There is a myth that rainwater harvesting means very little during a drought.

Yes, it is a myth since 1mm of rain on 1 square metre of roof space = 1 litre of water.

To put this into context:
A house with 200 square metres of roof will collect 2 000 litres of water during a 10mm downpour, or 200 litres with only 1mm of rain.

This means that 30mm of rain in a month (which is what is the forecast for Nelson Mandela Bay Metro) will harvest 6 000 litres of water off a 200 square metre roof

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Current water restrictions is 50 litres per person per day. For a family of 4 it is:

4 x 50 x 30 = 6000 litres per month! This can be harvested from your roof with only 1mm of rain per day…

MASKAM™ WATER

Summary:

If there is no municipal water, you can collect at least 6kl of water from a 200 square metre roof.

If there is some municipal water, you can save at least 6kl per month and help delaying the dams from running dry, while saving money on purchase of water.

By the same token, a factory or commercial building with roofspace of only 1000 square metres, will collect 30 000 litres of rain if there is a mere 30mm downpour in a month

MASKAM™ WATER

Imagine how much water you can collect from your driveway or the parking lot of a commercial building…

Stormwater from a parking lot may be contaminated and is not recommended for drinking purposes unless properly treated, but it is fit for toilet flushing and with minimal treatment floor cleaning, etc.

MASKAM™ WATER

Minimising flash floods

- Flash floods occur more and more and is mainly caused by hard landscaping (roads, parking areas, etc) and roofs of buildings that does not absorb any rainfall (as is the case in nature).

- Due to the high run-off rate, flash floods occur, with subsequent damage to property and injury to people and animals

- By harvesting rain water or storm water, some of the rainfall is contained in tanks or reservoirs, which means that less water flows down the storm water pipes and flash floods are less likely to occur.

MASKAM™ WATER

There are different ways of collecting rainwater, storing it and bringing it into the building.

Rainwater systems can vary from very basic to fully automated and automatic change-over to other sources of water (including municipal) if the tank runs dry.

The next few slides will discuss some options. There is no one-size-fits-all solution. These are merely a mixture of ideas and actual case studies to showcase what is possible. You may have different needs or a hybrid of some of these solutions.

Note that rainwater is normally acidic, which will corrode copper pipes and taps over time. Besides filtering it will be wise to adjust the pH and disinfect the water before indoor use.

It is good to have some form of strainer, that will prevent leaves and other large objects from entering the tank. Organic matter will decompose over time, affecting the quality of the water.

Do not install a fine-screended floating intake in the tank for pumped systems, since all organic debris then remains in the tank and will decompose there. Rather draw from the bottom of the tank and then filter the water. It is easy to clean or replace such a filter.

Note that rainwater is normally acidic, which will corrode copper pipes and taps over time. Besides filtering it will be wise to adjust the pH and disinfect the water before indoor use.

Pre-screens for rainwater havesting

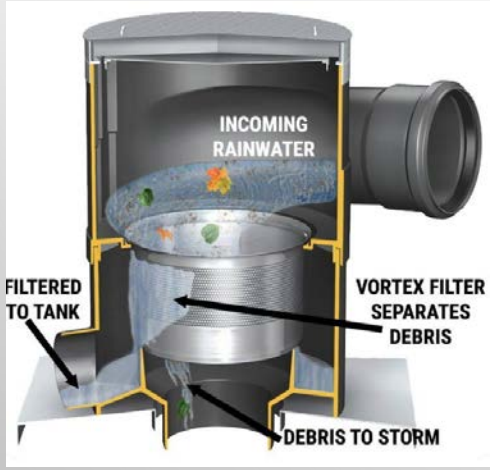
Leaf catcher: There are various types and brands of leaf-catchers on the market, each with their own pro's and cons. The biggest problem with leaf catchers is that in heavy downpours quite a bit of water may be spilled.

Pre-screens for rainwater harvesting

Wedge wire screens: Wedge wire screens are very effective in catching most debris and are available in different microns. They need to be manually cleaned.

Pre-screens for rainwater havesting

Vortex screens. Many of these screens are self-cleaning, thus omitting any human intervention. They are generally more expensive and about 10% of water is lost to clean the screen.



Pre-screens for rainwater havesting

Top of tank mesh screens. They are cheap and quite effective, but needs regular cleaning to prevent blockage and subsequent spillage. During heavy downpours quite a significant amount of water can be spilled.

