



Waste Water Treatment- BioRock

Localized, simple installation
& More Cash flow liquidity

WWSTP – Technology SYSTEMS

SYSTEM 1: ACTIVATED SLUDGE PROCESS (ASP/ EA)

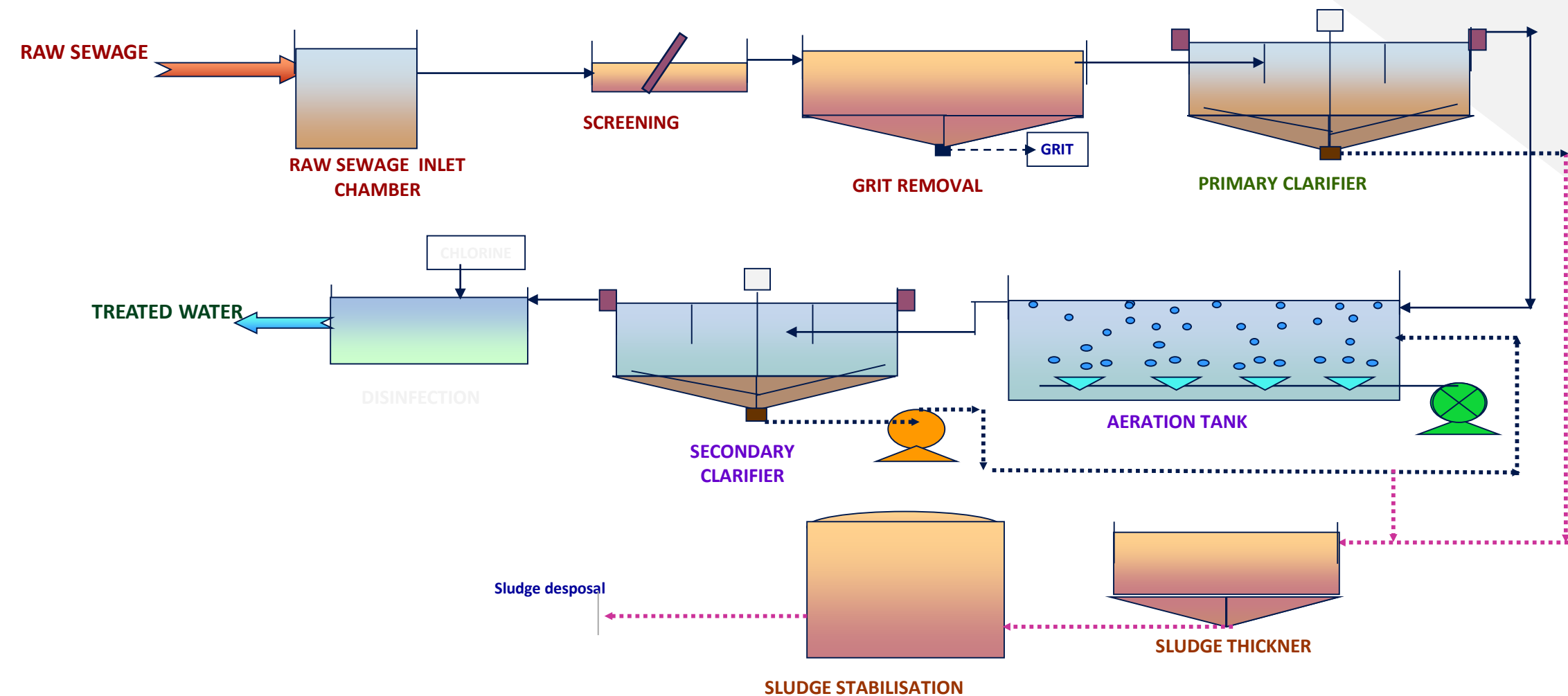
SYSTEM 2 : MOVING BED BIO REACTOR (MBBR)

SYSTEM 3 : SEQUENTIAL BATCH REACTOR (SBR)

SYSTEM 4 : MEMBRANE BIO REACTOR (MBR)

