JANUARY 2020

CIVIL SERVICE REPORT FOR A PROPOSED WILDLIFE ESTATE AND LEISURE RESORT ON PORTIONS 2 & 3 OF THE FARM TENBOS 661-JU

PREPARED BY

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PREPARED FOR

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TABLE OF CONTENTS

SECTION A: INTRODUCTION

A-1 TERMS OF REFERENCE

This report has been compiled to give an overview of initial proposals for the provision of civil and electrical engineering services for a proposed leisure resort and a wildlife estate on portions 2 & 3 of the Farm Tenbos 661-JU. The development is located just north of the town of Komatipoort with the Crocodile River (and the Kruger National Park) bordering the development area to the north and east.

A-2 OBJECTIVES

The objectives of the investigation are the following:

- to investigate existing and available infrastructure, required bulk and connector services, as well as to propose appropriate levels of service for internal civil services;
- to evaluate all aspects pertaining to the internal and bulk engineering services to the development, in order to enable all role players to make decisions on the provision of services to the development.

A-3 SCOPE OF INVESTIGATION

The scope of the report includes:

- Study area and demarcation;
- Information and design criteria;
- Existing and anticipated development;
- Applicable Legislation;
- Water Supply:
  - Water Treatment
  - Bulk Water Supply
  - Storage facilities
  - Distribution
  - Proposed new infrastructure
- Sanitation:
  - Sewage Treatment
  - Sewerage flows and loading;
  - Outfall sewers;
  - Connector sewers ;
- Roads:

- Existing roads network;
- Future roads;
- Proposed new roads;

- Storm Water Drainage:
  - Drainage areas;
  - Storm Water flows;
  - Proposed infrastructure;
- Disposal of Solid Waste;
- Environmental Issues;
- Financial Implications;
- Summary and Recommendations.

A-4 BACKGROUND

The development is intended to address the shortage of tourism facilities and luxury housing accommodation in the area. The Nkomazi Local Municipality, however, does not have the capacity to provide bulk water and sewage infrastructure to this development and all services must be provided for by the developer.

SECTION B: SUMMARY AND RECOMMENDATI4ONS

B-1 SUMMARY

B.1.1 The development area is located north and adjacent to the town of Komatipoort with the Crocodile River and the Kruger National Park forming the northern and eastern boundaries. The western boundary is adjacent to well cultivated farmland. .

B.1.2 Access to the development will be via an access servitude through Portion 814 of Komatipoort Extension 1 from Rietbok Street.

B.1.3 The development will consist of two distinctly separate developments namely:

A Leisure Resort located in the northern section of the development area consisting of:

- 175 Chalets;
- 150 bed Lodge;
- A reception area with a restaurant.

A Township located in the southern section of the development area consisting of

- 54 River Front Erven;
- 39 Bush Erven.

B.1.4 Bulk Water and Sanitation services are not available in the area, and all required infrastructure will have to be provided.

B.1.5 Existing water rights from the Crocodile River Irrigation Board will be converted to primary use to supply 461 m^3/day of raw water for the proposed development. The water will then be purified and adequate storage for human consumption and the fire demand will be provided, from where potable water will be distributed by a new water reticulation network.

B.1.6 A sewage treatment plant will be constructed at a suitable position within the development area and all the sewage from the reticulated sites within the development will be treated at this treatment plant.

B.1.7 Eskom is the supply authority for electricity in the area. The electrical services report is attached under Annexure B.

B.1.8 The level of services to be provided for the remainder of the development is as follows:

- Water supply – connection per building for in-house supply;
- Sanitation – full waterborne sewerage system with a connection for each chalet and all other facilities on site.
- Roads – graveled as well game viewing tracks
- Storm water drainage – surface with erosion control measures where required;
- Electrical Supply – Bulk supply from Eskom and an underground reticulation system.
- Refuse removal – daily door-door by Resort Management and Home Owners Association, owner supplies storage. Waste will be collected weekly by the Nkomazi Municipality.

B-2 RECOMMENDATIONS

B.1.9 It is recommended that:

This report be considered by all role players.

SECTION C: PLANNING

PART I - GENERAL

C-1.1 STUDY AREA

The study area comprises a portions 2 (339.7ha) & 3 (4.9 ha) of the Farm Tenbos 661-JU, which is located directly north of Komatipoort with the Crocodile River (and the Kruger national Park) bordering the area on the eastern and northern sides. The development area is bordered on the eastern side by well-developed farm land. .

The area is located between contours 142.5m and 199.5 m above mean sea level and the average annual rainfall is 605 mm.

C-1.2 INFORMATION

Information has been obtained from the following sources:

- Van Staden Surveyors (Pty) Ltd : Topographical and cadastral information
- Derick Peacock & Associates : Conceptual Layout Plan
- Department of Human Settlements : The Neighborhood planning and Design Guide
- Traffic Impact Statement : Hamatino Consulting Engineers
- Geotechnical Investigation Report : Johann van der Merwe (Pty) Ltd

C-1.3 TOWN PLANNING ASPECTS

A layout plan for the proposed leisure resort and residential township was compiled by Derick Peacock and Associates. This layout plan is used for the investigation into the provision of engineering services to the area. The conceptual layout has been included as Annexure A, and includes the basic civil infrastructure layout, position of raw water extraction, position of water and sewer treatment plants etc.

C-1.4 ENVIRONMENTOL MANAGEMENT PROGRAMME

An Environmental Management Programme has been compiled by Nuleaf.

C-1.5 EXISTING INFRASTRUCTURE

There are a number of overhead ESKOM electricity supply lines and unsurfaced service roads located within the development area but no significant water supply or sanitation infrastructure.

C-1.6 GOVERNING LEGISLATION

The development of any area and the provision of services are inter alia governed by the following legislation:

- Constitution;
- National Environmental Management Act (Act 107 of 1996);
- Environmental Protection Act (Act 73 of 1989);
- Water Services Act (Act 108 of 1997);
- National Water Bill (Act 36 of 1998);

- Local Government: Municipal Structures Act (Act 117 of 1998);
- Strategic Framework For Water Services (2003)
- National Sanitation Policy (2016)
- Water Use Licence Application and Appeals Regulations (2017)

The main aspects with regard to legislation to be taken into account are the following:

- The right to a healthy environment and the protection of the environment are included in Chapter 2 of the Constitution as a basic human right. This means that any person can approach a court for relieve should he or she be of the opinion that his or her human rights are threatened. This places restrictions on the development of areas and the provision of infrastructure.

- The **National Environmental Management Act (Act 73 of 1989)** gives the Minister the power to require full Environmental Impact Assessments (EIA) on certain projects. In September 1997 the Minister identified various activities that require full EIA's, which activities include the following:

  - Rezoning of any area for development Waste water treatment facilities;
  - Bulk water supply facilities for potable water;
  - Roads, air fields, railways, etc;
  - Canals and channels including diversion of normal river flows;
  - Disposal of water.

- The **Water Services Act** requires that a water services development plan be compiled for all areas supplied with potable water by the supply authority concerned. One of the main objectives of the Act is to monitor and control the use of water and to limit losses. This requires the provision of metering facilities together with network requirements to facilitate zone metering, etc if practical.

- The purpose of the **Water Use Licence Application and Appeals Regulations** is to describe the procedure and requirements fort water use license applications as contemplated in section 41 of the National Water Bill, as well as an appeal in terms of section 41(6) of the Bill.

C-1.3 GEOTECHNICAL ASPECTS

A geotechnical survey and report was compiled by Johann van der Merwe (Pty) Ltd and the findings are as follows:

The Portions 2 & 3 of the Farm Tenbos (Pty) Ltd is suitable for development but area is suitable for development but the area is considered very rocky and problems with the installation of underground services is expected due to excavation problems.

PART 2: SERVICES DEMANDS

C-2.1 GENERAL

The level of civil services to be provided in terms of water and sewer will be in terms of current design standards to comply with current legislation and on the availability of funds as well as practical considerations.

C-2.2 DESIGN CRITERIA

The design criteria as recommended in the "The Neighborhood Planning and Design Guide", issued by the Department of Human Settlement are applied, except where indicated otherwise.

C-2.3 PROPOSED LEVELS OF SERVICE

The levels of service adopted for the development are the following:

Water Supply	Potable water and connections for in-house supply and smart meters for management.
Sanitation	Full waterborne sanitation to sewer system and treatment works.
Roads	Graveled access roads and game viewing tracks,
Storm water drainage	Surface with erosion control measures where required.
Refuse removal	Weekly collection door-to-door, Resort Management supplies storage.

C-2.4 SERVICE DEMANDS

C.2.4.1 Water Supply for Household Use

The Annual Average Daily Water Demand for the Leisure Resort is estimated as follows:

- 150 Chalets @1.35 m^3/chalet = 202.5 m^3/day;
- 25 Chalets @1.7 m^3/chalet = 42.5 m^3/day;
- 150 bed lodge @ 0.25 m^3/bed = 37.5 m^3/day;
- Reception area and restaurant 250 m^2@0.9m^3/100m^2 = 2.25 m^3/day.

The total AADWD for the Leisure Resort is therefore estimated to be 284.75 m^3/day

The Annual Average Daily Water Demand for the Wildlife Estate is estimated as follows:

- 54 River Front Erven @2.0 m^3/erf = 108 m^3/day;
- 39 Bush Erven @ 1.75 m^3/unit =68.25 m^3/day.

The total AADWD for the Wildlife Estate is therefore estimated to be 176.25 m^3/day.

The total AADWD for the two phases combined is estimated to be 461 m^3/day.

It is proposed that storage is provided for 36 hours of the AAADWD which equates to 691.5 m^3.

C.2.4.2 Water Supply for Fire Fighting

Fire Flow:

The water supply system should cater for the Low Fire Risk Category and the design criteria area:

Total fire flow (L/s)	Minimum flow at one hydrant (L/s)	Minimum pressure at fire node (m)	Minimum pressure at rest of system (m)
15	15	10	5

Fire Duration:

The duration of fire flow for the Low Fir Risk Category is 1 hour.

Water Storage

The minimum additional storage capacity required for firefighting is 15 l/s for a duration of 1 hour, which equates to 54kl.

The total storage capacity required equates to 475.5 m³ (691.5 m³ for 36 hours domestic demand and 54 m³ for firefighting purposes).

C.2.4.3 Sewerage

Leisure Resort:

The anticipated Annual Average Daily Dry Weather Sewage flows for the proposed Leisure Resort is calculated as follows:

The Annual Average Daily Water Demand for the Resort is 284.75 m³/day and it is estimated that 70% of the AADWD will be transferred to the sewer system. Making provision of 15% ground water infiltration it is estimated that the AADWF will be 230 m³/day

Wildlife Estate

The anticipated Annual Average Daily Dry Weather Sewage flows for the proposed Wildlife Estate is calculated below:

The Annual Average Daily Water Demand for the Estate is 162.75 m³/day and it is estimated that 70% of the AADWD will be transferred to the sewer system. Making provision of 15% ground water infiltration it is estimated that the AADWF will be 131 m³/day

The combined AADWF is 361 m³/day.

C.2.4.4 Roads

Access to the development will be provided from Rietbok Street in Komatipoort via anew 16m wide proposed right of way servitude.

Both the Leisure Resort as well as the Wildlife Estate are planned as low impact nature developments and the construction of surfaced roads are not envisaged. All roads will be graveled access roads or game viewing tracks.

A construction access is planned via the Remainder of Tenbos 661-JU in the north western corner of the

development area.

C.2.4.5 Storm Water Management

Proper storm water management is essential to ensure protection of life and property from flood hazards and that the natural environment is protected. The objectives of storm water management can be summarized as follows:

- to provide a storm water drainage system for the protection of property from damage by runoff from frequent storms;
- to prevent loss of life and reduce damage of property from severe storms;
- to prevent land and watercourse erosion;
- to protect water resources from pollution;
- to preserve natural watercourses and their eco-systems;
- to achieve the foregoing objectives at optimal total cost.

The area generally drains to the Crocodile River to the north and east. The 1:100 year floodline have been calculated and are indicated on the drawings. No development will be allowed within the 1:100 year floodplains.

Storm water will be surface drained with piped road crossings where required. Erosion control measures will be implemented where required.

C.2.4.6 Electricity Supply

An underground reticulation system will be installed and will remain the property of the developer. The developer/resort management will be responsible for the maintenance and management of the system.

See Annexure B for the electrical services report.

C-2.5 DESIGN PARAMETERS

C2.5.1 Water Supply

Item	Sub-Item	Criteria
Velocity	Maximum	1,5 m/s
	Preferred	0,6 m/s
Pressures	Minimum peak	20 m
	Recommended maximum static	12 m
	Absolute maximum static	90 m
Minimum storage capacity		36 h of ADWD
Fire Flow		Low Risk Category

C2.5.2 Sewage Disposal (Waterborne Sewerage)

Item	Sub-Item	Criteria
Minimum pipe Ø		150 mm
Minimum manhole spacing		80 m
Minimum flow velocity		0,6 m/s (full flow)
Maximum flow velocity		2,5 m/s (full flow)
Minimum Cover		800mm
Peak design flow		Full bore capacity of pipe
Allowance for extraneous flows		15 %
COD loading		600 g/stand/day
Nitrogen loading		60g stand/day

C2.5.3 Access Roads/Streets

Both the Leisure Resort as well as the Wildlife Estate are planned as low impact nature developments and the construction of surfaced roads are not envisaged. All roads will be graveled access roads or game viewing tracks.

C2.5.4 Storm Water Drainage

Storm water will be surface drained with piped road crossings where required. Erosion control measures will be implemented where required.

C-2.6 CONSTRUCTION REQUIREMENTS

2.6.1 General

The proposed construction and material requirements are indicated below and will be incorporated in the detail design.

C2.6.2 Water Reticulation

ITEM	CRITERIA
Location	Where practical.
Pipe material	uPVC Class 12 for distribution
	HDPe Class 10 Type 4 for house connections
Valves	Resilient seal valve anti-clockwise closing to SABS 664, socketed for uPVC or flanged to Table D
Valve chambers	600mm x 600mm brick with cast iron cover
Air valves	Single orifice plastic
Water meters	Kent meters, complete with chamber

C2.6.3 Sewerage Reticulation

ITEM	CRITERIA	
Location	Where practical	
Pipe material	Heavy duty PVC pipes	
Manholes	1 000mm diameter precast concrete	
Rodding eyes	ABC cast iron with cast iron cover and frame box	
Manhole covers	Cast iron Type 2A in roadways	
	Cast iron type 4 VP for midblock sewers	
Stand connections	110 mm diameter with end cap , location 1m x 1m on low point of stand	
Minimum pipe diameter	150 mm	
Minimum gradients	Diameter	Minimum gradient
	100	1:120
	150	1:200
	200	1:300
	300	1:400

C2.6.4 Streets

Both the Leisure Resort as well as the Wildlife Estate are planned as low impact nature developments and the construction of surfaced roads are not envisaged. All roads will be graveled access roads or game viewing tracks.

C2.6.5 Storm Water Drainage

Storm water will be surface drained with piped road crossings where required. Erosion control measures will be implemented where required.

PART 3 – BULK SERVICES

C-3.1 GENERAL

The Nkomazi Local Municipality has no bulk services available in the vicinity of the development area and all bulk services will have to be provided by the developers.

C-3.2 WATER SUPPLY

C.3.2.1 Source

Water will be sourced from current water rights from the Crocodile River. A 20 ha water entitlement from the Crocodile River Irrigation Board for a total of 260 000 m³/annum is available for use for the development. If the irrigation water use is converted to primary (household) use, the allocation is reduced by 30%. The available water is therefore 182,000 m³/annum or 498.63 m^3/day.

The expected Annual Average Daily Water Demand is estimated at 461 m³/day. The water available from the irrigation board is therefore sufficient.

A new river intake well and a raw water pump station will have to be constructed in the Crocodile River at the position indicated on the layout plan with a new rising main to the Water Treatment Plant.

C.3.2.2 Water Treatment

A New Water Treatment Plant will be provided (possibly at the at the water storage facility) and the detail of a similar sized plant is included under Annexure C.

C.3.2.3 Storage

The storage requirements are 623.25 m³ for domestic consumption (36 hours of GAADD) plus 54kl for firefighting which equates to 623.25 m³. A new reservoir of at least 625 m³ will be installed at the position as shown on the layout drawing. The elevation of the reservoir area is not sufficient to provide sufficient pressure, and a booster pump system with standby electricity will have to be provided.

Two outlets will also be provided at different heights to ensure that water for fire fighting purposes cannot be used for domestic purpose.

C-3.3 SEWAGE DISPOSAL

C.3.3.1 Bulk Drainage

The area drains towards the south eastern corner of the development area, and lowest point is next to the Crocodile River. No reticulation lines will be constructed within the 1:100 year flood line sewage pump stations may be required to pump sewer to the proposed sewer treatment plant.

The total Annual Average Dry Weather Sewage Flow is estimated at 334.48 m³l/day.

C.3.3.2 Treatment

A Waste Water Treatment Plant will be constructed at a convenient position. The treated effluent will comply with the general standards required by the department of Water Affairs and Forestry and will be of such quality that the treated water can be used for irrigation purposes.

Detail of a similar sized treatment plant can be seen under Annexure D.

C-3.4 ACCESS

Access to the development will be provided from Rietbok Street in Komatipoort via a new 16m wide proposed right of way servitude.

C-3.5 DISPOSAL OF SOLID WASTE

It is proposed that solid waste be taken daily in municipal refuse bags to a holding facility at the entrance gate to the development. The holding facility must be properly walled in with a concrete floor, water supply for washing of the area as well as a drain. The Nkomazi Municipality or private waste collecting service provider will collect the waste on a weekly bases.

C-3.6 ELECTRICITY SUPPLY

The supply authority in the area is ESKOM. A report has been compiled on the provision of electricity to the development by P&L Consulting Electrical Engineers. The report is herewith included as Annexure B.

SECTION C: PLANNING

PART 4 – INTERNAL SERVICES

C-4.1 GENERAL

The development will be provided with high order internal services which will consist of a metered water connection for each building, a waterborne sewerage connection for each building and access to a road network. The development area is considered to be very rocky and excavation problems are expected.

C-4.2 WATER RETICULATION

The proposed water reticulation network will consist mainly of uPVC Class 12 piping of varying diameters. The network will be designed to ensure a minimum peak flow pressure of 20m to each stand, with a maximum static pressure of 90 m. Provision will be made for fire flow and fire hydrants and fire hose reels will be provided.

Isolating valves will be provided so that a maximum of four valves must be closed to isolate a section of the network for maintenance. Scouring will be allowed at low points with the provision of fire hydrants. Air valves will be provided where required.

Smart water meters will be installed as well as bulk meters to enable the developer to manage the water consumption, have minimal water losses and to identity leaks.

C-4.3 SEWER RETICULATION

The sewer reticulation network will be installed with a minimum pipe size of 100mm (internal diameter) and a maximum manhole spacing of 80m. A house connection to each stand will be provided. Manholes will be located for convenient access.

The pipes will be placed where practical and will gravitate to low points from where the sewer will be pumped to the treatment plant.

C-4.4 STREETS

A road network will be provided to distribute traffic between activities within the development area. The types of road which will be provided will be graveled.

C-4.5 STORM WATER DRAINAGE AND EROSION CONTROL

The storm water channels and structures will be designed for a 1:2 year storm recurrence, except at the piped crossings where a 1:5 year storm recurrence is catered for. Run-offs from 1:20 year storms will also be evaluated to prevent or limit possible damage. The infrastructure will be located within the road reserves.

Detention facilities will be introduced to ensure that storm water run-off does not exceed pre-development values. These facilities act as small flood control reservoirs, which can attenuate the peak of the runoff before it flows downstream as well as trap sediment and silt.

C-4.6 ELECTRICAL RETICULATION

An underground reticulation system will be installed within the road reserves and will remain the property of the developer. The developer/resort management will be responsible for the maintenance and management of the system. Each holiday cottage or erf will be supplied with a 60A single phase connection and the diversity maximum demand for the cottage will be taken as 5kVA.