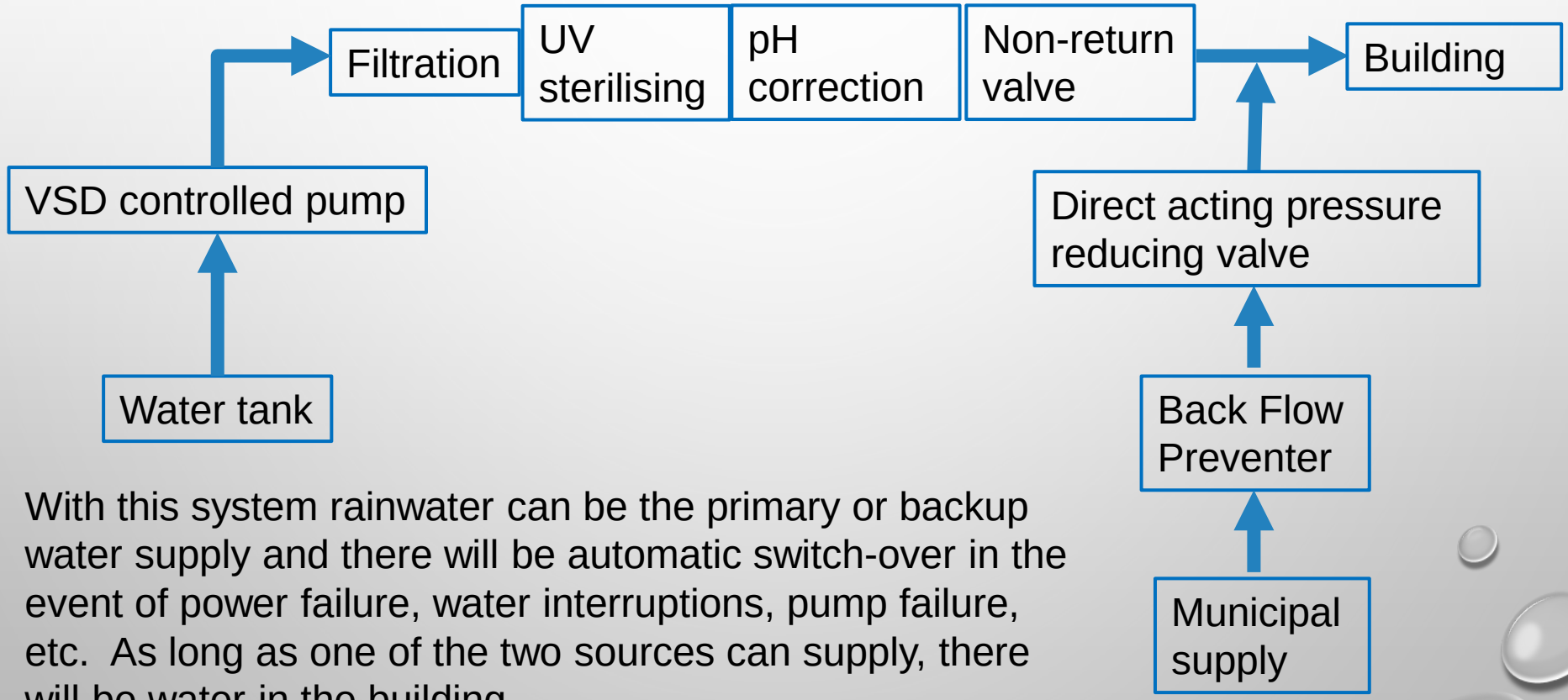
The most basic system would be to have the tank on a plinth and water is taken from the tank making use of a bucket. It may be wise to raise the tap a bit, with a flush valve at the bottom, to flush out sediment.

A more “elaborate” rainwater harvesting system would be a fully automated system, that can change from rainwater to council water without human intervention and will make maximum use of rainwater, with council water only needed as a backup. In between there are several options, depending on site requirements.

When rainwater, or any alternative water source, is connected to the municipal supply, it is very important to ensure that there can be no backflow into the municipal line. Firstly it will mean a loss of water for the occupant and secondly there is a chance that untreated water may enter the municipal system and may be a health risk to communities.

To ensure that there is no backflow, a proper reduced pressure zone back flow preventer should be installed on the incoming municipal supply.

- Below is a typical layout for a fully automated system.