Our System: **BioRock Zero Electricity System**

ASP - Flow Diagram



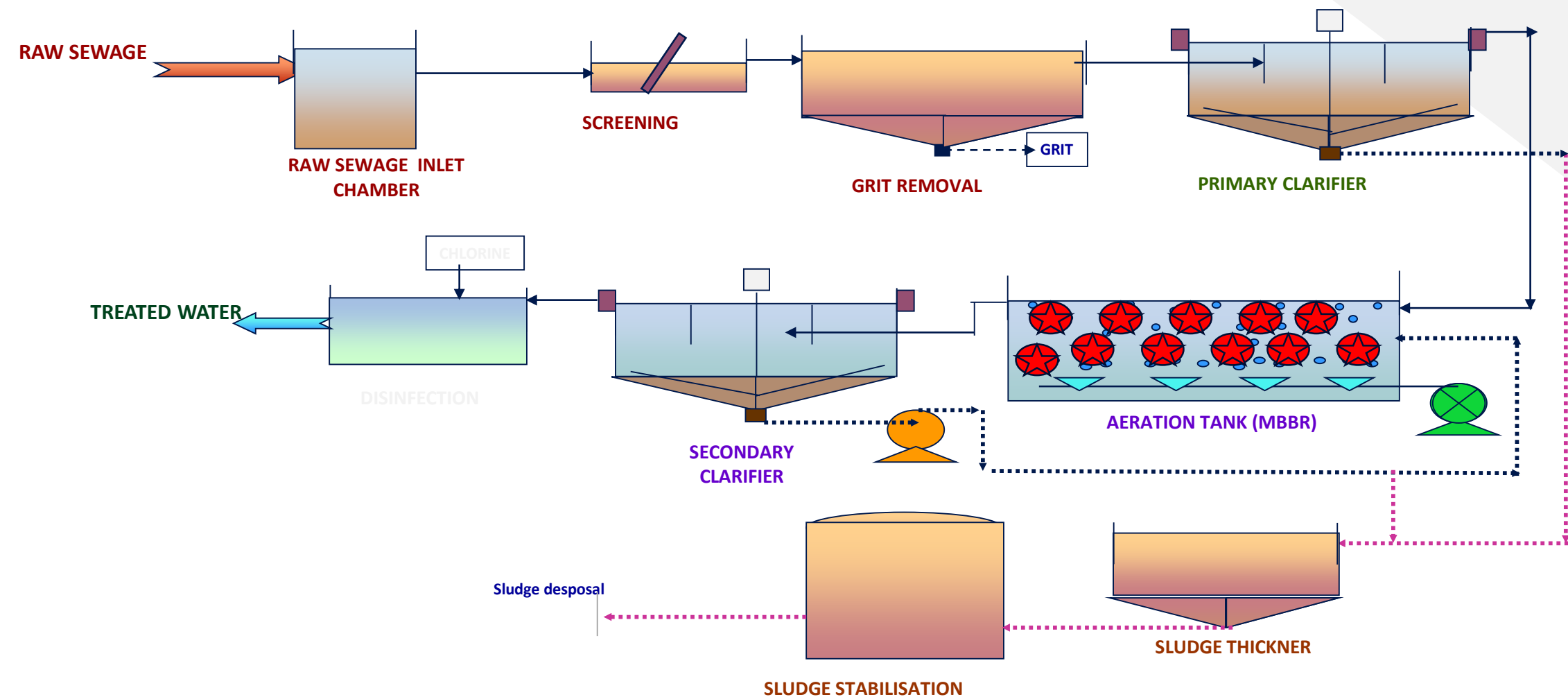
Traditional Systems- ASP



ASP



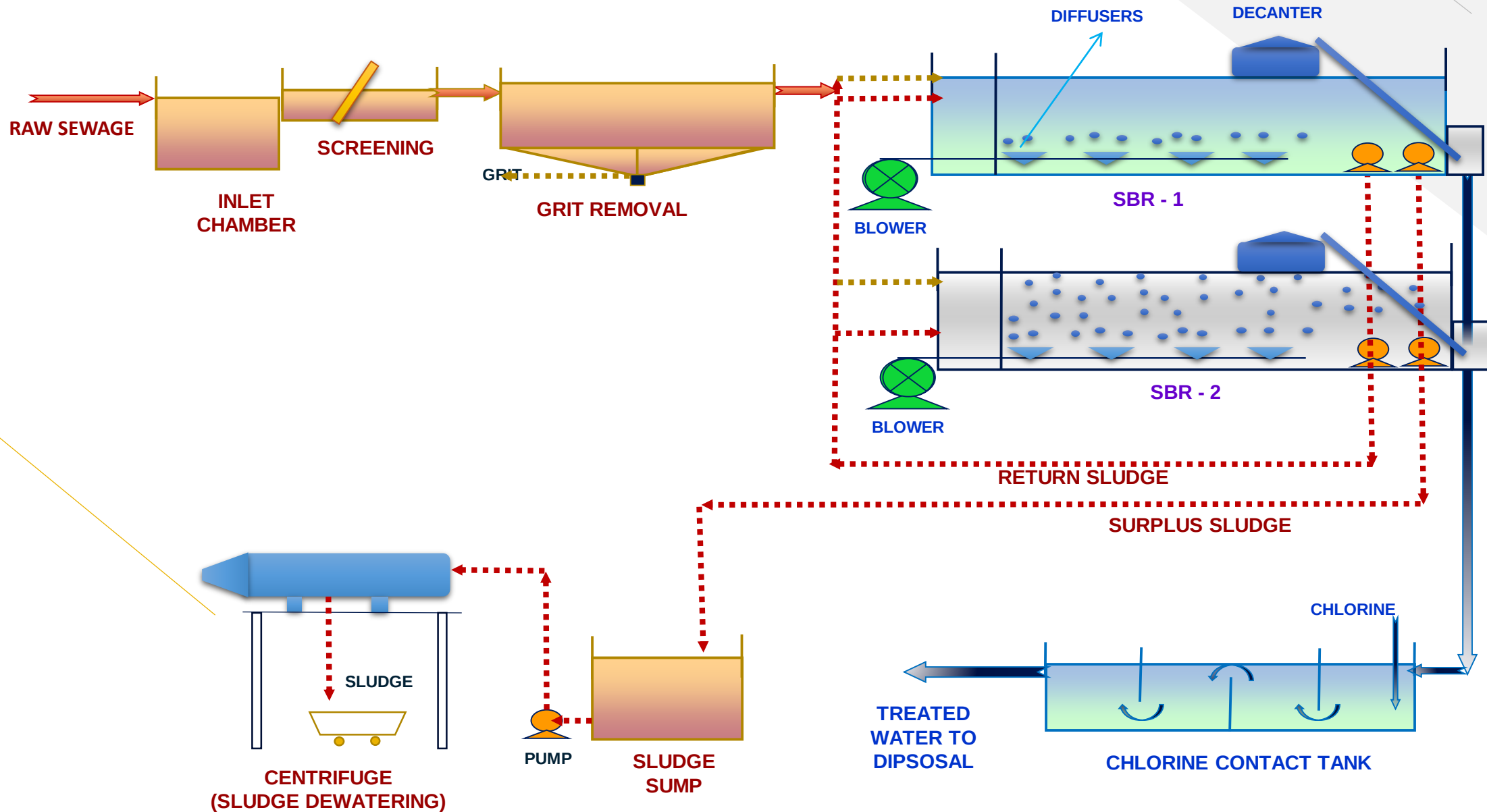
MBBR - Flow Diagram



MBBR



SBR - Flow Diagram



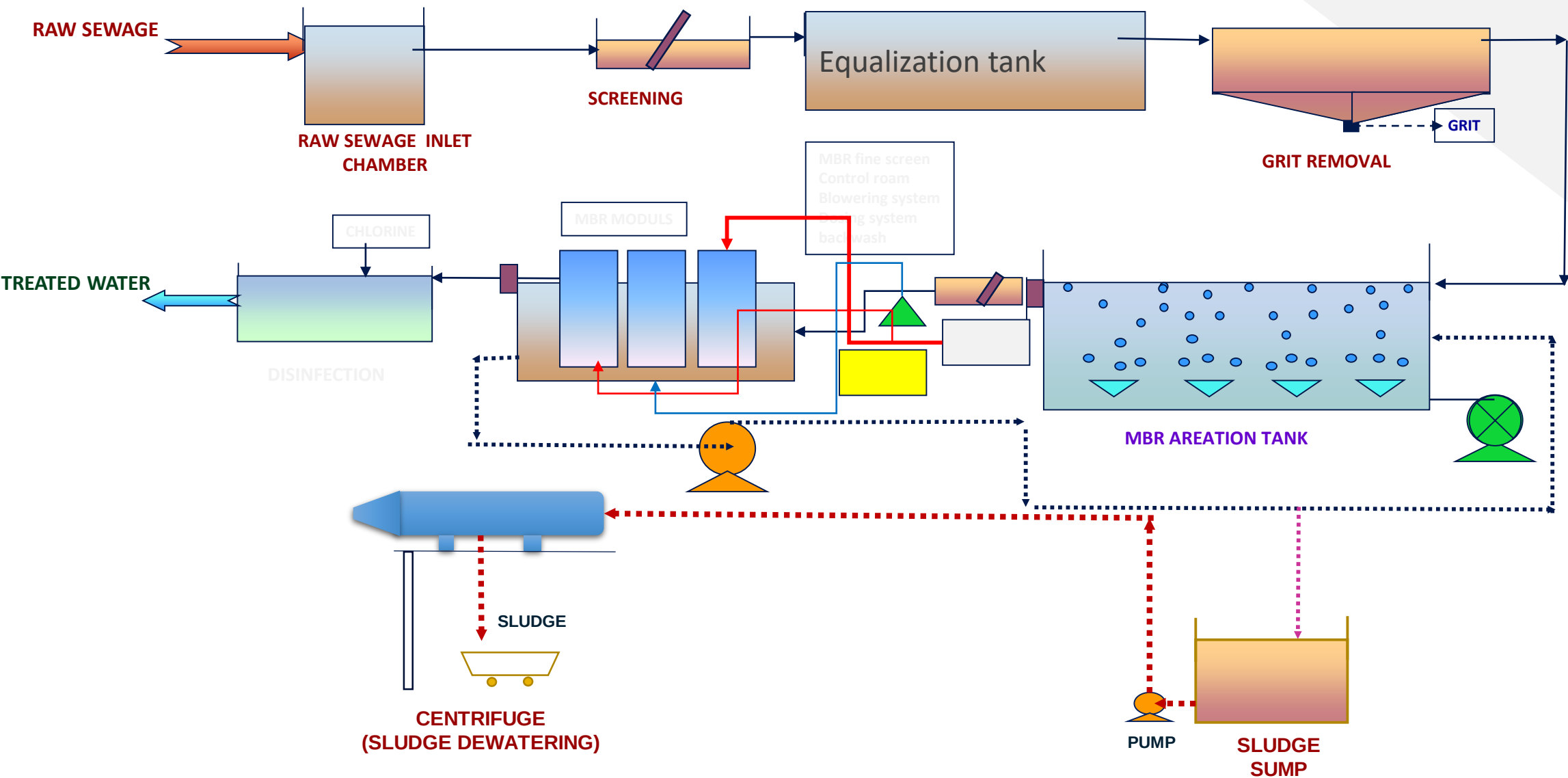
SBR



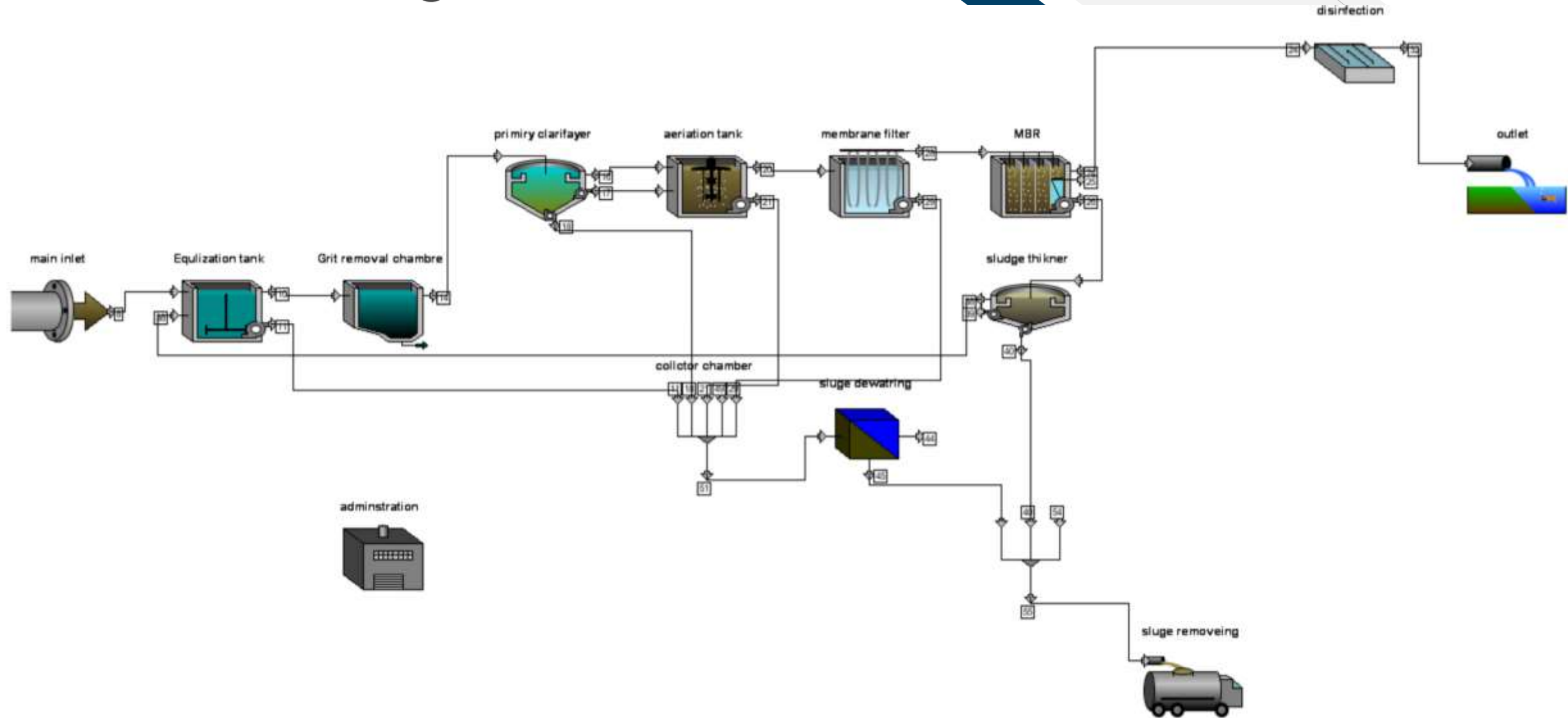
SBR



MBR- Flow Diagram



MBR- Flow Diagram



MBR



BioRock Compact System- The Shortcut Solution- Localized



BioRock System – How it Works

- **Completely Silent** - Completely silent operation as there are no pumps, motors or compressors.

- **Visually unobtrusive** - A small lid, flush with the ground ensures no visual obstruction. No compressor, blower or pump, so no above-ground kiosk.

