

OLIFANTSVLEI WWTW - Van Wyksrust Pump Station Refurbishment

Compulsory site briefing session; Technical presentation





Overview of the project

- This is an Infrastructure Renewal Project that deals with existing equipment and infrastructure that have been identified for replacement and/or refurbishment, at the Olifantsvlei Wastewater Treatment Works, specifically associated with what is known as the Van Wyksrust Pump station facility.
- Scope related to the Van Wyksrust pump station was escalated due to acts of vandalism rendering the pump station non-operational.
- The pump station receives over 500 l/s of raw sewage that is supposed to be pumped to the main head of works for treatment.
- All Mechanical, Electrical and Control equipment at the pump station has been stripped and thus will need to be replaced with new equipment.
- This also includes Civil works, building work and security measures at the pump station.
- The associated Substation will be refurbished to include building work, security measures and electrical equipment to enable power supply to the pumpstation.
- Certain upfront investigations are to be undertaken to enable designs for current and future projects.



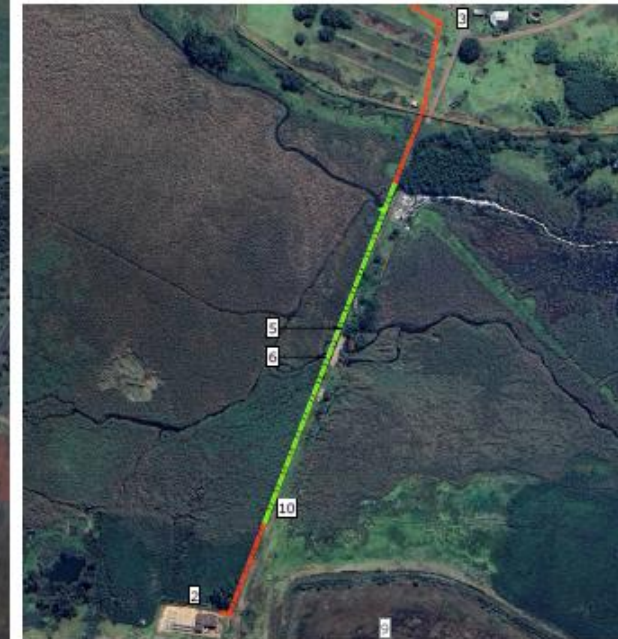
LOCALITY PLAN
1 : 10000



HEAD OF WORKS ENLARGED VIEW
1 : 2500

LEGEND	
1	MAIN ENTRANCE
2	VAN WYKRUST PUMP STATION
3	SUB - STATION C
4	PROPOSED CONTRACTORS CAMP
5	EXISTING DN700 RISING MAIN PIPELINE 1
6	EXISTING DN700 RISING MAIN PIPELINE 2
7	HEAD OF WORKS
8	EXISTING RISING MAIN PIPELINES 1 & 2 VALVE CHAMBER
9	MATURATION DAM
10	VAN WYKRUST AND MATURATION DAM ACCESS ROAD
11	MATURATION DAM FEED PIPE