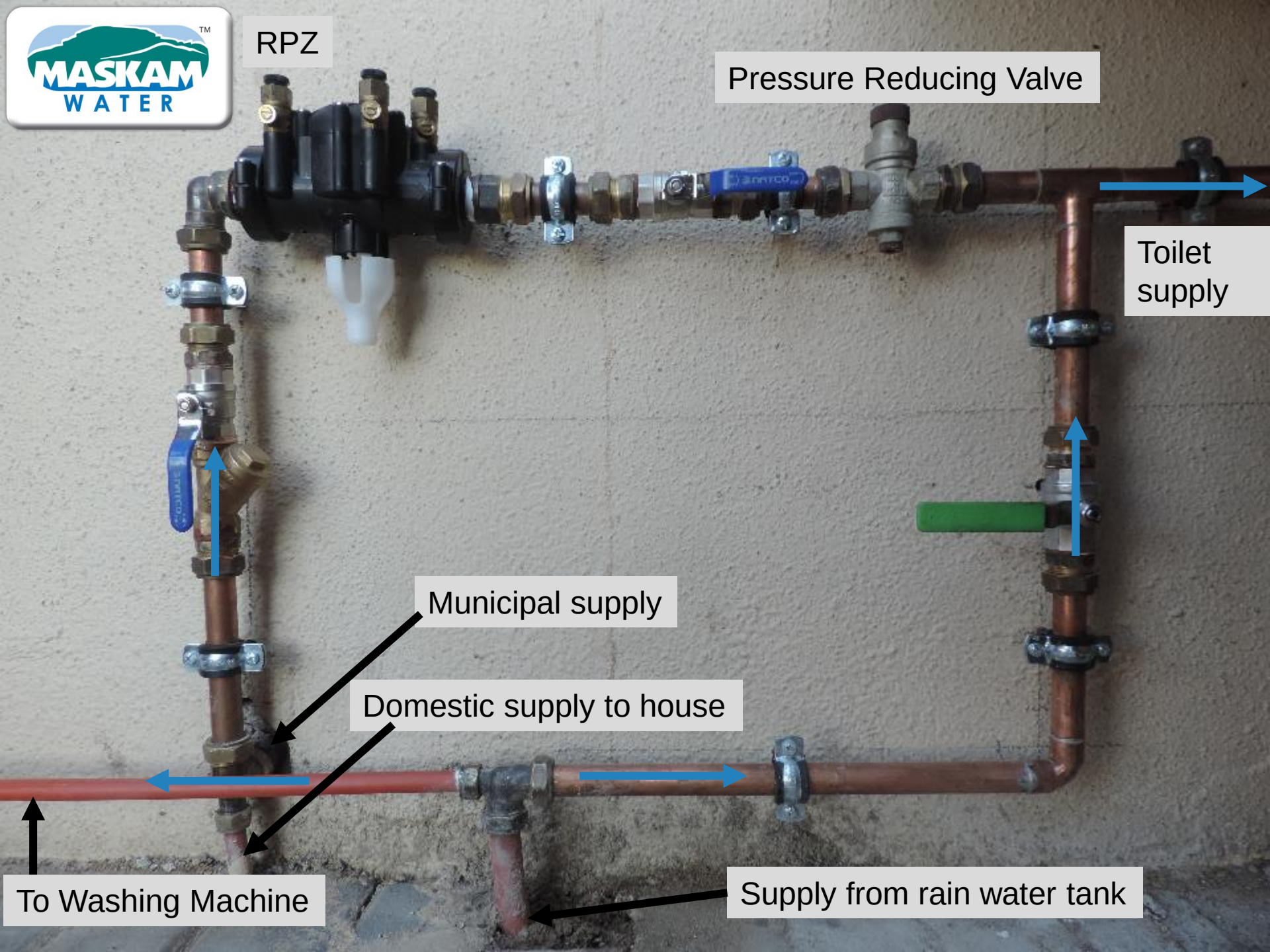
With this system rainwater can be the primary or backup water supply and there will be automatic switch-over in the event of power failure, water interruptions, pump failure, etc. As long as one of the two sources can supply, there will be water in the building.

Adding to the more “elaborate” system can also be an automatic municipal supply top-up of the rainwater tank. In this event the top-up level would be set to between 10% and 20% of the tank volume. The balance will be filled with rainwater. With this added, the tank will be filled to the desired level if there is no rain but municipal water is available. That will then be a backup in the event of municipal supply interruptions.

If correctly set up, this system will:

1. Make primary use of rainwater, which will reduce overall municipal water demand and save cost in purchasing water.
2. Will use municipal water direct from the municipal supply when the rainwater is depleted, if there is a power interruption or the pump fails.
3. Backup municipal water in the tank will ONLY be used if there is no rain and the municipal water is not available.

- ✓ **Full automatic change-over**
- ✓ **No human intervention required for change-over**
- ✓ **Maximum saving of municipal water (and money)**


MASKAM WATER
RPZ
Pressure Reducing Valve
Toilet supply
Municipal supply
Domestic supply to house
To Washing Machine
Supply from rain water tank

Rainwater Harvesting Case Studies

Case study 1: Single residence. Rainwater harvesting can look pretty and be functional

Case study 2: Commercial building – with a few changes huge amounts of water can be collected for on-site use.

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Single residence

200 micron stainless steel wedge wire screen

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Rainwater Harvesting

MASKAM™ WATER

Rainwater Harvesting

MASKAM™ WATER

Submersible booster pump – out of sight, no noise, no vandalism

Rain-water Harvesting

Rainwater harvesting retrofit, commercial building

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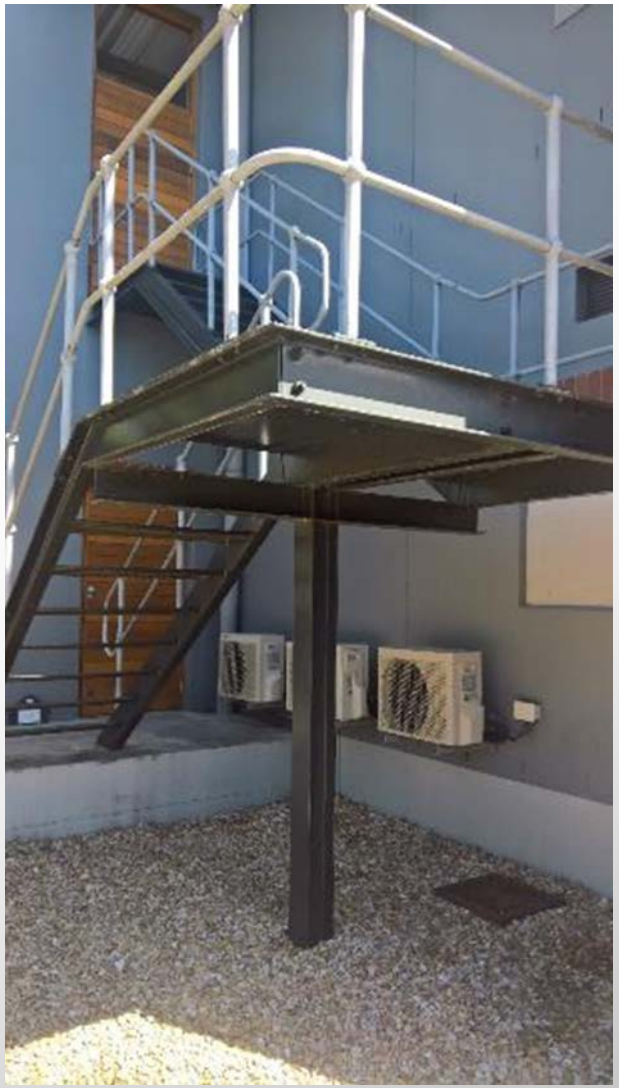
Parts of the building do not have gutters

