

## Great Wharf Road Bridge

The Great Wharf Road bridge is a road bridge that crosses a canal. The bridge carries vehicles and pedestrians into the Canary Wharf estate. In order to allow water traffic to pass underneath, the bridge raises by 18.2m at one end. Two large diameter pivots are located on the opposite side of the canal which form the hinge that the bridge rotates about.

The lead consultant and structural & civil designer was Gifford & Partners and the architect on the project was Wilkinson Eyre. Bennetts have worked with Wilkinson Eyre and Giffords on other projects including Gateshead bridge and Poole Harbour Second Crossing.

Davy Markhams (formerly Kvaerner Markham) were the mechanical contractor.

- Investigation into the various options for the lifting mechanism to fore fill the clients brief for no intrusion into the air space above the water.
- Outline design for Mechanical, Electrical and Hydraulic equipment.
- Production of performance specifications for all equipment associated with the operation of the bridge.
- Fully detailed design and analysis of hinge castings.
- Assisted client from conception to completion and final handover.
- Formed working relationship with Canary Wharf contractors that continues to provide bridge solutions for their estate.

The movement of the bridge is achieved by a telescopic, two stage hydraulic cylinder. This is powered by three 132kW power packs providing enough pressure to generate up to 660 tonnes. The bridge will still lift, but more slowly, even if only one of the power packs is operating.

Trunnion bearings at the base of the ram and a pivoting clevis at the top allow the ram to rotate approximately 7° either side of vertical as it raises and lowers the bridge. The whole assembly stands in a reinforced concrete chamber beneath the north abutment, where the master control cabinets are also located. A slave cabinet in the south abutment provides control and power to the vehicle and pedestrian barriers, as well as the bridge lighting.

Bennetts were responsible for the performance and design specifications for the electrical, hydraulic and mechanical equipment required to move the bridge, to accompany the exemplar design drawings used by the contractor for construction detailing.

Additional to the mechanical aspects we fully designed, detailed and analysed the castings for the hinges which hold the 420mm dia. spherical plane bearing. The diameter of the holding down bolts were machined to give a precise fuse effect to protect the substructure on the hinge side of the canal.

- Uses one of the largest hydraulic cylinders in the UK; 18.2m stroke, 910mm first stage, 800mm second stage.
- Raises in 555 seconds, lowers in 390 seconds.
- Opens approximately 12 times a year
- Master and slave sides linked across the deck via a cable reel.

Bennett Associates (originally founded in 1984) was acquired in 2008 by Atkins; bringing their proven technical expertise to the UK's leading engineering consultancy.

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