Power & Water

Mobile Construction Ground Water Treatment

www.powerandwater.com

Construction Background

Rainwater, water from excavations and water used for dust suppression on construction and demolition sites can become polluted with mud, soil, dust etc. from the work being undertaken on the site.

This results in the water being unsuitable for discharge to water courses as there is a risk to the aquatic life, due to the solids suspended in the water obscuring the sunlight that is required as part of the ecosystem and potentially reducing available air.

Treatment of site runoff

Site run off:

- Consists of surface, ground and any process water
- Contains solid particles made up of fines, clays, sand and colloidal suspensions.

Due to size and surface charge large settlement area can be required for solids removal.

Settlement area can be reduced by:

- Conditioning the runoff - by the addition of a coagulant &
- Using lamella clarifiers – that reduce the required footprint to circa 10% of a conventional lagoon

Soneco® is an alternative conditioning system to using liquid chemicals

A trial was undertaken to demonstrate the effectiveness of the **Soneco®** system on treating the water from a demolition site, to see if it could be improved to a suspended solids concentration of good enough quality to be discharged.

Aldershot Trial

The aim of the trial was to demonstrate the effectiveness of Soneco® in treating site run-off water.

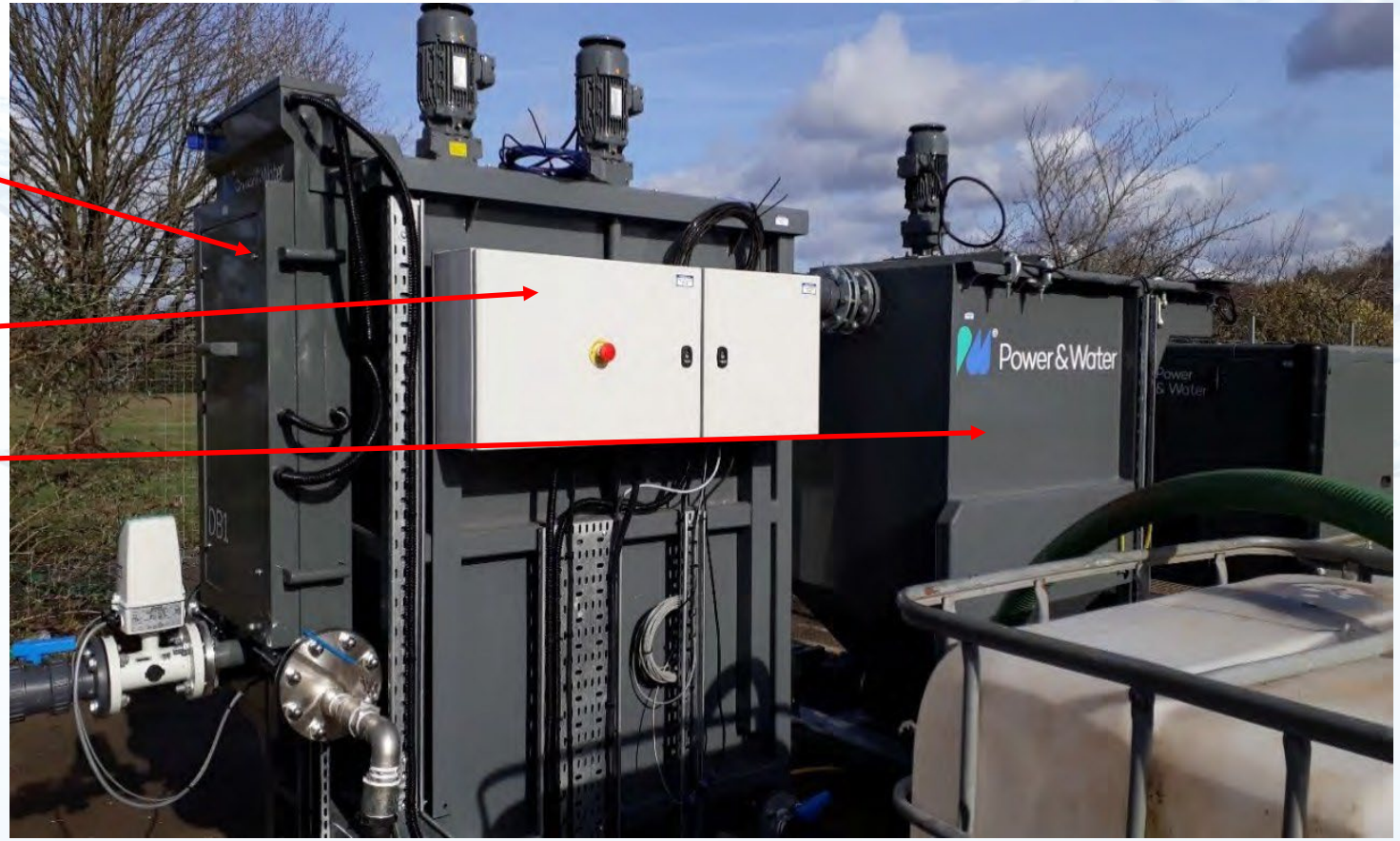
The objectives were:

