Dams & Reservoirs Ltd

Wimbledon Park Lake – Reservoir Safety and Water Levels (dated 18th Feb 2020)

Wimbledon Park Lake is a 'high risk, Category A reservoir' and is subject to the Reservoirs Act 1975. As such Merton Council, as owner of the waterbody, has to ensure that they appoint the following to be compliant with the requirements of the Act, i.e.

- Inspection by an Inspecting Engineer (IE)
- Supervision by a Supervising Engineer (SE)

As far as this Wimbledon Park Lake reservoir safety scheme is concerned, Merton has employed me, Prof A K Hughes, who as an All Reservoirs Panel Engineer, is to act as the independent Qualified Civil Engineer (QCE) for the scheme, to ensure it meets the requirements identified in a statutory Inspection report under Section 10 of the Act.

The Regulator for the Reservoirs Act in England is the Environment Agency. The Environment Agency plays an administrative role monitoring compliance with the Act. The QCE reports back to the Environment Agency as an independent engineer via certificates as prescribed within the Act.

The Panel Engineer, whether acting as IE, SE or QCE, uses his/her professional experience to try to ensure the safety of a structure, by giving advice and recommendations to the project team and uses his/her expertise to manage the risks at any time.

An statutory inspection of the reservoir, and the resulting report and the subsequent flood studies and hydrological assessment, has identified that there is a need to carry out works to increase the ability of the dam to manage the safe passage of a flood, of a defined size, past the dam to the downstream area without the dam failing or causing an increased risk elsewhere.

The Act's requirement is to 'protect persons and property against an escape of water' – i.e., the dam failing which could cause danger or damage onto those downstream.

The QCE's role is to manage a risk, and the timescales for works is always set recognising the degree of risks associated with operation of the reservoir, until the works identified and recommended are carried out.

It is known and recognised that water, and in particular waves, have overtopped the dam on many occasions at Wimbledon Park Lake, over many years. The existing water level will inherently rise and fall above and below the Top Water Level of 17.47m AOD with corresponding rainfall events. This is in part due to the existing hydraulic configuration of the Lake, including the existing size of the primary spillway. This situation and risk associated with this condition is being managed and addressed by this project, both now and by implementation of the proposed scheme.

I, as a Panel Engineer, am content with the level of risk associated with these events. This is influenced by the performance of the owner, the level of maintenance provided, the fact that the crest of the dam; in the areas of overtopping is armoured, the downstream slope has good grass cover etc.etc. If I considered the risks were too high, I would order further works and actions in the short term until the proposed scheme is implemented.

The inundation of the park during rainfall events is a result of a combination of factors, including the low lying nature of parts of the park, the soil composition, the flows being passed onto the downstream area and the capacity and condition of the existing open channels, pipes and culverts downstream of the dam. High frequency return period floods (ones which happen frequently of low magnitude) may cause

very localised ponding or flooding in the park, but I am confident that failure of the dam is very unlikely in those events and risk to the safety of users of park in terms of loss of life is very unlikely. For low frequency return period floods (ones which happen very infrequently of high magnitude) flood water is modelled to go beyond the limits of the park, and this is the situation for most if not all reservoirs subject to the Act.

This reservoir safety scheme is not a flood alleviation scheme – a scheme where storage or attenuation is increased or always maintained within a reservoir to be able to store storm inflow – it is an ornamental lake which is normally kept at a level defined by the top of the boards on the primary spillway in Ashen Grove. Subject to the rainfall event or in times of drought, water levels can rise above the level of the boards or below the level of the boards. For instance, in the summer months, it is relatively common for the water level to be below the top of the boards with no overflow downstream.

The reservoir is kept full as an amenity lake for use of the various stakeholders and a significant reduction of water level would cause problems with the amount of silt which is known to exist in the lake. Nevertheless, the lake, by virtue of its surface area, does provide attenuation, i.e., a reduction in the peak outflow compared with the peak inflow, by temporarily storing water above top water level.

A reduction of the lake level would provide some additional storage, but it would not prevent the dam overflowing/waves passing over the dam for very infrequent events, including those high order events required by the Act. In fact, if the lake was empty then in the 10,000 year event the reservoir would fill three times over.

As per the hydrological assessment, the current spillway arrangement has a maximum capacity or output of 0.25 cumecs, before the embankment overtops at the existing crest level of 17.7m AOD. This is equates to a storm return period of circa 1 in 1 year.

The current proposed scheme would see the water levels in the lake rising to a level of 17.48m AOD for the same return period and prevent overtopping of the embankment. That is a 0.22 metre high raising which will have significant improvement with regard to overtopping along walkways and in addition, help ensure that during the majority of the time, inflow drainage from such as for the Wimbledon Club, would be unimpeded.

The free oard along the embankment would be 0.27 metres (0.22m at the Auxiliary Spillway) again, this would further improve the situation with regards to wave overtopping.

The reservoir safety related proposals which will be put in place later this year, I believe, is the ‘best’ scheme which balances the risks at the site with the deficiencies identified and the timescales involved to reduce the risks. It involves primarily an increase of spillway capacity in places, where capacity can be ‘sympathetically’ increased, coupled with a limited raising of the dam, and a limited lowering of the water level. This was presented to the Friends of Wimbledon Park at the wider meeting on 15th January 2021 where there was also opportunity for Q&A.

The proposed scheme will be hydraulically modelled, which allows the performance of the design to be evaluated for a range of return periods up to and including the design flood and the safety check flood.

The outputs from these studies will form the Flood Risk Assessment which will accompany the Planning Application.

The Act does not ‘impose unnecessary impediment’ on changes that reduce risk, in fact it does exactly the opposite via the Panel Engineers involved whose role is to manage and reduce the risk and to do so in an educated and informal way.

Any owner of a dam is undertaking a risk and managing that risk. It is not true that the owner has increased the capacity of the reservoir as defined by the Reservoirs Act 1975.The scheme requires the appointment of a Qualified Civil Engineer (QCE) and not a Construction Engineer(CE). I understand that some years ago the Council installed bolts above the stop log boards, which define the top water

level, to stop the boards floating up whist water passes beneath them or vandals maliciously raising the levels further.

Merton Council is managing the risks associated with reservoir, under my supervision and is trying to enlist its best endeavors to implement a scheme which will make the dam safe for many years to come.

My role, as explained, is to provide to Merton advice before, during and after the project to try to ensure the safety of the structure and to ensure the Council do not take any ‘unnecessary risks’. In my opinion as Panel Engineer, the Council are certainly not ‘failing to take action to reduce the risks posed’, and not ‘chosen to take unnecessary risks’ but are working in a wholly professional way to maintain and improve the structure to the benefit of the persons and property downstream as well as those who use the water and enjoy the beauty of the park.

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Prof Andy Hughes
All Reservoirs Panel Engineer

2nd February 2021