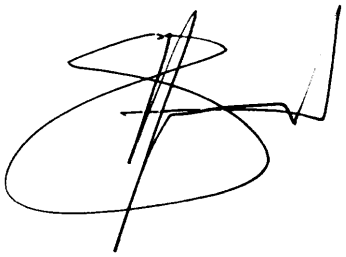
REFERENCES

References used in the compilation of this report are the following:

1. DEPARTMENT OF HUMAN SETTLEMENT. *The Neighborhood Planning and Design Guide (2019)*
2. P&L CONSULTING ENGINEERS: Electrical Services Report.
3. HAMATINO CONSULTING ENGINEERS: Traffic Impact Statement
4. JOHANN VAN DER MERWE (PTY) LTD: Geotechnical Investigation Report

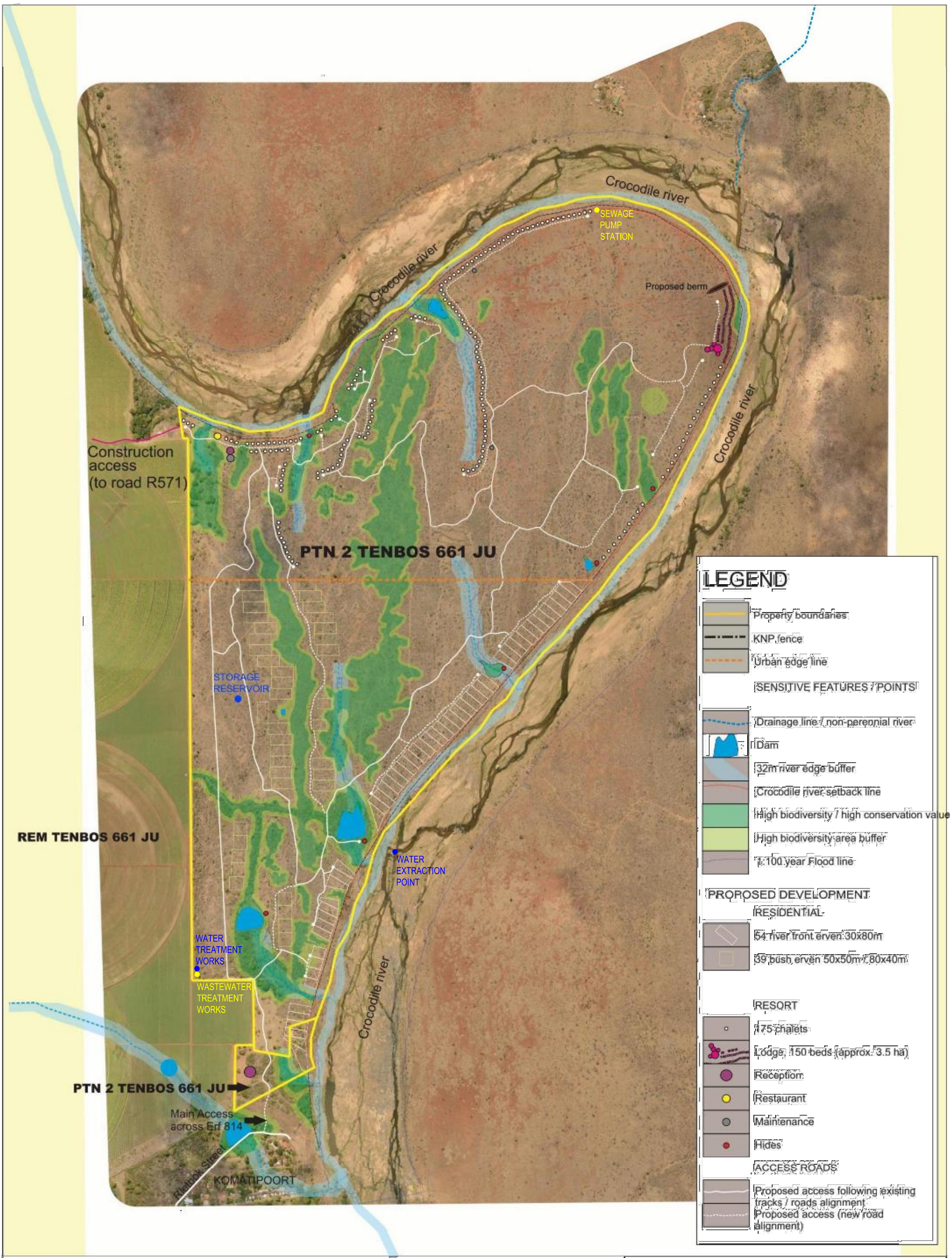
Yours sincerely

CONSOLV CONSULTING ENGINEERS



S.J.Triegaardt Pr.Eng

ANNEXURE A: CONCEPTUAL DEVELOPMENT LAYOUT



DERICK PEACOCK Associates
Town & Regional Planners
Resort & Leisure Planners
012 803 2124
082 414 3655

PROPOSED WILDLIFE ESTATE
Portion 2 & 3 Tenbosch 661 JU

plan no	revision	date
LR ALL	rev 4	11-12-2020

ANNEXURE B: REPORT ON ELECTRICAL SUPPLY

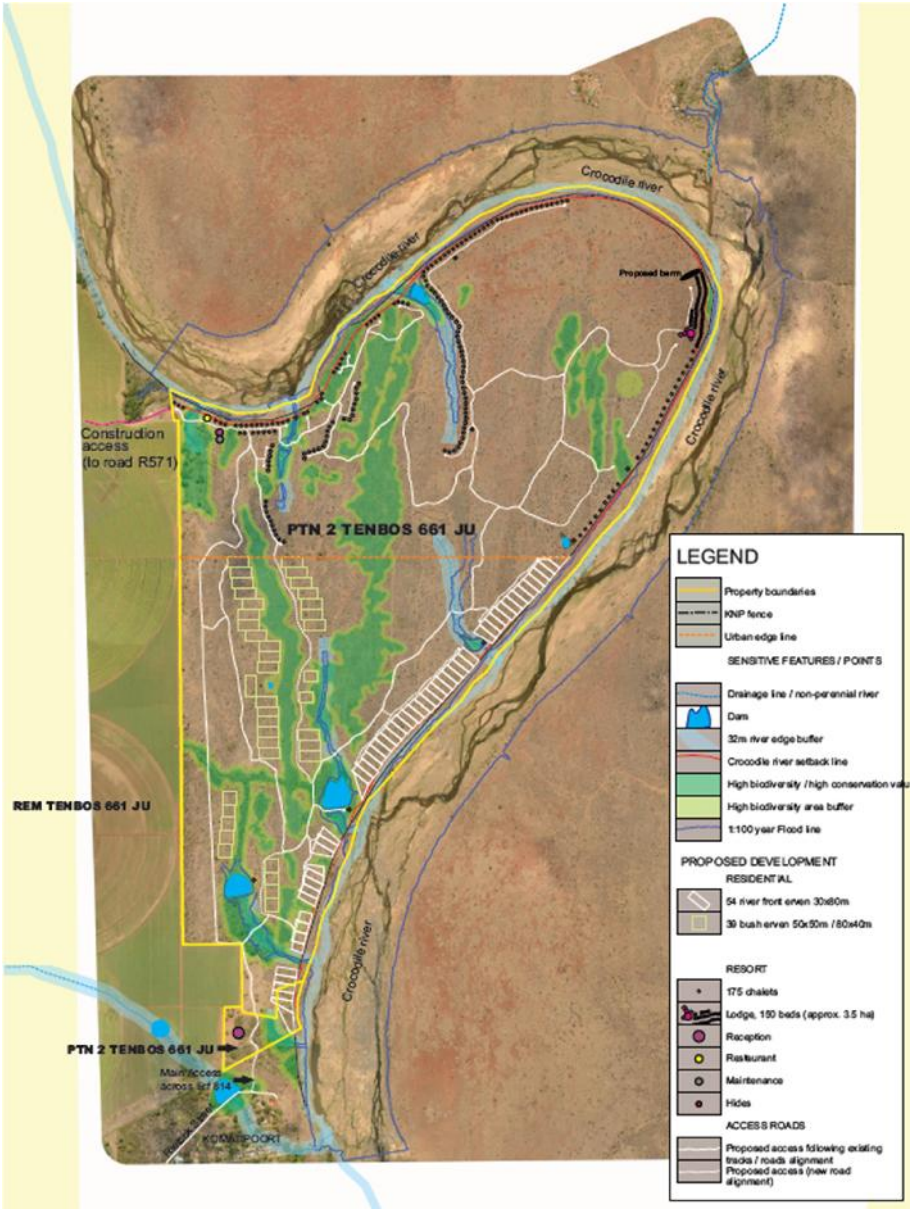
SERVICES REPORT: ELECTRICAL

by

Charl Pienaar (BScIng Elek Hons-PrIng)
Vennootskap P & L (Edms) Bpk

9 December 2020

KOMATIPOORT
PORTION 2 & 3 OF THE FARM TENBOS 661 JU



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P&L
CONSULTING ENGINEERS
RAADGEWENDE INGENIEURS

TABLE OF CONTENTS

1. INTRODUCTION

This report has been compiled to give an overview of initial proposals for the provision of electrical and Telkom services for the proposed Portion 2 of the Farm Tenbosch 166 JU in the Komatipoort district. The development will consist of:

Residential
54 river front erven
39 bush erven

Resort
175 chalets
150 bed lodge

2. PROJECT DESCRIPTION

The proposed development will consist of Residential stands and a Resort.
This report is on the Eskom and Telkom requirements.
This report is based on the requirements of Eskom, Telkom and SANS for a development like this.

3. PHASING

We accept that the development will be done as two phases.

4. SUPPLY AUTHORITY

The supply authority in this area is ESKOM. The design will be done to comply with the ESKOM standards. As soon as the development goes ahead we will apply for the electrical point. I spoke to ESKOM and they have very little spare capacity on their system. This capacity will be given on a first apply first served basis.
I would recommend that no development is done before the Eskom supply is secured and paid for. I recommend that if the developer wants to go ahead we apply for the Eskom supply. My estimate (I accept electrical geysers & stoves) for the electrical supply will be 1MVA.

5. DESIGN PARAMETERS

For this design we accepted that the water heating and cooling will be electrical.
I recommend that the developer look at sun water heaters and gas cooking.
This will reduce the electrical connection (Eskom cost) and reduce the reticulation cost. The design for the electrical reticulation will have 3 distribution points and a LT-underground cable reticulation to the houses and Lodge.

6. ELECTRICAL RETICULATION

The development is a nature friendly development, therefor I would propose an underground reticulation system. The development will get a supply point from ESKOM. The underground reticulation system will be the property of the developer. The maintenance, meter reading and billing for electricity consumption will be handled by the developer. Each housing unit shall be supplied with a 60A single phase supply. The after diversity maximum demand (ADMD) will be taken as 2.5kVA. For this report we accept that the lodge will use electricity for heating/cooling and cooking.
This report is written and based on ESKOM and Telkom requirements.

7. TELKOM

We propose that underground sleeves must be installed for Telkom. Telkom always reserves the right to install their services either underground or overhead. It may be worthwhile to also speak to private telecommunication supplies, as Telkom may not want to supply a service to this area. We find that especially business people needs fast access to the internet. It may be worthwhile to apply at Telkom or private companies for fast mobile internet connection.

8. METERING

Each stand will be separately metered with the energy meter installed on the stand boundary. Eskom will give a bulk supply to the development. The developer will be responsible to meter and bill individual limits if the developer wants each unit to pay for the electrical usage.

9. STREET LIGHTING

I accept that no street lights will be required as this is a nature friendly development.

10. EXISTING ELECTRICAL SERVICE

The electrical service shall be handled as per the ESKOM requirements
Please note that ESKOM does not have a servitude, but a way leave for the 11kV line. There is an existing 11kV line feeding Shishageni. This line may have to be re-located. With ESKOM's permission and for the cost of the developer the ESKOM line can be moved on this property. We are relocating an Eskom line in Nelspruit (650m) at about R185 000.00 (VAT Excluded).

I received these photographs showing 2x 132kV lines.
I assume they cross the property.
Please note these lines cannot be moved.
Each line will have an 18m (on each side) (36m in total for each line) servitude.
No buildings are allowed in these servitude areas.
I understand that these lines are on the southern corner of the property.
Please note that not gate houses can be built in the line servitude.

I received this photograph and accept that it is the transformer on the development area. This is a small transformer and will have very little capacity.
There is a possibility that this transformer feeds Shishangeni in the Kruger National Park.

Eskom

ESKOM HOLDINGS SOC LTD REG NO 2002/015527/30
VAT REG NO 4740101508

LIBUYILE FARMING SERVICES (PTY) LTD
CREDETORS DEPARTMENT
POSBUS 47
MALELANE
1320

NORTHERN REGION
PO BOX 8610 JHB 2000

CONTACT CENTRE: (0860) 037566
FAX NO: 0862 437 566
E-MAIL: customerservices@eskom.co.za
WEB: WWW.ESKOM.CO.ZA

Eskom

TEL: 08600 37566
SMS: 35328

CUSTOMER SELF SERVICE WEBSITE:
https://csonline.eskom.co.za

NORTHERN REGION
PO BOX 8610 JHB 2000

YOUR ACCOUNT NO	6783625658
SECURITY HELD	1039110.00
BILLING DATE	2020-10-19
TAX INVOICE NO	678845878268
ACCOUNT MONTH	OCTOBER 2020
CURRENT DUE DATE	2020-11-03
VAT REG NO	4410234290

DIRECT DEPOSIT DETAIL

BANK:	ABSA
BRANCH CODE:	335645
BANK ACC NO:	2310000119

TAX INVOICE

E-MAIL: sugarcreditors@rclfoods.com

ACCOUNT TRANSACTION SUMMARY

RCC / SCC CONNECTION CHARGE		R	0.00
ADMINISTRATION CHARGE		R	2,882.40
DIST. NETWORK CAPACITY CHARGE		R	35,481.60
DX EXCESS NETWORK CAPACITY CHA		R	16,877.00
NETWORK DEMAND CHARGE (C/KWH) (ALL)		R	50,367.80
ANCILLARY SERVICE (ALL)		R	893.11
ENERGY CHARGE (PEAK)	37,996.00	R	46,552.70
ENERGY CHARGE (OFF)	49,772.00	R	26,623.04
ENERGY CHARGE (STD)	98,296.00	R	82,863.53
SERVICE CHARGE		R	6,715.50
TOTAL CHARGES FOR BILLING PERIOD		R	**269,256.68**

ACCOUNT SUMMARY FOR OCTOBER 2020

BALANCE BROUGHT FORWARD	(Due Date 2020-10-02)	R	510,998.71
PAYMENT(S) RECEIVED	ACB Payment - 2020-10-01	R	-510,998.71
TOTAL CHARGES FOR BILLING PERIOD		R	269,256.68
VAT RAISED ON ITEMS AT 14%		R	0.00
VAT RAISED ON ITEMS AT 15%		R	40,388.51

ACCOUNT NO / REFERENCE NO
6783625658
NAME
LIBUYILE FARMING SERVICES (PTY
FAX NUMBER
0137911166

Post Office 0934 6783625658

11341 6783625658 >>>>>>>>>> 9207 5678 3625 6585

Eskom

NORTHERN REGION
PO BOX 8610 JHB 2000

CONTACT CENTRE: (0860) 037566
FAX NO: 0862 437 566
E-MAIL: customerservices@eskom.co.za
WEB: WWW.ESKOM.CO.ZA

LIBUYILE FARMING SERVICES (PTY) LTD
CREDETORS DEPARTMENT
POSBUS 47
MALELANE
1320

YOUR ACCOUNT NO	6783625658
BILLING DATE	2020-10-19
TAX INVOICE NO	678845878268
ACCOUNT MONTH	OCTOBER 2020
CURRENT DUE DATE	2020-11-03
VAT REG NO	4410234290
NOTIFIED MAX DEMAND	1,500.00
UTILISED CAPACITY	1,774.07

CONSUMPTION DETAILS (2020-09-16 - 2020-10-15)

ENERGY CONSUMPTION OFF PEAK kWH	49,772.07
ENERGY CONSUMPTION STD kWh	98,296.30
ENERGY CONSUMPTION PEAK kWh	37,996.26
ENERGY CONSUMPTION ALL kWh	186,064.63
DEMAND READING - KW/KVA	1,605.48
REACTIVE ENERGY - OFF PEAK	33,360.64
REACTIVE ENERGY - STD	53,601.91
REACTIVE ENERGY - PEAK	20,299.95
REACTIVE ENERGY - ALL	107,262.50
LOAD FACTOR	18.00

PREMISE ID NUMBER 6783625134 TARIFF NAME: Ruraflex Interval

MD2365 GED VAN SQUAMANS 416 JU DISTRIK MALELANE

Number of Events: 8	R	0.00
NMD Exceeded by 105.48 kVA	R	0.00
Administration Charge @ R96.08 per day for 30 days	R	2,882.40
Network Capacity Charge 1,774.08 kVA @ R20.00 : = R20.00/kVA	R	35,481.60
Excess Network Capacity Charge 843.85 kVa @ R20.00 : = R20.00/kVA	R	16,877.00
Network Demand Charge (All Periods) 186,065 kWh @ R0.2707 /kWh	R	50,367.80
Ancillary Service Charge 186,065 kWh @ R0.0048 /kWh	R	893.11
Low Season Peak Energy Charge 37,996 kWh @ R1.2252 /kWh	R	46,552.70
Low Season Off Peak Energy Charge 49,772 kWh @ R0.5349 /kWh	R	26,623.04
Low Season Standard Energy Charge 98,296 kWh @ R0.843 /kWh	R	82,863.53
Standard Connection Charge @ R0.00	R	0.00
SERVICE CHARGE	R	6,715.50
TOTAL CHARGES	R	**269,256.68**

I received the above Eskom account. If this Eskom supply is on the farm, a study must be done to see if this total capacity will be used after the Lodge etc. is in operation. If the current usage of this point (and if this point is on the farm) is reduced, there may be electrical capacity available for the Lodge and housing.

Regards,

_____

CJM Pienaar BSc (Hons) Elec. Pr. Ing

ANNEXURE C: VEOLIA WATER TREATMENT PLANT

ConSolv Consulting Engineers CC

Containerised Potable Water Treatment Plant

Figure 1:Typical Containerised Potable Water Treatment Plant

Enquiry number	: -
Tender number	: **WTP19_11-22-Rev A**
Bidder	: **Veolia Water Technologies**
Date	: **05 December 2019**

ConSolv Consulting Engineers CC
to the attention of Eric Dixon
Nelspruit, South Africa

Bayanda Radebe
Tendering Engineer,
Engineered Systems, Sebenza
WATER TECHNOLOGIES

Tender Reference: **WTP19_11-22-Rev A**
Sebenza, **05 December 2019**

Dear Sir

SUBJECT: Containerised Potable Water Treatment Plant - 20 m^3/h

We thank you for the opportunity to put forward our proposal for the design, supply, manufacture and advisory of installation and commissioning of a containerised potable water treatment plant able to treat 20 m^3/h to be installed in Malelane.

The plant offered will consist of the following process:

- Clarification
- Sand filtration
- Carbon filtration
- Dosing equipment

The plant will be housed in a refurbished second hand 12m shipping container. In this system a concrete slab will be required, which is in the client's scope of works. We will provide civil guidelines for the installation of the necessary equipment on site.

We believe our offer to be technically sound and cost effective and hope that our bid satisfies your requirements. Please do not hesitate to contact the undersigned should you have any questions or require more information.

We look forward to the opportunity to meeting with you to further discuss our proposal.

Yours faithfully for **Veolia Water Technologies**

Bayanda Radebe
Tendering Engineer
Engineered Systems

Martin Kotze
Tendering Manager
Engineered Systems

CONTENTS

SECTION 1 – DESIGN BASIS

Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

1.1 INTRODUCTION

1.1.1 Project introduction

Veolia Water Technologies has been approached by **ConSolv Consulting Engineers CC** to manufacture and supply a water treatment plant able to treat 20 m^3/h.

1.1.2 Introduction to Veolia Water Technologies

Veolia Water Technologies (Veolia) is a leading engineering contractor in the field of design, engineering and construction of water and wastewater treatment plants in Sub Saharan Africa. Over the past 25 years, Veolia South Africa, as part of the global VEOLIA family, has built up extensive experience and a solid reputation in developing water treatment solutions and technologies to suit our client's requirements throughout the African continent and across a range of industries and marketplaces.

VEOLIA AMBITIONS FOR AFRICA

"AMBITIONS FOR AFRICA IS NOT A MOTTO, IT IS OUR COMMITMENT"

Africa is urbanizing at a faster rate than any other region in the world, the subject of water thus remains a long-term challenge.

With this in mind, the need for a new approach to water resources management has become a necessity. An approach which combines access to water and sanitation, resilience and efficient resource management.

This is where we come in.