LEGEND:	
	PIPELINE BELOW GROUND
	PIPELINE ABOVE GROUND



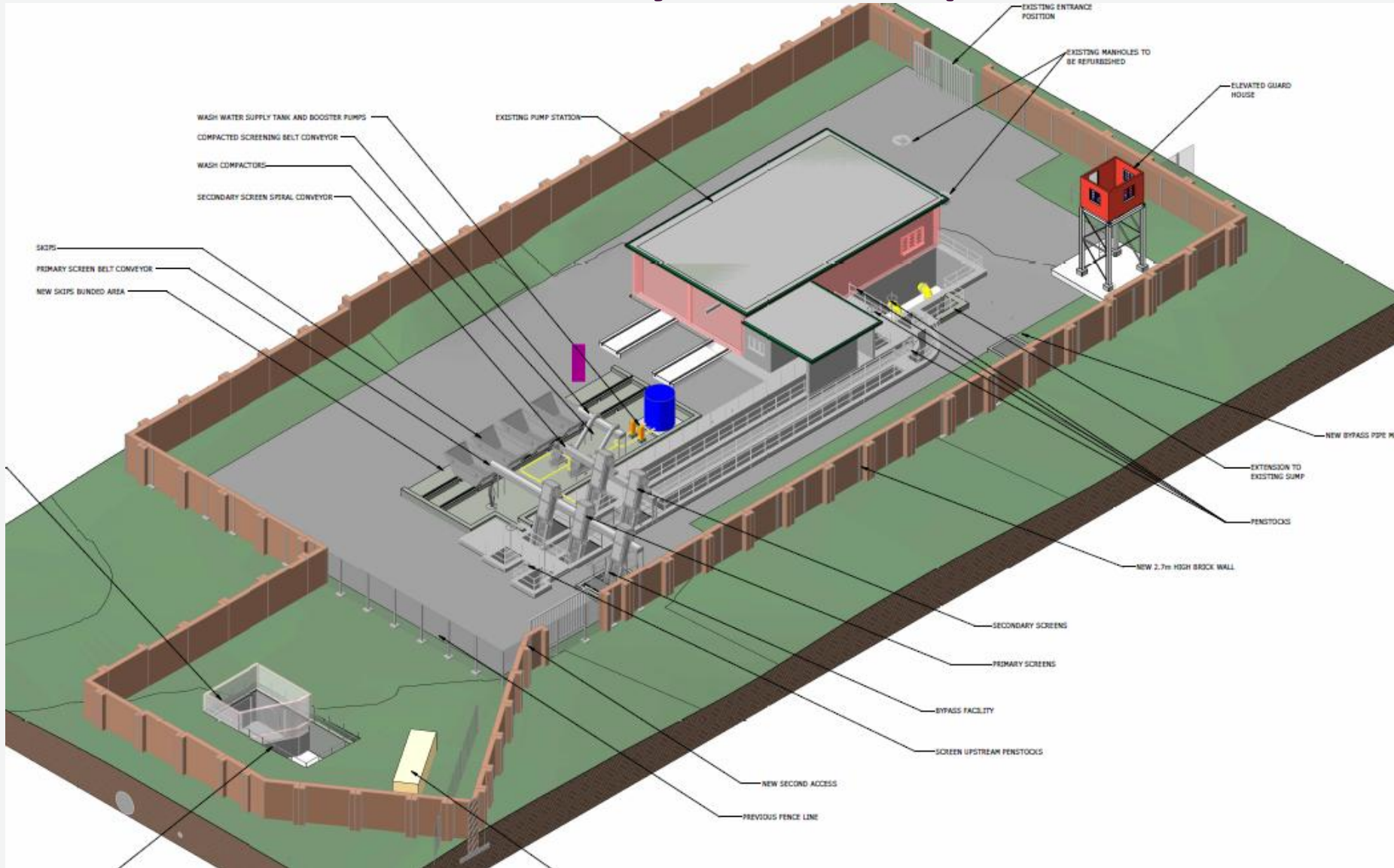
VAN WYKRUST PUMP STATION ENLARGED VIEW
1 : 2500

Van Wyksrust Pump station



- It is located fairly remotely compared to the rest of the works; security is an issue.
- Existing building; pump well is currently flooded.
- Screens, handrails, penstocks, fence, doors, windows, paving have been removed.

Refurbishment at Van Wykrust Pump Station



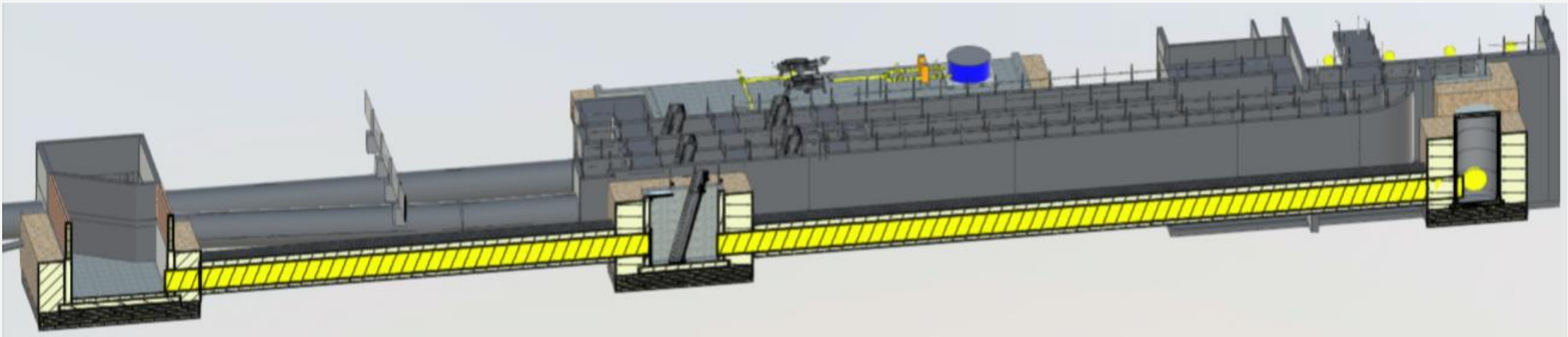
- New screenings facility: compactors; handrails; penstocks to be installed; skips slab.
- Building demolition, construction, repairs including new doors, vents, concrete repairs.
- A new bypass facility (pipe, channel and chamber extension) to be built.
- New mechanical and electrical equipment within the building.
- Refurbishment of existing 700mm dia. rising main pipes.
- Improved security measures to be introduced (wall, guardhouse, etc.)

