South Staffs Water

The History of Blithfield Reservoir

The History of Blithfield Reservoir

The land before Blithfield Reservoir

Prior to the development of Blithfield Reservoir, the landscape consisted largely of fields with small areas of woodland, and was formed in the shape of a wide flat valley with a floor of alluvial sand and gravel; the land was used mainly by farmers for growing crops and grazing their animals. The River Blithe meandered for three miles through these woods and fields, with the small Kitty Fisher Brook winding alongside. The Tad Brook, slightly larger than the Kitty Fisher Brook, flowed into the north eastern part of the area.

There were two buildings within the area that would eventually be flooded. In Yeatsall Hollow, at the foot of the valley, there was a small thatched cottage called Blithmoor Lodge. This was demolished to make way for the causeway that now allows vehicles to cross the Reservoir. The second building was an old mill called Blithfield Mill, positioned on the western bank of the River Blithe, and having an adjacent millpond; the mill's water wheel was driven by the flowing water of the River Blithe. Although some maps show the mill as having been demolished, the foundation stones and the brick wall around the millpond remain. At times when the level of the Reservoir becomes low enough these remains become visible.

During the 1930s and 1940s, The South Staffordshire Waterworks Company, as it was then known, purchased 952 hectares, (2,350 acres) of land, of which 642 hectares, (1,585 acres) was purchased from Lord Bagot. In addition to the land itself, the company acquired a number of buildings. One of these was the magnificent Blithfield Hall which at the time was in need of significant restoration. The Hall was later sold back to the Bagot family along with about 12.15 hectares, (30 acres) of garden and following this and sales of land during the 1950s and 60s to local farmers, the estate now extends to around 1,300 acres. Another was the Stansley Wood Sawmill complex, part of which has since been redeveloped into our very successful Blithfield Education Centre.

Not all of this land was destined to be flooded. In fact, the reservoir would only ever cover around 320 hectares, (790 acres) of the company's new land. One of the main reasons that the company purchased such an excess of land was so that it could minimise the risk of pollution by exercising control over the farming activity in the fields around the reservoir's perimeter. Hence, the land of six farms was acquired and control agreements were developed.

The opening of Blithfield Reservoir

The need for the reservoir arose for people to have a clean drinking water supply to their homes. The project was originally planned to commence in 1939 but the onset of World War 2, meant the work was shelved until 1947. Nearly 500 people spent six years building the reservoir and dam, with the Queen Mother declaring it open in October 1953.

The Queen Mother, 1953, at the opening ceremony

The storm of 1962

In 1962 a severe storm at Blithfield Reservoir saw huge waves on the water; this blew over both the causeway and the dam and, as there was no top wall along the length of the dam, across to the far bank.

The result was that the ground became water logged and began to slip downwards, creating large cracks in the side of the grass bank. In addition, the storm also managed to dislodge some of the large concrete flagstones that face the water-bearing side of the dam wall. In order to avoid severe damage to the dam wall, water company employees had to position sandbags to block the holes where the flagstones had been lifted.

Following the storm, the grass bank on the side of the dam was reinstated and the flagstones were repositioned. In addition, a wall was built along the length of the dam, which, in the event of such a severe storm occurring again, would deflect the water back into the reservoir and prevent it from blowing over the road onto the grass bank.

Blithfield Reservoir Construction

River Blithe scheme

The River Blithe Scheme was authorised by Act of Parliament in 1939, giving the company permission to carry out a significant amount of work including:

- Impounding the water in the River Blithe
- Constructing Blithfield Reservoir
- Creating a number of road diversions, including Admaston Road and Watery Lane
- Constructing the Seedy Mill Purification Works
- Extending the existing service reservoirs at Barr Beacon and Gentleshaw
- Laying a trunk main between Blithfield Reservoir and the Seedy Mill works

Cut-off trench

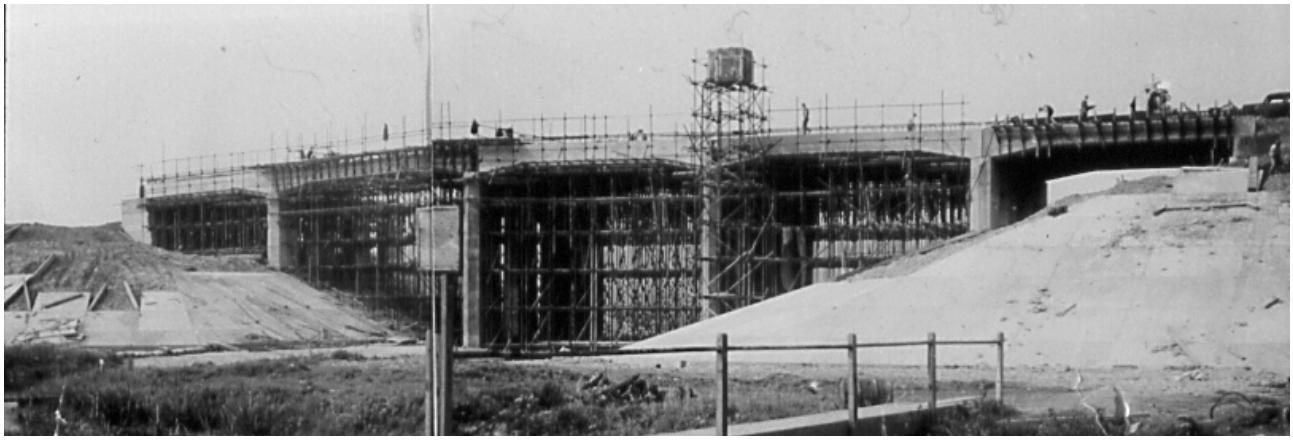
At the site of Blithfield Reservoir, the River Blithe passed through a wide, flat valley, the floor of which consisted of alluvial sand and gravel, which contained a lot of ground water.

