The project scope entails the design, construct, testing and commissioning of the flocculation, sedimentation and carbonation plant of the new 600ml/day water treatment and pumping system (System 5) at Zuikerbosch Pumping Station in Gauteng.

The 24-month long contract period, which commenced in August 2015, included the construction of the flocculation, sedimentation and carbonation plants, as well as the sludge pump station for Zuikerbosch Pumping Station’s new water treatment and pumping system (System 5 – Phase 1).

**Flocculation Plant**
The flocculation plant, consisting of three 300ml/day, forty diameter spiral units, was on the critical path of the construction schedule. The solution presented by the consortium and approved by Rand Water, entailed a creative precast methodology.

The principle was that an outer watertight shell would be created through casting in-situ concrete floor and walls, before the placement of the internal flow routing walls, which were manufactured off site. The manufacturing of the precast units commenced while the floor slabs and external walls were being cast.

By implementing this methodology, the construction duration for the flocculators was reduced by two thirds of the original contractual schedule. Furthermore, this method greatly enhanced the accuracy of the setting out, the quality of the structure, as well as operational safety during construction.

**Carbonation Plant**
As the carbonation area only consists of straight walls, a timber walling systems with steel support frames was chosen as formwork. The use of timber walling systems achieve an exceptionally high quality concrete finish, as well as facilitating a higher production output. The carbonation plant walls are four-metres high and the longest single section of wall poured was 75-metres long.

The project team constructed this structure in four months and by October 2016 the final preparation work was in process for handover to the Mechanical and Electrical partner.

**Sedimentation Tank**
The Sedimentation tank stretches over 30 000m$^2$ and due to the soil conditions at the Three Rivers site an engineered platform had to be constructed to accommodate it. Lime was used to stabilise the material, and the engineered platform was constructed creating a 1000mm-thick soil mattress.

The 30 000m$^2$ area was covered with a 100mm-thick layer of no-fines concrete that acts as a drainage system. The concrete structure was built on top of this, and consists of floor panels and walls that divide the sedimentation tank into four bays.

A total of 60 floor panels, measuring 25m-by-25m were constructed and 160 walls, each 25-metres long, constructed on the floor panels.

**Sludge Pump Station**
The sludge pump station was constructed six-metres below the natural ground level. The pumpstation control building that supplies power to, and that houses the instrumentation for the pump station, has been constructed on top of the pump station, within a steel structure that creates the roof of the pump station and building.

The flocculation, sedimentation and carbonation plants will respectively mix raw water with chemicals to achieve coagulation (and pipe protection), enabling floce formation, settling and sludge removal. The water will finally be dosed with carbon dioxide for pH correction prior to being discharged to the filtration plant.

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