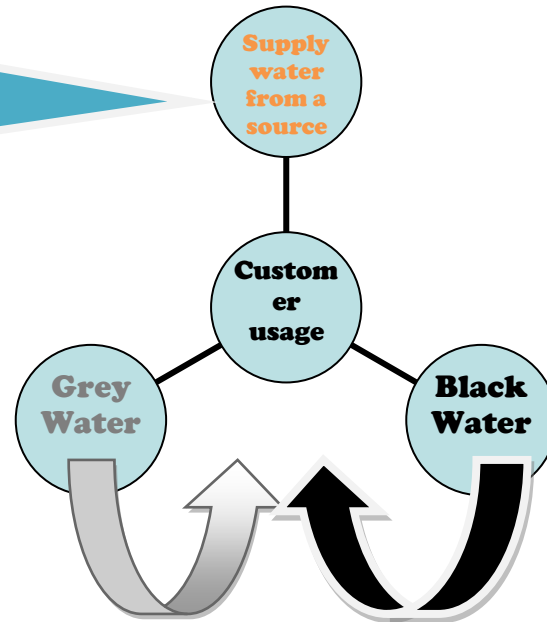


Overview of services for Influent & Effluent Water Treatment Solutions offered by Nimbus Water technologies

Generally and as a rule, source water from a local water supplier is treated and should meet with SANS 241 for potable water standards.

However, borehole, well, dam, rain & river water used as a direct source by a user, the water is un-treated & will require some form of treatment – depending on the water contaminants.

Water treatment solutions offered by Nimbus Water (Pty) Ltd, Water Technologies in alliance with WaterTec



- **Treatment of all source water influent & effluent for user application, be it commercial, industrial, domestic, to defined & required standards.**

Water treatment is a process through selective, applied & proven technology of removing contaminants from source water, or wastewater [also referred to as grey & black water] to make it safe and palatable for human consumption, or for commercial, non-drinking water applications.

A wide variety of technologies may be used, depending on the water source, contaminants present, standards to be met and your requirements.

Critical to determine the water contaminant levels and bacterial contamination, is the test phase and to "get it right" first time, we encourage the investment in a SANS accredited laboratory test & certification, of a full spectrum physical, aesthetic, operational, chemical & microbiological analysis.

This will reduce "trial & error" at the design stages of the required processes, to remove the problematic contaminants. Nimbus can, based on experience, forecast the water quality, levels of contamination & pollutants that are present and design, or suggest technology, based on a worst case scenario.

**WARNING – Keep in mind that no single water treatment device treats all water related problems and that even the best devices have limitations.**

• **Overview & common problems with source water and NSF recommended treatment;**

Fine silt, sand, clay & dissolved & suspended particle matter	Applicable to all source water and borehole, river or dam water will have higher counts of sediment mg/l or ppm than local tap water suppliers. Silt build up in water storage units is breeding ground for algae & bacteria. Sediment treatment technology suggested.
Taste & chemical odours – chlorine, toxins	Caused by un treated bacterial contamination and over dosing with sodium hypochlorite to treat bacterial matter. Disinfection by UV or Ozone & Carbon filtration suggested.
Hydrogen sulfide gas – rotten egg odour	Rotten matter in ground water supplies. Chemical disinfection & carbon filtration
Hard Water – Lime scale – high values of CaCo <sup>3</sup> - Total Hardness	Mainly borehole & ground water supply which is high in calcium and magnesium, causing precipitation and a “white” lime scale deposit. Very corrosive and damage heating equipment elements. Water softening technology suggested.
Suspended iron & manganese particles - High in iron – Fe, causing “brownish” staining	Mainly borehole & ground water supply and will stain sanitary bowls & white washing plus walling. Very corrosive and lowers the pH in the water to acidity levels. Iron exchange filtration technology suggested.
High total count of dissolved solids of sodium, sulfates & nitrates	Natural deposits in ground water supply and requires advanced filtration with either, UF –ultra filtration or RO – Reverse Osmosis micro membrane filtration.
Bacterial contamination – including faecal coliforms & e.Coli	Water supply that is untreated and has “aged”. Sewerage spillage and faecal contamination. Advanced disinfection, by either a chemical treatment, UV, Ozone, proper filtration stages of particle matter & carbon treatment and RO treatment.
Acidity	Need a water analysis to determine the in-organic minerals causing acidity – mainly heavy metals in the water oxidizing. Often pH correction required.
Volatile organic chemicals, trihalomethanes, certain pesticides & radons	Require a water analysis.
Many more	Visit the Nimbus website <a href="http://www.nimbuswater.co.za">www.nimbuswater.co.za</a> for contaminant testing protocols for influent & effluent requirements, including suggested treatment technology.

