966 a reinforced concrete upstream facing was installed to successfully reduce seepage through the wall.

Increasing Spillway Capacity

Throughout the years a number of modifications have been made to increase the spillway capacity in response to changes in structural design criteria and design floods. The dam was originally constructed with two small bywashes (spillways)—one on each abutment. In 1939 the right abutment bywash was closed off and the top 1.2 metres of a section of wall on the left abutment was broken off to form a new spillway. In 1988 the spillway crest was lowered by a further 2 metres.

Floods and Earthquakes

As part of the Water Authority's on-going dam safety and surveillance programme, a safety review of Victoria Dam concluded in 1988 that the dam did not have acceptable levels of safety under modern design criteria for flood and earthquake loadings.

Poor Concrete Quality

The concrete in the dam was of such poor quality that the dam could not be adequately rehabilitated.

Decision to Replace the Original Dam

In 1989 the decision was taken to replace the original Victoria dam with a new, larger dam. Sufficient of the original wall was demolished using explosives to allow free passage of flood overflow from the upstream New Victoria Dam.

Nearly 100 Years of Service

The original dam was taken out of service on 3 April 1990, after nearly 100 years of providing water for the people of Perth.

Water Supply for Perth

The New Victoria Dam supplies water to the hills suburbs of Lesmurdie and Kalamunda and augments supplies of water to the Perth metropolitan area during times of peak demand.

New Technology—Roller Compacted Concrete

Roller Compacted Concrete (RCC) was first used in dam construction in 1980 and since that time the RCC technique has gained worldwide acceptance. New Victoria Dam was the first RCC dam in Western Australia and the fifth and largest RCC dam completed in Australia.

RCC is a no-slump concrete spread and compacted using earthmoving equipment. The RCC was batched on-site in a continuous mixing batch plant, delivered onto the dam wall by conveyors and discharged into dump trucks. The trucks transported the concrete to the point of placement where it was spread by dozer and compacted into layers using vibratory rollers.

Bulk Materials Handling

—180 cubic metres of RCC per hour

RCC makes use of bulk materials handling technology at all stages of construction, from production of aggregates at the off-site quarry, to handling large stockpiles of aggregates on-site and through to continuous batching and placing.

No Formwork—Interlocking Facing Elements

The faces of the dam were formed using interlocking concrete facing elements, horizontally slipformed—much the same way as road kerbs—with a total length of 25 kilometres of facing elements being needed to complete the dam.

Replacement of Cement with Fly Ash

The cementitious content of the RCC consisted of one third ordinary Portland cement and two thirds fly ash. Fly ash is a waste product from the Muja Power Station near Collie. Apart from the economy in using the fly ash, the replacement of cement with fly ash minimises the amount of heat generated as the concrete hardens.

Rapid Construction Time —Less than One Year

Water was being stored in the new reservoir less than one year after excavation for the dam foundations commenced. The RCC technique enabled the dam to be completed one year sooner than a traditional concrete or earthfill dam. Placement of RCC in the dam took 160 days to complete.

Stepped Face for Spillway

The stepped downstream face of the dam will dissipate as much as 70 to 80% of the energy of the flow passing over the spillway.

Original Victoria Dam

Principal Statistics (at April 1990)

Catchment

Catchment Area 37.2 square kilometres

Reservoir

Full Supply Level R.L. 177.5 metres A.H.D.

Storage Volume 0.6 million cubic metres

Surface Area 15 hectares

System Yield 2.9 million cubic metres/year

Dam Wall

Type Concrete Gravity-Arch

Height above Foundations 23 metres

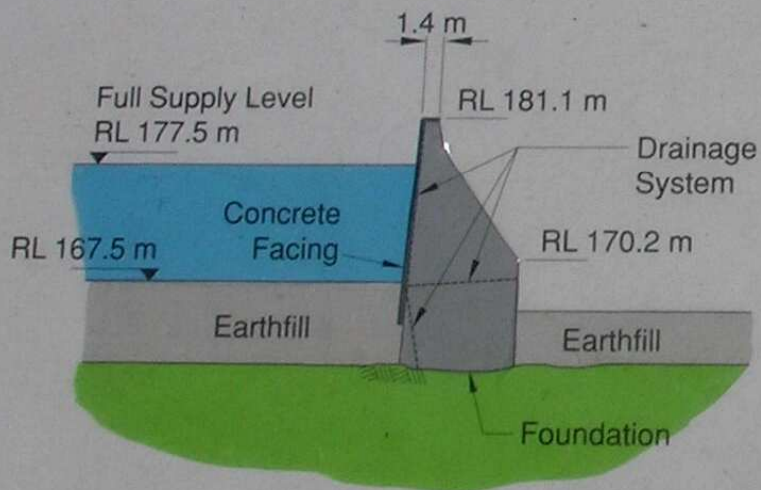
Crest Length 220 metres

Total Volume of Concrete 16 900 cubic metres

History

Official Dam Opening 1 October 1891

Taken out of Service 3 April 1990



New Victoria Dam

Principal Statistics

Catchment

Catchment Area 37.0 square kilometres

Reservoir

Full Supply Level R.L. 202.0 metres A.H.D.

Storage Volume 9.5 million cubic metres

Surface Area 77 hectares

System Yield 6.4 million cubic metres per year

Dam Wall

Type Roller Compacted Concrete Gravity

Height above Foundations 52 metres

Crest Length 285 metres

Total Volume of Concrete 134 500 cubic metres

Construction

Construction Commenced 23 August 1990

Official Dam Opening 22 November 1991

