

# Fact sheet Wivenhoe Dam



## Wivenhoe Dam

Wivenhoe Dam's primary function is to provide a safe drinking water supply to the people of Brisbane and surrounding areas. It also provides flood mitigation.

The water from Lake Wivenhoe, the reservoir formed by the dam, is stored before being treated to produce drinking water and follows the water journey of source, store and supply.

### Source

Wivenhoe Dam is located on the Brisbane River in the Somerset Regional Council area.

### Water supply

Wivenhoe Dam provides a safe drinking water supply for Brisbane, Ipswich, Logan, Gold Coast, Beaudesert, Esk, Gatton, Laidley, Kilcoy, Nanango and surrounding areas.

Wivenhoe Dam was designed and built as a multifunctional facility. The dam was built upstream of the Brisbane River, 80 kilometres from Brisbane City. At full supply level, the dam holds approximately 2,000 times the daily water consumption needed for Brisbane.

Wivenhoe Dam, along with the Somerset, Hinze and North Pine dams, ensures South East Queensland's water demand will be met into the future.

### Dam infrastructure features

Wivenhoe Dam consists of an earth and rock embankment, with a concrete spillway section on which five steel crest gates are installed.

These gates, 12 metres wide and 16.6 metres high, are among the largest of their type in the world.

### Key facts

|                      |                                      |
|----------------------|--------------------------------------|
| Name                 | Wivenhoe Dam (Lake Wivenhoe)         |
| Watercourse          | Brisbane River                       |
| Location             | Upstream of Fernvale                 |
| Catchment area       | 7020.0 square kilometres             |
| Length of dam wall   | 2300.0 metres                        |
| Year completed       | 1984                                 |
| Type of construction | Zoned earth and rock fill embankment |
| Spillway gates       | 5                                    |
| Full supply capacity | 1,165,238 megalitres                 |
| Flood mitigation     | 1,967,000 megalitres                 |

The construction of the dam involved the placement of around 4 million cubic metres of earth and rock fill, and around 140,000 cubic metres of concrete in the spillway section. Excavation of 2 million cubic metres of earth and rock was necessary to construct the spillway.

The Brisbane Valley Highway was relocated to pass over the dam wall, while 65 kilometres of roads and a number of new bridges were required following construction of the dam. An auxiliary spillway was also built to act as a giant pressure valve in the event of a 1 in 100,000 year rain and flood event to protect the dam wall and the downstream population.

### Hydro-electric power

Lake Wivenhoe is also the lower storage in a pumped-storage, hydro-electric generating facility. The Wivenhoe Power Station is located across the water from the Wivenhoe Dam wall – between Lake Wivenhoe and Splyyard Creek Dam.

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During the pumping phase in the operating cycle, the generator will operate as an electric motor driving the pump to lift water from Lake Wivenhoe to the upper storage of Splityard Creek Dam. When peak electricity demand occurs, the flow of water is reversed, flowing from the upper to the lower storage. This movement of water drives the turbine generator to produce electricity.

The pumped storage power station consists of two circular concrete silos, with an internal diameter of 32 metres. Each silo houses a 250 megawatt turbine generator and pump set.

The power station is controlled and monitored remotely from Queensland's power grid system operating centre. Twin 275 kilovolt transmission lines connect the power station to the electricity grid.

## Flood mitigation

During a flood situation, Wivenhoe Dam is designed to temporarily hold a further 1.967 million megalitres in addition to its drinking water storage capacity of 1.16 million megalitres.

When high rainfall occurs in the catchments, controlled releases of water can be made through the five steel gates, keeping the water level in the dam at an appropriate height.

An auxiliary spillway was completed in 2005 to prepare the dam for a 1 in 100,000 year flood event. The 1974 floods were a 1 in 100 year event, and the volume of water during the January 2011 event was equivalent to two episodes of the 1974 floods.

The auxiliary spillway is engineered to operate only once. The wall of this spillway acts as a safety valve or 'fuse plugs', slowly giving way if the dam wall is compromised during a catastrophic flood event.

Wivenhoe and Somerset Dams provided clear flood mitigation benefits during the 2011 flood event. The dams reduced the maximum hourly flow rate in the Brisbane River and the peak flood height during the flood.



However, 50% of the Brisbane River Catchment is below Somerset and Wivenhoe Dams, including the Bremer River and Lockyer Creek.

As these river systems enter the Brisbane River below Somerset Dam and Wivenhoe Dam, it is not possible to control their flows.

## For more information

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## Key features of three major dams

|  | Wivenhoe Dam  | North Pine Dam  | Hinze Dam                                     |
|--|---|---|---|
| Catchment area (km <sup>2</sup> )              | 5,554.0   | 348.0   | 207.0   |
| Capacity – water supply (ML)                   | 1,165,000   | 215,000   | 310,730                                       |
| Capacity – flood storage (ML)                  | 1,967,000   | N/A   | N/A   |
| Type of structure and volume (m <sup>3</sup> ) | Embankment 4 million,<br>Concrete 140,000   | Embankment 275,000<br>Concrete 175,000  | Embankment central core<br>earth and rockfill |
| Year of completion                             | 1985  | 1976  | 1976  |
| Length of wall (m)                             | 2300  | 1375  | 1850  |
| Spillway gates (m)                             | Gated (5, 12.0 x 16.6)  | Gated (5, 12.2 x 8.3)   | Ungated                                       |
| Sluice gates (m)                               | N/A   | Yes – 5 (12.2 x 8.3)  | N/A   |
| Regulator valves (m)                           | Yes – 2 (1.5 diameter)  | Yes – 2 (1.4 diameter)  | N/A   |
| Average rainfall (mm/year)                     | 940   | 1175  | 1354  |
| Hydroelectric station                          | Yes – 4.5 megawatts   | No  | No  |
| Major water supply customers                   | Brisbane, Ipswich, Logan,<br>Gold Coast, Beaudesert, Esk,<br>Gatton, Laidley, Kilcoy and<br>Nanango | Brisbane, Redcliffe, Pine<br>Rivers, Caboolture and other<br>parts of the Moreton Bay<br>Regional Council | Gold Coast                                    |