Gutters with downpipes discharging onto the concrete yard

MASKAM™ WATER

MASKAM™
WATER

Downpipes discharging to gravel area or stormwater pipe



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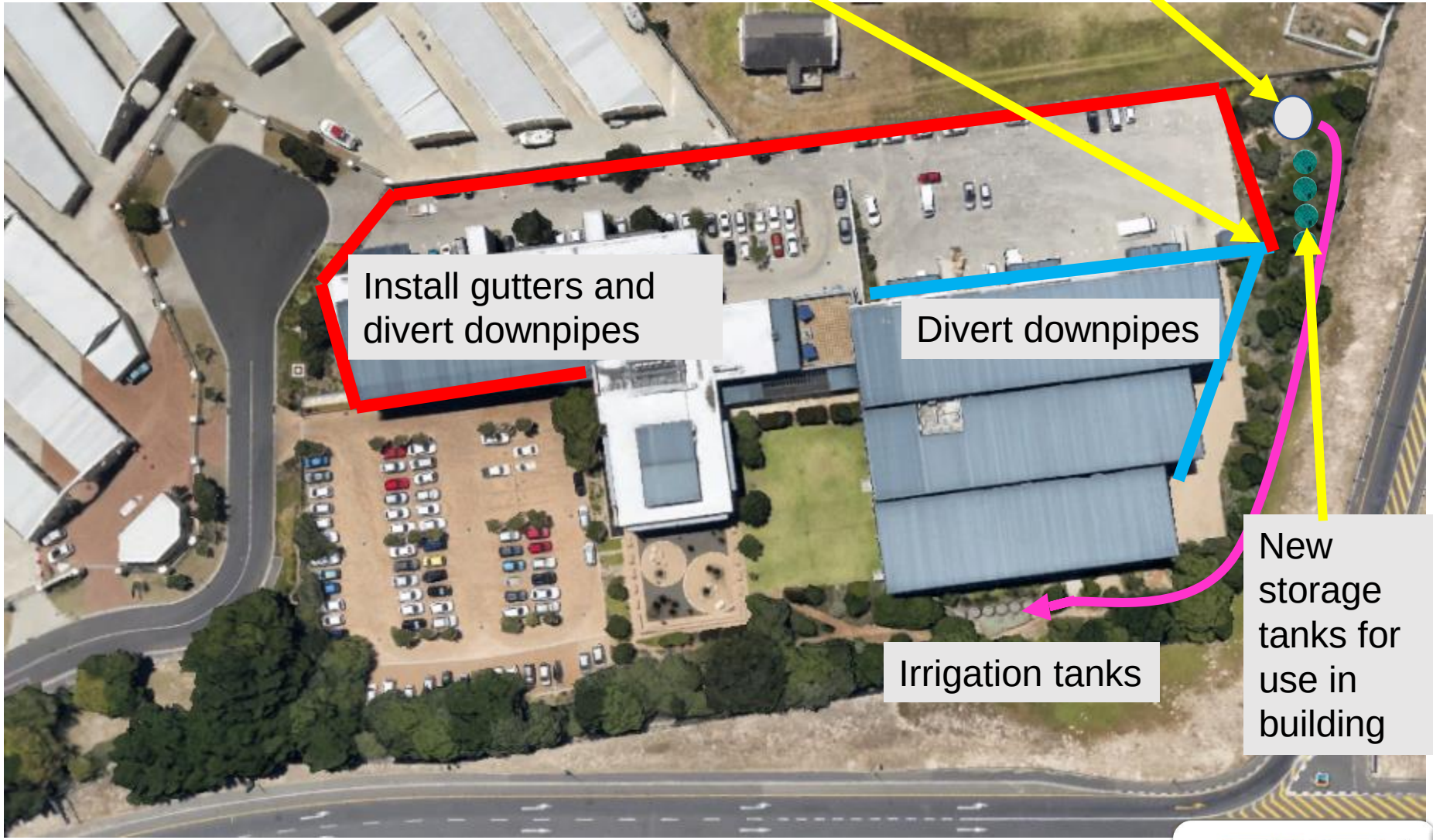
Existing irrigation tanks fed from borehole (now dried up)