Civil and General work

Bypass Facility

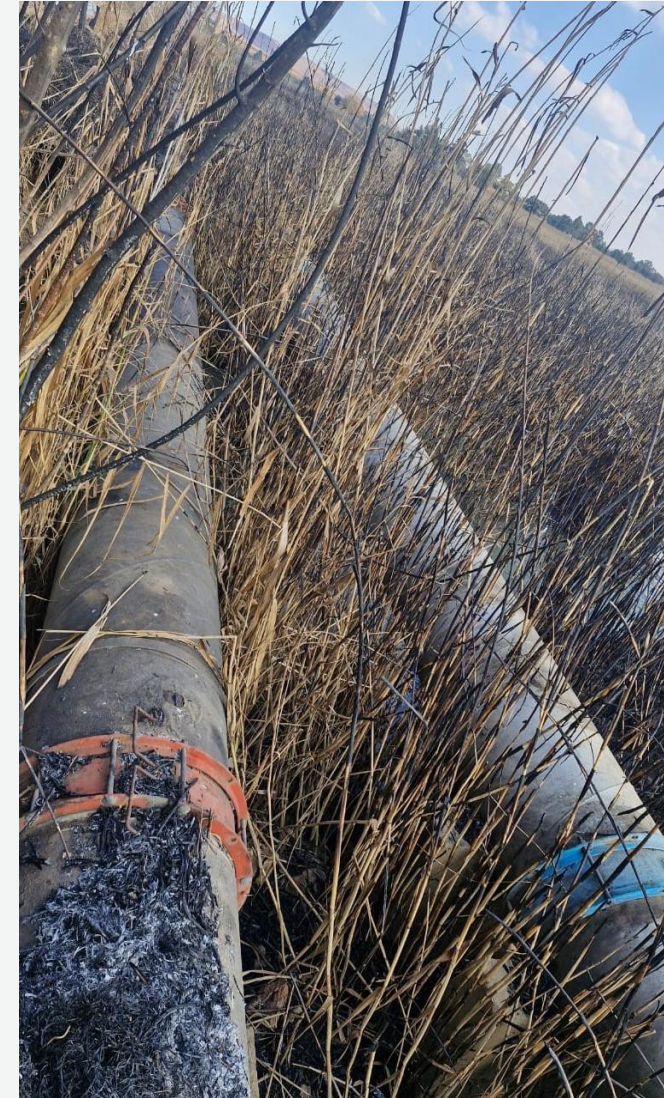


- Portion of open channel for a new screen installation, but for the most part, is made up of a DN1200, HDPE pipe.
- Internal surfaces of the channel will be finished with a corrosion resistant coating.
- The tie-in points for the start and end of the bypass will require changes to some existing infrastructure.
 - At the start of the bypass, an extension to the existing splitter chamber is required, to accommodate the new weir and bypass pipe.
 - At the bypass end or return, the existing sump will be extended to include the new pipe.



