

**URGENT WATER SUPPLY AND SANITATION REHABILITATION PROJECT PHASE II  
(UWSSRPII)  
REPUBLIC OF ZIMBABWE  
REHABILITATION OF THE WATER SUPPLY AND SANITATION SYSTEMS IN REDCLIFF-  
ICB NO: UWSSRPII/0013**

| <b>SUMMARY OF WORKS</b>          |                                |
|----------------------------------|--------------------------------|
| Type of Works                    | Sewage Treatment works         |
| Location of Works                | Redcliff, Zimbabwe             |
| Size of Works (Mℓ/D)             | 1.4 Mℓ/D                       |
| Date of Award                    | 27 July 2017                   |
| Date of Completion               | 17 May 2018                    |
| Completion Value (Including VAT) | R 1 662 051.66                 |
| Client                           | Maxim Trading                  |
| Conditions of Contract           | PCI Sales Terms and Conditions |

The Redcliff Town Sewage Treatment Works second phase upgrade was constructed in the late 1970's to cater for the expanding population of the industrial town of Redcliff mainly to receive and treat domestic effluent from the affluent/low density township but later expanded to accommodate the Rutendo high density suburb.

The economic challenges and hyperinflation experienced by the country at the turn of the century has seen the rapid decay in the infrastructure and this did not spare the area of Redcliff. The situation was further aggravated by the collapse of ZISCO STEEL (now NEW ZIMSTEEL) which was the major driving force of all the activities in the area. The steel manufacturer was also responsible for the management and development of the sewage works and with the collapse of the steel manufacturing venture, everything downstream also suffered hence the current, decrepit status of the plant.



**Figure 1** Current State of the Redcliff Wastewater Treatment Works.



**Figure 2** Existing Settling Tank - Not operational.

The Redcliff Town Sewage Works has a current design capacity of 1.4MI/day. The plant is currently out of operation due to the break-down of several units such as pumps, clarifiers, aerators etc. Therefore the continuing flow of sewerage from the connected areas is causing a serious health hazard to the communities downstream along the Kwe-Kwe River until it joins the bigger Sebakwe River.

PCI AFRICA assisted Pump Systems Africa as a mechanical sub-contractor for the supply of mechanical equipment in the form of one 37kW fixed, bridge-mounted aerator, a primary settling tank (8.5m diameter) and a final settling tank (18m diameter).