Veolia Water Technologies (VWT) provides a complete range of capabilities required to design, build, maintain and upgrade water and wastewater treatment facilities for industrial and municipal authorities. VWT is the world reference in all domains concerning water issues, such as desalination, drinking water, wastewater, process water and reuse.

What does "Ambitions for Africa" mean? VWT has a strong presence throughout Africa with numerous references and with local manufacturing and logistic facilities based in South Africa. By having a local presence dedicated to serving local customers, we are closer to our African clients, able to provide the best solutions and products adapted to every situation.

VWT also has the finest technical expert network on the continent. By associating our expertize with a unique network of partners and distributors, customers benefit from guaranteed support in all situations, including in the event of an emergency.

As part of Veolia, we have the full support of the world reference in environmental services.

Driven by your needs, our technologies make the difference to optimize scarce water resources, reduce environmental footprint, transform wastewater into a valuable resource and ensure secure access to drinking water.

Together let us believe in the value of water because we believe in Africa.

1.1.3 Engineered Systems

Engineered Systems (ES) is a division of Veolia Water Technologies South Africa, specialising in packaged water treatment solutions. ES focuses on both standard packages as well as engineered solutions, successfully supplying both packaged and fully engineered solutions throughout the South African and International market (See references).

Engineered Systems' project methodology enables the execution of projects in the shortest possible time at lower capital costs by utilising modular and standard process and equipment designs for water and waste water applications. The greatest saving is seen by the plug and play methodology whereby site establishment and commissioning time is drastically reduced, both saving time and mitigating risk.

Packaged solutions offer the following advantages:

- **Maintainability:** little maintenance as there are minimal moving parts utilising reputable OEM equipment
- **Ease of transport:** the packages are containerised and therefore ideal for remote locations
- **Easy Installation and commissioning:** modular systems that are fully Factory Acceptance Tested (FAT) prior to delivery to site.

In addition to packaged solutions, Engineered Systems has the following capabilities to provide full turnkey solutions:

- **Process Engineering:** Complete process design is undertaken in-house using latest process technology with access to the entire array of Veolia proprietary designs and solutions.
- **Electrical Control & Instrumentation (EC&I):** All EC&I selection and installation is executed in-house to ensure seamless integration into our systems.
- **Mechanical Design:** Mechanical Design utilising 3D Modelling software including Inventor and Autocad with the ability to perform virtual plant walkthroughs as well as perform all structural analysis to ensure a complete design free from defects; while ensuring seamless integration into a clients' system.
- **Fabrication:** An on-site workshop with the ability to fabricate PVC, HDPE, PVDF, Stainless Steels including Duplex and Super Duplex using only coded welders. A site testing station ensures all plants are fully FAT tested prior to delivery for complete quality assurance and client piece of mind.

1.2 PROPOSAL DESIGN BASIS

1.2.1 Treatment plant capacity

The current process design is based on flow data summarized in the following table:

Table 1: Design water flow characteristics

Water treatment description	Units	Design
Treated water	m^3/h	20

1.2.2 Inlet water quality and characteristics

No raw water analysis was provided with the enquiry therefore we have designed the plant based on the following assumptions:

- Total dissolved solids (TDS) < 1200 mg/l
- Total suspended solids (TSS) < 500 mg/l
- Turbidity < 1500 NTU
- No biological and heavy metal contamination

1.2.3 Treated water quality

The water treatment plant has been designed to supply disinfected treated water with reduced suspended solids.

1.2.4 Equipment specifications

No client mechanical or electrical specifications have been considered in the compilation of this tender. Mechanical and electrical equipment will be supplied as per Veolia's standard specifications. Please refer to Section 3- Scope of Supply for further details.

SECTION 2 - TECHNICAL

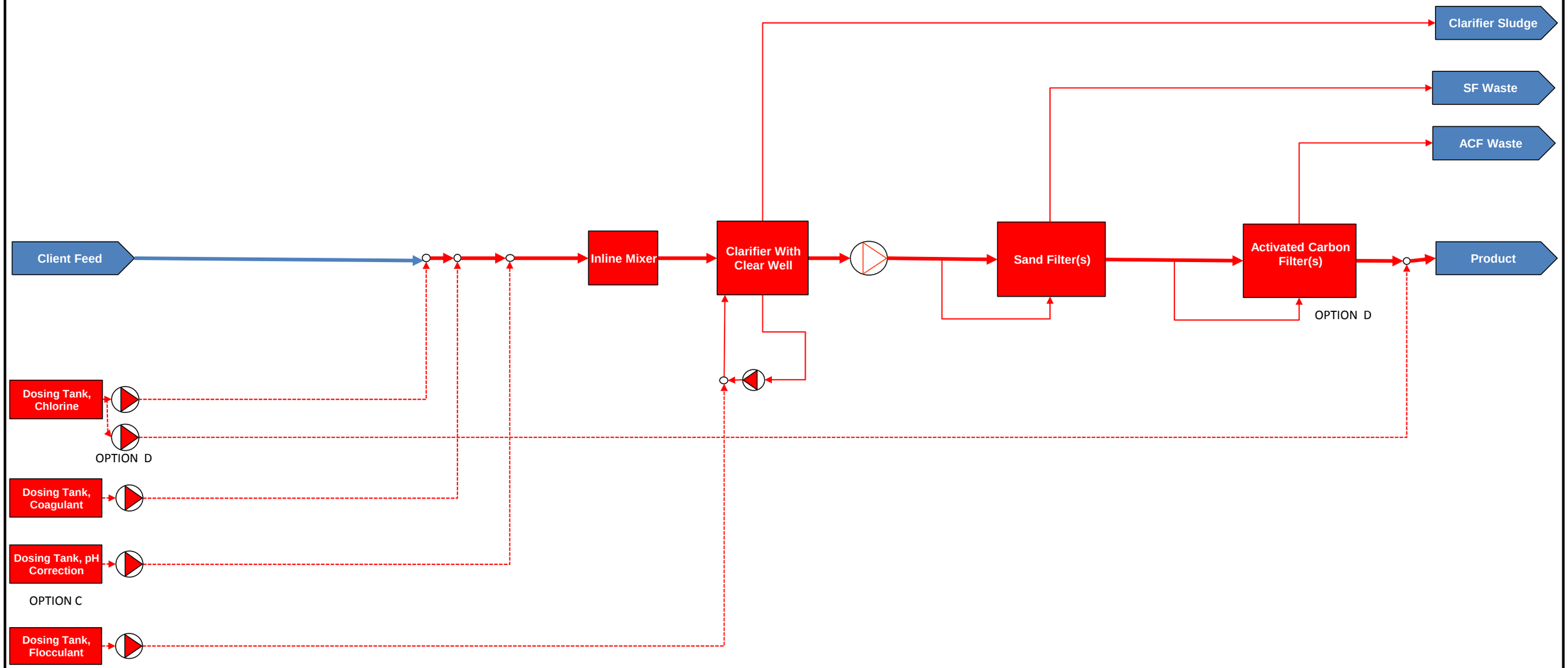
Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

PROCESS FLOW DIAGRAM

Client: ConSolv Consulting Engineers CC
Enquiry/Contract: N/A
Enquiry/Contract No.: WTP19_11-22

Date, Rev: 2019-12-05
Revision: A



OPTION C: pH Adjustment
OPTION D: Activated Carbon Filter with Post Chlorination

Legend

Other supply | Veolia supply | Services

Line, Primary | Line, Secondary | Line, Dosing

Comments:

	Name	Date	Rev	Issued for:
Designed:	B Radebe	2019-12-05	A	Review
Checked:				
Approved:				

2.1 PROCESS DESCRIPTION

Based on the PFD shown in the previous page, the process description is as follows:

Raw water, which will be supplied by others to our battery limit, will be dosed with appropriate chemicals pre-clarification. Sodium hypochlorite will be dosed for disinfection purposes, while flocculant and coagulant will be dosed to enhance the clarification process. The chemically dosed water will then enter the clarifier, where newly formed floc particles will be removed. Clear water from the clarifier will be pumped into the sand filter. The suspended solids will be reduced and filtered water will be directed to the carbon filter. The carbon filter will remove, colour, odour and taste. The treated water will be dosed with sodium hypochlorite as a final disinfection step.

The filters will be backwashed on a time basis. Both the filter feed pumps (please refer to equipment details) will be used during backwash.

2.2 MECHANICAL SPECIFICATION

Below is an overview of our standard mechanical specifications. Each item of equipment is specifically selected to be suitable for its intended application. For further equipment details please refer to APPENDIX A – EQUIPMENT DETAILS.

2.2.1 Piping and Valves

We have included for all interconnecting piping between supplied equipment, provided all treatment equipment is located in the same plant area.

Table 2: Piping and Valves

Application	Specification
All water/sludge piping	uPVC
Dosing Chemicals	uPVC / PE
Valves	Casing: uPVC/Cast Iron Wetted parts: uPVC/Stainless Steel
Flanges	SABS 1123/T1000
Valve and Actuator Coating	Manufacturers' standard painting specification

2.2.2 Pumps

VWS utilises the following suppliers for pumping and motor driven equipment, however deviation from these suppliers may be required in certain circumstances:

Table 3: Pumps

Application	Specification
Centrifugal pumps	KSB / Grundfos / Rapid Alweiler / Ebara
Submerged centrifugal pumps	KSB / ITT Flygt / Grundfos / Ebara
Dosing pumps	Grundfos Alldos
Equipment Coating and Corrosion Protection	Manufacturers' standard painting specification

2.3 ELECTRICAL, INSTRUMENTION AND CONTROL SPECIFICATIONS

The package plant is designed and manufactured to Veolia standards, only Purchaser standards or specifications as stated below have been considered.

Purchaser Standards & Specifications

None.

Electrical Supply

The plant is manufactured for 400VAC, 50Hz, three Phase & Neutral.

Hazard Classification

The equipment is suitable for installation in a non-classified hazard area only.

Motors

- Protection rating IP55
- 2 or 4 pole 400VAC, 3 phase, 50Hz

Motor duty and other detail are listed in the scope of supply.

Motor control panels

The motor control panel is mounted to an inside wall of the container. The motor panel is a fixed pattern Form 1 enclosure housing incomer, motor starters (switchgear) and process control (PLC/instrument marshalling) in one composite compartment.

Type	Two door one compartment wall mount
Form	Form 1
Withdrawable	No
Material	2mm mild steel
Finish	Powder coated orange
Protection	IP65
EX rating	No
Access	Front only
Cable entry	Bottom
Main isolator	HRC fused switch
Main feeder	400VAC 3 phase 50Hz 4 wire (L1/L2/L3/N) + Earth
Surge protection	40kA Class 2 (3p) on main isolator
Phase protection relay	Phase over/under volt, phase rotation, phase loss
Earth fault interrupt level	15kA @ 1sec
Busbars	200A HDHC copper
Type test certificate	No
Motor circuit breakers	Eaton thermal & magnetic
Motor contactors	Eaton
Circuit breakers	Eaton
Control voltage	230VAC from phase/neutral
Motor protection relay	No
Motor earth leakage	No
Motor thermistor relay	No
Incomer ammeter	No
Incomer voltmeter	No
Motor ammeter	No
Motor runhour meter	Available on HMI

Motor MCC fault	Alarm message on HMI
Motor MCC running lamp	Green LED in motor selector switch
Motor selector switch	Eaton 3 position (TEST/OFF/AUTO)
Motor start	DOL
VFD	No
Panel air condition	No
Panel fan	No
UPS	1000VA for instrumentation
PLC	Siemens S7-1214C
HMI	Siemens KTP400 key/touch panel (mono 3.8”)
Signal interface	24VDC digital input, volt free contacts digital output
Communication	Ethernet available for SCADA
Printer	No
Network modems	No
Fibre optic couplers	No
Network cables	No

Small power & container services

Three phase 230VAC is derived from each phase and neutral.

One phase is dedicated to motor panel control and dosing, one phase is used for container lighting and the third phase for utility sockets.

The container lighting and utility sockets have 30mA earth leakage protection.

20W CFL bulkhead lights are provided inside the container, one light is provided outside next to the exit door.

Emergency lighting (battery powered) is NOT provided.

Electrical cable & support

Power and control cable are supplied and sized in accordance with SANS Codes of Practice. Power cables cores are coloured to SANS standard (red, white, blue & black). Power cables (400/230V) are flexible non-armoured 1000/600V.

Cables are supported on medium duty galvanised mesh tray. Cables are secured to the tray at regular intervals with PVC ties.

Instrument cables are supported on the same tray as the power cables using largest separation possible.

Cables are tagged at both ends with thermal printed tags and PVC cable ties.

Every motor pump has a field mounted emergency stop switch mounted on a post (or wall) next to the motor. The emergency stop switch interlocks the motor starter and provides feedback to the PLC.

All cable (power and signal) within the confines of the container are non-armoured.

Surge protection (Class 2) is provided on the main incomer only.

Main supply cable is to be provided, installed and terminated by the Purchaser to the terminals of the main isolator in the motor panel.

Earthing

A copper earth bar is fixed to the container wall next to the motor panel. The earth bar is bonded to the container frame and to the earth bar inside the motor panel.

All motors pumps and electrical field devices are earthed to the motor panel earth bar using a spare core of the feeder cable.

The galvanized mesh tray cable support is bolted to steel unistrut channels welded to the container wall.

The Purchaser earth cable is connected to the main earth bar inside the container. There are earth bonding points (Threaded M12) provided at the four corners of the container. Earth bonding of the container and any site specific earthing requirements (earthing mat, ground spikes, lightning masts etc.) outside of the equipment container are the responsibility of the Purchaser.

Automation and instruments

Process control is by a Siemens S7-1214C PLC housed in the motor panel. Included in this panel is the marshalling termination to field instruments.

All PLC hardware and instruments are 24VDC.

Local operator interaction is via a Siemens KTP400 HMI screen. The plant is designed to run unattended with minimum operator intervention. (Chemical makeup is by the operator). All automated sequences can be manually initiated by the operator from the HMI screen. Plant event and alarm messages are retained at the HMI screen as descriptive text detailing the date, time and cause of event/alarm.

The main PLC components used:

- Siemens Sitop 240VAC/24VDC 5A stabilised power supply
- Siemens S7-1214C processor and imbedded IO
- Siemens S7-SM1223 16DI/16DO digital input/output
- Siemens KTP400 3.8” key/touch mono panel
- Terminal connectors, cables, etc.

The S7-1214C PLC is configured using Simatic TIA Step7 Pro V13, the TP700 is configured using TIA WinCC Comfort V13.

Surge protection (Class 2) is provided on the main incomer only, individual instrument lightning and surge protection is excluded.

Purchaser interface signals

Potential free contacts are provided for Purchaser remote monitoring of plant ready, plant running and plant alarm active. 24VDC inputs are provided for feed water tank low level and potable water tank high level signals.

Ethernet is available for network communications, data transfer tables will be provided on request, at no additional cost. Any couplers, modems, switches, media converters etc required for this are not included.

Raw water feed & sludge valves

Raw water and sludge valves are 24VDC motorized ¼ turn butterfly. UPS returns valves to shut position in event of main power interruption.

Sand & carbon filter valves

Sand and activated carbon filters for small capacity plants use top-mount multiport motorized valves for service/backwash/rinse control.

Sand and activated carbon filters for larger capacity plants use individual valves and frontal pipework for service/backwash/rinse control. These valves are hydraulic diaphragm actuated with 24VDC pilot valves, the diaphragm control valves are spring assist closed (filter vessels do not empty while the plant is standing idle). Hydraulic water is provided by the filter feed pump, hydraulic tubing is 6mm polyethylene, fittings are quick release push-in.

Instrument air

Instrument air is not required.

Complience certificates

Test reports for the motor panel and container electrical installation are provided.

Standard Veolia instrumentation

This is a list of standard instrumentation used by Veolia and does not imply that all the equipment listed here is included in this tender.

- Flow switch (calirometric) - Endress & Hauser DTT31
- Flow indicator (variable area) – ASV Stubbe DFM350
- Pressure indicator - Wika 63mm dial, st/st casing and internals, glycerine filled
- Level switch (float) - Endress & Hauser FTS20

Electrical control and instrument documentation

The following documentation is provided in pdf format:

- MCC schematic diagram and material list
- Cable schedule
- Instrument schedule
- Operating and maintenance manual
- Third party supplier operating/maintenance manuals

The following electronic backup files are provided on request (no cost if by email or drop box):

PLC configuration, fully commented (TIA Step7 Pro V13)
HMI configuration, fully commented (TIA WinCC Comfort V13)

Note: Siemens licensed engineering software (TIA Step7 and WinCC) is NOT included in this offer.

Environmental conditions

The container has extraction fans (20ft/6m = three, 40ft/12m = four) and louver vents for cooling air circulation. Air-conditioning is not provided. The container internal temperature

should not exceed 40deg Celsius, if in a hot climate then a shade roof with air-gap is recommended.

2.4 BATTERY LIMITS

The proposed battery limits are as follows:

- Raw water inlet flange on container wall
- Outlet flanges of treated water, backwash, rinse and sludge on container wall

2.5 SCOPE OF WORK

Table 4: Scope of work

Description	Veolia	Client
Design, manufacture and supply of containerised potable water treatment plant	X	
Civil works – see clause (5)		X
Advisory of installation & commissioning – see section (6)	X	
Site mechanical & electrical installation		X
Electrical power supply cable up to our MCC panel		X
Transport to site		X
Cranage, rigging & positioning of equipment		X
Treated water pumping and distribution		X
Storage tanks (raw and treated water)		X
Sanitation Facilities		X
Site Offices		X

2.6 CIVIL WORKS

We specifically exclude any civil construction work, holding down bolts, grouting, etc. from our scope of supply. We would supply all necessary details and loadings for the civil works to be designed and constructed (by others) to suit the plant.

2.7 INSTALLATION ADVISORY, COMMISSIONING AND TRAINING

Our tender price excludes for installation and commissioning of the plant. The Client will employ a local contractor to perform the installation of the plant. We have allowed for 10 days for advisory of installation and commissioning of the plant (quoted separately). Training of the client's personnel will take place during the commissioning period.

After successful commissioning we recommend a site visit by one of our technician to insure proper operation of the plant for duration of 2 – 3 days (excluded from our offer).

Our offer excludes any accommodation, subsistence, return flights to Johannesburg, local travel, visas and medicals. Should more days be spent on site which is beyond our control, a

day rate will be charged. The day rate excludes accommodation, living out allowance and local travel costs. On-site daily working hours are subject to Veolia T&C's.

2.8 TRANSPORT TO SITE

Due to the variability in all costs related to road and sea freight Veolia does not offer transport on a fixed cost basis. In order to ensure that all parties are fairly covered, Veolia can offer transport on a "cost plus 15%" basis and the price for transporting of the equipment to site will only be finalised upon presentation of our supplier invoice to the client.

2.9 SITE VISITS

No site visits by VWS have been included in our offer at this stage. Should a site visit be required, the cost of all international flights, local flights and travel and accommodation will be for the client's account.

2.10 GENERAL EXCLUSIONS

The following items are specifically excluded from our Scope of Supply:

- Storage at site
- Start-up chemicals
- Spare parts
- Structural supports and Structural analysis
- Any testing or analyses of equipment or systems unless called for by the code of construction to which such elements are manufactured. Unless specifically stated in our scope of supply, all tanks, vessels and pipework will be uncoded
- Proprietary items such as pumps, motors, valves, actuators, gearboxes etc. will be painted in accordance with the manufacturers' standard painting specification
- Production, storage, distribution or connection to services of any kind required for plant operation and maintenance (compressed air, chemicals, process water, cooling and chilled water, electrical power, steam, etc…)
- Charges for services provided by local authorities
- Feed water and treated water sampling and laboratory testing
- Sludge disposal facilities
- Trial assembly and trial run at our premises
- Any item not specifically/expressly mentioned in the above proposal.

2.11 QUALITY ASSURANCE

Veolia Water Solutions and Technologies South Africa (Pty) Ltd complies to and works in accordance to SABS ISO 9001:2008. A copy of our listing certificate is attached to this document. Our system has subsequently been audited by the SABS and still complies with the conditions and requirements of ISO 9001:2008. Proof of these audits and their findings are available on request.

All equipment/materials will be subject to shop inspection by our inspector during manufacture. Major items of equipment purchased by us from sub-Contractors will also be subject to inspection in the original manufacturer's shop. Clients will have the right, at their own cost and expense, to inspect at any time, any progress of work.