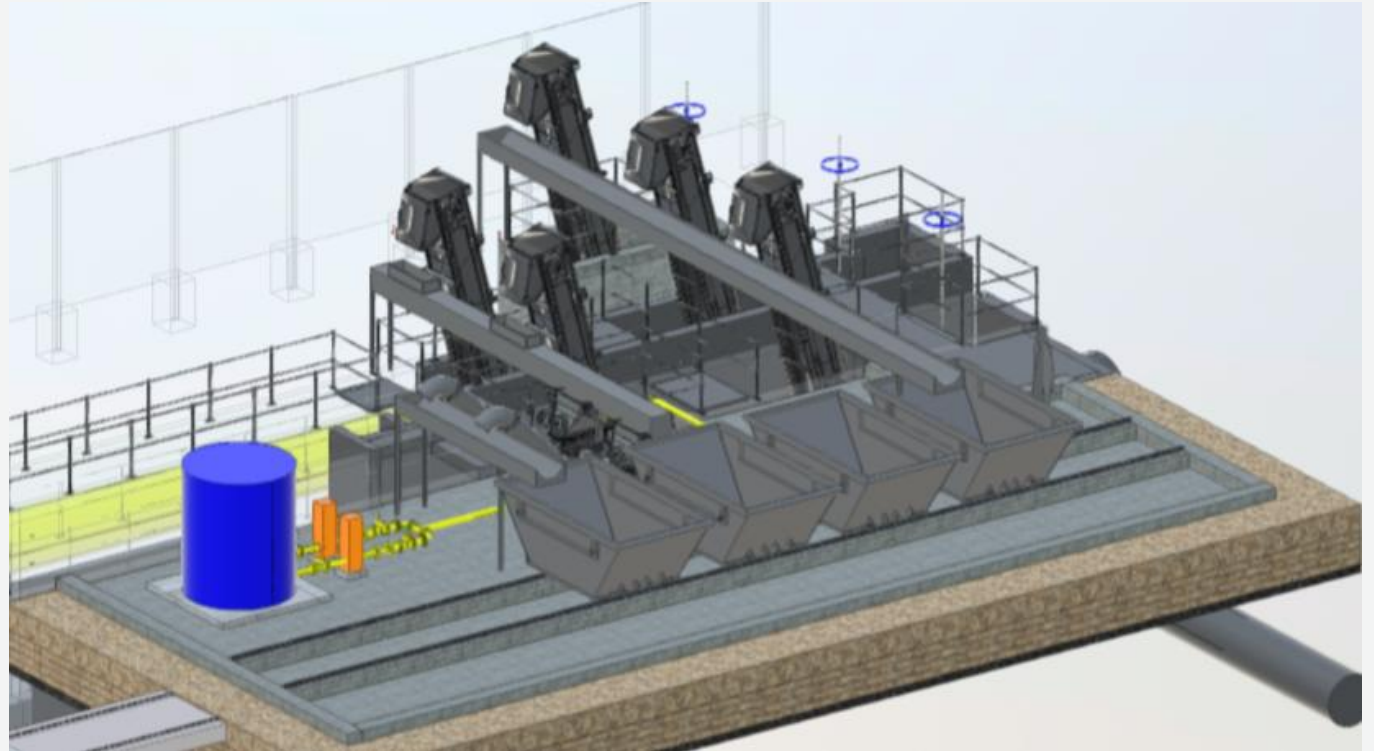
Rising Mains

- 1 of the 2 existing DN700 pipes had been repaired before, and we will be adopting a similar repair method for the 2nd pipe.
 - Slip-lining of the buried portion of pipe; say 1105 m long, with HDPE, DN630.
 - Replacement of the above ground section; say 595 m long, with same as existing, steel pipe. Most of this portion of the pipe traverses the existing wetland on existing concrete plinths.
- Isolating, draining, and cleaning of the pipes would be necessary prior to investigation; to be planned as upfront work.
- Current pipe condition investigation of existing pipes; to be planned as upfront work. This will also determine the type of refurbishment work required for the previously repaired pipe.
- New air valve installations and existing valves replacement.



Screenings facility

- A new concrete bunded area for the screenings' facility will include skips trolley and rails, as well as the screens compactors, to contain any spills.
- These concrete surfaces are to be treated with a corrosion resistant coating.
- A new wash water storage tank and booster pumps, on plinths, will be contained within the new bunded area.



Structural, Building Work and General

- The pump station basement/pump well and feed channels are currently flooded. These will require drainage and cleaning for inspection, prior to repairs/installations.
- Repairs to concrete defects in existing structures (cracks, holes, leaks, reinforcement, etc). Water ingress in the pump well must be addressed.
- Careful demolition of existing building superstructure, concrete staircase and pump plinths.
- Re-construction of new superstructure and additional monolithic basement (dry well).
- Floor and walls. Installation of new concrete slabs to replace the previously installed paving blocks.
- Missing stainless steel handrailing will be replaced with GRP handrailing, including additional sections of such.
- Other miscellaneous items, such as missing manhole covers, brickwork, etc, to be better defined and addressed during construction.