- To prove a treatment utilising a Soneco® system could be used to treat site run off water to a prescribed total suspended solids (TSS) condition,
- To confirm the dose required to coagulate the solids contained in the site surface run off water, and
- To confirm the hydraulic capacity of the treatment system.

Trial Results

Trial Equipment

- Conditioning
  - DB1 Soneco Reactor
- Solids/liquid separation via
  - Mix tank
  - LC10 lamella clarifier
  - Treated water monitoring
- Ancillaries
  - Feed and sludge pumps
  - Generator



Trial Design Summary

- System calculated aluminium dose of between 8mg/l and 10mg/l required
- Upper flow rate of treatment system was circa 5m3/hr (limited by DC voltage applied to the electrode)
- The required settlement velocity was 0.5m/h resulting in a typical effective settlement area of 10 m^2 when treating 5 m^3/hr.
- The trial power requirements were
  - 0.7kW/m^3 when the conductivity was circa 609 us/cm and
  - 2.3kW/m^3 when the conductivity was circa 338 us/cm.
- Design power requirements 1.5 kW/m3 to dosing 8mg/l when conductivity was circa 350 us/cm.
- Conductivity key to system sizing

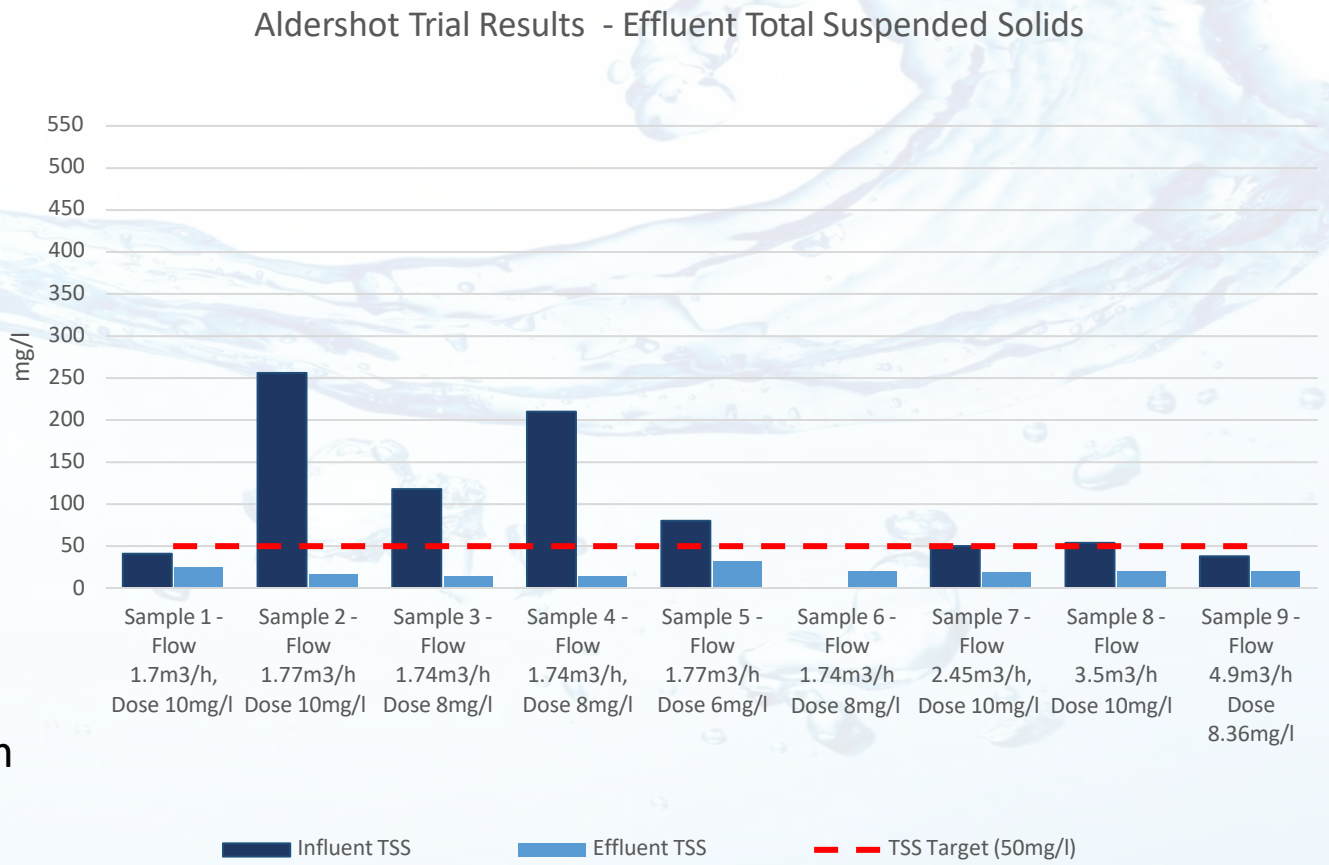
Trial Summary

- System treated water to a standard to allow discharge to water course
- TSS and turbidity were reduced during the treatment process
- Required aluminium dose of between 8 and 10 mg/l confirmed
- Operating power for a treatment system calculated to be 1.5 kW/m^3 (when conductivity is low, 350 us/cm)
- Run-off conductivity to system sizing
- Soneco and solids/liquid separation equipment design parameters established.
- Kit was easily mobilised
- Additional monitoring and feed pump control would be required for SDS systems