SECTION 3 - COMMERCIAL

Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

3.1 COMMERCIAL INTRODUCTION

This section covers the commercial terms for plant and equipment, as detailed in our Scope of Supply (Section 3).

Client: **ConSolv Consulting Engineers CC**

Delivery: Ex-works, Sebenza, Johannesburg

3.2 BID PRICE

Our price for the design, supply, manufacture, ex-works delivery and the upholding during the defects liability period of the plant and equipment as detailed in above sections of this document is:

Item	Description	Price (ZAR)
1	Containerised Potable Water Treatment Plant, 20 m^3/h	1 020 192.00
2	*Advisory of installation & commissioning (10 days)	68 000.00
3	*Day rate for advisory of installation, commissioning and training	6 800.00

The above prices all exclude VAT.
* Excludes accommodation, meals, local and international travel, subsistence (R265/day), visas, medicals and inductions.

3.3 VALIDITY

Our offer is budget and subject to confirmation.

3.4 FOREIGN CONTENT

Our tender price may be subject to fluctuation of exchange rates. The rates of exchange for our offer are as follows:

Table 5: Foreign Exchange at 05 December 2019

Item	Currency	Exchange Rate
1	Euro	ZAR 16.18 = 1.00 EUR

3.5 DELIVERY PERIOD

The required water treatment plant will be made available **12-14 weeks (ex-works)** from confirmation of receipt of official order and receipt of down payment. This does not include for any time that may be required for document approval by the client.

3.6 PAYMENT TERMS

Our offer is based on the following payment terms:

- **30 %** of Item 1 will be payable at contract award

- **70 %** of Item 1, additional to the above payments, plus any variations, shall be payable upon availability of all equipment, unpacked ex-works, Sebenza, Gauteng

- **100 %** of Item 2, additional to the above payments, plus any variations, shall be payable upon completion of installation and commissioning

All payments for work as mentioned above, together with claims for escalation, if applicable, shall be made by electronic bank transfer within 30 days of the contractor's monthly invoices provided such invoices are submitted to the employer prior to or on the 26th of each month.

Please note that transfer of ownership of the water treatment plant will only occur once all outstanding payments have been received. Veolia will not be held liable for the replacement or repair of any damaged equipment that may result due to mishandling or misuse on site, even if transfer of ownership has not yet occurred.

3.7 LATE PAYMENT

Should payment not be made within 30 days as stated above, the Contractor will claim interest on the amount not paid out, up to the date of payment, at the Standard Bank of South Africa's prime overdraft rate plus three (3%) percent.

3.8 PENALTIES

Veolia shall not be liable for any indirect, incidental and/or consequential damages of whatsoever nature, including but not limited to loss of profit, loss of production, cost of capital and cost related to an outage of plant. We do not accept any penalties unless agreed to by all parties in writing.

3.9 GUARANTEES

The period of warranty is eighteen (18) months from the date of the Factory Acceptance Test (FAT).

If any material, equipment or workmanship is proved to be defective or faulty and incapable of performing a satisfactory operation during the guarantee period we will, as soon as possible after receipt of the claim, take the necessary steps to make either repairs or replacement. This is subject to the goods having been treated with reasonable care and to the defective goods being returned to our works.

Consumable material used in normal operation as well as normal wear and tear will be excluded from the guarantee.

During the guarantee period the Client must ensure that the plant is professionally serviced at his own expense to render any claims valid during the guarantee period. The operation and maintenance of the plant should be carried out in accordance with our instructions.

Our guarantee does not extend to any consequential loss that may arise from any defects.

3.10 DELAYED PLANT

Should the Contractor be prevented, by circumstances outside his control, from delivering, installing and/or commissioning equipment as per the original contract due dates, the following conditions will apply:

- The equipment will be stored on site, on the Contractor's premises or any suitable area mutually agreed upon at the expense of the Client until the Contractor is able to commence with the contract.

- The Contractor shall be paid for the equipment in storage in accordance with the general payment terms applicable to equipment under this contract.

- On receipt of a written instruction to proceed, the Contractor shall be entitled to inspect the equipment in the presence of the Client or his representative and to make good any defects to the equipment caused as a result of the extended storage period at the Client's expense.

- The Contractor shall not be liable for any performance guarantee and/or warranty on equipment beyond the original contract guarantee period, except if otherwise agreed in writing.

- The Contractor will adjust his preliminary and general item costs accordingly where applicable.

3.11 PLANT ACCEPTANCE

After commissioning of the plant or latest two weeks thereafter, an acceptance certificate (which may be subject to reservations) shall be issued. Should such a certificate not be issued within the mentioned period, the plant shall be regarded as having been accepted without reservations.

3.12 INSURANCE

We confirm that Veolia Water Technologies have in place Employers Liability Insurance, Public Liability Insurance and Professional Indemnity policies.

3.13 DOCUMENTATION

All documents including drawings will be submitted in English. All dimensions will be shown in the metric form. A Master Document Register (MDR) is attached for client's review and comment (See Appendix C). Please note that a commented MDR should be returned to us before contract award as it may affect the delivery schedule.

APPENDIX A – EQUIPMENT DETAILS

Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

Please note that the following are preliminary equipment details. Final equipment details will be supplied during contract stage.

Table 6: Clarifier specification

Description	Design Parameters
Number	1
Arrangement	Duty Only
Dimensions: Length (mm)	TBC
Feed flow per unit (m^3/h)	20
Material of construction	Coated mild steel
Clarifier Packing	Lamella

Table 7: Filter specification

Description	Sand Filter	Activated carbon Filter
Number	2	1
Arrangement	Duty only	Duty only
Dimensions: Diameter (mm)	1200	1200
Dimensions:HOS (mm)	1300	1300
Feed flow per unit (m^3/h)	20	20
Orientation	Vertical	Vertical
Material of construction	FRP	FRP
Filtration media Operation	Sand Gravel Automated	Carbon Media Gravel Automated

Table 8: Design Parameters for the pumps

Description	Filters Feed/Backwsh Pump
Number	1
Arrangement	Duty
Type	End suction centrifugal
Capacity [m^3/h]	30
Pressure [kPa]	300
Motor size (kW)	4
Material of construction	
· Casing	Cast iron
· Impeller	Cast iron

Table 9: Dosing station specification

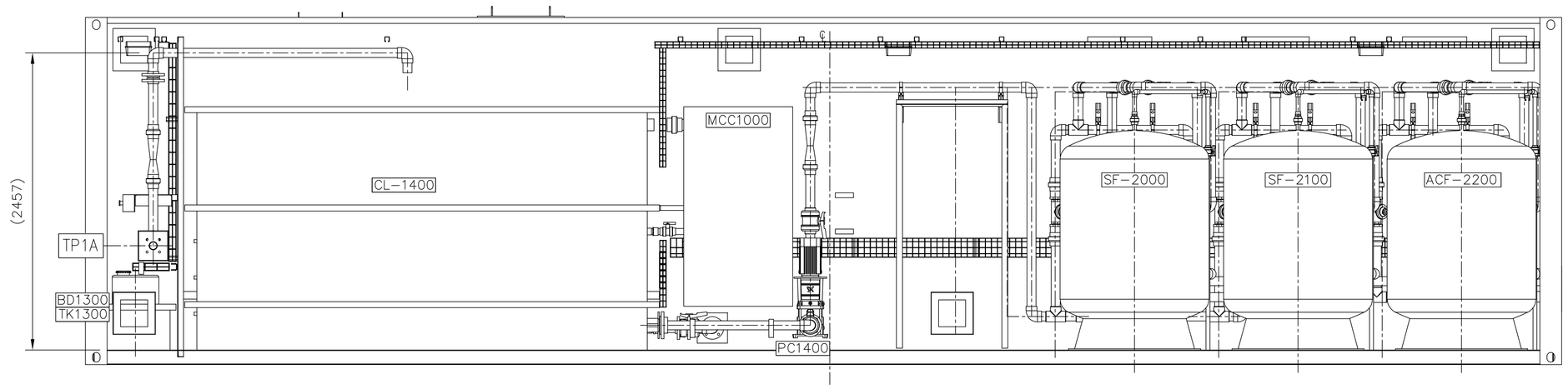
Description	Sodium Hypochlorite	Flocculant	Coagulant
Pump type	Diaphragm	Diaphragm	Diaphragm
Capacity [litres per hour]	TBC	TBC	TBC
Pressure (bar)	TBC	TBC	TBC
Number	2	1	1
Arrangement	Duty only	Duty only	Duty only
Storage tank	Yes	Yes	Yes
Tank material of construction	Polyethylene	Polyethylene	Polyethylene
Mixer	No	No	No
Control	On/Off	On/Off	On/Off

APPENDIX B – INDICATIVE LAYOUT

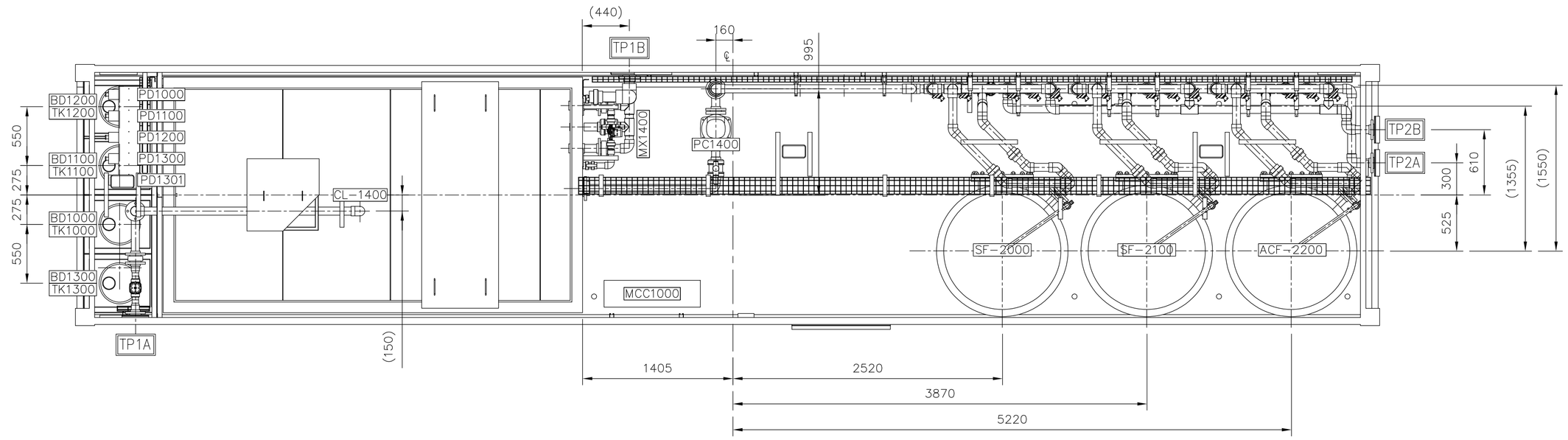
Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

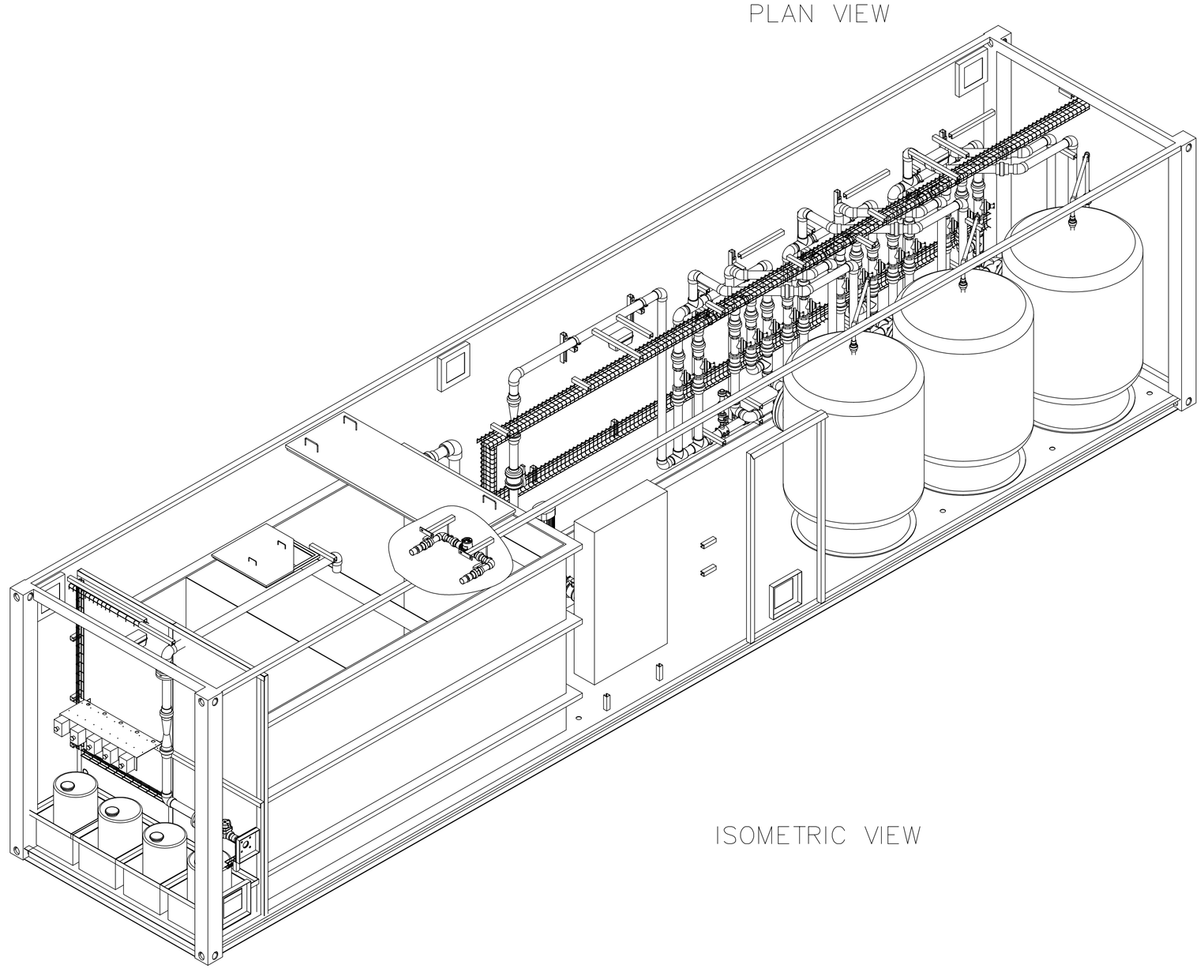
"WHEN IN DOUBT ASK"



FRONT VIEW



PLAN VIEW



ISOMETRIC VIEW

LEGEND

- A – CLIENT'S BATTERY LIMIT
- 1 – VWS CONTINUATION POINT
- 1 – MATERIAL IDENTIFICATION NUMBER (SEE MATERIAL SCHEDULE ABOVE)
- L92A – VALVE IDENTIFICATION NUMBER (SEE VALVE SCHEDULE)
- FIQ 01 – INSTRUMENT IDENTIFICATION NUMBER (SEE INSTRUMENT SCHEDULE)
- 15 – PIPE IDENTIFICATION NUMBER (TO BE HARD STAMPED ON PIPE FLANGE)
- PS10 – PIPE SUPPORT NUMBER (SEE SUPPORT DRAWING FOR DETAILS)

CLIENT'S BATTERY LIMIT

REF.	SERVICE	SIZE	DESCRIPTION
TP1A	RAW WATER INLET	65NB	FLANGED TO SANS 1123 1000/3
TP1B	CLARIFIER DRAIN	65NB	FLANGED TO SANS 1123 1000/3
TP2A	TREATED WATER OUTLET	65NB	FLANGED TO SANS 1123 1000/3
TP2B	FILTERS DRAIN	65NB	FLANGED TO SANS 1123 1000/3

REV.	DATE	BY	DESCRIPTION
A	05-12-2019	A.M	ISSUED FOR FIRST REVIEW

PROCESS ENGINEER: ALEXANDER LEPPERT	DATE:	SIGN:
EC&I ENGINEER: TONY SARGENT	DATE:	SIGN:
PROJECT ENGINEER: –	DATE:	SIGN:
MECHANICAL ENGINEER: NIGEL BESTER	DATE:	SIGN:
DESIGN ENGINEER: ABOOBAKAR MAGAGA	DATE:	SIGN:

VEOLIA
P. O. Box 446
Isando
1600
SOUTH AFRICA
Tel: +27 11 2813600
Fax: +27 11 2813644

PROJECT No.:	CLIENT: CONSOLV CONSULTING ENGINEERS (22 m³/hr.)
WTP19_11-22	TITLE: CONTAINERISED PWTP G.A. OF PLANT LAYOUT
CAD No.: –	SCALE: 1:30 / SHEET 1 OF 1
DRAWING No. WTP19_11-22-01-02	SIZE: A1 / REV. A

APPENDIX C – REFERENCES

Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

Potable Water Tratment Plant References

Mining & Primary Metal Sector						
Contract No.	Client	End User	Country of Installation	Plant Configuration	Capacity	Activity
31481542	Arcelor Mittal Libaria Limited	Arcelor Mittal Libaria Limited	Liberia	Potable Water Treatment Plant	8 m3/hr	Mining & Primary Metal
31481527	Xstrata Coal	Xstrata Coal	South Africa	Clarification and Filtration	20m³/hr	Mining & Primary Metal
31481494	Matomo / TWP - Mongbwalu	Anglogold Ashanti	Demogratic Republic Congo	Containerised Potable Water Treatment Plant	1 x 10m/hr 1 x 1m/hr	Mining & Primary Metal
31481493	Fluor & K'Enyuka	East Plats	South Africa	Clarification & Potable Water Treatment Plant	88m/hr	Mining & Primary Metal
31481491	Matomo / TWP - Mongbwalu	Anglogold Ashanti	Demogratic Republic Congo	Containerised Potable Water Treatment Plant	4m/hr	Mining & Primary Metal
31481488	RSV Enco	Dorstfontein Coal Mine	South Africa	Potable Water Treatment Plant	6m/hr	Mining & Primary Metal
31481481	Xstrata Alloys	Xstrata Alloys	South Africa	Potable Water Treatment Plant	300m/hr	Mining & Primary Metal
31481480	Lumwana Mining Company	Lumwana Mining Co	Zambia	Containerised Potable Water Treatment Plant	5m/hr	Mining & Primary Metal
31481441	Lumwana Mining	Lumwana Mining Co	Zambia	Containerised Potable Water Treatment Plant	18m/hr	Mining & Primary Metal
31481440	RSV Enco	Dorstfontein Coal Mine	South Africa	Potable Water Treatment Plant	3m/hr	Mining & Primary Metal
31481406	Lumwana Mining	Lumwana	Zambia	Containerised Potable Water Treatment Plant	18m/hr	Mining & Primary Metal
31481491	Matomo / TWP - Mongbwalu	Anglogold Ashanti	DRC	Clarifiers, Sand Filters	4m/hr	Mining & Primary Metal
31481494	Matomo / TWP - Mongbwalu	Anglogold Ashanti	DRC	Clarifiers, Sand Filters	1 x 10m/hr 1 x 1m/hr	Mining & Primary Metal
31481655	Correct Engineer	Correct Engineer	Ghana	Oily Water Treatment Plant		Mining & Primary Metal
n/a	Namdeb	Daberas Hostel PWTP	Namibia	River Water Treatment Plant		Mining & Primary Metal
31481493	Fluor & K'Enyuka	East Plats	South Africa	Clarifiers	88m/hr	Mining & Primary Metal
31481440	RSV Enco	Dorstfontein Coal Mine	South Africa	Clarifiers, Iron Removal Filters, Activated Carbon Filters, Reverse Osmosis, CIP System	3m/hr	Mining & Primary Metal
31481481	Xstrata Alloys	Xstrata Alloys	South Africa	Sand Filters, Activated Carbon Filters, Disinfection, Dosing	50m3/hr	Mining &