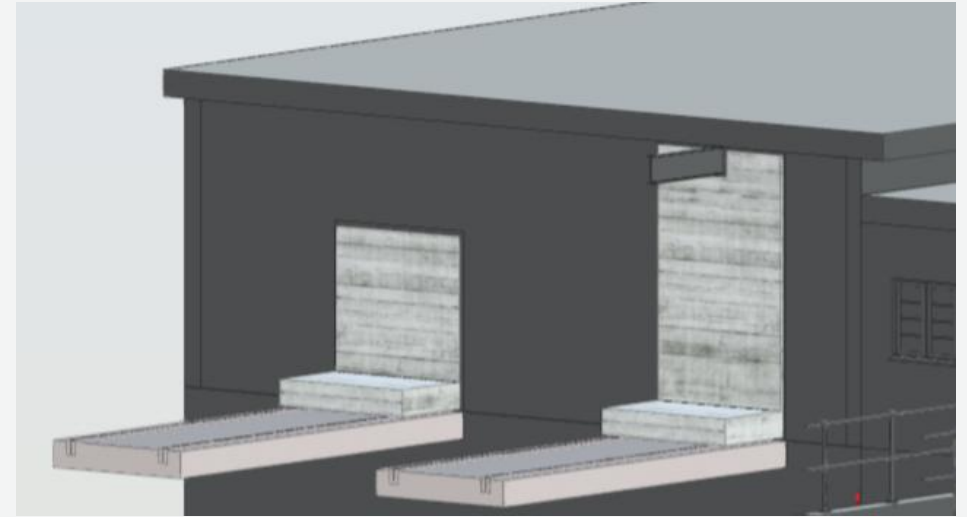


Security Measures

- A new 2,7 m high brick wall, without footholds or handholds, to be constructed, with an anti-climb topping.
- Existing missing doors, louvres and windows are to be replaced with concrete type doors and ventilation panels.
- Supply and installation, of a prefabricated guard house made from armoured material including bullet resistant glass windows.

Generator

- A new concrete slab with a concrete bund wall and sump for the self-bunded generator.



Mechanical Work

■ Screening equipment.

Primary Screen. 50mm front rake.
1m wide, 6m tall

Secondary Screen. 25mm front rake.