Trial Results

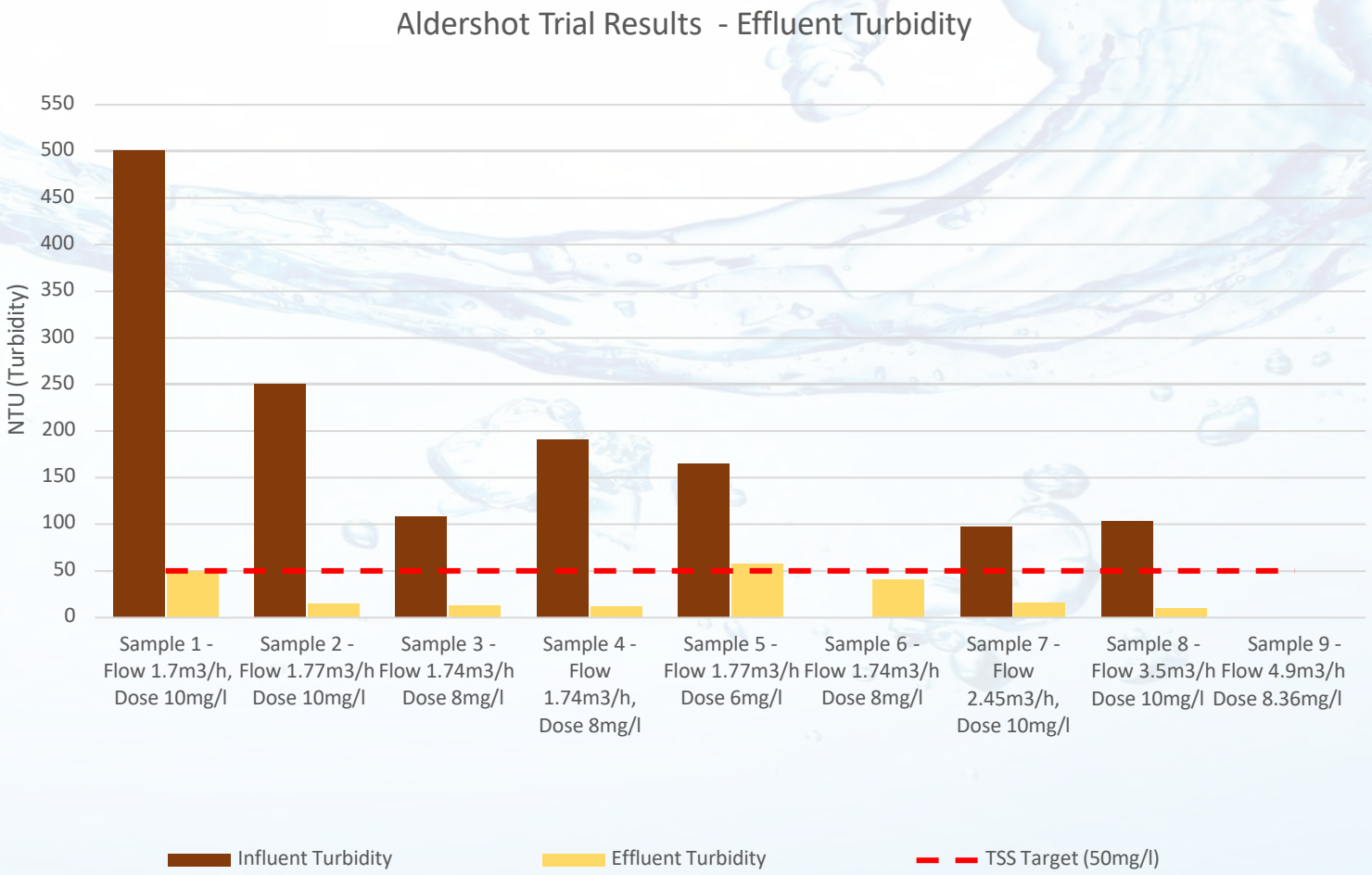
- Trial Undertaken over 2 weeks
  - Week 1 -- run-off made from Potable water
  - Week 2 – run off consisting of rain water

- Initially Aluminium dose held constant to confirm dose required
- Once aluminium dose confirmed flow was varied to test hydraulic capacity
- General improvement in effluent quality as the aluminium dose was increased.



Trial Results

- Similar improvement in turbidity
- Aluminium dosed pulls colloidal solids together
- Solids then removed from solution in the solids/liquid separation stage



Groundwater Treatment Concept

- Packaged mobile plant, easily moved (all on one skid) and ready to treat run off
  - Conditioning via Sono EC (to provide coagulant)
  - Solids/liquid separation via Integrated mix tank and clarifier to ensure system is compact and provides a robust process
- System needs to be auto start and stop on water level in feed sump
- Treated water to discharge to local water course
- Telemetry system to cover plant operation and discharge water quality
- Power supplied by generator

Operational Requirements

- Level hardstanding
- Plate changing – davit to be added to system
- Power – via diesel generator or mains supply
- Sludge disposal – on site
- Operations – monitored via telemetry, daily check weekly clean down