Rainwater lifting station to storage tanks

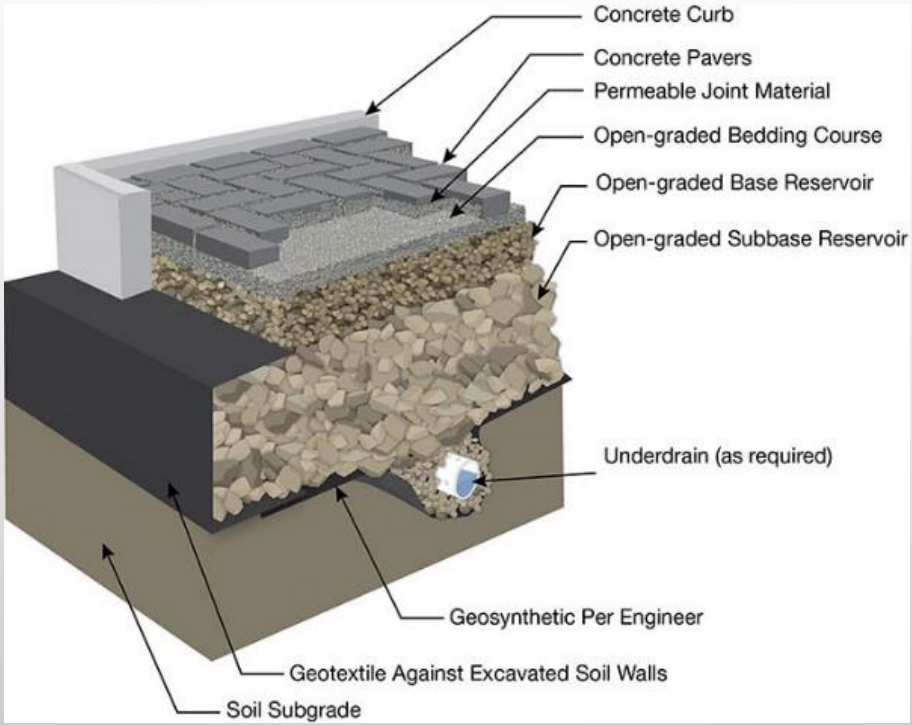
Hard landscaping stormwater lifting station, to irrigation tanks



MASKAM WATER™

PERMIABLE PAVING

- Reduces flash floods
- Harvesting run-off water
- Harvested water can be stored sub-surface or pumped to above-ground storage



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- This water may be contaminated and therefore must be used with care

UNDERGROUND STORAGE

Provided that the material is designed for the application, this can be below a parking lot.

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HVAC

Collect HVAC water and add to water tanks. This can save thousands of litres of water per year on each building.

- This photo is taken in Namaqualand in October. Imagine how much water you can harvest near the coast!
- This water is perfect for drinking, as it is condensed from the atmosphere.

Use your pool as a reservoir

With Blue Lagoon's UV-C pool water treatment products, your pool can be chlorine- and salt free.

The pool can thus be a perfect water backup, topped up with rainwater.

Retrofitting can easily be done, with a Citypump submersible booster pump.

MASKAM™ WATER

✓ Use your backwash water in the garden, for toilet flushing or add to your irrigation tank

Waterwise pool....

✓Top-up with rain water

This pool has not seen a drop of chlorine for 6 years when the photo was taken

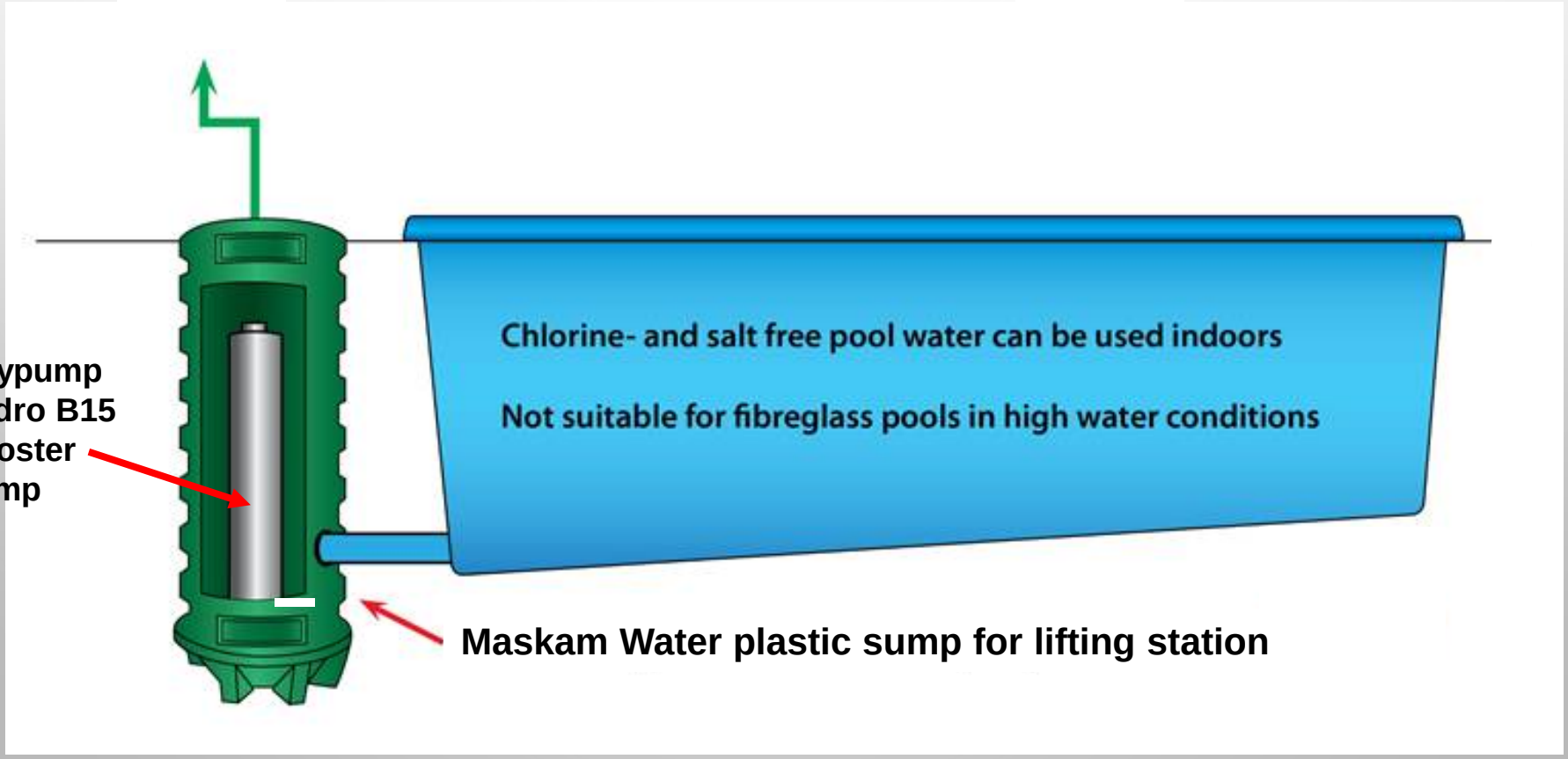
Temporary wire mesh screen on top of gulley to remove debris

