31 Allen Drive, Loevenstein 7530
PO Box 398, Bellville 7535
South Africa
Telephone: +27 (0)21 912 3000

UPGRADE OF SCHAAPKOP PUMP STATION: PROPOSED CONSTUCTION METHODOLOGY

PIPE BRIDGE

The pipe bridge will be constructed from in-situ as well as precast, reinforced concrete elements, as shown on drawing P08295-W-DET-101.

Construction of the temporary access roads will commence first. The construction of the access roads will include site clearance, levelling, placement of a 150mm thick subbase (C4 material or similar), and the placement of a 100mm thick coarse gravel layer.

The construction of the crane platforms (on the western and eastern bank of the river) will be carried out in parallel with the temporary access roads. The platform area will be filled with granular material, 300 – 500 mm thick, compacted to 95% MOD AASHTO density.

Once the access roads and platforms are constructed, the piling required for the RC piers will commence. Each pier will require 4 × 410mm diameter forum bored piles. Once the piles are in place, the 700mm × 3200mm RC pile caps and 3550mm high RC piers will be cast in-situ.

During this period, the river will be diverted using cofferdams and dewatering will be required to facilitate the piling required at the foundation of each pier. The river will be diverted to the west for the piling and construction of the eastern pier. The river will be diverted to the east for the piling and construction of the western pier. The river diversion will be done by means of sandbag cofferdam walls. These walls will not be more than 1m in height.

Once the piers have been constructed, the construction of the pipe bridge anchor structures will commence. The ground below the footing will be excavated and filled with engineered fill. A blinding layer of 50mm thick mass concrete will be placed to provide a surface for the footing. The 3600mm × 4200mm × 600mm RC footings will be cast in-situ.

Once the piers and anchor structures are in place, the RC precast elements will be brought to site, lifted with 110-ton crane and placed. The upstand I-beams will be placed and tied, after which the bottom slabs will by placed. The top slabs will only put in place after the new 800mm diameter rising main has been placed and fixed on the bridge.

SWITCH OVER BETWEEN OLD AND NEW RISING MAIN

A new 800mm diameter rising main will be constructed to replace the portion of the existing rising main which is 500mm in diameter. The new rising main will be connected to the existing rising main at the point where the existing rising main size is increased from 500mm diameter to 800mm diameter.

A new valve chamber, as shown in drawing P08925-W-DT-001, will be constructed and will include an isolation valve on the new 800mm diameter rising main, as well as a 500mm tee-off with an associated isolation valve.

Once the new valve chamber has been constructed, approximately 530m^3 of sewage will have to be drained from the existing rising main to allow timeframe for switch over. The upstream inflows to the Schaapkop pump station will be plugged to avoid sewage being pumped.

At this stage, when the existing rising main is empty and the downstream sewage has been plugged, the existing rising main disconnected at the 500mm-800mm reducer and connected to the newly constructed valve chamber. The new rising main will be connected to the existing rising main, just downstream of the existing reducer and valve chamber. The existing 500mm diameter rising main, upstream of the new and existing valve chamber, will also be connected to the new valve chamber via the new 500mm diameter tee. This will enable over pumping via the existing 500mm diameter rising main if required. Refer to drawing P08925-W-DT-001 which shows the various connections and tie-ins.