GREEN TECHNOLOGIES LTD

- Electronic dosing and monitoring systems

EDD

- Flow Activated
- Can dose multiple Flocculants
- Transmits data to a website and smart phone
- Manage your pond from your desktop
- Remote monitoring pH and TSS other parameters added as required (up to 16 devices)
- Low level tank alerts
- Measures Rainfall and Rainfall intensity
- Txt message alerts

Section 1: The Electronic Dosing Device (EDD)

- The electronic dosing device (EDD) provides precision dosing based on water flow for efficient coagulation of sediment retention ponds. Using solar power, and a long-life peristaltic pump these are durable and long-lasting units. The units use a precise aluminium flume, with an ultrasonic that reads to within 2mm accuracy, to measure the total flow into a sediment retention pond. Each unit has remote access from online or with a mobile app that can provide live updates, alerts, and historical data. An included rain sensor adds to the unit and in conjunction with the flume provides a more complete picture of the site.

Section 2: What is the EDD?

- The electronic dosing device (EDD) is a solar powered unit that provides precision dosing to sediment retention ponds on a range of sites up to 6Ha. It can be used with a range of chemicals to provide coagulation to assist in sediment retention.
- The unit measures the flow of water into the pond and doses based on this flow. To measure the flow-rate the units use an aluminium flume and a precision ultrasonic level sensor. The flume accelerates the water from subcritical flow to supercritical flow which gives a precise relationship between the water level at the inlet to the flume and the total flow of water through the flume.
- The unit has been designed to have lower power consumption, to allow battery operation for several days if there is insufficient sunlight. An MPPT solar controller gives maximum efficiency, and a 150W solar panel provides ample power when sunlight is available.
- The combination of a peristaltic pump, driven by a stepper motor, provides very precise dosing at up to 1 L/min. It is capable of dosing up to 300 m^3/h at a standard dose rate of 200ml/m^3 of coagulant.
- Each unit is remotely accessible through mobile app or through our telemetry website. This gives users access to all the data, including current flow, total water treated, pump state, etc. In addition to these the units also have a pressure transducer that measures the liquid level in the tank, and a tipping rain bucket sensor that measures the onsite rainfall. Through the use of the telemetry, each site can be configured with alerts, typically when there is large flow or rainfall, or the tank is low.

Section 3: The EDD History.

- In 2016, Robert Coulson had the idea for an electronic dossing device that doses based on the total flow of water into a pond, rather than just rainfall. Later that year he hired a contractor to develop these units, but the result was very expensive, overly complex, and not reliable enough. In November of 2016 Robert decided to employ a local engineer (Shay Pandey) full-time to develop the units at Green1 Technologies Ltd. Shay quickly threw out the previous design and got to work on what we now call an Electronic Dosing Device or EDD.
- Over the next few months Shay developed the first iteration of the EDD and in January of 2017 Robert hired Karl Hewlett to assist in the development and building of the units. Shortly afterwards the first was assembled and installed on a test site in Silverstream, Wellington.
- After testing on site there were a few changes made to the software, the pump was swapped out for a peristaltic pump, and some other electrical parts were changed. After a month we went into production mode and have since been building these units and installing them all over New Zealand, as well as a some in Australia and the USA.

