Excellence award for SPRING GROVE DAM

The water engineering excellence achieved during the design and construction of the Spring Grove Dam was recently recognised when Consulting Engineers South Africa (CESA) awarded AECOM with a CESA Aon Engineering Excellence Award for the project in the category 'Engineering Excellence with a value greater than R250 million.' The Water Wheel looks at some of the non-engineering factors that make this project unusual.

Situated on the Mooi River, Spring Grove Dam is the main component of Phase 2 of the Mooi-Mgeni Transfer Scheme. This is a much needed water resource development project to bring additional water to the ever expanding KwaZulu-Natal coastal metropolitan area.

Spring Grove is the fifth dam to be built in the Mooi-Mgeni system, which already comprises Midmar, Albert Falls, Nagle and Inanda dams. Together, these dams provide water to more than five million people and industries in Durban, Pietermaritzburg and surrounding towns. The new dam has augmented the yield of the system by 60 million m^3/year, taking the total system yield to 394 million m^3/year.

Throughout the design and construction phases of this dam, it was up to the design and construction teams to work closely with the client, TCTA, to ensure that all efforts were made to minimise the impacts on the social and natural environment wherever possible.

The dam is nestled in the KwaZulu-Natal Midlands, near the small town of Rosetta, a quiet, picturesque area. Land acquisition is always a sensitive issue, particularly when arable land, homesteads and sensitive natural habitats will be inundated. AECOM worked closely with TCTA using a phased approach to acquire the portions of properties that would be inundated by the dam, giving priority to properties with dwellings that lay below the purchase line and in the construction domain. Throughout this process, the team was careful to ensure that landowners were properly communicated with and that the process was fair and clear.

As some landowners would have to reduce their agricultural operations following the expropriation of portions of their land, employment opportunities would change and measures had to be devised to compensate and relocate those who would be affected. A Relocation Action Plan (RAP) was thus developed under the proviso that the relocation process needed to be completed before impoundment of the dam.

The Spring Grove dam wall during construction.

Courtesy AECOM

Because the circumstances, history and 'relationship to the land' of the people affected by land acquisition differed so greatly, the RAP could not apply standard principles and procedures. The international standards and procedures for the relocation and compensation also did not apply because there was no homogenous community in the area (only individuals and families) and because the affected properties were all privately owned.

While the relocation of people was a major part of the project, the project team also had to ensure that historical, archaeological, social and natural fauna and flora aspects were also sensitively addressed. This area is noted not only for its beauty, but also for its role in South Africa's history.

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The KwaZulu-Natal Midlands has both tangible and intangible cultural and heritage importance, and the project documented the 'sense of place' in and around the dam's basin. Interestingly, the dam's basin was formally occupied by settlers of English decent in the late 1800s and was primarily used as farming land. The dam basin also included part of the wagon trail that led to the interior of the country and was part of historical events such as the Langalibalele rebellion, the Anglo-Zulu war, the Anglo-Boer war and the Bambatha rebellion.

The presence of San inhabitants was also evident in the dam basin. Three rock paintings just below Inchbrakie Falls, known as the Vaalekop Rock Art Site, would be inundated. The artwork was carefully removed by a team of archaeological experts and was taken to the Natal Museum for preservation.

In addition, 157 graves were reported as affected and were investigated for exhumation at the identified locations, 109 graves were found with remains or evidence of existence of a grave, and 42 sites were excavated and no remains were found or showed any existence of a grave.

During construction, the R103 became a major travel route for vehicles hauling construction materials to site.

Courtesy AECOM

An environmental aspect of the project that was unique was the construction of a fish barrier structure upstream of the Spring Grove reservoir to mimic the function of the Inchbrakie Falls, which served as a natural a barrier between smallmouth bass populations downstream of the falls and trout upstream. At full supply the Inchbrakie Falls would be inundated. During construction, the R103 became a major travel route for vehicles hauling construction materials to site, and much time was spent in consultation with local residents of Nottingham Road and Rosetta to find a solution that suited everyone.

The conditions of approval of the Traffic Management Plan stipulated that all vehicles hauling processed rock be fitted with GPS devices to track, among others, speed, and that the construction trucks had to follow a loop system so that no trucks passed each other on their way to/from site.

The D146 road from the R103 to the dam construction site was upgraded and maintained during construction so that it could accommodate the extra traffic burden. The construction of Spring Grove Dam holds short- and long-term benefits for the region, especially the nearby towns of Mooi River, Rosetta and Nottingham Road.

Guesthouses, restaurants, entertainment facilities and suppliers in the towns benefited from the influx of site staff and various sub-contractors. The project also generated employment opportunities for the local communities, and specific performance targets were included in the contract to ensure that socio-economic objectives were achieved.

In March 2013, impoundment of Spring Grove Dam started and the Taking-Over Certificate was issued on 25 October 2013 marking the end of construction. The dam was officially opened by President Jacob Zuma on 19 November 2013, who said "South Africans should remember that the country is one of the driest on earth. Not a drop must be wasted, not a drop must be polluted, and all infrastructure developed must be cared for. Water is life. Let us conserve it, respect it and enjoy it."

With good rain over the past few months, the dam reservoir's level has increased from 10% in November 2013 to 85% as at April 2014. ❑

Courtesy AECOM

The Inchbrakie falls, which are inundated during full supply.