Blue lagoon
UV-C and Pool equipment

Waterwise pool....

✓ **Permanent backup system installed, can also double up for fire protection**

Emergency water supply to house
Add sediment filter and additional UV inline before entry to the building



- Install rain sensors or mini weather stations on irrigation systems. It saves water and electricity (pumping cost)

SOLAR SYNC®

Sensor: ET/Rain/Freeze

Type: Wired & Wireless

RAIN-CLIK®

Sensor: Rain/Freeze

Type: Wired & Wireless

MINI-CLIK

Sensor: Rain

Type: Wired

SOIL-CLIK™

Sensor: Soil Moisture

Type: Wired

WIND-CLIK®

Sensor: Wind

Type: Wired

FLOW-CLIK®

Sensor: Flow

Type: Wired

MINI-WEATHER STATION

Sensor: Wind/Freeze/Rain

Type: Wired

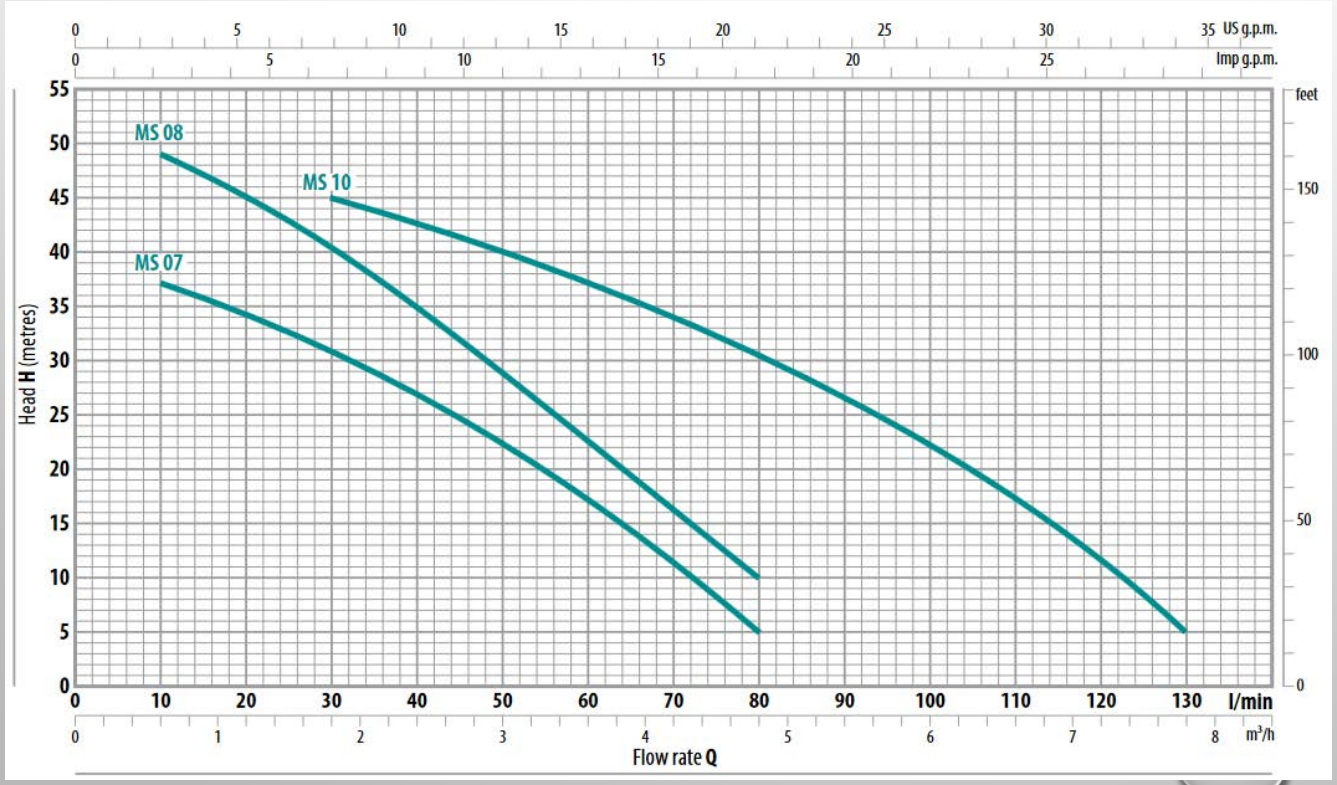