- **Minimum Annual Maintenance** - The maintenance on a Biorock® is lower than any of its rivals, saving money and reducing carbon emissions.

- **No Electricity Required** - The Biorock® relies on gravity and natural air flow to work. This is a significant monthly saving even on small single house sewage plants.

- **Low Carbon Footprint** - No electricity is used, eliminating any CO₂ emissions related to electricity generation. Likewise the infrequent desludge period reduces the CO₂ emissions caused by the tankers that empty all sewage treatment plants.

- **Sustainability** - Without question it is the most sustainable system available.

- **Solar Power Friendly** - Where a pumped outlet is required, the Biorock® uses a tiny low-voltage pump which can comfortably operate on SOLAR POWER - not mains electricity!

- **Long Desludge Interval** - The primary tank only requires a desludge every 3-5 years, cutting running cost substantially.

- **No Concrete Required** - The Biorock® requires no concrete for the installation (depending on ground conditions); saving you money as no concrete plinth

- **No Moving Parts** - No pumps, blowers or other equipment is used in the sewage treatment plant.

- **Lowest Running Costs** - This is the cheapest system to operate in Africa. Guaranteed!



BioRock Video- Introduction

<https://www.youtube.com/watch?v=FEQ46AkfQBg>

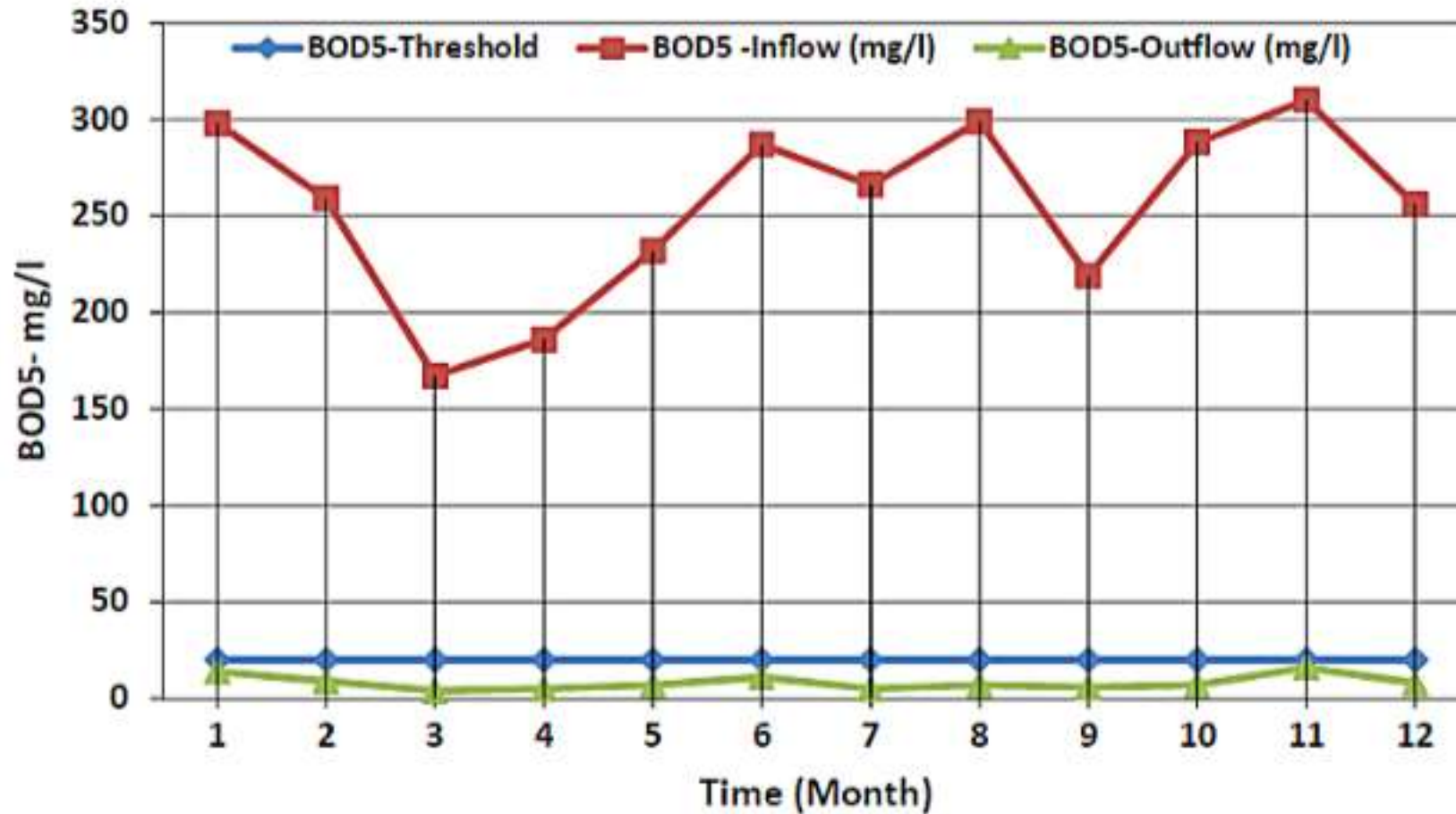
What are the benefits of a localized system ?