						Primary Metal
31481527	Xstrata Coal	Xstrata Coal	South Africa	Clarifiers, Sand Filters	20m³/hr	Mining & Primary Metal
31481595	Shanta Mining Company	Shanta Mining	Tanzania	Clarifiers, Sand Filters, Activated Carbon Filters, Dosing	660 m3/Day	Mining & Primary Metal
31481517	First Quantum Minerals	Kansanshi Mining	Zambia	Activated Carbon Filters, UV System, Dosing	Various	Mining & Primary Metal
31481406	Lumwana Mining Company	Lumwana Mining Co	Zambia	Sand Filters, Activated Carbon Filters	18m3/hr	Mining & Primary Metal
31481480	Lumwana Mining Company	Lumwana Mining Co	Zambia	Disinfection, Clarifiers, Sand Filters, Activated Carbon Filters, Dosing	72 m3/Day	Mining & Primary Metal
Municipal Sector						
31481531	Envig Botswana	Department of Water Affairs	Botswana	Containerised Potable Water Treatment Plant	11.5 m3/hr	Municipal
31481478	Veolia Water Botswana		Botswana	Containerised Potable Water Treatment Plant	20m/hr	Municipal
n/a	NamWater	Aussenkehr WTW	Namibia	River Water Treatment Plant		Municipal
31481530	Eauxwell Nigeria	Eauxwell Nigeria	Nigeria	Clarifiers, Sand Filters, Disinfection	100m³/hr	Municipal
31481616	Ayamah Consulting Engineers	VWT South Africa	South Africa	.75ML/d Potable Water Treatment Plant		Municipal
31481617	Ayamah Consulting Engineers	VWT South Africa	South Africa	1Ml/d Potable water treatment plant		Municipal
31481593	Bicacon	Vaal Marina	South Africa	Clarifiers, Sand Filters, Activated Carbon Filters, Softener, Disinfection	110 m3/day	Municipal
31481673	Gert Sibande Municipality	Gert Sibande Municipality	South Africa	1MLD PWTP, Full Turnkey		Municipal
31481564	Quintax 202	Mangaung Municipality	South Africa	Clarifiers, Sand Filters, Activated Carbon Filters, Disinfection	20m³/hr	Municipal
31481656	Stellenbosch Municipality	Stellenbosch Municipality	South Africa	Containerized Borehole Water Treatment Plant		Municipal
31481570	Veolia Water - D&B (Politsi)	Lepelle Northern Water	South Africa	Clarifiers, Sand Filters, Dosing	5Ml/day	Municipal
31481575	Veolia Water D&B - Lepelle	Lepelle Northern Water	South Africa	Dosing, Clarifiers, Sand Filters	10Ml/d	Municipal
31481585	Zamangwe Water Technologies	Baberton	South Africa	Dosing, Clarifiers, Sand Filters, Activated Carbon Filters	110 m3/day	Municipal
31481557	Veolia D&B	Kafubu	Zambia	Clarifiers, Sand Filters, Activated Carbon Filters, Disinfection	40m³/hr	Municipal
31481568	Veolia Water - D&B (Masaiti Boma)	Kafubu	Zambia	Clarifiers, Sand Filters, Activated Carbon Filters, Disinfection	40m³/hr	Municipal
Food & Beverage Sector						
31481463	Bevcan	Bevcan Angolata	Angola	Sand Filters, Activated Carbon Filters	10m3/hr	Food & Beverage
31481667	Kingsley Beverages	Kingley Beverages	South Africa	Water Treatment Plant Upgrades - Kingsley Malvern		Food & Beverage
31481657	Simba	VWT South Africa	South Africa	Water Treatment Plant		Food & Beverage
31481666	Vital Health Foods	Vital Health Foods	South Africa	Borehole Water Treatment Plant , 5 m3/h IRF, ACF and RO		Food & Beverage
31481592	Lesaffre	Lesaffre	Zimbabwe	Clarifiers, Sand Filters, Activated Carbon Filters, Disinfection	25m³/hr	Food & Beverage

Water Treatment						
31481530	Eauxwell Nigeria Ltd	Eauxwell Nigeria Ltd	Nigeria	Clarification and Filtration	100 m3/hr	Water Treatment
Other Sectors						
31481463	Bevcan Angolata	Bevcan Angolata	Angola	Containerised Potable Water Treatment Plant	10m/hr	Can manufacturing
31481614	Veolia Water Technologies Paarl	Bambisana Hospital	South Africa	Clarifiers, Sand Filters, Activated Carbon Filters, Dosing	5m³/hr	Healthcare
31481659	Inyati Construction	Inyati Construction	South Africa	Containerized Borehole Water Treatment Plant		Tertiary
31481622	Toshiba	Toshiba - Tanzania Electric Supply Company (TANESCO)	South Africa	Potable Water Treatment Plant - Kinerizi II		Power
31481670	Hatch Stellenbosch University	Hatch Stellenbosch University	South Africa	Stellenbosch University Water Supply - Potable Water , 16 m3/h SF, ACF and RO		Science & Education
31481587	Kranspoort Eienaars Kommitee	Kranspoort	South Africa	Clarifiers, Sand Filters, Activated Carbon Filters, Disinfection, Dosing	300 m3/Day	Tourism

Potable Water Tratment Plant References List

22m3ph CPWTP - Kranspoort Holiday Resort

5m3ph CPWTP – Bicacon

5m3ph CPWTP - VWT Paarl – Lusikisiki

Lepelle - Dorndraai, 5MLPD PWTP

100m3ph, PWTP, Samancor - Limpopo

Kafubu Water and Sanitation Improvement Project - D&B

10m3 per hr Nanofiltration - Ethekwini

10 m^3/h Matomo/ TWP – Containerized PWTP– DRC

18 m3/h Lumwana Mining Co – Containerized water treatment plant – Zambia

20 m3/h Veolia Water Botswana – Shakawe – Containerized PWTP – Botswana

APPENDIX D – MASTER DOCUMENT REGISTER

Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

Document Number:	**0**
Document Title:	**MASTER DOCUMENT REGISTER**
Contract Number:	**1534**
Client Name:	
Client Contract Number:	**0**
Document Revision Number:	**A.0**
Date:	**22/04/2014**

Doc Number:	Supplier Document Number:	Discipline Identifier	Document Identifier	Unique Sequential Number	Document Description	Document Latest Revision	Required Date	Date First Issued	Last Issued Dated	Status	Contractual Requirements
001	1534-PM-MDR-001-RevA	Project Management	Master Document Register	001	Master Document Register	A				WIP	FIO
002	1534-PR-PID-001-RevA	Process	Piping & Instrumentation Diagram	001	Piping and Instrumentation Diagram	A				WIP	FIO
003	1534-PR-PFD-001-RevA	Process	Process Flow Diagram	001	Process Flow Diagram	A				WIP	FIO
004	1534-PR-SCH-001-RevA	Process	Schedule	001	Line List	A				WIP	FIO
005	1534-PR-SCH-002-RevA	Process	Schedule	002	Equipment List	A				WIP	FIO
006	1534-PR-SCH-003-RevA	Process	Schedule	003	Valve Schedule	A				WIP	FIO
007	1534-IC-SCH-004-RevA	Instruments and Control	Schedule	004	Instrumentation Schedule	A				WIP	FIO
008	1534-EL-SCH-005-RevA	Electrical	Schedule	005	Electrical Load and Motor List	A				WIP	FIO
009	1534-EL-DES-001-RevA	Electrical	Design Documentation	001	MCC Design	A				WIP	FIO
010	1534-IC-SCH-006-RevA	Instruments and Control	Schedule	006	Cable Schedule	A				WIP	FIO
011	1534-EL-DDM-001-RevA	Electrical	Design Diagram	001	Termination Diagram	A				WIP	FIO
012	1534-ME-MAN-001-RevA	Mechanical	Manual	001	Maintenance Manual	A				WIP	FIO
013	1534-ME-ITP-001-RevA	Mechanical	Inspection Test Plan	001	Inspection and Test Plan	A				WIP	FIO
014	1534-PR-DAS-001-RevA	Process	Datasheet	001	Equipment Datasheets	A				WIP	FIO
015	1534-DO-DCG-001-RevA	Drawing Office	Drawing Civil Guideline	001	Civil Guide	A				WIP	FIO
016	1534-DO-DGA-001-RevA	Drawing Office	Drawing General Arrangement	001	General Arrangement	A				WIP	FIO
017	1534-EL-DDM-002-RevA	Electrical	Design Diagram	002	Earthing Schematic	A				WIP	FIO
018	1534-DO-DLA-001-RevA	Drawing Office	Drawing Layout	001	Block Plan	A				WIP	FIO
019	1534-ME-MAN-002-RevA	Mechanical	Manual	002	Site Erection Manual	A				WIP	FIO
020	1534-PR-MAN-003-RevA	Process	Manual	003	Operations Manual	A				WIP	FIO
021	1534-IC-DAS-002-RevA	Instruments and Control	Datasheet	002	Instrument Datasheets	A				WIP	FIO
022	1534-PR-FAT-001-RevA	Process	Factory Acceptance Test	001	FAT	A				WIP	FIO
023	1534-PR-REP-001-RevA	Process	Report	001	FAT Report	A				WIP	FIO
024	1534-ME-SCH-007-RevA	Mechanical	Schedule	007	Interface Schedule	A				WIP	FIO
025	1534-PR-DES-002-RevA	Process	Design Documentation	002	Process Parameters	A				WIP	FIO
026	1534-EL-CRT-001-RevA	Electrical	Certificate	001	Certificate of Conformance	A				WIP	FIO
027	1534-PR-CRT-002-RevA	Process	Certificate	002	Certificate of Performance	A				WIP	FIO
028	1534-CO-SAT-001-RevA	Commissioning	Site Acceptance Test	001	SAT Procedure	A				WIP	FIO
029	1534-PM-LST-001-RevA	Project Management	List	001	Packing Lists	A				WIP	FIO
030	1534-PM-LST-002-RevA	Project Management	List	002	Spares List	A				WIP	FIO
031	1534-ME-PRC-001-RevA	Mechanical	Procedure	001	Preservation and Storage Procedure	A				WIP	FIO
032	1534-PM-SAT-002-RevA	Project Management	Site Acceptance Test	002	Handover Documentation	A				WIP	FIO
033	1534-FIO-REG-001-RevA	Drawing Office	Register	001	Drawing Office Register	A				WIP	FIO

Discipline Identifier	
Architectural	AR
Civil	CI
Commissioning	CO
Configuration Management	CM
Drawing Office	DO
Engineering Design Systems	DS
Electrical	EL
Estimating	ES
General	GE
Installation / Construction Management	CM
Instruments and Control	IC
Mechanical	ME
Process	PR
Project Administration	PA
Project Management	PM
Quality / Environment	EN
Structural	ST
Document Identifier	
Bill of Materials	BOM
Certificate	CRT
Datasheet	DAS
Design Documentation	DES
Design Diagram	DDM
Drawing General Arrangement	DGA
Master Document Register	MDR
Drawing Civil Guideline	DCG
Drawing Layout	DLA
Factory Acceptance Test	FAT
Inspection Test Plan	ITP
Interface Control Document	ICD
Isometric Drawing	ISO
List	LST
Manual	MAN
Part Detail / Manufacturing	DWG
Piping & Instrumentation Diagram	PID
Process Flow Diagram	PFD
Procedure	PRC
Report	REP
Register	REG
Site Acceptance Test	SAT
Schedule	SCH
Supplier Documentation	SDO
Supplier Drawing	SDR

Document Status	
Work In progress	WIP
Issued for Review to client	IFR
Returned Working Copy from Client	RWC
Released to Client	REL
Approved by Client	APP
For Information Only	FIO

Contractual Requirements	
For Client Approval	FCA
For Information Only	FIO
Internal Review Only	IRO

APPENDIX E – CERTIFICATION

Potable Water Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Radebe**
Phone number :	**+27 11 281 3600**

SABS

Certificate of Registration

This is to certify that the Quality Management System of

VEOLIA WATER SOLUTIONS AND TECHNOLOGIES SOUTH AFRICA (PTY) LTD

HEAD OFFICE: MODDERFONTEIN

(Refer to schedule 1 for other branches addresses)

has been assessed and found to satisfy the requirements of

ISO 9001:2015

QUALITY MANAGEMENT SYSTEMS - REQUIREMENTS

in respect of

- THE DESIGN, DEVELOPMENT AND MANUFACTURING, DISTRIBUTION AND MECHANICAL/CHEMICAL ANALYSING AND SUPPLY OF A FULL RANGE OF WATER AND WASTEWATER TREATMENT EQUIPMENT, AUTOMATED SYSTEMS AND CHEMICALS, INCLUDING INDUSTRIAL CLEANERS, SANITISERS, ION EXCHANGE RESINS AND ACTIVATED CARBON

- THE PROVISION OF TOTAL CUSTOMER BACK-UP SERVICE AND MAINTENANCE OF WATER TREATMENT EQUIPMENT

This certificate, including the schedule which forms an integral part thereof:
- is issued without alteration;
- is identified by the applicable registration number;
- is subject to any condition or limitation contained therein;
- is valid subject to ongoing compliance with certification requirements;
- bears the embossed SABS Commercial seal. In the absence of the seal, the certificate and the schedule shall be invalid; and
- the certificate may be authenticated by referring to the register of "Certified Clients" on the SABS Commercial website (www.sabs.co.za)

Registration Number	**LS 1556**
Effective Date	**17 July 2018**
Expiry Date	**15 September 2021**
Date of Original Registration	**09 June 1995**
Chief Executive Officer	

IAF sanas C01a

SABS COMMERCIAL

SABS COMMERCIAL SOC Ltd.
1 Dr Lategan Rd, Groenkloof, Pretoria,
Republic of South Africa

0005736

ANNEXURE D: VEOLIA SEWER TREATMENT PLANT

ConSolv Consulting Engineers CC

Sewage Treatment Plant

Figure 1:Typical Hybrid Sewage Treatment Plant

Enquiry number	: -
Tender number	: **WTP19_11-22-Rev A**
Bidder	: **Veolia Water Technologies**
Date	: **05 December 2019**

ConSolv Consulting Engineers CC
to the attention of Eric Dixon
Nelspruit, South Africa

Bayanda Bayanda
Tendering Engineer,
Engineered Systems, Sebenza
WATER TECHNOLOGIES

Tender Reference: **WTP19_11-22-Rev A**
Sebenza, **05 December 2019**

Dear Sir

SUBJECT: Sewage Treatment Plant - 200 m^3/day

We thank you for the opportunity to put forward our proposal for the design, supply, manufacture and advisory of installation and commissioning of a sewage treatment plant able to treat 200 m^3/day of domestic sewage to be installed in Malelane.

The offered sewage treatment plant utilises proven new generation trickling filter technology. At this time Veolia Water is the only company in Southern Africa with the technology to design and build industrial sized trickling filter plants. Veolia has installed a significant number of trickling filter projects in Southern Africa (particularly Namibia).

Trickling filter plants have the following advantages when compared to alternative technologies:

- Simple, reliable technology with minimal automation and control
- No skilled operators required
- Flexibility of effluent load
- Low sludge production
- Compact
- Odourless

Further to the above, it is important to note that the treatment plant is considered to be "self-operating", only minor day to day maintenance is required.

Our proposal is based on the hybrid sewage treatment package. This system consists of a civil structure for the anaerobic tank with the balance of the equipment housed in second hand, refurbished shipping container/s.

Our proposal for the 200 m^3/day STP consists of 3 shipping containers ie, 2 x 12 mHC container double stacked for the trickling filter and 1 x 6 m for the equipment container. Please refer to Appendix B for an indicative layout.

All civil structures are in the client's scope of works. We will provide civil guidelines for the installation of the necessary equipment on site.

We believe our offer to be technically sound and cost effective and hope that our bid satisfies your requirements. Please do not hesitate to contact the undersigned should you have any questions or require more information.

We look forward to the opportunity to meeting with you to further discuss our proposal.

Yours faithfully for **Veolia Water Technologies**

Bayanda Bayanda
Tendering Engineer
Engineered Systems

Martin Kotze
Tendering Manager
Engineered Systems

Veolia Water Solutions & Technologies South Africa (Pty) Ltd
Golf View Office Park, 13 Pressburg Road, Founders View, Modderfontein, 1609, Gauteng, South Africa
REG. N^{O} 1964/007768/07 VAT N^{O} 4650105341
Tel.: +27 11 663 3600 Fax: +27 11 608 4772
Email: info.southafrica@veolia.com

18 Grader Road, Sebenza, Kempton Park, 1619, South Africa
P O Box 446, Isando, 1600, Gauteng, South Africa
DIRECTORS: HN Opaleye, LJ Nxumalo, S Govender, P Couzinet (French)
Tel.: +27 11 281 3600 Fax: +27 11 281 3644
Website : www.veoliawatertechnologies.co.za

CONTENTS

SECTION 1 – DESIGN BASIS

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

1.1 INTRODUCTION

1.1.1 Project introduction

Veolia Water Technologies has been approached by **ConSolv Consulting Engineers CC** to manufacture and supply a sewage treatment plant able to treat 200 m^3/day of domestic sewage water.

1.1.2 Introduction to Veolia Water Technologies

Veolia Water Technologies (Veolia) is a leading engineering contractor in the field of design, engineering and construction of water and wastewater treatment plants in Sub Saharan Africa. Over the past 25 years, Veolia South Africa, as part of the global VEOLIA family, has built up extensive experience and a solid reputation in developing water treatment solutions and technologies to suit our client's requirements throughout the African continent and across a range of industries and marketplaces.

VEOLIA AMBITIONS FOR AFRICA

"AMBITIONS FOR AFRICA IS NOT A MOTTO, IT IS OUR COMMITMENT"

Africa is urbanizing at a faster rate than any other region in the world, the subject of water thus remains a long-term challenge.

With this in mind, the need for a new approach to water resources management has become a necessity. An approach which combines access to water and sanitation, resilience and efficient resource management.

This is where we come in.

Veolia Water Technologies (VWT) provides a complete range of capabilities required to design, build, maintain and upgrade water and wastewater treatment facilities for industrial and municipal authorities. VWT is the world reference in all domains concerning water issues, such as desalination, drinking water, wastewater, process water and reuse.

What does "Ambitions for Africa" mean? VWT has a strong presence throughout Africa with numerous references and with local manufacturing and logistic facilities based in South Africa. By having a local presence dedicated to serving local customers, we are closer to our African clients, able to provide the best solutions and products adapted to every situation.

VWT also has the finest technical expert network on the continent. By associating our expertize with a unique network of partners and distributors, customers benefit from guaranteed support in all situations, including in the event of an emergency.

As part of Veolia, we have the full support of the world reference in environmental services.

Driven by your needs, our technologies make the difference to optimize scarce water resources, reduce environmental footprint, transform wastewater into a valuable resource and ensure secure access to drinking water.

Together let us believe in the value of water because we believe in Africa.

1.1.3 Engineered Systems

Engineered Systems (ES) is a division of Veolia Water Technologies South Africa, specialising in packaged water treatment solutions. ES focuses on both standard packages as well as engineered solutions, successfully supplying both packaged and fully engineered solutions throughout the South African and International market (See references).

Engineered Systems' project methodology enables the execution of projects in the shortest possible time at lower capital costs by utilising modular and standard process and equipment designs for water and waste water applications. The greatest saving is seen by the plug and play methodology whereby site establishment and commissioning time is drastically reduced, both saving time and mitigating risk.

Packaged solutions offer the following advantages:

- **Maintainability:** little maintenance as there are minimal moving parts utilising reputable OEM equipment
- **Ease of transport:** the packages are containerised and therefore ideal for remote locations
- **Easy Installation and commissioning:** modular systems that are fully Factory Acceptance Tested (FAT) prior to delivery to site.

In addition to packaged solutions, Engineered Systems has the following capabilities to provide full turnkey solutions:

- **Process Engineering:** Complete process design is undertaken in-house using latest process technology with access to the entire array of Veolia proprietary designs and solutions.
- **Electrical Control & Instrumentation (EC&I):** All EC&I selection and installation is executed in-house to ensure seamless integration into our systems.
- **Mechanical Design:** Mechanical Design utilising 3D Modelling software including Inventor and Autocad with the ability to perform virtual plant walkthroughs as well as perform all structural analysis to ensure a complete design free from defects; while ensuring seamless integration into a clients' system.
- **Fabrication:** An on-site workshop with the ability to fabricate PVC, HDPE, PVDF, Stainless Steels including Duplex and Super Duplex using only coded welders. A site testing station ensures all plants are fully FAT tested prior to delivery for complete quality assurance and client piece of mind.