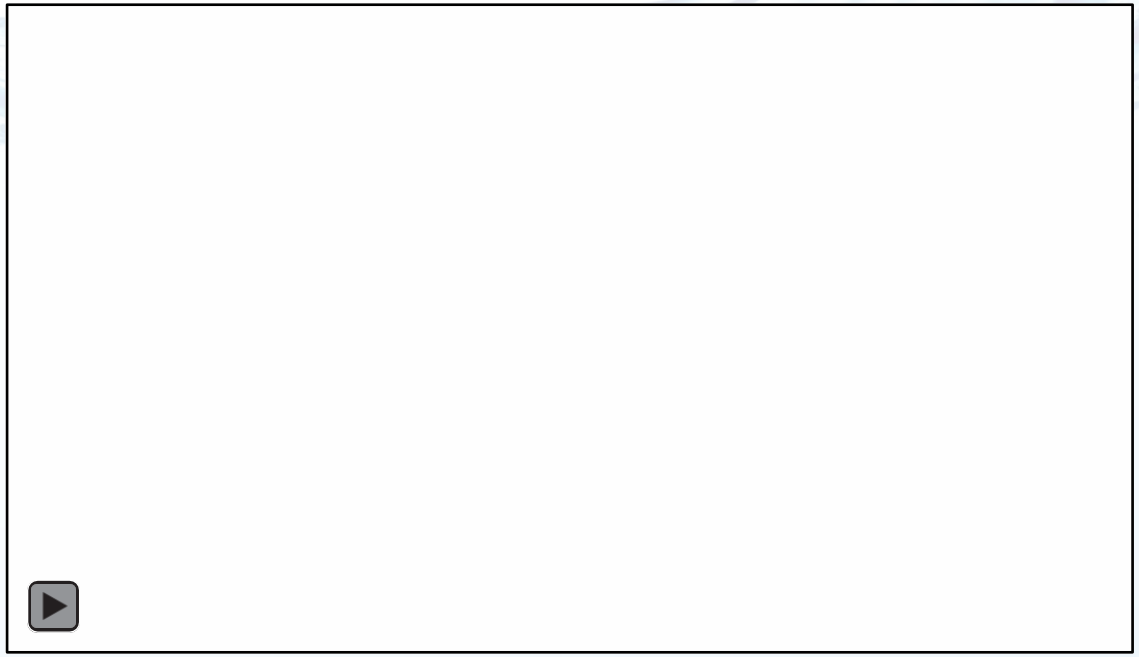
Soneco® Benefits

- Reduced environmental and health and safety concerns
- Appropriate for sites with poor or limited access
- Patented process and unique approach to treating run-off
- Environmentally friendly and sustainable treatment method
- Factory build solution can be delivered to site as a skid mounted “plug and play” system
- Integrated treatment solutions requiring a small footprint
- No reduction in pH of treatment stream as seen in liquid chemical dosing
- No liquid chemicals leading to reduced manpower requirements
- Reduced infrastructure on site – no chemical storage requirements
- Auto start/stop and monitoring of performance discharge
- The system is not affected by the plates aging as is the case with liquid chemicals

Our Technology

P&W's patented Sono-electrochemical technology is leading the field in contemporary water treatment – offering unrivalled environmental performance.