To create Blithfield Reservoir, the water company had to construct a dam across the River Blithe. This involved digging a "cut off" trench along the entire length of the dam's centre line, in order to stop water leeching under the dam. The trench was so deep that it met the hard marl underground. Prior to the excavation for the trench, interlocking steel sheet piling was driven down into the ground until it met the underlying hard marl. The excavation for the trench was then carried out in sections completely enclosed by the interlocking steel sheet piling. As well as providing support for the walls of the trench, this sheet piling was used to exclude some of the ground water held by the alluvial gravel in the valley floor. As the excavation proceeded, as much as 9.1 million litres per day of ground water had to be pumped from the various sections of the trench in which work was proceeding. The trench was filled with mass concrete in 1.4 metre lifts. The bulk of the sand and gravel required for the concreting operations was obtained from the reservoir basin below top water level, the material being washed, crushed and screened at the site.

A section of the trench near to the river was left unopened until it was possible to divert the River Blithe over a completed section of the concrete filling. The river was finally diverted through the discharge tunnel to allow the embankment to be completed across the valley.

Puddled clay core wall

Having prevented the water from seeping through the ground underneath the dam, the designers then turned their attention to the surface. Clearly, should the dam wall be made of the wrong materials, then the water would soak through the dam itself. Additionally, if the wall of the dam was just perched on top of the concrete cut-off, the water may be able to squeeze out between the two and so the dam would leak. Neither of these problems was acceptable so solutions had to be found.



Arches construction, causeway

The materials for the dam were carefully chosen. It was decided that a central core wall should be made using puddled clay. In fact, much of the clay was dug out from the local area. A deposit of suitable clay was found less than a kilometre up the valley from the embankment. This clay was brought to the dam and treated using "pug mills" to turn it into puddled clay. The puddled clay, which had a dense, putty-like texture, was placed in layers over the area of the core wall. It was then "heeled" into a compact mass that formed a water-tight barrier along the centre of the dam.

Having solved two of the three problems, all that remained was to find a way of preventing the water from passing between the cut-off trench and the puddled clay core wall. To solve this problem, a special joint was designed which allowed the puddled clay core wall to interlock with the concrete cut-off forming a seal that the water could not penetrate.

Completing the construction

The dam at Blithfield, otherwise known as the "Embankment", was a tremendous achievement in engineering terms. Following the construction of the concrete cut-off, the building of the dam continued with the creation of the puddled clay core wall. The marl that had been excavated to make the cut-off trench was used as "selective embankment material", helping to support the puddled clay wall on both sides. Alluvial gravel was dredged by drag-line excavators from lagoons in the floor of the valley within the reservoir area. A fleet of tipping trucks brought the gravel to the work area where it was then piled up against the marl. The movements of these trucks helped to compact the gravel, aided by bulldozers and vibratory rollers.

In order to prevent erosion of the face of the dam, the waterside of the dam was covered in thick concrete slabs. These slabs were actually made in casts "in situ", the joints between them being filled with fine gravel to allow easy drainage.

At the top of the protective facing provided by the concrete slabs, a specially shaped concrete coving was made. Its purpose was to act as a wave break to help prevent water from flying up and over the dam.

Soil and grass seed were spread on the downstream slope of the dam to create a picturesque field-like area, which is now used for grazing animals.

The labour force

Work commenced on the reservoir in autumn 1947. In order to attract labour, a camp capable of housing 130 men was constructed on the site, which became occupied largely by Irish labour. Roughly one-third of the total labour force was drawn from a unit of the Polish Re-Settlement Corps, which was billeted in a camp within a few kilometres of the reservoir. Coaches were run daily from the Potteries and from the Lichfield, Rugeley, and Cannock Chase areas, to convey men to and from the site. The maximum labour force was 495 men.

Work on the Admaston Road diversion commenced in June 1950. The maximum number of men employed on this was 190. By June 1952, the work was substantially finished, apart from the parapet walls, the construction of which was delayed until 1953 in order to give the embankment a chance to settle down and stabilise.

Blithfield Reservoir Technical Information

- The reservoir covers an area of 790 acres and has a maximum capacity of 18,200 million litres of water.
- This type of reservoir is known as an "impounding" reservoir and was created by building a dam across the nearby River Blithe, forcing water into the valley alongside.
- At least 24 million litres of water must be released from Blithfield Reservoir every day to ensure the stability of the River Blithe downstream of the dam. This water, known as the Compensation Flow, must be released even when the country is undergoing drought conditions.
- When there is a drought, the demands of the Compensation Flow become a problem. However, where the River Blithe meets the River Trent at Nethertown there is actually a lot more water than the river needs. So during the late 1990s, the company set up a scheme which allowed it to pump some of the water from the river at Nethertown back up to Blithfield Reservoir, recycling its own compensation flow to help to maintain a satisfactory water level. The water enters the reservoir at the south-eastern edge of the causeway and can sometimes be seen in operation if the water level in the reservoir is low enough.
- There are three points in the reservoir from which water can be drawn: from the valve tower close to the dam; from the bottom of the reservoir; and through a pipe that extends out under the water about 100 metres from the valve tower. Using three points to draw water from minimises the impact of algae growth on the water, since algae can both discolour water and make it distasteful as well as clogging filters at the treatment works.
- Other measures to reduce algae growth are: Destratification, where air bubbles are released into the water from near the bottom of the reservoir. This has a mixing effect on the water that lowers the average temperature of the water and reduces the exposure to sunlight, thus slowing down the growth and reproduction rate of the algae; the use of barley straw bales which gradually break down and decay, inhibiting algae growth.

Blithfield Reservoir
aerial view