### Bridge-Mounted Aerator

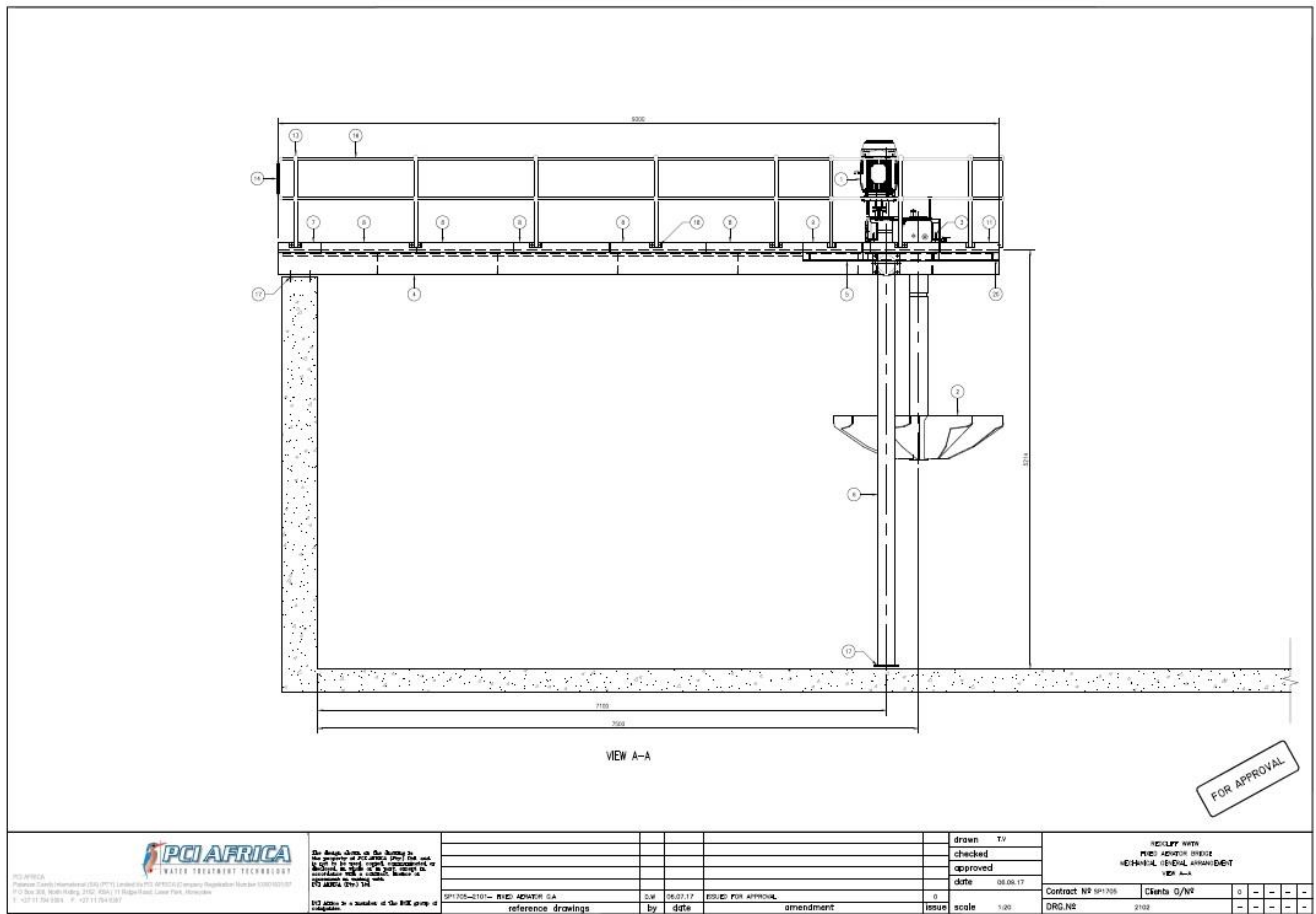


Figure 3 Bridge-mounted, fixed aerator.

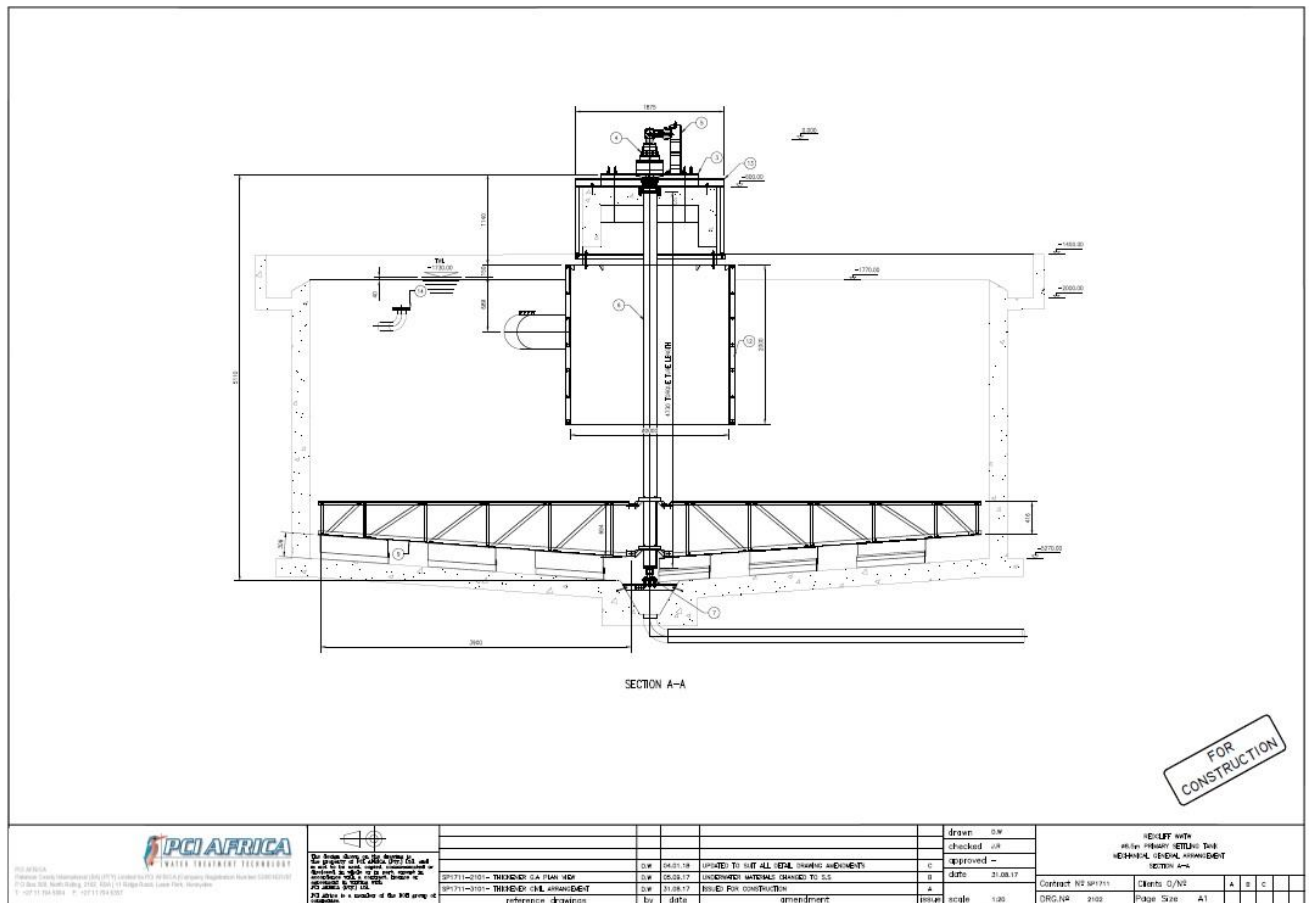
A 37 kW, bridge mounted vertical shaft PCI Ventura aerator as per **Figure 3** was supplied together with a Siemens Flender H2BV size 06, oil lubricated gearbox with a dry well at the output shaft and low speed coupling.