**For Nimbus WaterTec to offer a cost effective & sustainable water treatment system, we need;**

- **A water analysis, or defined overview of the problem.**
- **Schematic of the current reticulation system, if applicable.**
- **Flow rate per hour & water supply pressure.**
- **What the treated water is required for,**
- **WARNING – Keep in mind that no single water treatment device treats all water related problems and that even the best devices have limitations.**
- **Nimbus website [www.nimbuswater.co.za](http://www.nimbuswater.co.za) offers more detail on contaminants & approved NSF & WHO treatment technology for purpose.**

- **Rain water harvesting as a source water supply**
  - **a commercially viable alternative for Commercial, Industrial & Domestic applications;**

1. General purpose & drinking water for domestic, commercial & industrial applications, including irrigation.
2. Commercial & industrial non drinking water applications.

- **Rain water harvesting as a source water supply**
  - **General concerns & contaminants in rain water from source – COD & BOD;**

1. High in solid, suspended & dissolved sediment matter, including a verity of solid, or rotten matter,
2. Dead & rotting birds, rats, mice and various insects which will microbiologically contaminate the water. Animal & bird faecal waste will cause high faecal coliforms counts & pollution, result will be e,Coli.
3. Bacterial & algae acceleration as the source water “ages” and exposed to environmental conditions. Same will apply to municipal water storage.

**The process to consider;**

- **Receiving rain water to storage – a range of JoJo surface & recessed water storage tanks of various sizes ranging from 750lt to 20,000lt available in different colour options**
- **To treat the water for purpose as in 1 & 2 above**

**If for general purpose and potable drinking water, the following treatment processes to consider;**

- **From receiving, immediate macro particle filtration & disinfection to storage.**
- **In storage treatment to avoid “aging” – various options,**
- **From storage, under pressure, advanced filtration & options of UV or Ozone treatment, into current reticulation water mains. All water going into the home, or building treated on demand.**

**If require a purified quality product of water, for application, i.e. the foods industry, additional micro filtration will be required, after advanced filtration stages, example will be RO – Reverse Osmosis, membrane separation technology, or UF – Ultra filtration technology.**

**For irrigation only – suggest macro filtration and disinfection and some form of basic filtration.**

**For Nimbus WaterTec to offer a cost effective & sustainable rain water harvesting treatment system, we need;**

- **A water analysis or sample for bench top testing,**
- **Schematic of the current reticulation system, if applicable.**
- **Required flow rate per hour & water supply pressure.**
- **What the treated water is required for,**
- **WARNING – Keep in mind that no single water treatment device treats all water related problems and that even the best devices have limitations.**
- **Nimbus website [www.nimbuswater.co.za](http://www.nimbuswater.co.za) offers more detail on contaminants & approved NSF & WHO treatment technology for purpose.**
- **Or talk to one of our consultants, to assist you with the RAIN WATER HARVESTING project - +27(0)11 395 3133**

- **Applied processes & suggested technology for the treatment of large volume raw source water, to NSF & WHO recommended treatment;**