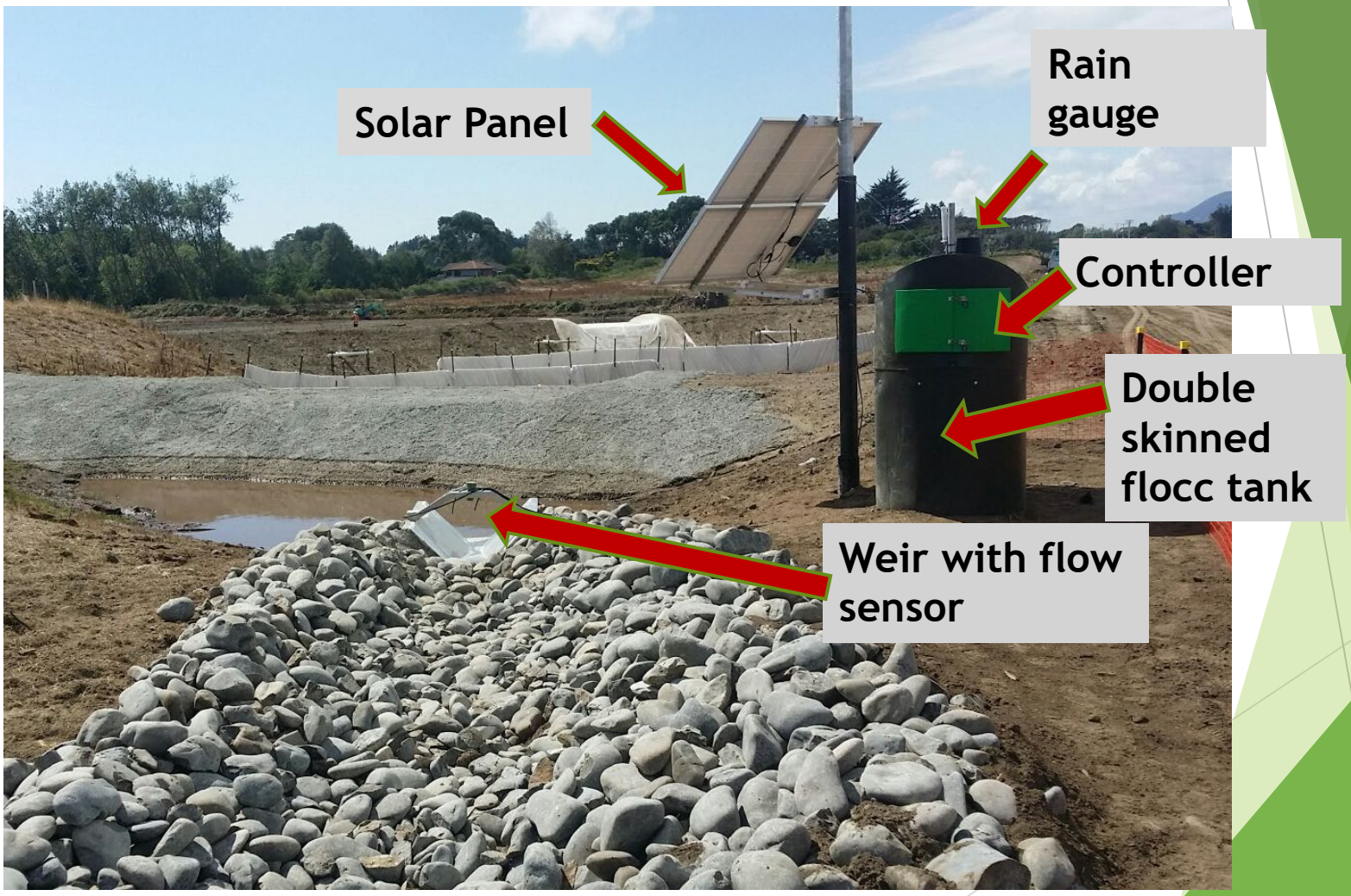
Section 4: What makes the EDD special.

- The EDD units have several defining features that allow it to operate efficiently and precisely.
- The combination of an aluminium flume with a precise ultrasonic level sensor provides durable and reliable flow measurement. The shape of the flume conditions the flow to transition from subcritical flow to supercritical flow which allows us to measure the water flow using only the water height. Without the flume shape to get an accurate measure of the water flow would require not only the water height, but the velocity as well.
- Each unit is connected online through our telemetry system. This provides a live unit state, including rainfall, water flow, tank level, as well as historic values for all these variables. The units use a low data protocol to reduce the cost of data and power consumption. A particularly useful feature of the telemetry system is the automatic alerts, these are generally used to alert when tank levels drop, or there is a significant rain event.
- The units use solar power to allow installation at remote sites where mains power would be impractical or impossible. To do this each unit has a MPPT solar charger and a high capacity AGM battery. Using this the units can operate on battery power for several days without any solar charging, and can then charge within one day.
- To dose the coagulant the units use a peristaltic pump, which allows very precise dosing. To drive the pumps we use a stepper motor, which has more precise control than a DC motor. These two parts working in conjunction allow very accurate dosing. It also means that multiple chemistries can be used on difficult sites.
- One of the key features of the EDD units are their adaptability and customizability. Each unit can be fitted with additional sensors, and or pumps. Many units have pH and/or turbidity sensor to monitor the water quality to determine the success or failure of the sediment retention pond. It can also work with a flow meter or a flume.