600mm wide belt conveyor

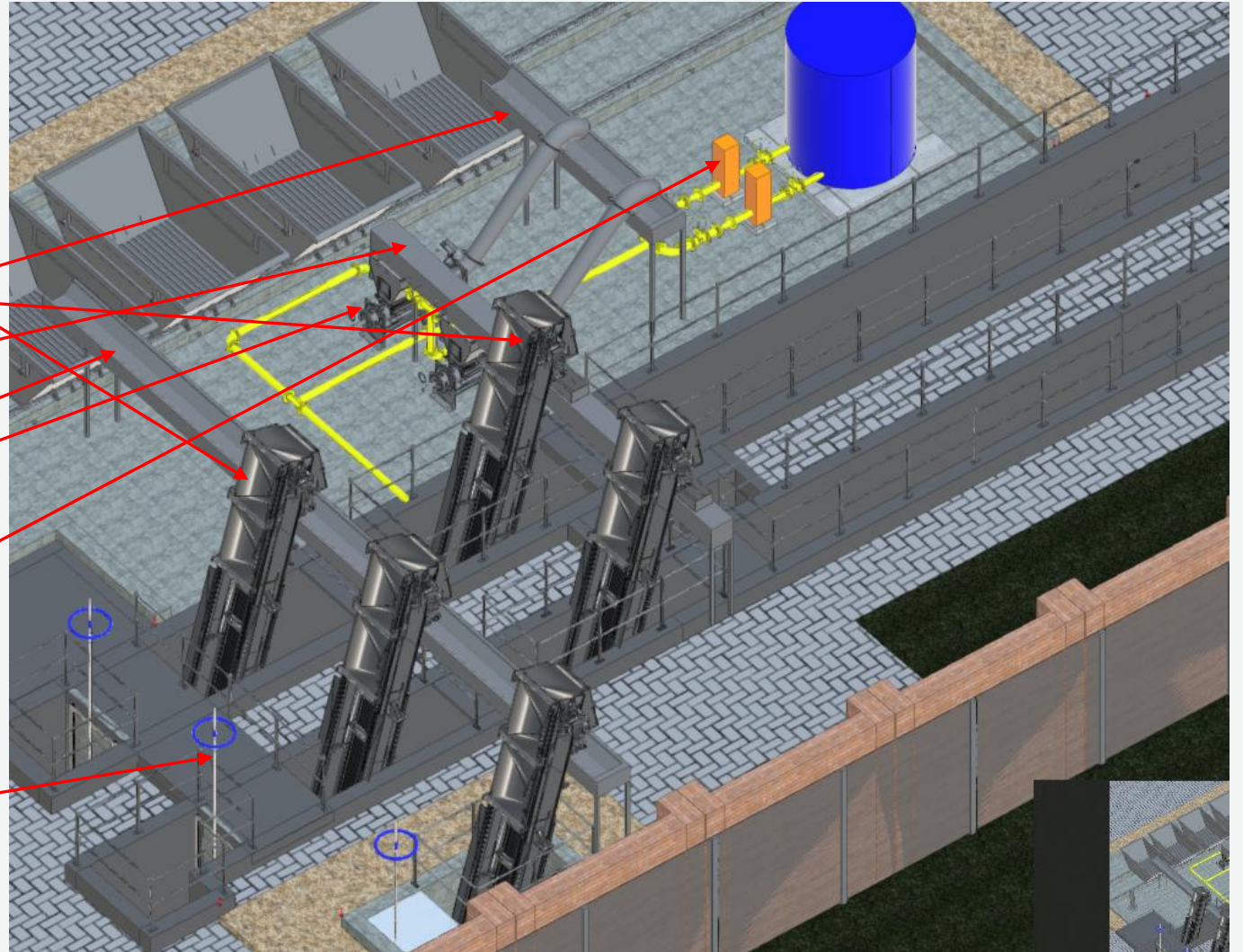
Spiral conveyor

600mm wide belt conveyor

Wash Compactors

Wash Water booster system

Penstocks 5 x 1m wide 2m high



Mechanical Work



Mechanical works include equipping the pump station as well as the screening facility.

■ Pumps station

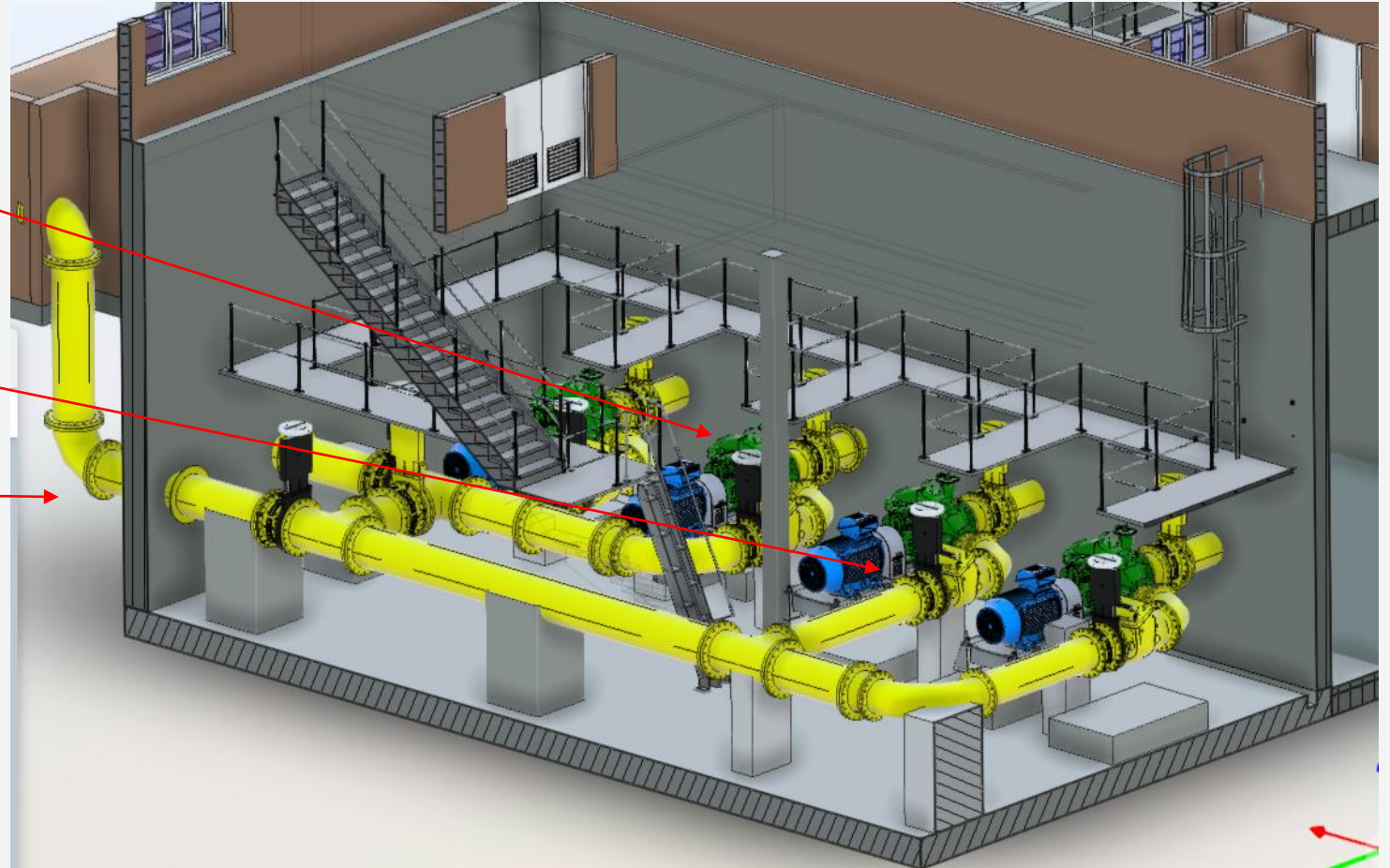
4 x 185 kW pumps
580 l/s @ 24 m, 3 tons each