- From supplied, or abstracted raw source water, including rain water harvesting, **macro [bag filtration] or screen filtration applied for purpose, if required.**
- Source water receiving **Coagulation treatment** by means of, chemical dosing, with options of chemicals added, if required & depending on the water contaminants, to the supplied source water. Dirt particles are destabilized and become active.
- **Flocculation** – during flocculation dirt particles become stabilized. They are attracted [precipitate] to each other and form heavier, visible particles, called FLOC. **[Flocculation process]**
- Received water enters storage, referred to as **“sedimentation stage”**. During the sedimentation stage, FLOC forms larger/bigger particles called sediment & even sludge. Purpose is to prepare the water for **sediment filtration of the precipitated matter.**
- Pre-treated water is ready for hydraulic filtration via Silica sand – **sediment treatment & activated carbon filter media treatment.** During filtration, water [pass 1] passes through sand/sediment filter beds to remove all the precipitated sediment matter & particles and through [pass 2] carbon filter media to neutralise the effect of the chemicals that were added on earlier in the treatment process.
- **Treated water may require additional treatment –**
  1. **Treated water may now require, pre storage, or inline on demand;**
    - 1.1 additional treatment for HARD WATER, lime scale,
    - 1.2 Iron & heavy metal removal & filtration
  2. **General applied technology for purpose options;**

## Disinfect source & supply water at receiving - options;

- Automatic System of Chemical dosing with Sodium Hypochlorite, or specified.
- Ultra Violet – limited application & effectiveness at this early stage.
- Ozone – highly effective, multi- functional, to disinfect and oxidize out various contaminants, including heavy metals for later filtration.

## • Chemical dosing of source water required to FLOC– @ storage;

- **Flocculation** – during flocculation dirt particles become stabilized. They are attracted [precipitate] to each other and form heavier, visible particles, called FLOC. [**Flocculation process**]

## • Sediment & Carbon filtration from storage/supply;

- During the sedimentation stage, FLOC forms larger/bigger particles called sediment & even sludge. Purpose is to prepare the water for **sediment filtration of the precipitated matter**.
- Pre-treated water is ready for hydraulic filtration via Silica sand – **sediment treatment & activated carbon filter media treatment**. During filtration, water [pass 1] passes through sand/sediment filter beds to remove all the precipitated sediment matter & particles and through [pass 2] carbon filter media to neutralise the effect of the chemicals that were added on earlier in the treatment process.

Sediment & Carbon filtration –  
Options, depending on flow &  
pressure –

### Multimedia bed filtration

Sediment & Carbon filtration –  
Options, depending on flow &  
pressure –

### Cartridge filter filtration

- IF required, Hard Water CaCO<sub>3</sub> lime scale treatment.

### Ion Exchange Water Softening System

- IF required, Heavy Metals – Iron & Manganese treatment

### BIRM/Manganese Green Sand Filtration System

- **Final disinfection** – inline on demand for potable water quality & micro purification system options.

- **Ultra Violet**
- **Ozone**

- **RO - Reverse Osmosis membrane micron separation technology**

- **UF – Ultra Filtration, or micron filtration**

See section for options of plant design, fixed, moveable/mobile or containerized.

**Nimbus website [www.nimbuswater.co.za](http://www.nimbuswater.co.za) offers more detail on contaminants & approved NSF & WHO treatment technology for purpose.**

## SOFT GREY WATER & WASTEWATER EFFLUENT TREATMENT

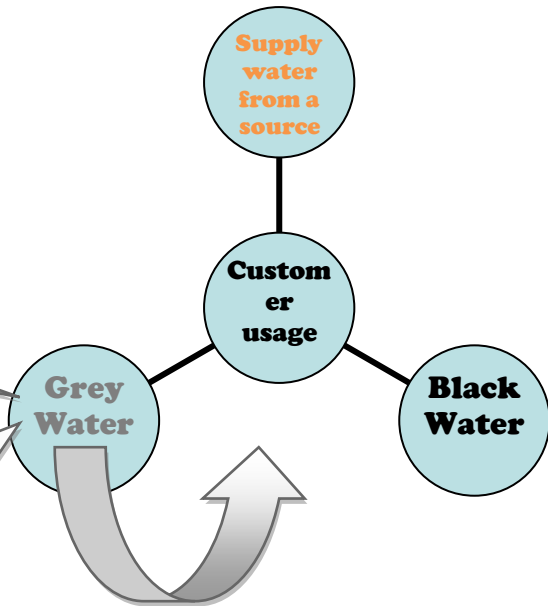
**Soft GREY water effluent is un-treated & will require some form of advanced treatment – depending on the water contaminants and final application and quality of a water product required.**