The Bridge to the PCI design was supplied by Pump Systems Africa in Zimbabwe.

#### Technical data

|                             |                                 |
|-----------------------------|---------------------------------|
| Aerator diameter            | : 1750 mm                       |
| Aerator speed               | : 60.9rpm                       |
| Absorbed power              | : 33 kW                         |
| Drive tube outside diameter | : 168mm                         |
| No of blades                | : 8                             |
| Immersion range             | : 200 mm                        |
| Material of manufacture     | : Carbon steel                  |
| Corrosion protection        | : 3-Coat Polyamide Epoxy system |
| Gearbox make                | : Siemens Flender               |
| Gearbox model No            | : H2BV Size 06                  |
| Motor Make                  | : WEG or equal                  |
| Motor power                 | : 37 kW                         |
| Motor speed                 | : 1480 rpm                      |

# Primary Settling Tank



**Figure 4** Primary settling tank. (8.5m diameter).

A primary settling tank with sloped floor, side top feed, bottom sludge draw-off, fixed full bridge and centre drive with two arm lattice structure floor scraper mechanism was required. The existing mechanical equipment was replaced with new and the existing civil structure was refurbished.

The mechanical PCI supply portion as per **Figure 4** consisted of a new gearbox, base plate, torque tube, stilling well, scraper lattice arms, scrapers, drive coupling and lower bearing.

## Technical Data

|                              |                       |
|------------------------------|-----------------------|
| Diameter of tank             | : 8.5m                |
| Diameter of stilling well    | : 2000 mm             |
| Depth of stilling well       | : 2000 mm             |
| No of scrapers               | : 6                   |
| Scraper blade length         | : 1900 mm             |
| Scraper blade depth          | : 250 mm              |
| Gearbox make                 | : Bonfiglioli         |
| Motor power                  | : 0.18 kW             |
| Material of underwater items | : 304 Stainless steel |