ET SENSOR

Sensor: ET

Type: Wired

MS

MULTI-STAGE CENTRIFUGAL PUMPS



PERFORMANCE RANGE

- Flow rate up to 130 l/min (7.8 m³/h)
- Head up to 52 m

APPLICATION LIMITS

- Manometric suction lift up to 7 m
- Liquid temperature
  : between -10 °C and +40 °C
- Ambient temperature up to +40 °C
- Max. working pressure 7 bar
- Continuous service S1

City pumps

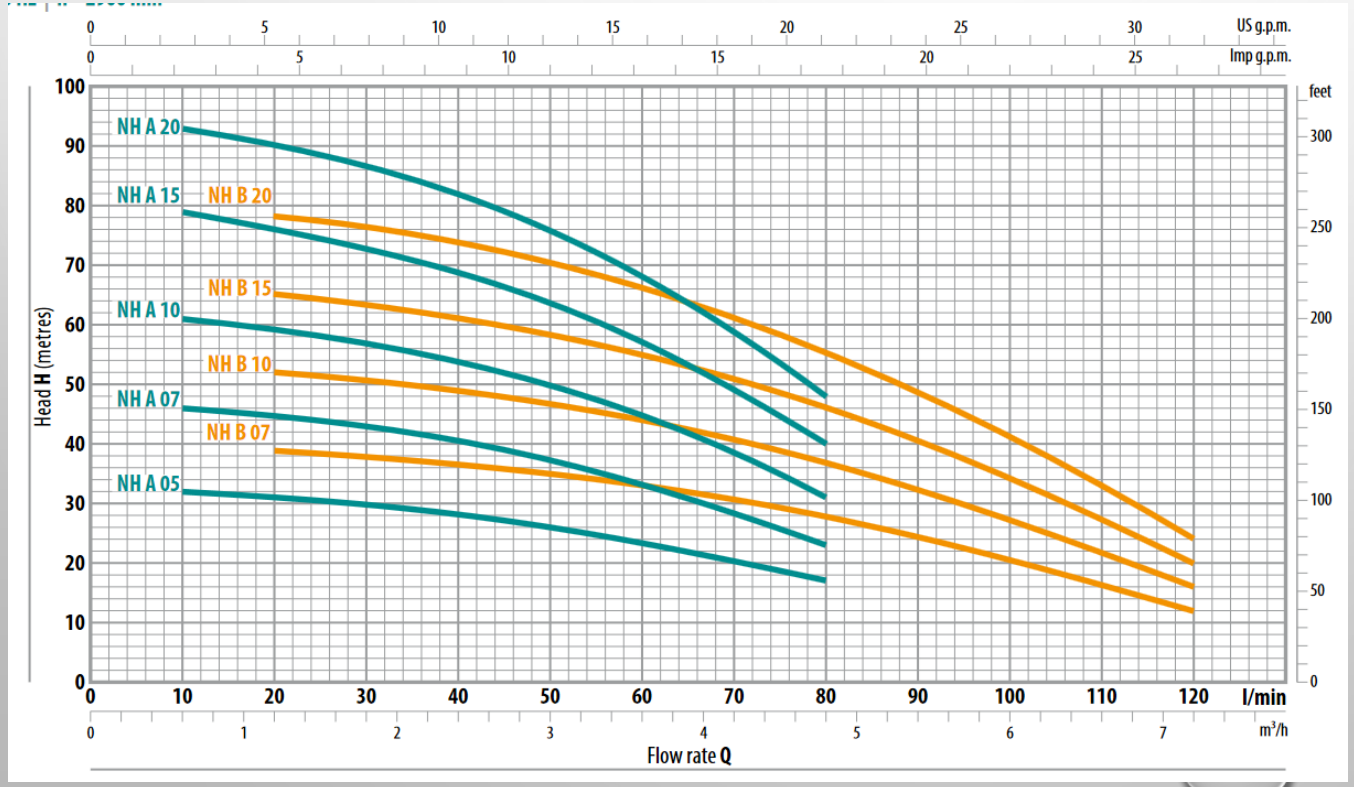
Out of Sight

Quiet

No Vandalism

NH

MULTI-STAGE SUBMERSIBLE PUMPS



PERFORMANCE RANGE

- Flow rate up to 120 l/min (7.2 m³/h)
- Head up to 95 m

APPLICATION LIMITS

- Maximum liquid temperature +40 °C
- Maximum sand content 150 g/m³
- 20m maximum immersion depth (with a sufficiently long power cable)
- Continuous service S1