**Generally the water “ages” fast because of bacteria, consuming the oxygen –BOD. Faecal coliform & pollution will produce E.coli at point of storage.**

**Do not “confuse” soft GREY water with commercial or industrial wastewater effluent.**

**Grey water/wastewater effluent is produced within a manufacturing process and will vary depending on the scope of the contamination. Abattoir water is classed as VOC – highly contaminated. Degree of contamination must be established via laboratory tests.**

**Water treatment solutions offered by Nimbus Water (Pty) Ltd, Water Technologies in alliance with WaterTec**



**Treatment of all grey water influent & effluent for user application, be it commercial, industrial, domestic, to defined & required standards.**

Critical to determine the water contaminant levels and bacterial contamination, is the test phase and to “get it right” first time, we encourage the investment in a SANS accredited laboratory test & certification, of a full spectrum physical, aesthetic, operational, chemical & microbiological analysis.

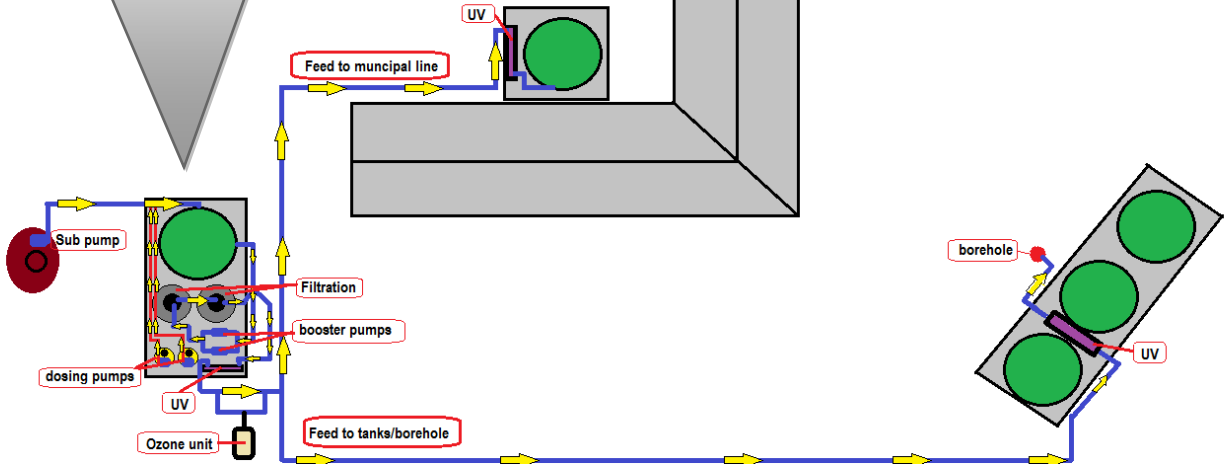
This will reduce “trial & error” at the design stages of the required processes, to remove the problematic contaminants. Nimbus can, based on experience, forecast the water quality, levels of contamination & pollutants that are present and design, or suggest technology, based on a worst case scenario.

A business proposal with costs & fees will be presented as a phase 1, consulting & testing stage, based on the scope of the work, for approval, pre phase II detail, quote, or project proposal.