Isolation and non-return
valves 500NB

Pipework steel 500-600NB

Other smaller items:

- Drainage submersible pumps
- Lifting equipment (3-ton electric)
- Ventilation fan and ducting
- 3 x Penstocks (650x650)
- Fabricate new staircase



Mechanical Work



- Pump Station discharge and rising main:
 - 2 off DN600 PN16 knife gate valves
 - 3 off DN700 PN16 knife gate valves
 - 6 off DN350 PN16 knife gate valves
 - Air-valves
 - Provision for some valve interconnecting pipework.

Mechanical Work

■ Wash Water (Final Effluent) Supply

2 self-priming pumps

110mm diameter MSG pipeline,
1,6km long

To wash water tank,
at Van Wyksrust Pump Station



Electrical & Control Work

- Pump Station

Security lighting, including 2 high masts

New MCC

630 kVA Transformer, 11/0.4kV ONAN

500 kVA, 400V Generator

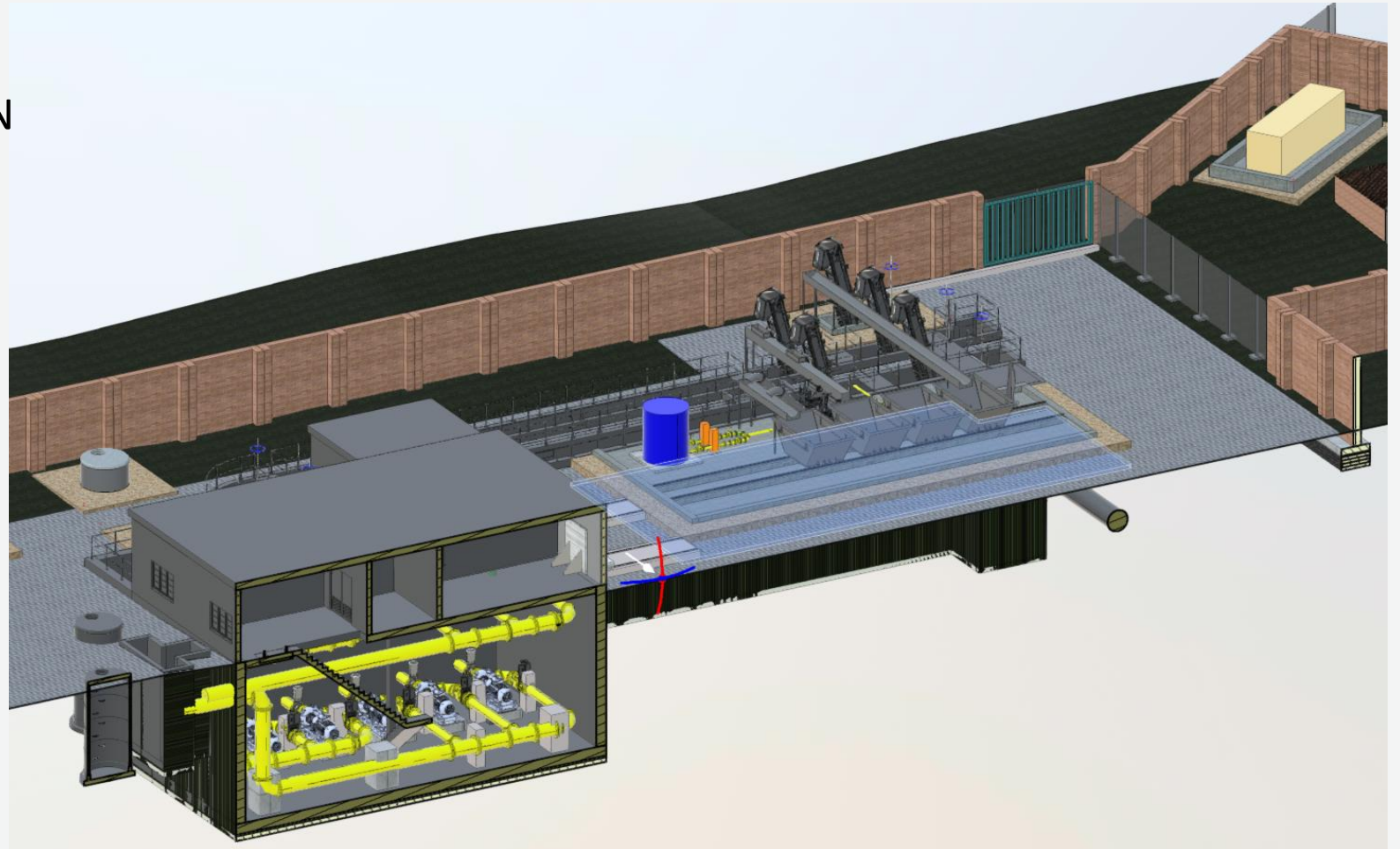
Earthing and cabling

Local control panels (approx. 20)

Small Power and Lighting

Automation system based on
Schneider M580, instrumentation

Perimeter intrusion detection



Electrical Work



■ MV reticulation re-establishment

Substation C to be refurbished including perimeter wall and electric fence

New 11kV Ring Main Unit, 630A isolators and 200A breakers

MV cabling

1000m 185mm² SWA XLPE, buried

190m 70mm² SWA XLPE, buried

650m 11kV Fox conductor overhead line

Van Wyksrust PS substation

2x Incoming panels, transformer circuit breaker, and BTU



Electrical and Control Work

- Communication reestablishment and security

Fiber optic link to be re-established

Buried cable in sleeves with concrete tile protection. 750m

Overhead (aerial) cable, supported on MV line. 700m

Perimeter intrusion detection system

Wall mounted and buried fibre optic system

Security Radio system Booster

Survey area then install booster system

Security Camera system

28 pole mounted 4MP cameras covering PS perimeter and rising mains.

Connected via the fibre network and monitoring stations at the PS, Admin building and Guard house



Special Considerations



- Dolomite designated site
 - Methodologies and procedures undertaken by the contractor must be in compliance with SANS for Development on Dolomitic land. This also includes for planned hold points for certain inspections as required by the Engineer for reporting back to the Council for geoscience.

- Environmental Management
 - Various existing infrastructure falls within Environmentally sensitive areas (within the 1:100 year floodline, wetland buffer zones and the wetland itself).
 - The scope of work for this contract triggers environmental activities leading to authorisations and approvals by the authorities. An Environmental Authorisation is applicable to the site and compliance with such as required.
