

PROJECT NAME

Midvaal North Filter Refurbishment

CLIENT

Midvaal Water

LOCATION

Stilfontein

PROJECT VALUE

R 45,000,000

SERVICES

Feasibility studies, detail civil and mechanical design, tenders and construction management

TIME FRAME

July 2009 to December 2011 (estimate)



Midvaal Water operates a number of rapid gravity filtration units at its potable water treatment plant situated on the banks of the Vaal River in Stilfontein. The plant is fairly old, and although maintenance of the plant has been adequate, some of the filtration units are reaching the end of its service life. CSVwater was appointed to assist Midvaal Water in the refurbishment and upgrade of the North Filter Block.

The original filters were constructed toward the end of the 1960's and early 1970's in two stages and has an estimated capacity of 60 ML/d. The project scope definition for the refurbishment of the filters was as follows:

- Upgrade the filters to deliver a flow of 92 ML/d while maintaining the original footprint of the plant
- Upgrade the filters to deal with a number of operational and process challenges including the filter's tendency to air-bind, heavy manganese deposits and high biological activity on the media
- Incorporate advanced hydraulic control systems to cater for the complex nature of water supply to the filters as well as advanced filter operations strategies such as flexible filter-to-waste, synchronised start-up and backwash procedures.
- Include aesthetic considerations in the final design of the filter and gallery structures in order to enhance overall presentation of the facility.

The project was complicated by the unavailability of as-built and design information. It was therefore necessary to perform a detailed investigation on the original filters to understand the original design philosophies employed, the restrictions this imposed on the current plans for expansion and the practical implications this held for the construction of the new facility. As always, budget restrictions played a significant role in the final design of the facility and its construction.

The final project involved the demolition and reconstruction of the top structures and filter floors. It also included the complete revamping of the backwash and blower systems to cater for the increased wash rates. Finally it included the partial demolition and then raising of the filter bay walls and the provision of new chlorination system. Particular challenges had to be overcome included the strengthening of the original civil structures to cope with the increased loads and pressures placed on it by the new backwash systems as well as the increased height of the filter basins. Also, novel and unconventional approaches had to be taken in order to install the upsized mechanical equipment in the civil facilities originally designed for

much smaller equipment. Throughout the project the client was involved to ensure that their operational requirements are met and are not compromised in the attempt to meet the engineering challenges of the project.

The scope of services delivered on this project includes:

- Process engineering of the refurbished filtration facility
- Civil and structural engineering
- Mechanical engineering of the backwash pumping station, blower facility, pipework and other and operations and maintenance related infrastructure
- Electric and electronic (instrumentation) work
- Architecture

