

Clifton Integrated Wetlands

Client: Yorkshire Water

Location: Clifton, Yorkshire

Value: £750k

Duration: 5 Months

In Brief...

BarhaleDoosan JV were engaged by Yorkshire Water to deliver the construction elements of a new Integrated Wetlands treatment works in Clifton. This nature-based solution has been a first for Yorkshire Water and provides a blueprint for sustainable wastewater treatment across the industry.

Award Winning Project...

Clifton has been recognised across the water and construction sectors as industry leading. It has won:

- British Construction Industry Awards: Winner of the Environment and Sustainability Initiative of the Year
- CIRIA Big Biodiversity Awards: Overall Winner and Winner of the Innovation Award
- Constructing Excellence Yorkshire and Humber Awards: Winner of the Net Zero Award
- Water Industry Awards: Winner of the Natural Capital Initiative Award and Winner of the Wastewater Innovation Project of the Year Award
- Utility Week Awards: Net Zero Award Winner

Technical Features...

The team worked closely with the design and delivery partners to develop the wetlands solution into a workable outcome.

The final constructed solution comprised:

- 5 no treatment cells (settlement ponds and shallow marshes)
- New scum board in the existing primary tank
- Inlet and outlet flow metre chambers to enable analysis of the flow for the Environment Agency
- Outfall point, a precast concrete unit to take flows into Kearsley Beck
- 430m of post and rail fencing, to be in keeping with the area
- Additionally, the team undertook a 12 week sampling programme which was extended by 40 weeks to analyse the performance of the wetlands over a longer period

Cell 1 is the primary settlement tank, a holding tank that was not planted. This cell was excavated from clay and formed, excavated, shaped and compacted in layers. Cells 2 and 3 are both secondary treatment ponds, with both Cells 4 and 5 being tertiary treatment. Biomat was laid in the cells to help with stability and seeding.

To create and distribute flow between the cells, pipework and V-shaped ditches were constructed. 3 no ditches were created between cells 2,3,4,5 and 150mm diameter pipework was installed under cells 2 and 3.

Environmental Benefits...

In total, the team planted over 20,000 wetland plants in the series of settlement ponds and shallow marshes which remove phosphorous without the need for the additional chemical treatment that is standard for wastewater treatment.

With over 80% of a reduction in operational emissions compared to chemical dosing, a 40% reduction in carbon versus traditional construction and a net increase in biodiversity, Clifton has provided significant environmental savings.

This is the first wetland for Yorkshire Water, and is also the first in the country to have an Environment Agency (EA) operating agreement instead of a consent, due to the environmentally friendly treatment option.

The team cleared 3,600m³ of organic material to expose clay in area for cut/fill shaping of ponds. This material was then reused in a habitat creation area as more environmentally friendly and efficient option. Comprises circa 4,000 trees/plants etc and the natural scrape will provide a catchment area for leaves and run off from fields.



The cells before plants had grown



The completed wetlands treatment