 - Remedial measures and conditions that must be attended to by the Contractor are allowed for in the provisional sum included in the Schedule of Quantities.

Special Considerations



- **Security**
 - This is a security high-risk area. Mitigation strategies are essential to protect both the physical assets and the safety of personnel on site. It is preferred that this area be adequately secured prior to commencing and during construction.
 - Attention is drawn to the specific type, proposed number of security personnel, arms, etc that may be required during construction, contained in the document.

- **Sewage spillage mitigation and Flow accommodation**
 - The mitigation of current sewage spillage is deemed urgent and may be undertaken by Others, as an “Emergency project” prior to construction of this main project.
 - Certain construction activities, around the Van Wyksrust pump station facility will require diverting and/or isolation of incoming raw sewage flow. Existing chambers, manholes, pipes and channels may be used for such with construction isolation and diversion measures. This may form part of the “Emergency project” by Others.
 - The preliminary geotechnical information indicated a fairly high water table, around 2 m.
 - The existing DN700 rising mains will also have to be drained and cleaned prior to investigation and/or refurbishment.

Special Considerations



- Investigations

- Investigation of the pump station structure, pipelines, etc. will require the use of specialised technology and/or service providers. This should be programmed as upfront work to allow adequate time for procurement of these services, potential design updates and other related tasks, where required.

- Access

- The current existing access road, from the northern side of the Van Wyksrust pump station, crossing the wetland, may prove challenging, especially during wet weather and/or high river conditions.
- An alternative, existing informal vehicle track on the west side of the Maturation dam, accessible from the R554, may be used as an informal access path to the pump station.
- There is a risk that heavy plant may have difficulty navigating water-logged areas around the pump station at certain times.

Specifications and BoQ



- The structure of the various sections of specifications are as follows:
 - Mechanical and Electrical Project Specifications in sections PSX and PSY of the Scope of work Document (Volume 2A).
 - Particular Specifications (Johannesburg Water Particular Specifications) forms Volume 2B.

- The BoQ was shared in excel format for ease of pricing.

