

Sutton Bingham Dam

remedial work

by
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Sutton Bingham Dam, constructed between 1952 - 1956, and designed by Herbert Lapworth Partners, is 5 miles south of Yeovil in Somerset. It is a category A, 15m high earth filled puddle clay core embankment dam, reported to be one of the last dams in the country to have a puddle clay core. Sutton Bingham reservoir has a catchment area of 30.3Km², has 2,400ML capacity and supplies up to 20ML per day to the adjacent water treatment works. The works is the primary water source that supplies Yeovil and the surrounding area. Routine regulatory inspection initially identified a settlement to the wave wall on the crest of the dam. A subsequent All Reservoirs Panel Engineer inspection confirmed a possible structural problem and required that the reservoir be held two metres below normal operating level until any remedial works required from a section 10 inspection were complete. The existing scour facilities proved to be barely adequate during the wet weather and this prompted a review of the scour facilities alongside the other inspection work.



Work on the Sutton Bingham dam near Yeovil

photo courtesy Wessex Engineering & Construction Services

Wessex Engineering and Construction Services were asked to complete a design and build scheme to comply with the reservoir act and to achieve a design life of at least 100 years. This scope included any remediation works required for the whole of the dam in order to meet current and foreseeable standards, a review of the drawdown capacity of the reservoir, maintenance of any existing amenity value, (primarily boating and fishing), together with the handling of all the associated PR issues. A strict programme was dictated in which all works were to be completed.

Operationally, Wessex Engineering and Construction Services was required to maintain supply to Yeovil and minimise any impact on the existing treatment works in terms of both quality and flow. To mitigate a possible loss to flow various modifications were required at five water treatment works and pumping stations together with the construction of 4.6km of new 300mm diameter pipeline to facilitate movement of supplies across the region. An advancement of existing works on the Somerset spine main was also implemented.

The challenges to the Wessex Engineering and Construction Services design and construction team were to rectify an unknown structural problem whilst protecting the existing customer supply and maintaining the dropped water level in the reservoir. All works were required to be completed within one year which allowed approximately six months for the actual construction work.

Conclusions drawn from the extensive site investigations and studies undertaken proved a localised slip plane within the dam structure caused by seasonal water level variation and soil water retention. It was also concluded that increased drawdown capacity was also required due to the existing undersized scour pipes.

Options considered included localised repairs to the slip plane, localised stabilisation through piling into the structure of the dam, or placing overburden on the dam face. The options study undertaken by Wessex Water approved the placement of 30,000 tonnes of overburden to the wet face of the dam. This slope stabilisation work was designed to slacken the overall slope angle of the upstream face of the dam, enhancing the overall stability of the slope and “buttressing” the failed section of the slope. The upper section was designed to be covered with rip rap for wave protection.

Works to increase the drawdown capacity of the reservoir required the installation of two new 600mm diameter conduits through the existing spillway tower.

Initial works to the dam face involved the removal of the majority of the existing concrete slabs on the upstream slope, some of which had settled leaving open joints. A small amount of the existing slabs were broken and left in situ as a base for overburden and slackening of the slope. The overburden was subsequently placed in two stages, firstly underwater from a floating barge supplied from a specially



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photo courtesy of Wessex Engineering & Construction Services

constructed jetty within the existing reservoir, and secondly placed directly from land above the waterline using small moxys (dumpers). Two separate stone layers were placed giving a firm key to the existing slope whilst offering a free draining rock fill material. Rip Rap stone was placed on top of the overburden on the upper half of the dam to assist in preventing wave erosion to the structure. The PR needed to be carefully managed throughout the project through liaison with the council, local residents, the press and recreational users of the reservoir. A sizeable fleet of marine equipment together with approx 30,000 tonnes of stone needed to be delivered to site via the small local lanes that access the reservoir from the main A37 road. A large number of daily lorry movements were required to bring materials from the local quarries while causing minimal disruption to local residents and other users of the highway.

couldn't be emptied due to both supply and stability issues. To facilitate construction of this work Wessex Engineering and Construction Services installed a bespoke limpet dam to the existing circular spillway tower in which the work could be carried out. The concrete spillway tower could then be cored and new pipes inserted and grouted into position in the dry. Reservoir drawdown is now carried out through newly installed actuator controlled operation and guard valves. All new M & E plant can be accessed by a new access gantry installed as part of these works.

Works were handed back to the client on 30th March 2008 within programme and budget, and with the reservoir full and ready to return to full supply.

Installation of the two new drawdown pipes was required at three metres below the water level of the reservoir, whilst the reservoir

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