1.2 PROPOSAL DESIGN BASIS

1.2.1 Treatment plant capacity

The current process design is based on flow data summarized in the following table:

Table 1: Design water flow characteristics

Water treatment description	Units	Design
Raw water feed flow	m^3/day	200

1.2.2 Inlet water quality and characteristics

The sewage treatment plant process design is based on the inlet water characteristics summarized in the following table:

Table 2: Flow Data

Parameter	Units	Guideline
Hydraulic Load	l/p/d	200
Suspended solids	mg/l	275
COD	mg/l	600
BOD	mg/l	300
Settleable solids	mg/l	-
Ammoniacal nitrogen	mg/l	35
Total phosphorous (P)	mg/l	12.5

- Our design is based on the above guideline values.
- The sewage feeding the proposed treatment plant will be generated by inhabitants.
- It has also been assumed that the feed to the plant will not be industrial effluent, which would require additional treatment processes.
- Our treatment plant does not include for a fat trap to capture fat/oil/grease (FOG) discharge from cooking facilities. Installation of such a fat trap should be done at the kitchen or location of discharge (by others)

With regards to laundry effluent

- Laundry effluent should be discharged/mixed with other domestic effluent so that not more than ca 25% (volume wise) stems from laundry itself;
- Should be domestic-type laundry (can also be e.g. typically laundry from shift-workers etc.) and not dry-cleaning (chemical-based cleaning) laundry;
- The laundry should use typically domestic-type washing powders (e.g. Skip, OMO, etc...);
- Washing powder description should read “easily biodegradable” – the term “readily biodegradable” is not acceptable

1.2.3 Treated water quality

The sewage treatment plant has been designed to meet the following treated water quality requirements:

- In line with common practice in the region, the plant has been designed to produce final effluent to comply with the RSA General Standard for Discharge as published in Table 3.2 of Gazette No. 20526 of 8 October 1999 as shown below:

Table 3: Treated Water Quality

Parameter	Units	Design	Comments
COD	mg/l	75	After removal of algae
pH	-	5.5 – 9.5	
Ammonia as N	mg/l	3	(ionised and un-ionised)
Suspended Solids	mg/l	25	
Nitrate/Nitrite as Nitrogen	mg/l	15	
Chlorine as free Chlorine	mg/l	0.25	
Otho-phosphate as phosphorus	mg/l	10	
Faecal Coliforms	Per 100ml	1 000	

Final effluent of this quality can be reused for gardening and growing of selected agricultural crops (non-root vegetables). Since the final water is rich in nitrates, it is well suited for plant growth and will not have adverse effects on the flora. However, some microbial growth may still be present in the water, so locations frequented by people should not be considered for this purpose.

1.2.4 Equipment specifications

No client mechanical or electrical specifications have been considered in the compilation of this tender. Mechanical and electrical equipment will be supplied as per Veolia's standard specifications. Please refer to Section 3- Scope of Supply for further details.

SECTION 2 - TECHNICAL

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

2.1 INTRODUCTION

The sewage treatment plant we are offering is proven trickling filter technology and is ideal for the required application due to the following reasons:

Simple, reliable technology: The trickling filter relies on attached growth technology (a biological process) with hydraulic distribution and control. Such systems can accommodate large fluctuations (quality and flow) of inflow and can even accommodate shock loads. The most sophisticated pieces of equipment employed are pumps, which are simple and easy to maintain. Also, for the latter we have allowed for standby units to ensure increased reliability of the overall system.

Minimal automation and control: Because of the simple technology employed, automation and control is minimal and the system is therefore very reliable, robust and most appropriate for the envisaged application.

No skilled operators required: Hydraulic control and operation of the system renders skilled operators obsolete. The system does not require mechanical oxygen input and therefore no specific skill or supervision is required from the operators.

Low sludge production: The aerobic sludge produced in the trickling filter is returned to the anaerobic (septic) tank, where it is anaerobically digested to approximately a 3rd of its original volume.

Flexibility of load: The sewage treatment plant must cater for periods of very little or no inflow and then again for short periods of very high loading. Trickling filters would be the most appropriate technology currently available to treat the effluent to the required environmental standards.

There are three ways in which our sewage treatment plants can be packaged and these are as follows:

Table 4: Packaged sewage treatment plant configurations

Packaged plant configuration	Description
Fully Containerised	In these systems, all the tanks and process equipment are constructed using standard refurbished shipping containers. The civil work required is only a concrete slab. Ideal for a temporary installation.
Hybrid	This solution covers the widest range of flow requirements. In these systems, the anaerobic reactor is constructed using concrete (i.e. civil based). The mechanical equipment is then assembled and installed in this civil structure and the remainder of the plant is housed in standard refurbished shipping containers. Suitable for medium to long term installations.
Fully civil	In these systems, the mechanical and electrical equipment is installed/assembled in civil structures. These systems are typically offered for larger capacity requirements and for long-term installations.

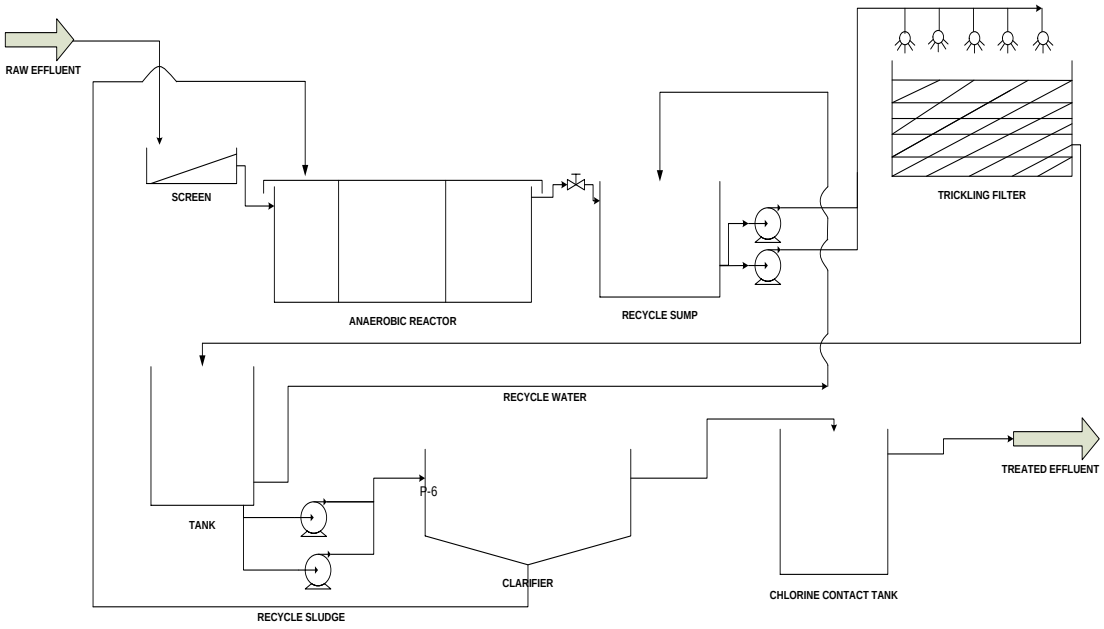


Figure 2: Diagram showing the process flow of a typical trickling filter plant

2.2 PROCESS

2.2.1 Process Description

The proposed treatment plant comprises of the treatment process shown in figure 2 (previous page). The plant will include all unit processes and treatment components required to accomplish screening, primary treatment, and nitrification, solids removal (secondary settling) and disinfection (chlorination) tanks.

2.2.2 Screening Facility – Inlet Box

Raw sewage will need to be supplied (by others) up to our battery limits. A screening facility consisting of an inlet box (civil) with bar screen and drip tray will be required. We will supply the bar screen, drip tray and a manual rake for an operator to clean out the box. Once a week, an operator will rake trapped matter (screenings) with the rake onto the drip tray and leave this to dewater. The (semi-dry) screenings from the previous week will be carted away by the operator to a proper disposal site (to be identified by Client).

Figure 3: Illustration of typical inlet screen

2.2.3 Primary Treatment Tank (Anaerobic Reactor)

The raw sewage, after screening, will enter a two compartment anaerobic reactor. The anaerobic reactor will be a concrete structure. The anaerobic reactor has been designed with enough retention time to allow the solids and sludge to settle out and be digested in the first compartment, while the second will mainly contain grey water. Anaerobic conditions in this tank will ensure BOD removals of at least 40 % to 50 %. Additionally, aerobic sludge from the secondary settler will be recycled to the inlet of this tank, to be further digested. This reduces the overall sludge volume produced in the biological system.

2.2.4 Trickling Filter Feed Pumps (installed in the primary treatment tank)

After primary treatment, the effluent will be discharged into a pump sump (Anoxic Reactor) from where it will be re-circulated by open impeller submersible pumps (duty/standby) through the trickling filter. This sump has been sized with a hydraulic retention time in excess of 60 min, which allows for anoxic conditions to prevail.

During times of no inflow to the plant, there will be no discharge from the anaerobic reactor into this sump. The pumps will then continue re-circulating water from the trickling filter basin through the media, ensuring that the biomass on the media is kept wet (and alive). The pumps are fitted with a low-level protection switch. If the period of non-inflow to the plant is very long, it can be expected that water will be lost through evaporation and the level in this sump will drop. To then prevent the pump(s) from running dry, they will be switched off at a certain low-level.

Should the plant receive inflow again, the level in the sump will rise and the level switch will switch the pump(s) on automatically. This also ensures that no operator will be required to switch the plant on or off.

2.2.5 Trickling Filter (Aerobic Reactor)

The trickling filter system consists of a bed of highly permeable medium, which serves as host for micro-organisms to attach to and grow on, and form a biological film. The wastewater is sprayed over and percolates through the media. Organic material in the wastewater is absorbed by the micro-organisms growing as a biological film on the media. In the outer portion of the film, aerobic organisms degrade organic material, whereas anaerobic organisms exist deeper into the biological film, i.e. near the surface of the media.

The reason for an aerobic and anaerobic layer being established is because, as the microbial layer grows in thickness, the diffused oxygen is consumed before it can penetrate the full depth of the microbial layer. Therefore, oxygen only reaches the outer layer of micro-organisms resulting in aerobic conditions, whereas deeper into the biological film no oxygen is available resulting in anaerobic conditions. Figure 4 demonstrates this principle.

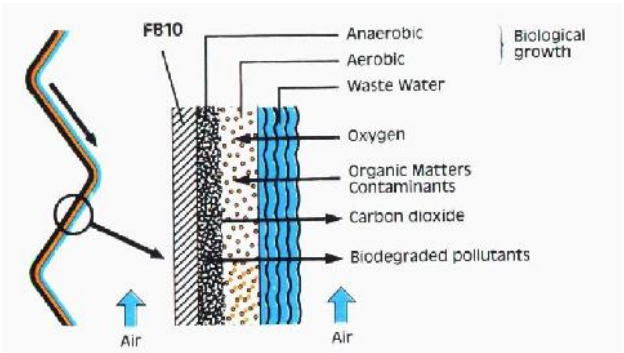


Figure 4: Biological activity on trickling filter media

Construction and Operation: The trickling filter houses plastic media (UV protected PVC) that consists of sheets which are assembled and glued together to form rigid blocks. These blocks are stacked into the tower above the collecting basin. A simple system of non-clogging, open nozzles will be used to distribute the water evenly over the top of the media as shown in Figure 4.

The water, after percolating through the media, will be collected in the trickling filter basin. Biological solids that have become detached from the packing media have to be removed before the effluent is disinfected and can be finally discharged. Removal of the biomass is achieved in a conventional, secondary settler, which will be further described in the next section.

Figure 5: Water distribution in a trickling filter

2.2.6 Clarifier

The water from the trickling filter basin will be directed to the clarifier by transfer pumps (duty/standby) only if there is inflow into the plant.

Water from the trickling filter contains solids made up of a mixture of aerobic and anaerobic sludge. This sludge will be heavier (and lower in volume) than aerobic sludge produced in an activated sludge plant and does not produce scum. It will settle and accumulate at the bottom of the clarifier.

Sludge will periodically be withdrawn from the bottom of the clarifier and will be gravitationally fed to the anaerobic reactor. To achieve this, an electrically actuated valve has been provided. The valve's opening time and frequency is controlled by a timer for the duration and interval of sludge extraction. Typically, the timer is set to allow settled sludge to be extracted from the clarifier once per hour for 5 min and returned to the inlet box. The interval and duration of sludge extraction is adjusted by the process engineer during commissioning and again after continuous, stable operation of the plant (ca 6 months after commissioning).

2.2.7 Disinfection

Clarified water from the clarifier is discharged into the chlorine contact tank. This tank has been sized for an effective contact time of 20 min at ADWF. Disinfection will be provided by a hypochlorite dosing system. The treated water will be suitable for irrigation and dust control.

2.2.8 Sludge Removal and Drying Beds (supplied by others)

Sludge stabilisation and digestion takes place in the anaerobic reactor. This tank is annually inspected. If the sludge at the bottom of the first compartment of the anaerobic reactor has accumulated to a height of ca 400 mm the sludge has to be emptied (pumped) into sludge drying beds or taken away for dumping at a suitable location. An easy procedure for checking the sludge level inside the anaerobic reactor is given/described in our operation manuals.

It is very difficult to predict the required frequency of sludge removal because each plant operates under different conditions. We normally design for the sludge to be emptied every one to two years; however we do not expect sludge removal to be required more than once every 3 to 5 years due to the larger anaerobic reactors being designed for.

To empty the sludge inside the anaerobic reactor, one of the recirculation pumps can be lifted out of the recycle sump. The pump will then be connected to a flexible hose (not included in quote) and put inside the anaerobic reactor's first compartment. The hose discharges into sludge drying beds or a collecting tank. The operator connects the pump to the flexible hose, switches on the pump and drags it along the floor of the anaerobic reactor.

Although sludge drying beds are not explicitly necessary, their construction should be considered where space and application permit. These consist mainly of civil works and a pipe lateral system that should be installed at the bottom of the sludge bed to ensure that the clear liquid is collected and flows back into the anaerobic reactor, whereas the sludge accumulates on top of the drying beds. The drying beds should suffice to collect all sludge required for cleaning the anaerobic reactor. This sludge will then be left to dry before it can be disposed of or used for other purposes.

An alternative to sludge drying beds involves the collecting and transport of the accumulated sludge to a suitable disposal site. Since it is expected that the removal of the sludge will need to be done once every 1 – 2 years, this method may be more suitable for the proposed plant.

2.2.9 Operation and Maintenance

Our plants require minimum maintenance that could be limited to one operator's input and requires:

- Daily general check if all pumps are working (inform supplier if not)
- Daily cleaning/raking of the inlet bar screens and suitable disposal of screenings
- Weekly check that trickling filter spray nozzles are spraying and manual cleaning if required (nozzles are of the non-clogging type, but it would be good to check them anyway)
- Inspect check valves and clean if clogged
- Annual check of sludge accumulation in anaerobic reactor
- Keeping the fenced-in area clean of all weeds etc.
- Emptying of sludge into sludge drying beds or collecting tanks when required and discarding of dried sludge (once every 1 – 2 years)

Please note that further details are provided in our Operation & Maintenance Manual which will be supplied upon completion of installation.

SECTION 3 – SCOPE OF SUPPLY

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

3.1 MECHANICAL SPECIFICATION

Below is an overview of our standard mechanical specifications. Each item of equipment is specifically selected to be suitable for its intended application. For further equipment details please refer to APPENDIX A – EQUIPMENT DETAILS.

3.1.1 Piping and Valves

We have included for all carbon steel and uPVC interconnecting piping between supplied equipment, provided all treatment equipment is located in the same plant area.

Table 5: Piping and Valves

Application	Specification
All water/sludge piping	uPVC
Puddle pipes	SS304L
Dosing Chemicals	PVC / PE
Valves	uPVC
Flanges	SABS 1123/T1000
Valve and Actuator Coating	Manufacturers' standard painting specification

3.1.2 Pumps

VWS utilise the following suppliers for pumping and motor driven equipment, however deviation from these suppliers may be required in certain circumstances:

Table 6: Pumps

Application	Specification
Centrifugal pumps	KSB / Grundfos / Rapid Alweiler / Ebara
Submerged centrifugal pumps	KSB / ITT Flygt / Grundfos / Ebara
Dosing pumps	Grundfos Alldos
Equipment Coating and Corrosion Protection	Manufacturers' standard painting specification

3.2 ELECTRICAL, INSTRUMENTION AND CONTROL SPECIFICATIONS

The package plant is designed and manufactured to Veolia standards, only Purchaser standards or specifications as stated below have been considered.

Purchaser Standards & Specifications

None.

Electrical Supply

The plant is manufactured for 400VAC, 50Hz, three Phase & Neutral.

Hazard Classification

The equipment is suitable for installation in a non-classified hazard area only.

Motors

- Protection rating IP55
- 2 or 4 pole 400VAC, 3 phase, 50Hz

Motor duty and other details are listed in Appendix A.

Motor control panels

The motor control panel is mounted to an inside wall of the equipment container. The motor panel is a fixed pattern Form 1 enclosure housing incomer, motor starters (switchgear) and process control (plc/instrument marshalling) in one composite compartment.

Type	Two door one compartment wall mount
Form	Form 1
Withdrawable	No
Material	2mm mild steel
Finish	Powder coated orange
Protection	IP65
EX rating	No
Access	Front only
Cable entry	Bottom
Main isolator	HRC fused switch
Main feeder	400VAC 3 phase 50Hz 4 wire (L1/L2/L3/N) + Earth
Surge protection	40kA Class 2 (3p) on main isolator
Phase protection relay	Phase over/under volt, phase rotation, phase loss
Earth fault interrupt level	15kA @ 1sec
Busbars	200A HDHC copper
Type test certificate	No
Motor circuit breakers	Eaton thermal & magnetic
Motor contactors	Eaton
Circuit breakers	Eaton
Control voltage	230VAC from phase/neutral
Motor protection relay	No
Motor earth leakage	On submerged pumps only
Motor thermistor relay	No
Incomer ammeter	No
Incomer voltmeter	No
Motor ammeter	No
Motor runhour meter	Available on HMI

Motor mcc fault	Alarm message on HMI
Motor mcc running lamp	Green LED in motor selector switch
Motor selector switch	Eaton 3 position (TEST/OFF/AUTO)
Motor start	DOL or Star/Delta as required by pump OEM
VFD	No
Panel air condition	No
Panel fan	No
UPS	1000VA for instrumentation
PLC	Siemens S7-1214C
HMI	Siemens KTP400 key/touch panel (mono 3.8”)
Signal interface	24VDC digital input, volt free contacts digital output
Communication	Ethernet available for SCADA
Printer	No
Network modems	No
Fibre optic couplers	No
Network cables	No

Small power & container services

Three phase 230VAC is derived from each phase and neutral.

One phase is dedicated to motor panel control and dosing, one phase is used for container and area lighting and the third phase for utility sockets.

The area lighting and utility sockets have 30mA earth leakage protection.

20W CFL bulkhead lights are provided inside the container, above the exit door and at the inlet sump pumps.

Emergency lighting (battery powered) is NOT provided.

Electrical cable, support, terminations & earthing

Power and control cable are supplied and sized in accordance with SANS Codes of Practice. Power cables cores are coloured to SANS standard (red, white, blue & black).

Cables are supported on medium duty galvanised mesh tray. Cables inside the container are secured to the tray at regular intervals with PVC ties, exposed outdoor cables use stainless steel ties.

Instrument cables are supported on the same tray as the power cables using largest separation possible.

Cables are tagged at both ends with thermal printed tags and pvc cable ties.

Every motor pump has a field mounted emergency stop switch mounted on a post (or wall) next to the motor. The emergency stop switch interlocks the motor starter and provides feedback to the PLC.

All cable (power and signal) within the confines of the container are non-armoured. Power cables exiting the equipment container are armoured. Small power and lighting cables are semi rigid Surfex

Surge protection (Class 2) is provided on the main incomer only.

Main supply cable is to be provided, installed and terminated by the Purchaser to the terminals of the main isolator in the motor panel.

Earthing

A copper earth bar is fixed to the container wall below the motor panel. The earth bar is bonded to the earth bar inside the motor panel.

All motors pumps and electrical field devices are earthed to the motor panel earth bar using a spare core of the feeder cable.

The galvanized mesh tray cable support is bolted to steel unistrut channels welded to the container wall. External cable support and metal structures are bonded to the main earth bar.

The Purchaser earth cable is connected to the main earth bar inside the equipment container. There are earth bonding points (Threaded M12) provided at the four corners of each container. Earth bonding of the containers and any site specific earthing requirements (earthing mat, ground spikes, lightning masts etc.) outside of the equipment container are the responsibility of the Purchaser.

Automation and instruments

Process control is by a Siemens S7-1214C PLC housed in the motor panel. Included in this panel is the marshalling termination to field instruments.

All plc hardware and instruments are 24VDC.