- BioRock has a great impact on the cash flow for any project, by allowing **partial handling over**.
- Systems are localized and hence can be installed per each building offering a great flexibility with **construction time schedule**
- **No** need for the **complex piping systems**
- **Hence, all project's loans/ budget will be directed towards pure construction**

Irrigation Cost – Treated Waste water

- Each Landscape sector will be serviced by a Biorock unit leading to a huge savings in water cost.
- Hence Rate of return for each Biorock Unit can then be calculated.

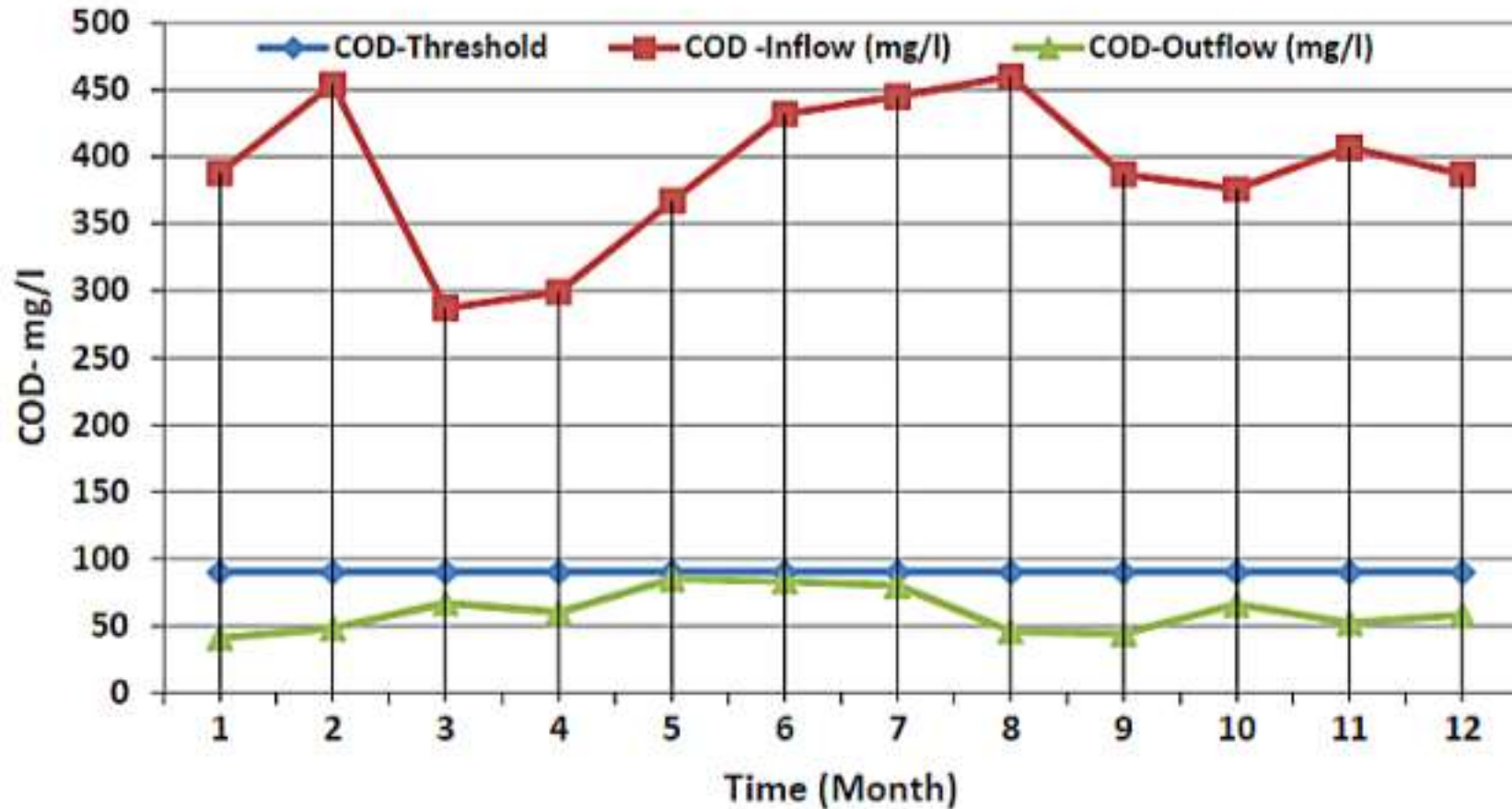
What about effluent Quality? BOD5



Blue Line is Agriculture Water Quality Threshold

Figure 6. Inflow, outflow, and threshold values of BOD₅ in mg/l from May 2016 to April 2017