MASKAM™ WATER

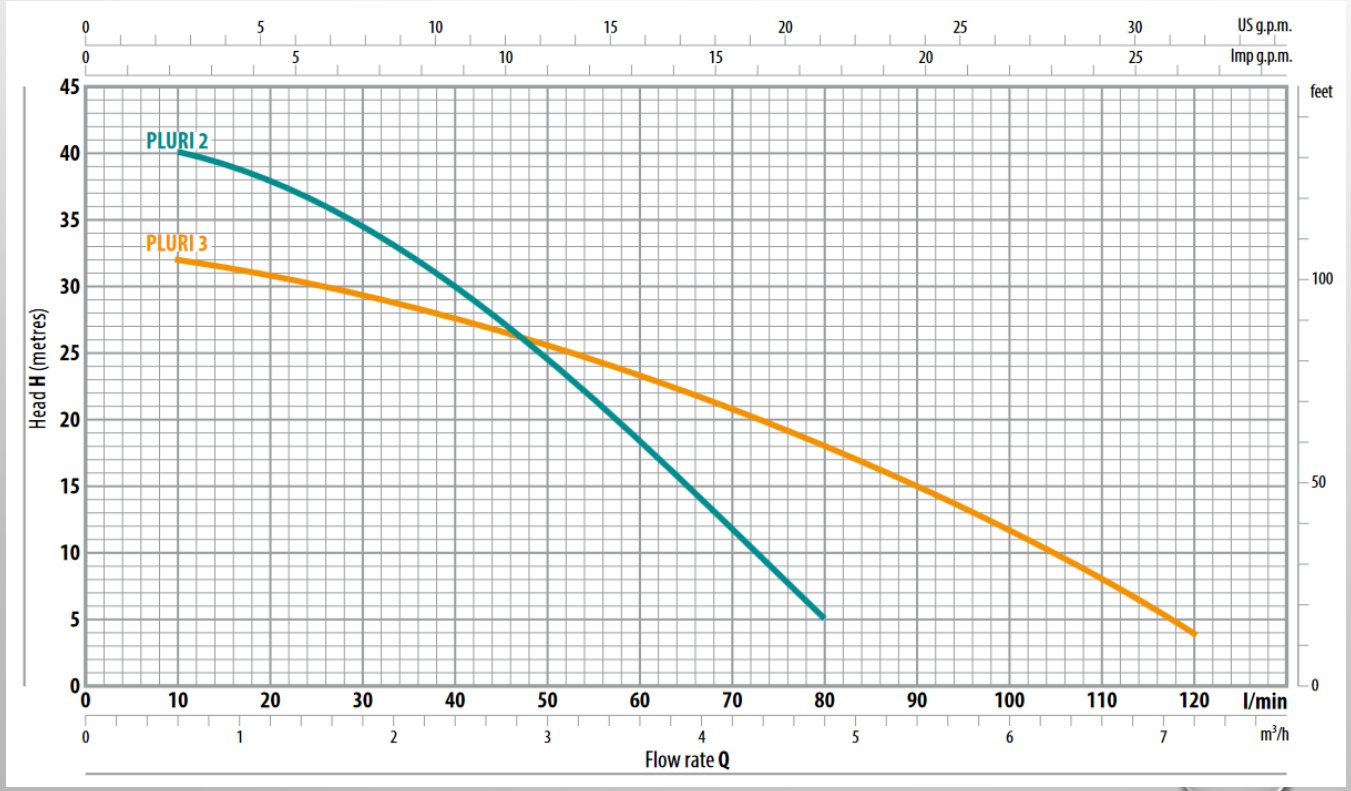
Out of Sight

Quiet

No Vandalism

PLURI

MULTI-STAGE SUBMERSIBLE PUMPS



PERFORMANCE RANGE

- Flow rate up to 120 l/min (7.2 m³/h)
- Head up to 42 m

APPLICATION LIMITS

- 10 m maximum immersion depth (with a sufficiently long power cable)
- Maximum liquid temperature +40 °C
- Suction down to 22 mm above ground level
- Continuous service S1

MASKAM™ WATER

Rainwater alone may not be enough for the total needs of the home or business but it can certainly help to reduce the load on the municipal system while ensuring there is some water while the council supply is off.

Rainwater can be supplemented by re-use of treated greywater or on-site treated wastewater. To do this a dual piping system will be needed. Upcycled greywater or wastewater will be piped to toilets for flushing and other outdoor / non-drinking applications while rainwater will only be used for drinking, washing and personal hygiene. By not wasting rainwater on toilet flushing, etc., the rainwater will last longer.

WE CAN HELP!

- RAIN WATER HARVESTING
- ON-SITE WASTEWATER RECYCLING
- GREY WATER RE-USE
- USE YOUR SWIMMING POOL AS A RESERVOIR OR BACK-UP

www.maskamwater.com

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