Local operator interaction is via a Siemens KTP400 hmi screen. The plant is designed to run unattended with minimum operator intervention. (Chemical makeup is by the operator). All automated sequences can be manually initiated by the operator from the hmi screen. Plant event and alarm messages are retained at the hmi screen as descriptive text detailing the date, time and cause of event/alarm.

The main PLC components used:

- Siemens Sitop 240VAC/24VDC 5A stabilised power supply
- Siemens S7-1214C processor and imbedded IO
- Siemens S7-SM1223 16DI/16DO digital input/output
- Siemens KTP400 3.8” key/touch mono panel
- Terminal connectors, cables, etc.

The S7-1214C plc is configured using Simatic TIA Step7 Pro V13, the KTP400 is configured using TIA WinCC Comfort V13.

Surge protection (Class 2) is provided on the main incomer only, individual instrument lightning and surge protection is excluded.

Purchaser interface signals

Potential free contacts are provided for Purchaser remote monitoring of plant ready, plant running and plant alarm active.

Ethernet is available for network communications, data transfer tables will be provided on request, at no additional cost. Any couplers, modems, switches, media converters etc required for this are not included.

Sludge purge valves

Sludge purge valves are 24VDC motorized ¼ turn butterfly. UPS returns valves to shut position in event of main power interruption.

Instrument air

Instrument air is not required.

Compliance certificates

Test reports for the motor panel and container electrical installation are provided.

Standard Veolia instrumentation

This is a list of standard instrumentation used by Veolia and does not imply that all the equipment listed here is included in this tender.

- Flow transmitter (magnet full full bore) - Endress & Hauser Promag 10W
- Flow switch (calirometric) - Endress & Hauser DTT31
- Pressure indicator - Wika 63mm dial, st/st casing and internals, glycerine filled
- Level switch (float) - Endress & Hauser FTS20

Electrical control and instrument documentation

The following documentation is provided in pdf format:

- MCC schematic diagram and material list
- Cable schedule
- Instrument schedule
- Operating and maintenance manual
- Third party supplier operating/maintenance manuals

The following electronic backup files are provided on request (no cost if by email or drop box):

PLC configuration, fully commented (TIA Step7 Pro V13)
HMI configuration, fully commented (TIA WinCC Comfort V13)

Note: Siemens licensed engineering software (TIA Step7 and WinCC) is NOT included in this offer.

Environmental conditions

The container has extraction fans (20ft/6m = three, 40ft/12m = four) and louver vents for cooling air circulation. Air-conditioning is not provided. The container internal temperature should not exceed 40deg Celsius, if in a hot climate then a shade roof with air-gap is recommended.

3.3 BATTERY LIMITS

The proposed battery limits are as follows:

- Inlet flange of the inlet screen.
- Treated water outlet flange on container wall.

3.4 SCOPE OF WORK

Table 7: Scope of work

Description	Veolia Scope of Work	Client Scope of Work
Design, manufacture and supply of Sewage treatment plant	x	
Civil works – see clause 3.5. below		x
Installation advisory, commissioning & training – see clause 3.6. below	x	
Site mechanical & electrical installation		x
Incoming electrical power supply cable to be provided up to our MCC terminals.		x
Transport to site		x
Cranage, rigging & positioning of equipment on site		x
Supply of access ladder & hand railing for trickling filter tower	x	

3.5 CIVIL WORKS

We specifically exclude any civil construction work, holding down bolts, grouting, etc. from our scope of supply. We would supply all necessary details and loadings for the civil works to be designed and constructed (by others) to suit the plant.

3.6 INSTALLATION ADVISORY, COMMISSIONING AND TRAINING

Our tender price excludes for installation and commissioning of the plant. The Client will employ a local contractor to perform the installation of the plant. We have allowed for 10 days for advisory of installation and commissioning of the plant (quoted separately). Training of the client's personnel will take place during the commissioning period.

At the end of the commissioning period, the plant will NOT deliver the expected treated water quality as it is a biological process and the correct biomass first has to establish on the media. The plant will be fully operational 12 weeks after commissioning.

After successful commissioning we recommend a site visit by one of our technician to insure proper operation of the plant for duration of 2 – 3 day (excluded from our offer).

Our offer excludes any accommodation, subsistence, return flights to Johannesburg, local travel, visas and medicals. Should more days be spent on site which is beyond our control, a day rate will be charged. The day rate excludes accommodation, living out allowance and local travel costs. On-site daily working hours are subject to Veolia T&C's.

3.7 TRANSPORT TO SITE

Due to the variability in all costs related to road and sea freight Veolia does not offer transport on a fixed cost basis. In order to ensure that all parties are fairly covered, Veolia can offer transport on a "cost plus 15%" basis and the price for transporting of the equipment to site will only be finalised upon presentation of our supplier invoice to the client.

3.8 SITE VISITS

No site visits by VWS have been included in our offer at this stage. Should a site visit be required, the cost of all international flights, local flights and travel and accommodation will be for the client's account.

3.9 GENERAL EXCLUSIONS

The following items are specifically excluded from our Scope of Supply:

- Storage at site
- Start-up chemicals
- Structural supports and Structural analysis
- Any testing or analyses of equipment or systems unless called for by the code of construction to which such elements are manufactured. Unless specifically stated in our scope of supply, all tanks, vessels and pipework will be uncoded
- Proprietary items such as pumps, motors, valves, actuators, gearboxes etc. will be painted in accordance with the manufacturers' standard painting specification
- Production, storage, distribution or connection to services of any kind required for plant operation and maintenance (compressed air, chemicals, process water, cooling and chilled water, electrical power, steam, etc…)
- Charges for services provided by local authorities
- Feed water and treated water sampling and laboratory testing
- Sludge disposal facilities
- Trial assembly and trial run at our premises
- Any item not specifically/expressly mentioned in the above proposal.

3.10 QUALITY ASSURANCE

Veolia Water Solutions and Technologies South Africa (Pty) Ltd complies to and works in accordance to SABS ISO 9001:2008. A copy of our listing certificate is attached to this document. Our system has subsequently been audited by the SABS and still complies with the conditions and requirements of ISO 9001:2008. Proof of these audits and their findings are available on request.

All equipment/materials will be subject to shop inspection by our inspector during manufacture. Major items of equipment purchased by us from sub-Contractors will also be subject to inspection in the original manufacturer's shop. Clients will have the right, at their own cost and expense, to inspect at any time, any progress of work.

SECTION 4 - COMMERCIAL

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

4.1 COMMERCIAL INTRODUCTION

This section covers the commercial terms for plant and equipment, as detailed in our Scope of Supply (Section 3).

Client: **ConSolv Consulting Engineers CC**

Delivery: Ex-works, Sebenza, Johannesburg

4.2 BID PRICE

Our price for the design, supply, manufacture, ex-works delivery and the upholding during the defects liability period of the plant and equipment as detailed in above sections of this document is:

Item	Description	Price (ZAR)
1	Hybrid Sewage Treatment Plant, 200 m^3/d	1 628 971.00
2	*Advisory of installation & commissioning (10 days)	68 000.00
3	*Day rate for advisory of installation, commissioning and training	6 800.00

The above prices all exclude VAT.
* Excludes accommodation, meals, local and international travel, subsistence (R265/day), visas, medicals and inductions.

4.3 VALIDITY

Our offer is budget and subject to confirmation.

4.4 FOREIGN CONTENT

Our tender price may be subject to fluctuation of exchange rates. The rates of exchange for our offer are as follows:

Table 8: Foreign Exchange at 05 December 2019

Item	Currency	Exchange Rate
1	Euro	ZAR 16.48 = 1.00 EUR

4.5 DELIVERY PERIOD

The required water treatment plant will be made available **12-14 weeks (ex-works)** from confirmation of receipt of official order and receipt of down payment. This does not include for any time that may be required for document approval by the client.

4.6 PAYMENT TERMS

Our offer is based on the following payment terms:

- **30 %** of Item 1 will be payable at contract award

- **70 %** of Item 1, additional to the above payments, plus any variations, shall be payable upon availability of all equipment, unpacked ex-works, Sebenza, Gauteng

- **100 %** of Item 2, additional to the above payments, plus any variations, shall be payable upon completion of installation and commissioning

All payments for work as mentioned above, together with claims for escalation, if applicable, shall be made by electronic bank transfer within 30 days of the contractor's monthly invoices provided such invoices are submitted to the employer prior to or on the 26th of each month.

Please note that transfer of ownership of the water treatment plant will only occur once all outstanding payments have been received. Veolia will not be held liable for the replacement or repair of any damaged equipment that may result due to mishandling or misuse on site, even if transfer of ownership has not yet occurred.

4.7 LATE PAYMENT

Should payment not be made within 30 days as stated above, the Contractor will claim interest on the amount not paid out, up to the date of payment, at the Standard Bank of South Africa's prime overdraft rate plus three (3%) percent.

4.8 PENALTIES

Veolia shall not be liable for any indirect, incidental and/or consequential damages of whatsoever nature, including but not limited to loss of profit, loss of production, cost of capital and cost related to an outage of plant. We do not accept any penalties unless agreed to by all parties in writing.

4.9 GUARANTEES

The period of warranty is eighteen (18) months from the date of the Factory Acceptance Test (FAT).

If any material, equipment or workmanship is proved to be defective or faulty and incapable of performing a satisfactory operation during the guarantee period we will, as soon as possible after receipt of the claim, take the necessary steps to make either repairs or replacement. This is subject to the goods having been treated with reasonable care and to the defective goods being returned to our works.

Consumable material used in normal operation as well as normal wear and tear will be excluded from the guarantee.

During the guarantee period the Client must ensure that the plant is professionally serviced at his own expense to render any claims valid during the guarantee period. The operation and maintenance of the plant should be carried out in accordance with our instructions.

Our guarantee does not extend to any consequential loss that may arise from any defects.

4.10 DELAYED PLANT

Should the Contractor be prevented, by circumstances outside his control, from delivering, installing and/or commissioning equipment as per the original contract due dates, the following conditions will apply:

- The equipment will be stored on site, on the Contractor's premises or any suitable area mutually agreed upon at the expense of the Client until the Contractor is able to commence with the contract.

- The Contractor shall be paid for the equipment in storage in accordance with the general payment terms applicable to equipment under this contract.

- On receipt of a written instruction to proceed, the Contractor shall be entitled to inspect the equipment in the presence of the Client or his representative and to make good any defects to the equipment caused as a result of the extended storage period at the Client's expense.

- The Contractor shall not be liable for any performance guarantee and/or warranty on equipment beyond the original contract guarantee period, except if otherwise agreed in writing.

- The Contractor will adjust his preliminary and general item costs accordingly where applicable.

4.11 PLANT ACCEPTANCE

After commissioning of the plant or latest two weeks thereafter, an acceptance certificate (which may be subject to reservations) shall be issued. Should such a certificate not be issued within the mentioned period, the plant shall be regarded as having been accepted without reservations.

4.12 INSURANCE

We confirm that Veolia Water Technologies have in place Employers Liability Insurance, Public Liability Insurance and Professional Indemnity policies.

4.13 DOCUMENTATION

All documents including drawings will be submitted in English. All dimensions will be shown in the metric form. A Master Document Register (MDR) is attached for client's review and comment (See Appendix C). Please note that a commented MDR should be returned to us before contract award as it may affect the delivery schedule.

APPENDIX A – EQUIPMENT DETAILS

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

Please note that the following are preliminary equipment details. Final equipment details will be supplied during contract stage.

Table 9: Hypochlorite/ ferric Dosing

Hypochlorite Dosing	
Number	1/1
Arrangement	Duty only
Pump type	Diaphragm
Capacity [litres per hour]	TBC
Pressure (bar)	TBC
Motor size (kW)	0.1
Storage tank	Yes
Tank material of construction	Polyethylene
Mixer	Yes
Control	On/Off

Table 10: Trickling Filter Feed Pumps

Trickling Filter Feed Pumps	
Number	2
Arrangement	Duty/ Standby
Type	Submersible
Capacity [m^3/h]	52
Pressure [kPa]	200
Motor size (kW)	5.5
Material of construction • Casing • Impeller	 Cast iron Cast iron

Table 11: Clarifier Feed Pumps

Clarifier Feed Pumps	
Number	2
Arrangement	Duty/ Standby
Type	Submersible
Capacity [m^3/h]	12.5
Pressure [kPa]	60
Motor size (kW)	1.5
Material of construction • Casing • Impeller	 Cast iron Cast iron

Table 12: Clarifier

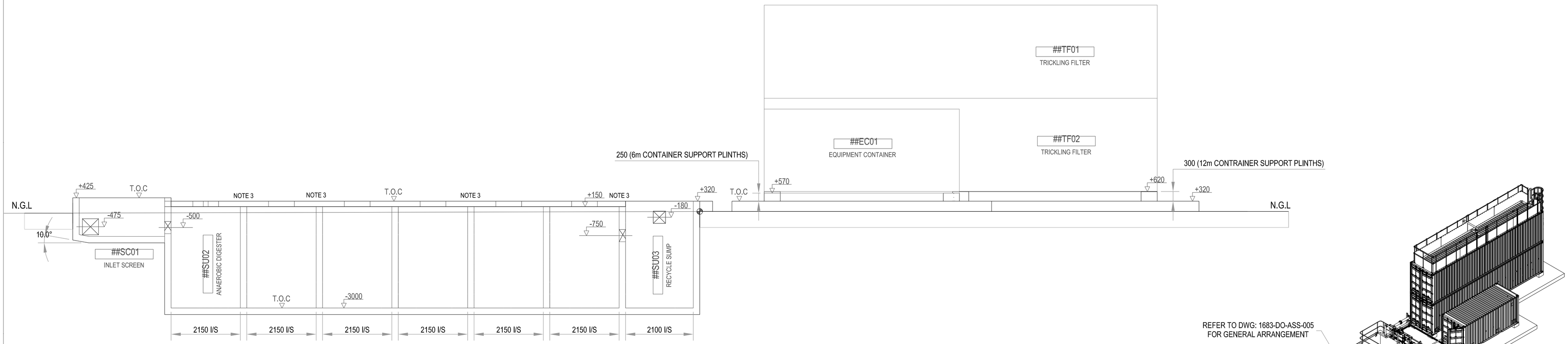
Clarifier	
Number	1
Arrangement	Duty only
Dimensions	TBC
Material of construction	Coated Mild Steel
Packing	PVC lamella

APPENDIX B – INDICATIVE LAYOUT

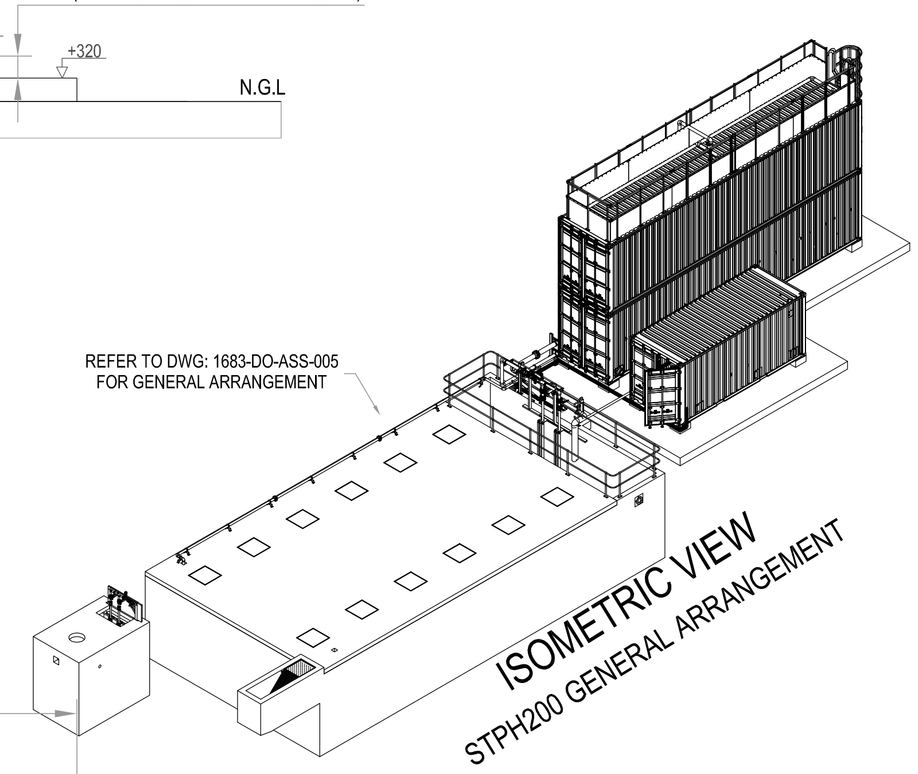
Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

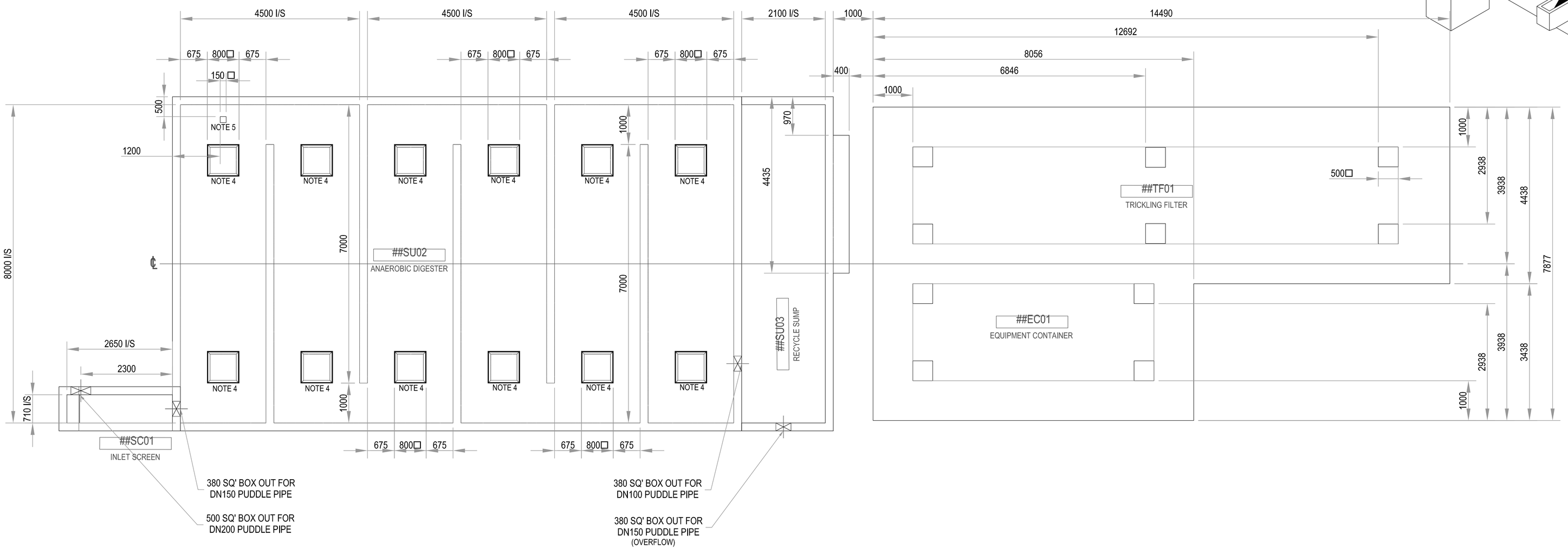
"WHEN IN DOUBT, ASK"



FRONT VIEW



ISOMETRIC VIEW
STPH200 GENERAL ARRANGEMENT



PLAN VIEW

VEOLIA STANDARD

GENERAL NOTES:

1. THIS DRAWING IS A GUIDE ONLY - DESIGN TO BE CONFIRMED BY CIVIL CONTRACTOR
2. CIVIL CONTRACTOR TO RECOMMEND STANDARD SIZE OF LINTEL
3. THE SEPTIC TANK HAS A SLAB ON THE TOP
4. CIVIL CONTRACTOR / CLIENT TO PROVIDE SUITABE MANWAY COVERS
5. HOLE FOR SLUDGE RETURN FROM CLARIFIER
6. CIVIL CONTRACTOR TO INSTALL ALL PUDDLE PIPES (SUPPLIED BY VEOLIA)

REV.	DATE	BY	DESCRIPTION
A	05-12-2019	A.M	ISSUED FOR FIRST REVIEW

PROCESS ENGINEER: PRENESA PILLAY	DATE:	SIGN:
EC&I ENGINEER: TONY SARGENT	DATE:	SIGN:
PROJECT ENGINEER: -	DATE:	SIGN:
MECHANICAL ENGINEER: SEAN MOMBERG	DATE:	SIGN:
DESIGN ENGINEER: ABOOBAKAR MAGAGA	DATE:	SIGN:

P.O BOX 446
ISANDO
1600
SOUTH AFRICA
TEL: +27 11 281 3600
FAX: +27 11 281 3640

CLIENT:	CONSOLV CONSULTING ENGINEERS
TITLE:	STPH 200 CIVIL OUTLINE & REQUIREMENTS
PROJECT No:	WTP19_11-22
SCALE:	N.T.S
SHEET:	1 OF 1
DRAWING No:	WTP19_11-22-01-01
REV:	A

APPENDIX C – REFERENCES

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

Sewage Treatment Plant References

Contract No.	Client	End User	Country of Installation	Plant Configuration	Capacity	Activity
Tourism						
ASE1110.001.DVI	Namibia Wildlife Resorts	Daan Viljoen Resort	Namibia	Civil Based	72 m^3/d	Tourism
ASE1302.005.PFR	Namibia Wildlife Resorts	Popa Falls Resort	Namibia	Hybrid	20 m^3/d	Tourism
ASE1512.002.AIS	Namibia Wildlife Resorts	Ai-Ais Resort & Hobas Camp	Namibia	Civil Based	100 m^3/d	Tourism
ASE1512.002.AIS	Namibia Wildlife Resorts	Hobas Resort	Namibia	Civil Based	20 m^3/d	Tourism
ASE1611.008.SES	Ministry of Environment & Tourism	Sesriem & Sossusdune Lodge	Namibia	Civil Based	60 m^3/d 12 m^3/d	Tourism
ASE1701.006.MET	Ministry of Environment & Tourism	Shisinze National Park	Namibia	Hybrid	10 m^3/d	Tourism
ASE1701.007.MET	Ministry of Environment & Tourism	Khaudum & Sikereti National Park	Namibia	Hybrid	10 m^3/d	Tourism
ASE1003.001.OMY	Omeya Golf Development	Omeya	Namibia	Civil Based	260 m^3/d	Tourism
ASE1407.004.MAR	Marula Game Ranch	Marula Game Ranch	Namibia	Civil Based	10 m^3/d	Tourism
ASE1510.001.ETH	Etosha Heights Tourism	Etosha Heights Safari Lodge	Namibia	Hybrid	10 m^3/d	Tourism
31481668	Vacation Recreation Services	Ngwenya Lodge	South Africa	Civil Based	400 m^3/d	Tourism
31481675	Vacation Recreation Services	Mabalingwe Nature Reserve	South Africa	Civil Based	200 m^3/d	Tourism
Mining & Primary Metal Sector						
31481599	VWS Botswana	Botswana Soda Ash	Botswana	Civil Based	120 m^3/d	Mining & Primary Metal
31481596	Anglo Gold Ashanti	Anglo Gold Ashanti	Ghana	Hybrid	450 m^3/d	Mining & Primary Metal
31481543	Sphere Mauritania	Askaf Iron Ore	Mauritania	Hybrid	60 m^3/d	Mining & Primary Metal
31481539	Vale	Vale	Mozambique	Civil Based	100 m^3/d	Mining & Primary Metal
31481534	Arcelor Mittal Libaria Limited	Arcelor Mittal Libaria Limited	Mexico	Containerised	100 m^3/d	Mining & Primary Metal
31481521	Kinsenda Copper Company	Kinsenda Copper	Congo	Containerised	110 m^3/d	Mining & Primary Metal
31481514	BCL Limited	BCL Mining	Botswana	Hybrid	50 m^3/d	Mining & Primary Metal
31481508	Discovery Metals	Discovery Metals	Botswana	Containerised	180 m^3/d	Mining & Primary Metal
31481495	Matomo / TWP - Mongbwalu	Anglogold Ashanti	DRC	Containerised	2 x 15 m^3/d 1 x 70 m^3/d	Mining & Primary Metal
31481492	Matomo / TWP - Mongbwalu	Anglogold Ashanti	DRC	Containerised	40 m^3/d 70 m^3/d	Mining & Primary Metal

31481469	Odebrecht	Odebrecht Services	Mozambique	Containerised	10 m^3/d 70 m^3/d	Mining & Primary Metal
3148165	DRA Projects (Pty) Ltd	Alphamin Bisi Mining SA	DRC	Containerised	72 m^3/d	Mining & Primary Metal
1412.002.KMB-1	Pladin (Africa) (Malawi)	Kayelekera Uranuim	Malawi	Containerised	100 m^3/d	Mining & Primary Metal
Municipal Sector						
ASE 1306.001.ASS	Namibia Dep of Works	Ashipala Secondary School	Namibia	Civil Based	86 m^3/d	Municipal
Nam/335-03 272	Ministry of Local Gov & Housing	Rundu Sauyemwa	Namibia	Civil Based	450 m^3/d	Municipal
1005-07	Min of Basic Education	Mpungu Vlei Sec School	Namibia	Civil Based	40 m^3/d	Municipal
1501.001.ENJC	Min of Prisons & Corr Service	E. Nepemba Juvenile Center	Namibia	Civil Based	80 m^3/d	Municipal
ASE 0910.002.TKW	Ministry of Education	Tsumkwe School Sewage Plant	Namibia	Civil Based	90 m^3/d	Municipal
ASE 1002.001.NSL	Ministry of Education	Ncaute School Sewage Plant	Namibia	Civil Based	150 m^3/d	Municipal
ASE 0911.002.OMB	Ministry of Works	Ombika Gate	Namibia	Civil Based	60 m^3/d	Municipal
AUC 0310.002.OSP	Ministry of Defence	Oshivelo M/Base	Namibia	Civil Based	300 m^3/d	Municipal
ASE 1008.002.OAM	Ministry of Defence	Oamites M/Base	Namibia	Civil Based	72 m^3/d	Municipal
ASE 1011.001.OTJ	Ministry of Education	Otjinene School Sewage Plant	Namibia	Civil Based	224 m^3/d	Municipal
ASE 0911.005.MNSS	Ministry of Education	Martin-Ndumba	Namibia	Civil Based	30 m^3/d	Municipal
ASE 1107.001.OMU	Ministry of Education	Omuntele Snr Sec School Phase 1	Namibia	Civil Based	45 m^3/d	Municipal
AUC 1302.007.TKB	Ministry of Works and Transport	Trans-Kalahari Border post	Namibia	Civil Based	100 m^3/d	Municipal
ASE 1304.001.OKN	Ministry of Education	Oshikunde School	Namibia	Civil Based	120 m^3/d	Municipal
AUC 1308.013.OMA	Ministry of Works and Transport	Omahenene Border Post	Namibia	Containerised	30 m^3/d	Municipal
AUC 1307.003.OMS	Ministry of Works and Transport	Omuntele Snr Sec School Phase 2	Namibia	Civil Based	45 m^3/d	Municipal
ASE 1402.008.UTT	Namibian Police	Uutsathima Police Station	Namibia	Civil Based	10 m^3/d	Municipal
ASE 1303.007.ISB	Namibian Police	Eiseb Police Station	Namibia	Civil Based	10 m^3/d	Municipal
ASE 1502.004.ETA	Namibian Police	Etayi Police Station	Namibia	Civil Based	10 m^3/d	Municipal
ASE 1502.005.NCA	Namibian Police	Ncaute Police Station	Namibia	Civil Based	10 m^3/d	Municipal
1505.010.IMP	Ministry of Defence	Impalila Island	Namibia	Civil Based	7.5 m^3/d	Municipal
1504.001.GOB	Ministry of Works and Transport	Gobabis Military Base	Namibia	Civil Based	90 m^3/d	Municipal
1412.002.KMB-1	Ministry of Defence	Kongola Military	Namibia	Containerised	10 m^3/d	Municipal

1501.003.OMG	Ministry of Works, Transport and Communication	Omega Police Station	Namibia	Containerised	25 m³/d	Municipal
1502.002.RDC	Ministry of Urban & Rural Development	Rupara Rural Development Centre	Namibia	Civil Based	10 m³/d	Municipal
1510.008.EEM	Ministry of Urban & Rural Development	Eembaxu Rural Development Centre	Namibia	Civil Based	10 m³/d	Municipal
AUC1509.004.DOR	Ministry of Safety and Security	Dordabis Police Station	Namibia	Civil Based	10 m³/d	Municipal
1507.009.OMY	Ministry of Police	Omuthiya Police Station	Namibia	Civil Based	30 m³/d	Municipal
1201.001.SVT	Sisters of Tutzing	Sisters of Tutzing	Namibia	Civil Based	10m³/d	Municipal
0705.001.HB	Henties Bay City Council	Henties Bay Sewage Plant	Namibia	Civil Based	680 m³/d	Municipal
0709.005-LS	Walvis Bay Municipality	Langstrand Sewage Plant	Namibia	Civil Based	200 m³/d	Municipal
103/2011	Walvis Bay Municipality	Walvis Bay Biofilter Upgrade	Namibia	Civil Based	6.5 Ml/d	Municipal
1005.002.WB	Karas Regional Council	Warmbad STP	Namibia	Containerised	10 m³/d	Municipal
1109.004.ATF	Karas Regional Council	Aus STP	Namibia	Civil Based	135 m³/d	Municipal
1402.001.ORC	Oshikoto Regional Council	Oniipa (Onethindi) Sewage Treatment Plant	Namibia	Containerised	400 m³/d	Municipal
1401.004.OP	Omusati Regional Council	Ogongo Sewage Treatment Plant	Namibia	Civil Based	200 m³/d	Municipal
1508.007.OSH	Helao Nafidi Town Council	Helao Nafidi (Ohangwana & Oshikango) Sewage Treatment Plant	Namibia	Containerised	1500 m³/d	Municipal
1509.001.ZAM-REV4	Zambesi Regional Council	Zambesi Regional Council Office Park	Namibia	Hybrid	30 m³/d	Municipal
1510.010.WIT	Omaheke Regional Council	Witvlei Village	Namibia	Civil Based	320 m³/d	Municipal
1608.001.OKO	Okongo Village Council	Okongo Village	Namibia	Civil Based	250 m³/d	Municipal
31481594	Geom. Luigi Varnero Impresa Construzion PLC	Geom. Luigi Varnero Impresa Construzion PLC	Ethiopia	Hybrid	100 m^3/d	Municipal
31481556	Altivex 469	Altivex 469	South Africa	Hybrid	72 m^3/d	Municipal
31481536	Envig Botswana	Letsholathebe Hospital	Botswana	Containerised	180 m^3/d	Municipal
31481650	Lamasat International Ltd	Chalimbana College	Zambia	Containerised	200 m^3/d	Municipal
31481651	Melmetoc (Pty) Ltd	EcoBank	DRC	Containerised	60 m^3/d	Municipal
31481613	Ruwacon	Bambisana Hospital	South Africa	Containerised	60 m^3/d	Municipal
31481649	VWT Botswana	Botswana International University of Science & Technology	Botswana	Hybrid	450 m^3/d	Municipal
31481683	Tipp-Conn	Tinana Junior Secondary School	South Africa	Hybrid	200 m^3/d	Municipal
31481503	Erwat - Herbert Bickley	Erwat	South Africa	Civil Based	6.25 Ml/d	Municipal

Other Sectors						
31481484	Tullow Oil	Tullow Oil	Uganda	Containerised	45 m^3/d	Oil
31481511	Veolia Water (Paarl)	WBHO Kathu	South Africa	Hybrid	73 m^3/d	Construction
31481590	Development & Engineering Consultants (Pty) Ltd	Development & Engineering Consultants (Pty) Ltd	Mozambique	Hybrid	90 m^3/d	Power


Figure 1: 120 m³/d Civil Based STP - Botswana Soda Ash, Botswana (31481599)


Figure 2:100 m³/day Civil Based STP – Vale, Mozambique (31481539)


Figure 3: 180 m³/day Containerized STP - Letsholathebe Hospital, Botswana (31481536)

Figure 4: 110 m ^{3} /day Containerised STP - Kinsenda Copper, Congo (31481521)

Figure 5: 50 m ^{3} /day Hybrid STP - BCL Mining, Botswana (31481514)

Figure 6: 180 m3/day Containerised STP - Discovery Metals, Botswana (31481508)

Figure 7: 6.25 Ml/day Civil Based STP – Erwat, South Africa (31481503)

Figure 8: 45m^3/day Containerised STP - Tullow Oil, Uganda (31481484)

Figure 9: 70 m^3/day Civil STP - Chunya Gold Mine, Tanzania (31481483)

APPENDIX D – MASTER DOCUMENT REGISTER

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

Document Number:	**0**
Document Title:	**MASTER DOCUMENT REGISTER**
Contract Number:	**1534**
Client Name:	
Client Contract Number:	**0**
Document Revision Number:	**A.0**
Date:	**22/04/2014**

Doc Number:	Supplier Document Number:	Discipline Identifier	Document Identifier	Unique Sequential Number	Document Description	Document Latest Revision	Required Date	Date First Issued	Last Issued Dated	Status	Contractual Requirements
001	1534-PM-MDR-001-RevA	Project Management	Master Document Register	001	Master Document Register	A				WIP	FIO
002	1534-PR-PID-001-RevA	Process	Piping & Instrumentation Diagram	001	Piping and Instrumentation Diagram	A				WIP	FIO
003	1534-PR-PFD-001-RevA	Process	Process Flow Diagram	001	Process Flow Diagram	A				WIP	FIO
004	1534-PR-SCH-001-RevA	Process	Schedule	001	Line List	A				WIP	FIO
005	1534-PR-SCH-002-RevA	Process	Schedule	002	Equipment List	A				WIP	FIO
006	1534-PR-SCH-003-RevA	Process	Schedule	003	Valve Schedule	A				WIP	FIO
007	1534-IC-SCH-004-RevA	Instruments and Control	Schedule	004	Instrumentation Schedule	A				WIP	FIO
008	1534-EL-SCH-005-RevA	Electrical	Schedule	005	Electrical Load and Motor List	A				WIP	FIO
009	1534-EL-DES-001-RevA	Electrical	Design Documentation	001	MCC Design	A				WIP	FIO
010	1534-IC-SCH-006-RevA	Instruments and Control	Schedule	006	Cable Schedule	A				WIP	FIO
011	1534-EL-DDM-001-RevA	Electrical	Design Diagram	001	Termination Diagram	A				WIP	FIO
012	1534-ME-MAN-001-RevA	Mechanical	Manual	001	Maintenance Manual	A				WIP	FIO
013	1534-ME-ITP-001-RevA	Mechanical	Inspection Test Plan	001	Inspection and Test Plan	A				WIP	FIO
014	1534-PR-DAS-001-RevA	Process	Datasheet	001	Equipment Datasheets	A				WIP	FIO
015	1534-DO-DCG-001-RevA	Drawing Office	Drawing Civil Guideline	001	Civil Guide	A				WIP	FIO
016	1534-DO-DGA-001-RevA	Drawing Office	Drawing General Arrangement	001	General Arrangement	A				WIP	FIO
017	1534-EL-DDM-002-RevA	Electrical	Design Diagram	002	Earthing Schematic	A				WIP	FIO
018	1534-DO-DLA-001-RevA	Drawing Office	Drawing Layout	001	Block Plan	A				WIP	FIO
019	1534-ME-MAN-002-RevA	Mechanical	Manual	002	Site Erection Manual	A				WIP	FIO
020	1534-PR-MAN-003-RevA	Process	Manual	003	Operations Manual	A				WIP	FIO
021	1534-IC-DAS-002-RevA	Instruments and Control	Datasheet	002	Instrument Datasheets	A				WIP	FIO
022	1534-PR-FAT-001-RevA	Process	Factory Acceptance Test	001	FAT	A				WIP	FIO
023	1534-PR-REP-001-RevA	Process	Report	001	FAT Report	A				WIP	FIO
024	1534-ME-SCH-007-RevA	Mechanical	Schedule	007	Interface Schedule	A				WIP	FIO
025	1534-PR-DES-002-RevA	Process	Design Documentation	002	Process Parameters	A				WIP	FIO
026	1534-EL-CRT-001-RevA	Electrical	Certificate	001	Certificate of Conformance	A				WIP	FIO
027	1534-PR-CRT-002-RevA	Process	Certificate	002	Certificate of Performance	A				WIP	FIO
028	1534-CO-SAT-001-RevA	Commissioning	Site Acceptance Test	001	SAT Procedure	A				WIP	FIO
029	1534-PM-LST-001-RevA	Project Management	List	001	Packing Lists	A				WIP	FIO
030	1534-PM-LST-002-RevA	Project Management	List	002	Spares List	A				WIP	FIO
031	1534-ME-PRC-001-RevA	Mechanical	Procedure	001	Preservation and Storage Procedure	A				WIP	FIO
032	1534-PM-SAT-002-RevA	Project Management	Site Acceptance Test	002	Handover Documentation	A				WIP	FIO
033	1534-FIO-REG-001-RevA	Drawing Office	Register	001	Drawing Office Register	A				WIP	FIO

Discipline Identifier	
Architectural	AR
Civil	CI
Commissioning	CO
Configuration Management	CM
Drawing Office	DO
Engineering Design Systems	DS
Electrical	EL
Estimating	ES
General	GE
Installation / Construction Management	CM
Instruments and Control	IC
Mechanical	ME
Process	PR
Project Administration	PA
Project Management	PM
Quality / Environment	EN
Structural	ST
Document Identifier	
Bill of Materials	BOM
Certificate	CRT
Datasheet	DAS
Design Documentation	DES
Design Diagram	DDM
Drawing General Arrangement	DGA
Master Document Register	MDR
Drawing Civil Guideline	DCG
Drawing Layout	DLA
Factory Acceptance Test	FAT
Inspection Test Plan	ITP
Interface Control Document	ICD
Isometric Drawing	ISO
List	LST
Manual	MAN
Part Detail / Manufacturing	DWG
Piping & Instrumentation Diagram	PID
Process Flow Diagram	PFD
Procedure	PRC
Report	REP
Register	REG
Site Acceptance Test	SAT
Schedule	SCH
Supplier Documentation	SDO
Supplier Drawing	SDR

Document Status	
Work In progress	WIP
Issued for Review to client	IFR
Returned Working Copy from Client	RWC
Released to Client	REL
Approved by Client	APP
For Information Only	FIO

Contractual Requirements	
For Client Approval	FCA
For Information Only	FIO
Internal Review Only	IRO

APPENDIX E – CERTIFICATION

Sewage Treatment Plant

Proposal-No :	**WTP19_11-22-Rev A**
Date :	**05 December 2019**
Client:	**ConSolv Consulting Engineers CC**
Tendering Engineer:	**Bayanda Bayanda**
Phone number :	**+27 11 281 3600**

SABS

Certificate of Registration

This is to certify that the Quality Management System of

VEOLIA WATER SOLUTIONS AND TECHNOLOGIES SOUTH AFRICA (PTY) LTD

HEAD OFFICE: MODDERFONTEIN

(Refer to schedule 1 for other branches addresses)

has been assessed and found to satisfy the requirements of

ISO 9001:2015

QUALITY MANAGEMENT SYSTEMS - REQUIREMENTS

in respect of

- THE DESIGN, DEVELOPMENT AND MANUFACTURING, DISTRIBUTION AND MECHANICAL/CHEMICAL ANALYSING AND SUPPLY OF A FULL RANGE OF WATER AND WASTEWATER TREATMENT EQUIPMENT, AUTOMATED SYSTEMS AND CHEMICALS, INCLUDING INDUSTRIAL CLEANERS, SANITISERS, ION EXCHANGE RESINS AND ACTIVATED CARBON

- THE PROVISION OF TOTAL CUSTOMER BACK-UP SERVICE AND MAINTENANCE OF WATER TREATMENT EQUIPMENT

This certificate, including the schedule which forms an integral part thereof:
- is issued without alteration;
- is identified by the applicable registration number;
- is subject to any condition or limitation contained therein;
- is valid subject to ongoing compliance with certification requirements;
- bears the embossed SABS Commercial seal. In the absence of the seal, the certificate and the schedule shall be invalid; and
- the certificate may be authenticated by referring to the register of "Certified Clients" on the SABS Commercial website (www.sabs.co.za)

Registration Number	**LS 1556**
Effective Date	**17 July 2018**
Expiry Date	**15 September 2021**
Date of Original Registration	**09 June 1995**
Chief Executive Officer	

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SABS COMMERCIAL

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