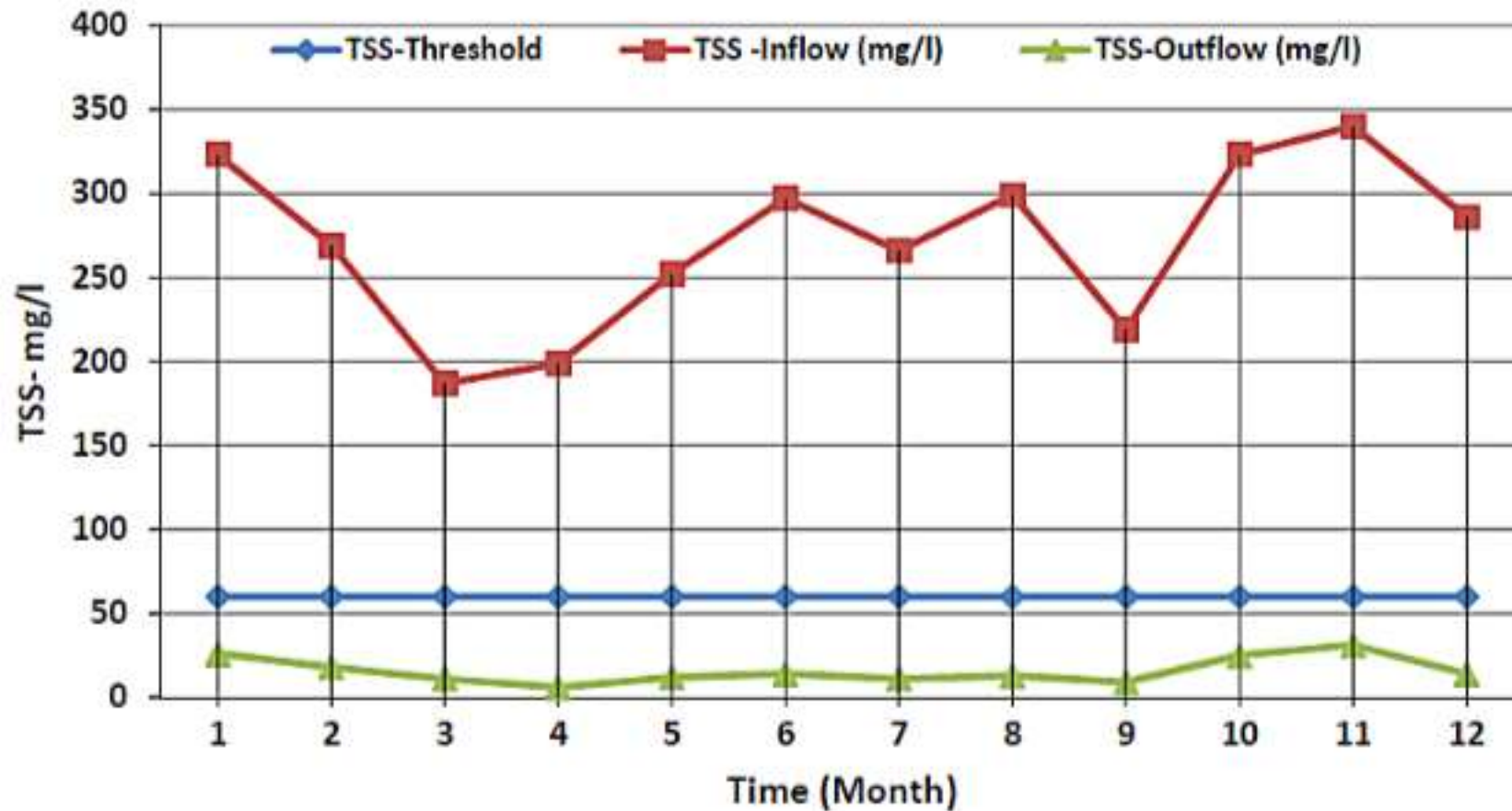
What about effluent Quality? COD



Blue Line is Agriculture Water Quality Threshold

Figure 7. Inflow, outflow, and threshold values of COD in mg/l from May 2016 to April 2017

What about effluent Quality? TSS



Blue Line is Agriculture
Water Quality Threshold

Figure 8. Inflow, outflow, and threshold values of TSS in mg/l from May 2016 to April 2017

Our tailored Solution

BioRock

- Each building will have it's own Biorock treatment unit. A villa will have a monoblock-900 that serve 6 persons while a building with 30 persons will have 1 Ecorock 5000 allowing a single unit- single building monitoring.
- Each unit will serve a specific garden/ landscape. This will offer flexibility of installation with construction timing & will decrease piping system budget.

