

ERWAT WATERVAL BLOWER REPLACEMENT

ELECTRO-MECHANICAL ENGINEERING

ENGINEERING PERSPECTIVE

Engineering processes employ mechanical and chemical operations to transform matter for social benefit. At the core of sustainability, good process design reduces the formation of entropy, which is achieved through:

- Minimisation of losses and optimisation of heat and power transfer
- Resource recovery and emission control of solids, liquids and gas
- Design optimisation of electrical power supply, motor control centres and plant automation

PROFESSIONAL SERVICES

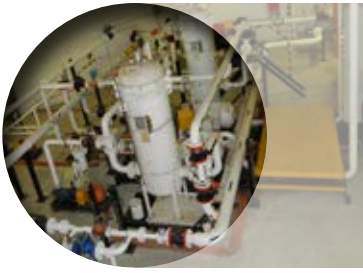
Virtual Consulting Engineers employs specialist electrical and mechanical engineers to work on a range of systems from concept to commissioning, operation and maintenance. We are proficient with the interpretation of international design codes, including:

- American Petroleum Institute/Energy Institute's specifications and codes, such as *API 1540 Design, Construction, Operation and Maintenance of Aviation Fuelling Facilities*
- Joint Inspection Group's *Standards for Aviation Fuel Quality Control and Operating Procedures at Airports and Upstream Fuel Facilities*
- American Society of Mechanical Engineers, including ASME B31.1 Power piping and ASME B31.3 Process piping
- Pressure Equipment Regulations and steam systems
- SANS codes of practitioner for low voltage (LV) medium voltage (MV) and high voltage (HV) infrastructure
- Security systems and electronic access control
- General fire systems and fire detection

Our computer aided design packages include libraries of symbols and sub-systems that were developed over years, in accordance with:

- Process Flow Diagrams (*ISO 10628: General Rules for Flow Diagrams for Process Plants*)
- Piping & Instrumentation Diagrams (*ISA 5.1 Instrumentation Symbols and Identification*)





Makhado and Waterkloof Air Force Bases: Aircraft Refuelling System (2010)

Department of Public Works / South African Air Force

Condition assessment, compliance audits, hydraulic flow and pressure analysis led to the Repair, Upgrade and Maintenance project that included the rail siding fuel supply system (1,250l/min), two main booster pump stations (2,500l/min) with storage tanks, fighter aircraft revetments, gantry with refuelling points for training aircraft and refuelling pit installations as well as the back-up pump station to supply jet-fuel to the hydrant system and Presidential VIP Unit. Mechanical fire fighting systems and cathodic protection completed the scope of work.



St Helena Airport Fuel Facility (2015)

Government of St Helena / Basil Read

Conceptualisation and detail design, as per API 1540, Design, Construction, etc., of the new St Helena Airport Fuel Facility, that comprised dual function receipt and refuelling pumps with automated flow control, fuel coalescer filter separators, four horizontal epoxy coated storage tanks with capacity of 50m³ each and a complete product recovery system.



Waterval Blower Replacement and Mechanical Ventilation (2019)

Ekurhuleni Water Care Company

Compressors from 1993 were replaced after careful functional and spatial analysis. Five new 400kW aeration compressors (10,896rpm) were designed, manufactured and subjected to ISO 5389:2005(en) Turbocompressors — Performance test code. The installation included new electrical supply with Variable Speed Drive starters. Radiators and extractor fans ensure air cooling of the blower house.



Replacement of Boilers and Steam Installations (2020-2024)

Development Bank of Southern Africa / North West Health

Replacement of old boilers at Hospitals with new coal fired boilers at Mahikeng (8.0ton/h), Gelukspan and Wolmaransstad (3.2ton/h), Schweizer-Reneke (1.8ton/h) and refurbishment of boilers at Klerksdorp and Tshepong. Work included installation of feed water softening plants, repair of steam distribution pipes, calorifier installations and condensate return piping. After completion of construction, we completed a 36-month maintenance contract.



SABS Groenkloof: Pipework and electrical services (2021)

South African Buro of Standards (SABS)

The SABS main campus was established in 1972 and electro-mechanical services have reached the end of its design life. Tunnels below the buildings house 11km of pipe network that provide mechanical services, including hot-, cold- and chilled water, steam, gas, drinking water and sewage. VCE was appointed for condition assessment and drafted over 900 as-built drawings and electrical line diagrams, for the planning of renovations and upgrades towards energy efficiency.



Parliamentary Precinct: Upgrade of Security System (2024)

Department of Public Works / South African Parliament

With more than 7,000 people working on the premises of the Parliament and approximately 200,000 visitors received by Parliament every year, security plays an essential role in ensuring the smooth running of the institution. VCE was appointed as electrical/electronic engineer to assess and replace the main network, access control system, close-circuit television surveillance system, x-ray machines and metal detectors.