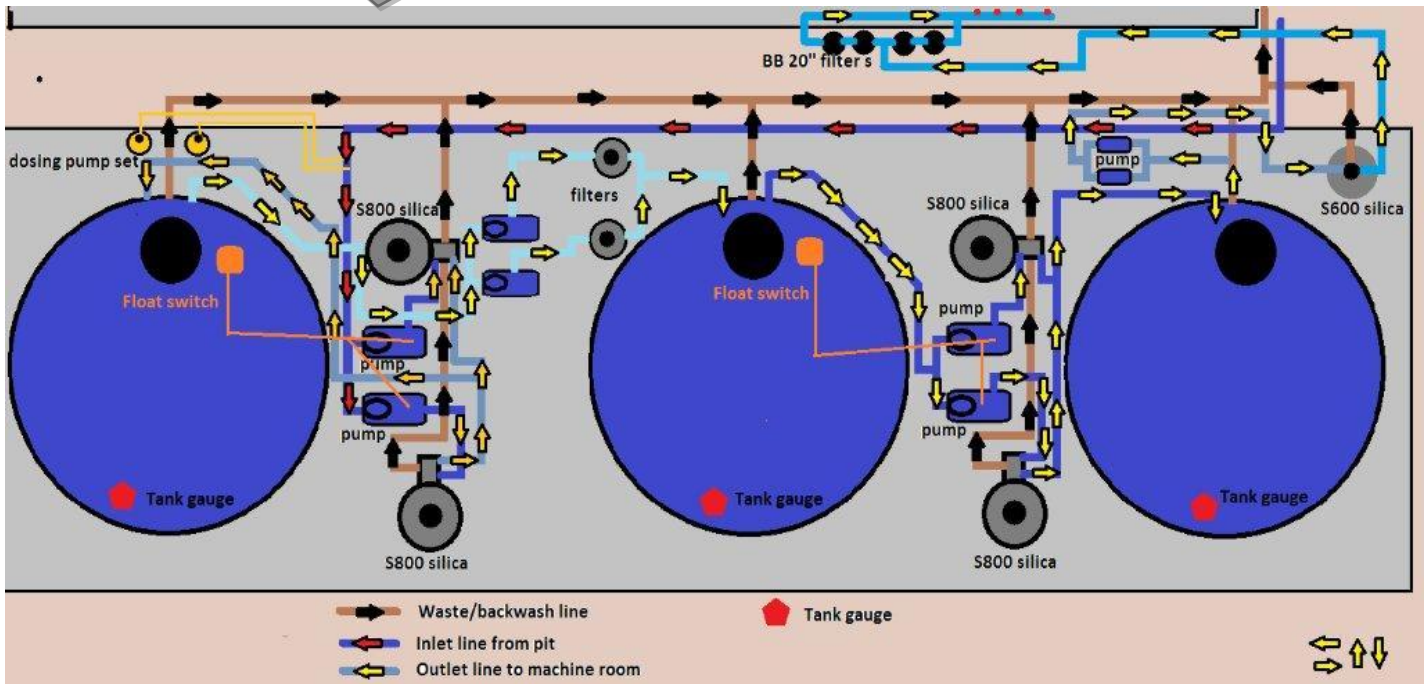
**WARNING – Keep in mind that no single water treatment devise treats all water related problems and that even the best devises have limitations.**



Typical design of a commercial soft grey water treatment plant with capacity 10-15m<sup>3</sup>/hr. § to client requirements § specification to meet SANS241 Potable water standards for re-use.



Typical design of an industrial waste water influent and effluent treatment plant with capacity 35-40m<sup>3</sup>/hr. § to client requirements § specification to meet a water quality standard, for re-use. In the production process, - non drinking water application. Designed with little to no effluent discharge into a source. Filter backwash effluent is returned to settling pits. Settled sludge is removed by a waste company and disposed of at an approved site.



# BLACK WATER/SEWERAGE WATER TREATMENT

**Water treatment solutions offered by Nimbus Water (Pty) Ltd, Water Technologies in alliance with WaterTec & AMITEK M&D SA Pty Ltd.**

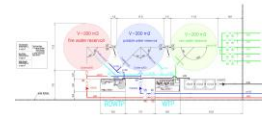
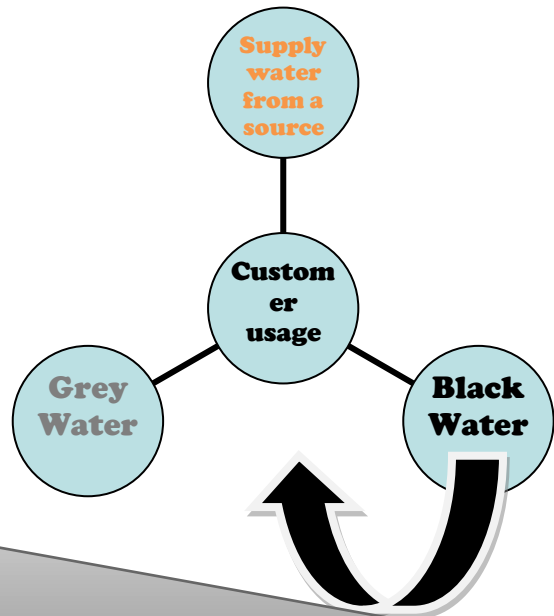
**Do not “confuse” BLACK/SEWERAGE water with domestic, commercial or industrial wastewater effluent.**