## Final Settling Tank

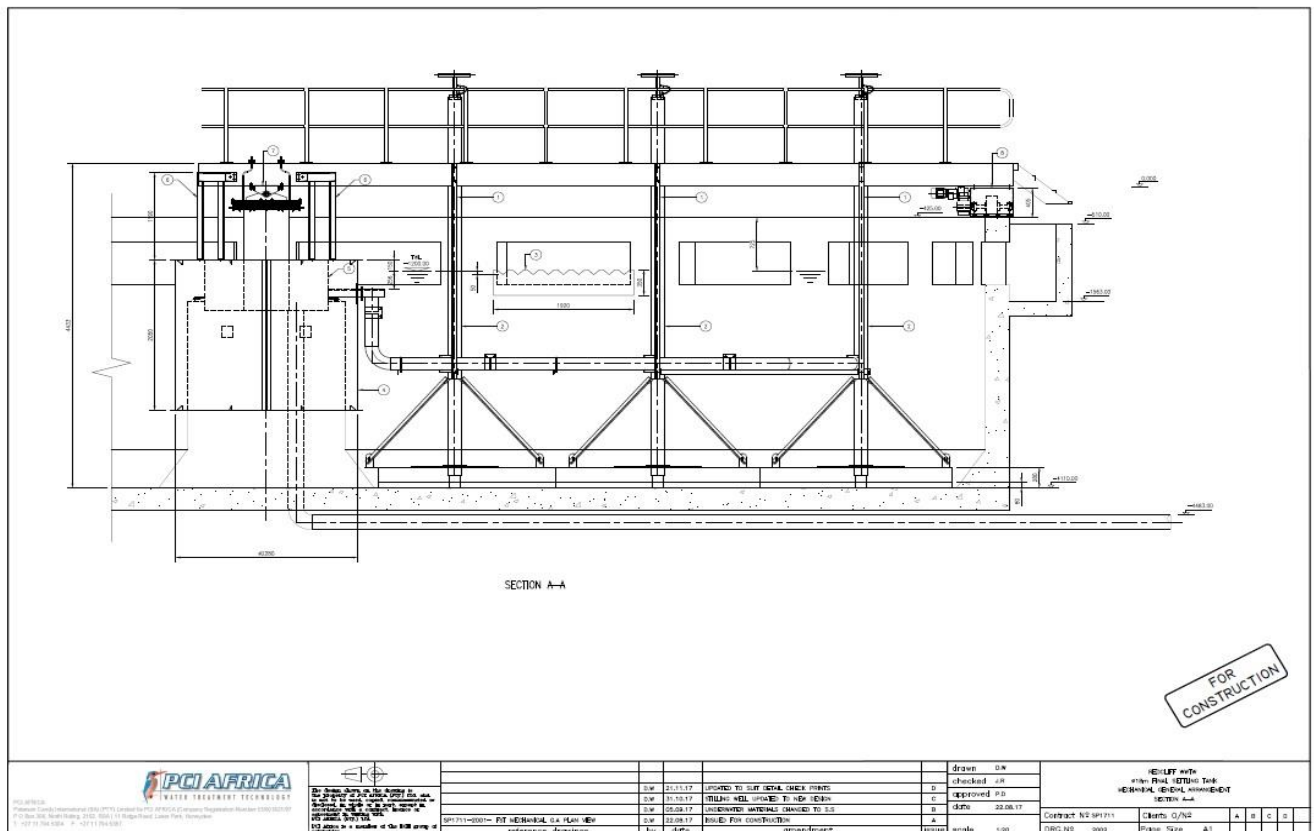


Figure 5 Final Settling tank. (18m diameter).

A final settling tank with flat floor, centre feed, suction lift centre sludge draw-off and half rotating bridge floor scraper mechanism was required. The existing mechanical equipment was replaced with new and the existing civil structure was refurbished.

The mechanical PCI supply portion as per **Figure 5** consisted of a new slewing ring bearing, stilling well, end carriage with new drive and all new underwater structure. The suction lift sludge draw-off system comprised of three v-scrapers with adjustable flow uptake tubes and centrally located discharge siphon.

The weir plates located on the inside wall of the settling tank were also replaced with new 316 stainless steel v-notch weir plates and weir clamps.

### Technical Data

|                              |                          |
|------------------------------|--------------------------|
| Diameter of tank             | : 18m                    |
| Bridge width                 | : 750 mm                 |
| Bridge length                | : 9000 mm                |
| Bridge members               | : 200 mm x 75 mm channel |
| No of scrapers               | : 3                      |
| Gearbox make                 | : Siemens Flender        |
| Motor power                  | : 0.18 kW                |
| Diameter of wheel            | : 317 mm                 |
| Width of wheel               | : 75 mm                  |
| Material of bridge           | : Carbon steel           |
| Material of underwater items | : 304 Stainless steel    |
| Protection of bridge         | : Epoxy painted          |
| Walkway type                 | : Galvanised open grid   |
| Handrails                    | : Galvanised tubular     |