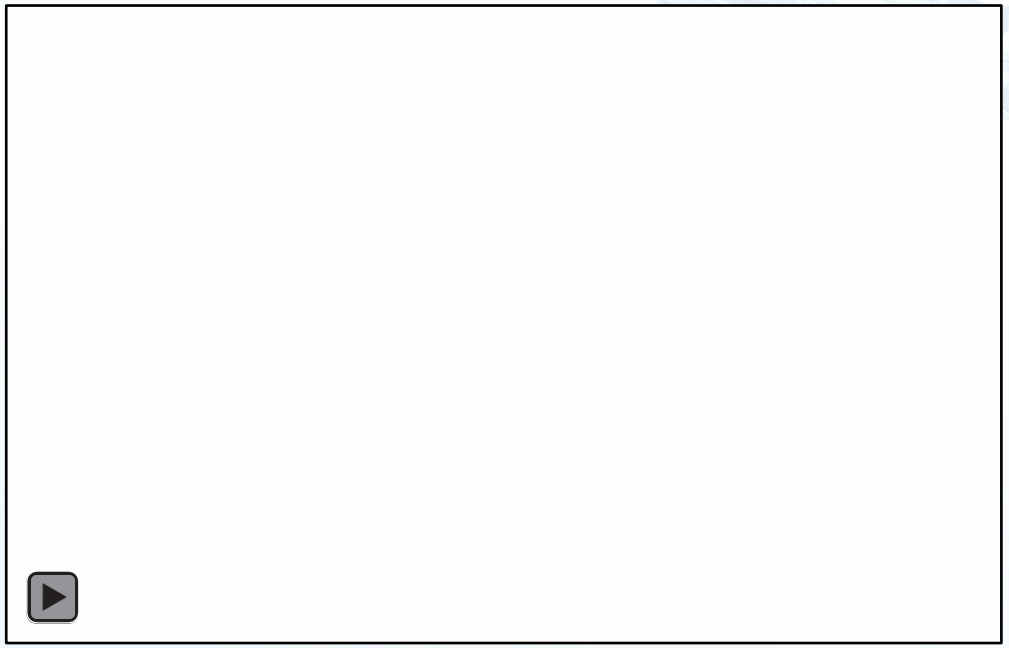
- A clever combination of both electrolysis and ultrasound in a single, modular design
- Versatile, effective and highly efficient with the ability to create a revolution within the industry.
- A compact design makes Soneco® the ideal choice for small to medium flows, whilst its modular construction caters for much larger requirements.
- Soneco® can be installed as a stand-alone system or used in conjunction with several proprietary processes.
- P&W offer fully integrated Soneco® treatment systems.



DB4 Reactor

How does it work?

An innovative sono-electrochemical treatment process of combining electrolysis and ultrasound; generating reactive treatment reagents and oxidative radicals from electrode plates.



DB2 Reactor

- Programmed to treat a wide variety of waste streams simply by altering the parameters on the PSU and changing the electrode material.
- Can be used with either Iron, Aluminium, Mixed Metal Oxide (MMO) or Magnesium plates. Reactions include:
  - **Sono-SEC:** Electro Coagulation (using Iron and Aluminium Plates)
  - **Sono-HDX:** Electro hydroxide (using Magnesium Plates)
  - **Sono-AOP:** Advanced Oxidation Process (using MMO Plates)
- Replacement is simple with minimal operator requirements: electrodes can be removed and changed by one engineer (or using a davit-lift, if required).
- Ultrasonic cavitation acts as a cleaning-in-place (CIP) tool, keeping the electrode surfaces clean; maintaining an evenly reactive treatment surface and gaining full electrode utilisation.

Our Products

Our specialists will match the precise solution required for your technical and operational challenges, will assist with process design, integration and technical support, and provide the means to help you safeguard the environment and reduce overheads.

Our solutions can help our customers to:

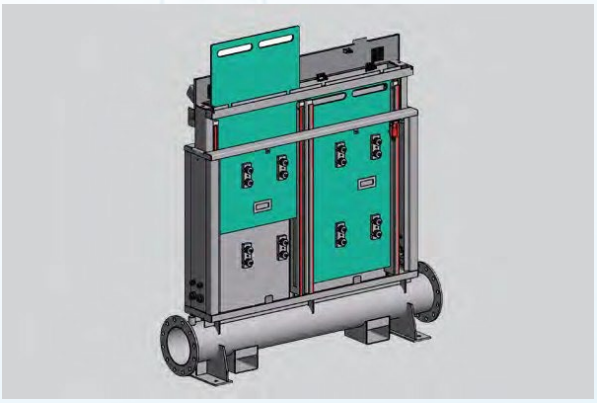
- increase resource resilience;
- relieve environmental challenges;
- alleviate regulatory pressures

1. DB Series Reactors

2. DB Systems

3. Power Supply Units

4. Electrode Plates



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