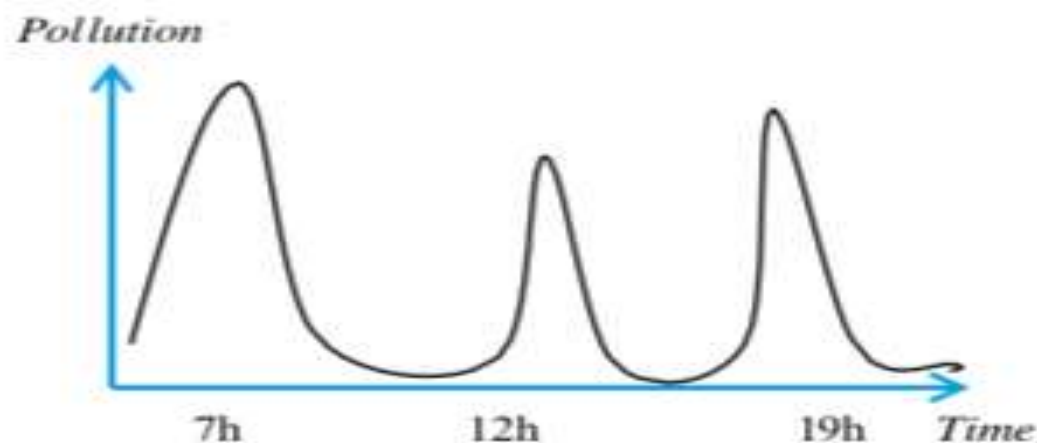
Variable load management

BIOROCK® multi-unit installations can tolerate variations in loads far better than large single unit systems. This is due to an even distribution of effluent between the units allowing more time for efficient treatment.

Standard installations

In simple terms when a single house is occupied by a family everyone tends to get up at the same time, come home at the same time, and go to bed at the same time (most of the time).

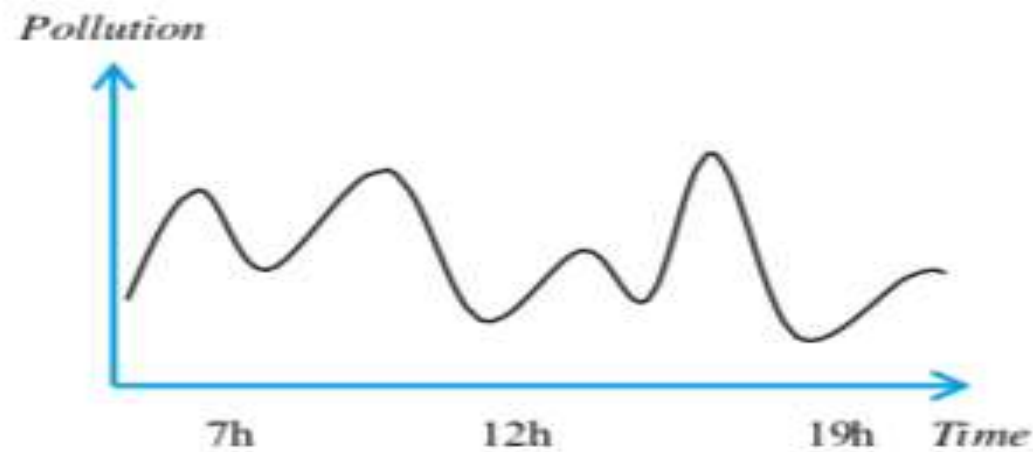
The peaks in loading are generally **high**.



BioRock Multi-unit systems

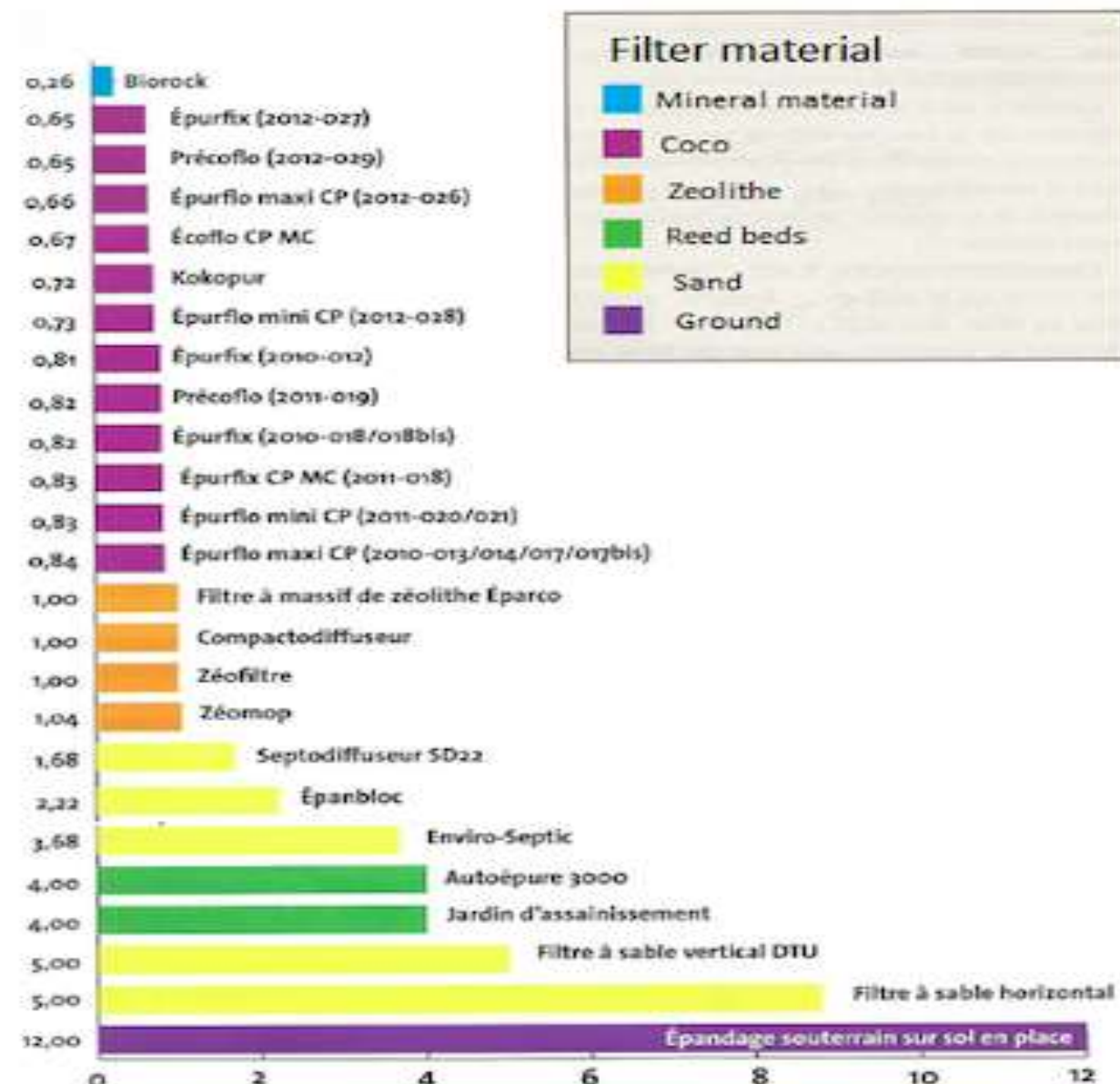
Each person or family lives in a different property. The families' activities and daily life often differ and facilities are used at different times.