**The procedure to deal with black water/sewerage treatment is presented in a phased basic proposal following basic information required from the client, or user.**

**Number of people usage critical in the design.**

**Preparing the water for discharge into a source, or for commercial applications to be considered.**

**Contact Nimbus WaterTec on +27(0)11 395 3133 or email, [info@nimbuswater.co.za](mailto:info@nimbuswater.co.za)**



Typical design of 2 x 400 people sewerage plant for Nacala Corridor Project in Malawi as phase 1 at two sites. System is modular and will be increased as the people requirement for this camp increases.



Typical design of 2 x 15m<sup>3</sup>/hr containerized potable water treatment plant & 2 x 2.7m<sup>3</sup>/day RO processed water for Nacala Corridor Project in Malawi as phase 1 at two sites. Modular and at marginal cost increase production by 100%



# Fixed, skid mounted, mobile or containerized, Potable or Reverse Osmosis Water treatment plant design examples;

**Nimbus** Water Purification Solutions  
Influent & Effluent Solutions

Basic design & Schematic of the Potable Water Treatment unit of 10.0m<sup>3</sup>/hr with 5.0m<sup>3</sup>/hr Bi-pass Plant

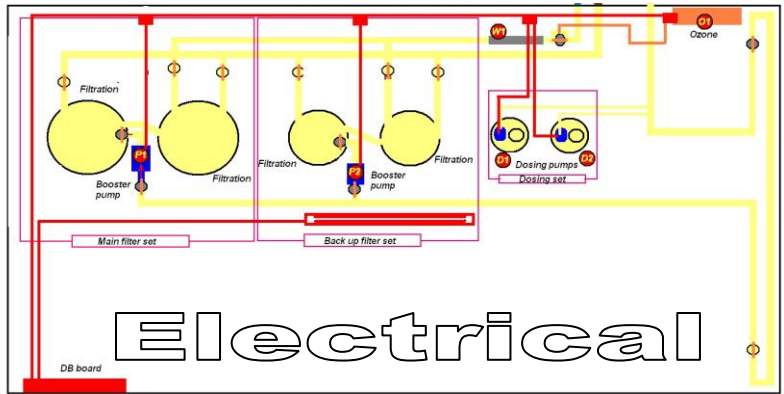
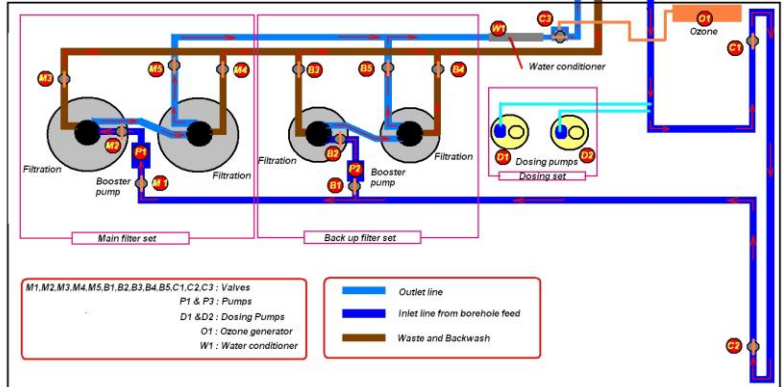
Pressure Pump  
Water Post Valve  
Media filter set  
Dosing Pump  
Ozone system (4gms/hr)  
UV treatment  
Dosing Units

**Nimbus** Water Purification Solutions  
Influent & Effluent Solutions

Basic design & Schematic of the Potable Water Treatment unit of 10.0m<sup>3</sup>/hr with 5.0m<sup>3</sup>/hr Bi-pass Plant

General Technology

5750 Multi Media Filtration Vessels with Water Booster Pump set, with Automatic Pressure Control @10m<sup>3</sup>/hr  
**Nimbus Water SA (Pty) Ltd**

