

Woburn Forest Center Parcs

Balance Tank

Client: ACWA

Location: Woburn, Bedfordshire

Value: £485k

Duration: 9 Months

In Brief...

As part of upgrades to the waste water treatment system at Woburn Forest Center Parcs, Barhale were contracted by ACWA to construct a new 1200m³ balance tank and undertake associated civils. The increased tank capacity will provide operational and emergency resilience for expanded village facilities, which includes 57 luxury accommodation lodges at the popular holiday site.

Despite challenging conditions, which included cold winter weather, working in an area adjacent to guest accommodation, and modifications to the initial scope that increased the volume of work, the Barhale team finished the work within cost and programme, and in accordance with all technical standards.



Undertaking landscaping



Inside of balance tank before roof installation



Aerial view of balance tank interior

Technical Features...

The full scope of works included the following:

- Balance tank reinforced concrete (RC) structure of 17m (W) x 18m (L) x 4.6m (H)
- RC base of 2.9m x 5.5m for kiosk
- RC base of 4m x 4m for feed pumps
- RC circular base of 5m diameter for sludge tank
- Landscaping works around the tanks, including land drainage works

Barhale first constructed a haul road to provide vehicular access to the working area. The team then excavated to construct the base of the balance tank and to prepare for the blinding. Once the blinding had cured, the team installed the reinforcement and poured the concrete base. As these works were undertaken during the winter period, which can cause problems to reinforced concrete works due to low temperatures, special precautions were taken to ensure the proper curing of concrete occurred. These included using a defrost blanket over a seven day period to protect the concrete from frost.

Once the concrete had cured, the team commenced with construction of the tank walls. Due to their size, the walls were built in four sections. The team therefore had to ensure that the joints were water tight. To do so, the team used a swell-able hydrophilic waterstop, made from a combination of an elastomer and a hydrophilic resin. When installed in a confined joint, the hydrophilic waterstop swells on contact with water to ensure a waterproof joint is created. Expansion of the waterstop creates a positive pressure against the faces of the concrete leading to a joint that is resistant to hydraulic pressure.

After the tank was completed, Barhale built the base for the kiosk, pump and sludge tank to enable ACWA's MEICA subcontractors to install these items. Afterwards, Barhale commenced the landscaping work, which included land drainage. The landscaping also required Barhale to find a solution for the protection of a bat tree. To do so, Barhale erected a gabion wall between the tree and the high level embankment.

Customer Benefits...

Throughout the lifecycle of the project, the Barhale team recognised the need for innovation and fresh-thinking, which resulted in engineering solutions that saved ACWA significant costs, but also had important environmental benefits.

For example, the original plan required the construction of a haul road/crane working area around the tank, to enable the concrete works. This, however, would have entailed significant costs, a long programme and high health and safety risks. To avoid these disadvantages, Barhale suggested an alternative solution. Specifically, after installing a crane pad on the concrete base, the team kept the crane inside the tank while constructing three of the four walls. For the construction of the fourth wall, the crane was moved outside the tank and onto the existing haul road, which had been pre-designed to take the bearing load of the crane.

Similarly, the original work scope required the team to move the excavation arisings to a designated bay within the Center Parcs site. This would have involved extensive planning and logistics management, with both time and cost implications. To circumvent these additional expenses, Barhale utilised the space around the tank area to store all excavation arisings. Moreover, the team re-used the arisings for the embankment construction during the final phases of the project.

The team also displayed the ability to quickly adjust to evolving client requirements. In addition to the original scope, ACWA also asked Barhale to provide a solution to prevent the depositing of solids in rough corners of the tank – an event that ACWA had recently experienced at one of its projects in Yorkshire. Barhale suggested the construction of a convex shape benching around each corner of the tank, to prevent any settlement of solids once the tank was commissioned. ACWA were satisfied with the proposal and appropriated it for their future projects of a similar nature.

Throughout, the project required excellent stakeholder interface. Center Parcs Woburn Forest is a very popular holiday site, frequented by hundreds of people on a daily basis. The nearest guest accommodation was only 50m away from the site. This required special arrangements to manage risks and disturbances to the public, such as designated delivery days, the need for an escort vehicle for all deliveries and restricted working hours. Significant interface with visitors was also required, for example to explain the works. The team collaborated closely with ACWA, their other subcontractors and representatives from Center Parcs. This ensured Barhale managed guest expectations and finished the works within budget and on time.



Finalised balance tank