The peaks in loadings are generally spread out and are not so severe.



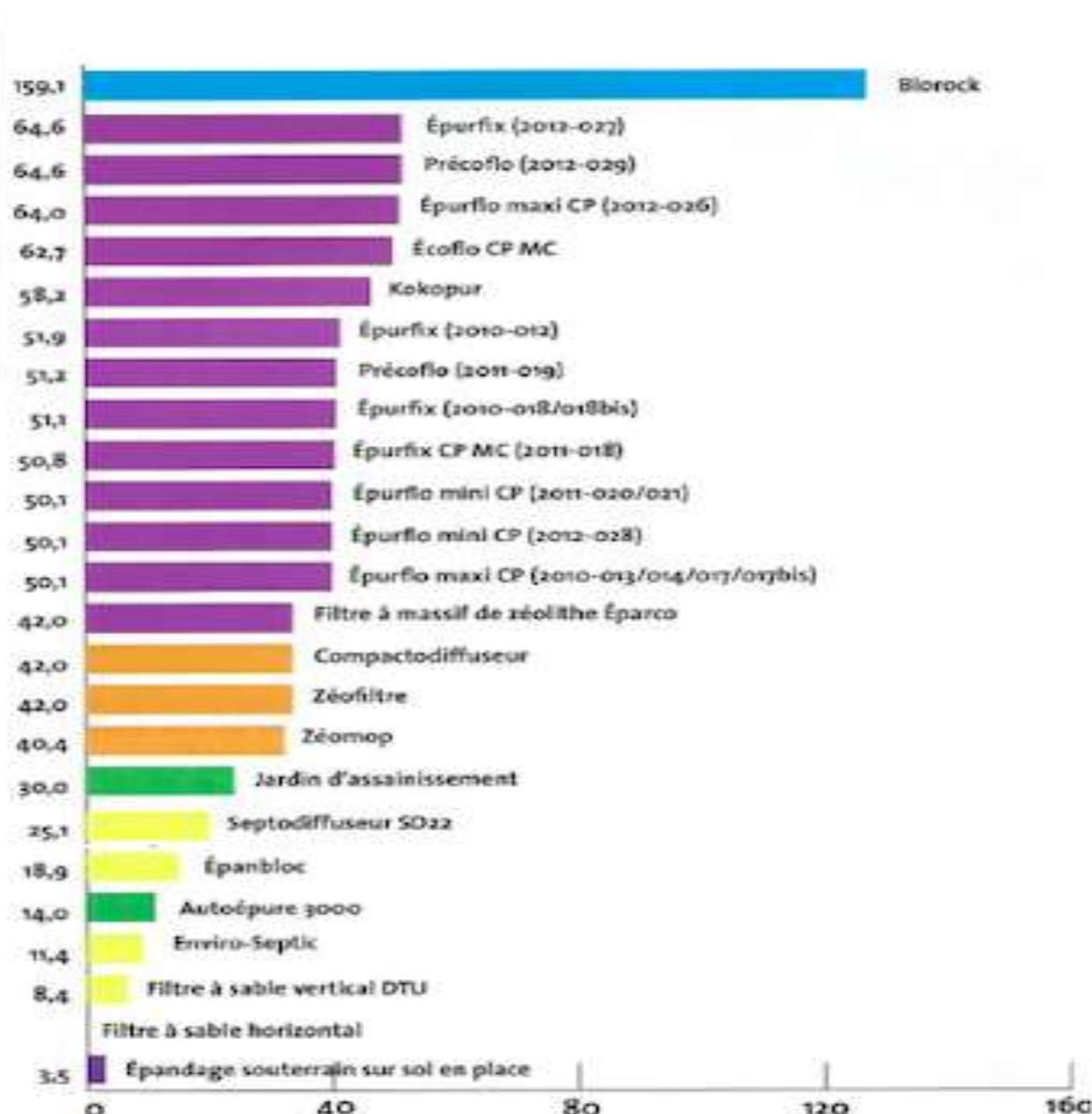
BIOROCK has the lowest footprint requirement in M²/PE in its category

Source : Irstea (French National Institute of Research in Science and Technologies)



BIOROCK has the highest treatment efficiency for BOD5 reduction

Source : Irstea (French National Institute of Research in Science and Technologies)



Conclusion

- With almost 1-2% of the unit price (Villa, apartment, building, Chalet). BioRock systems could be installed at the very end of the project just before handing over.
- Project's budget & time are hence very well saved & now are way more efficiently used.

Thank You 😊