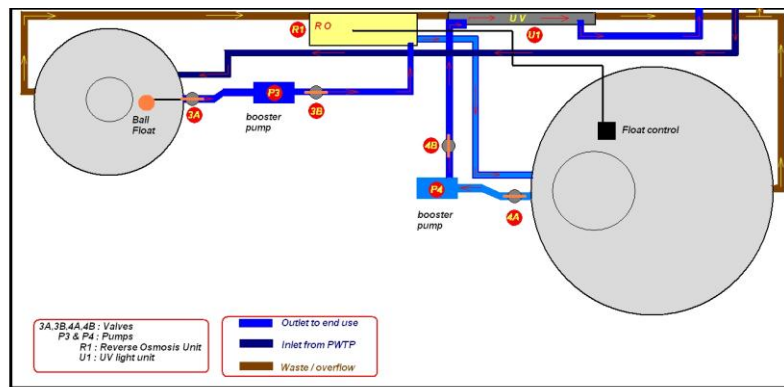


**Nimbus** Water Purification Solutions  
Influent & Effluent Solutions

General Pictures – All Plant

Final design & Schematic of the Potable Water Treatment unit of 10.0m<sup>3</sup>/hr with 5.0m<sup>3</sup>/hr Bi-pass Plant &

Final design & Schematic of 2.7m<sup>3</sup>/day Reverse Osmosis Water Treatment unit with Ultra Violet treatment on final discharge line under pressure.

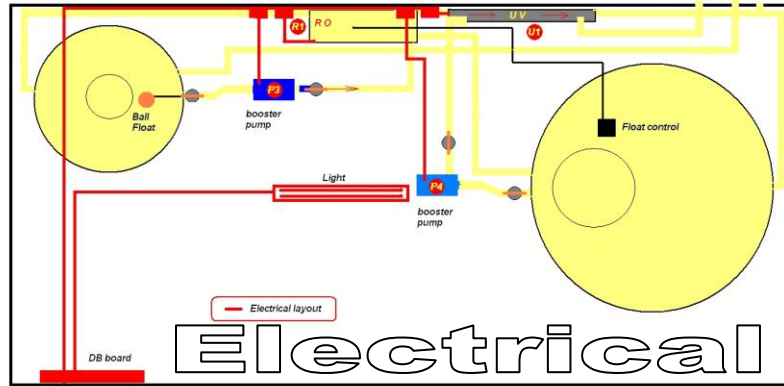


**Nimbus** Water Purification Solutions  
Influent & Effluent Solutions

Final design & Schematic of 2.7m<sup>3</sup>/day Reverse Osmosis Water Treatment unit with Ultra Violet treatment on final discharge line under pressure.

RO Plant - Completed Container UNIT 8089173

**Nimbus Water SA (Pty) Ltd**  
www.nimbuswater.co.za



**Nimbus Water (Pty) Ltd designed & process plant services include the following water treatment solutions – Your project partners;**

- **Source water influent treatment to potable or purification requirements, for domestic, commercial & industrial applications.**
- **Raw source water [borehole, well, river, dam, or rain water harvesting] influent treatment to specifications.**
- **Grey, Black or sewerage water treatment for requirements.**
- **Commercial & industrial wastewater effluent treatment for discharge or re-use.**
- **Applied technology – Chemical treatment, filtration, Ultra Violet, Ozone, UF, Reverse Osmosis for all applications, including water bottling plant.**
- **Concepts, design, build, pressure test, on-site installation, site start -up & commissioning & training – all supervised by trained professionals.**
- **Nimbus offer cost effective water treatment solutions, we do not sell systems. Talk to Nimbus first, or first visit our website – [www.nimbuswater.co.za](http://www.nimbuswater.co.za) and page through the e-catalogue !**



Nimbus Water (Pty) Ltd  
**Nimbus Water Technologies**  
P.O. Box 15607  
Farrarmere, 1518  
Tel; +27 011 395 3133  
Fax; +27 011 395 3932  
Customer Service Line 083 379 6996  
info@nimbuswater.co.za

**Nimbus Water SA (Pty) Ltd**

[www.nimbuswater.co.za](http://www.nimbuswater.co.za)