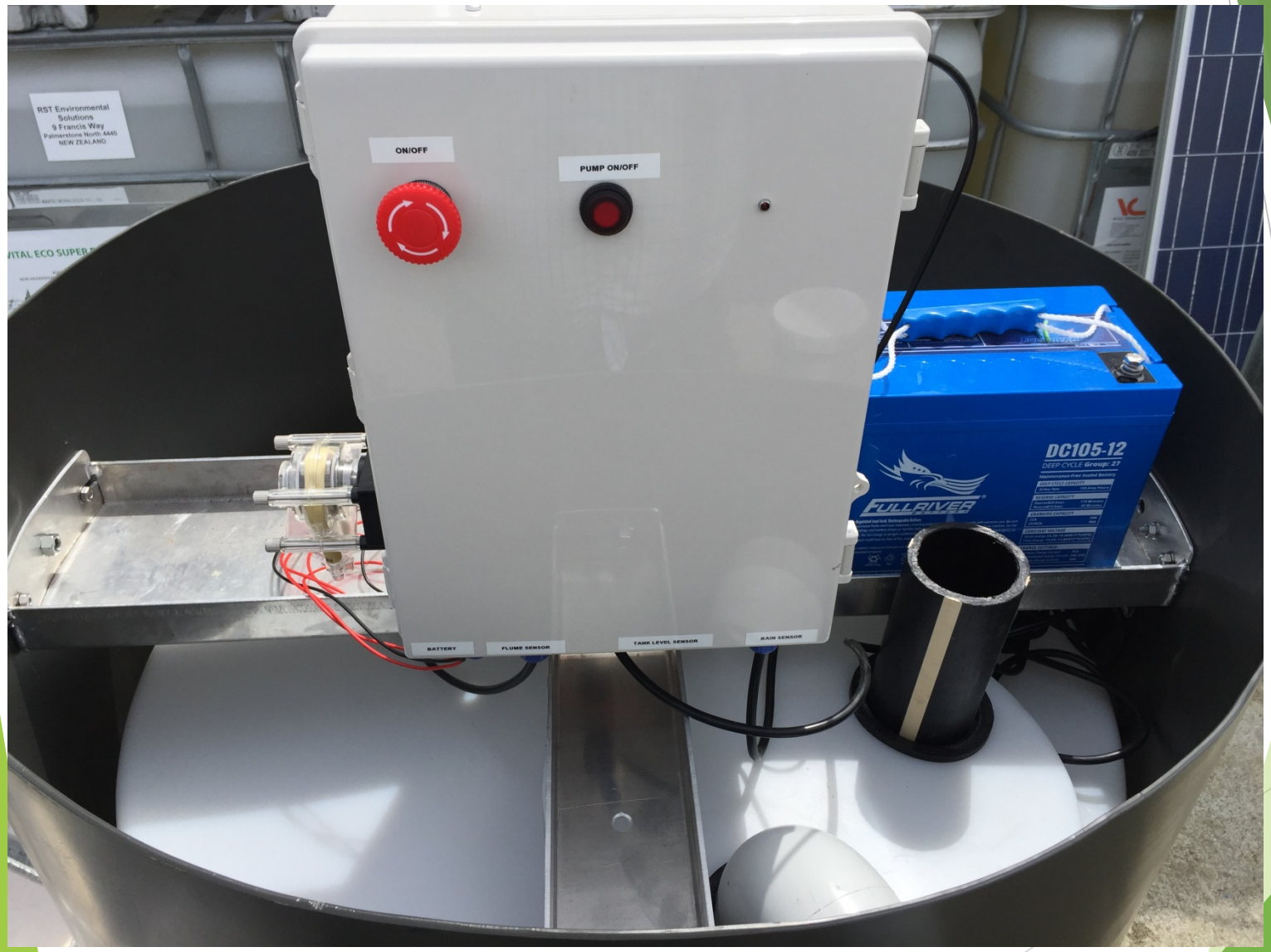
Section 5: Benefits of the EDD

- The EDD has provided coagulation for dozens of ponds throughout New Zealand. This helps the sediment retention process greatly and reduces the sediment discharged into the environment.
- As well as this the units have provided significant opportunity to Green1 Technologies Ltd. The units were the start of Green1 Technologies Ltd which since has been a successful technology company throughout New Zealand and spreading to Australia and the USA.
- The units offer very accurate dosing compared to the existing rainfall activated units. It means that the ponds and the receiving environment are highly unlikely to be overdosed with a flocculent and when monitoring equipment such as pH and turbidity measures are attached that everyone knows exactly what is being discharged.
- In areas where the soils are difficult the unit has the ability to dose multiple chemistries accurately if required. The client now has a mini water treatment plant operating on site that is auditable so there is less chance of error.
- The units also offer the flexibility of being real-time so that during a storm event interested parties can monitor what is happening without having to attend site 24/7.

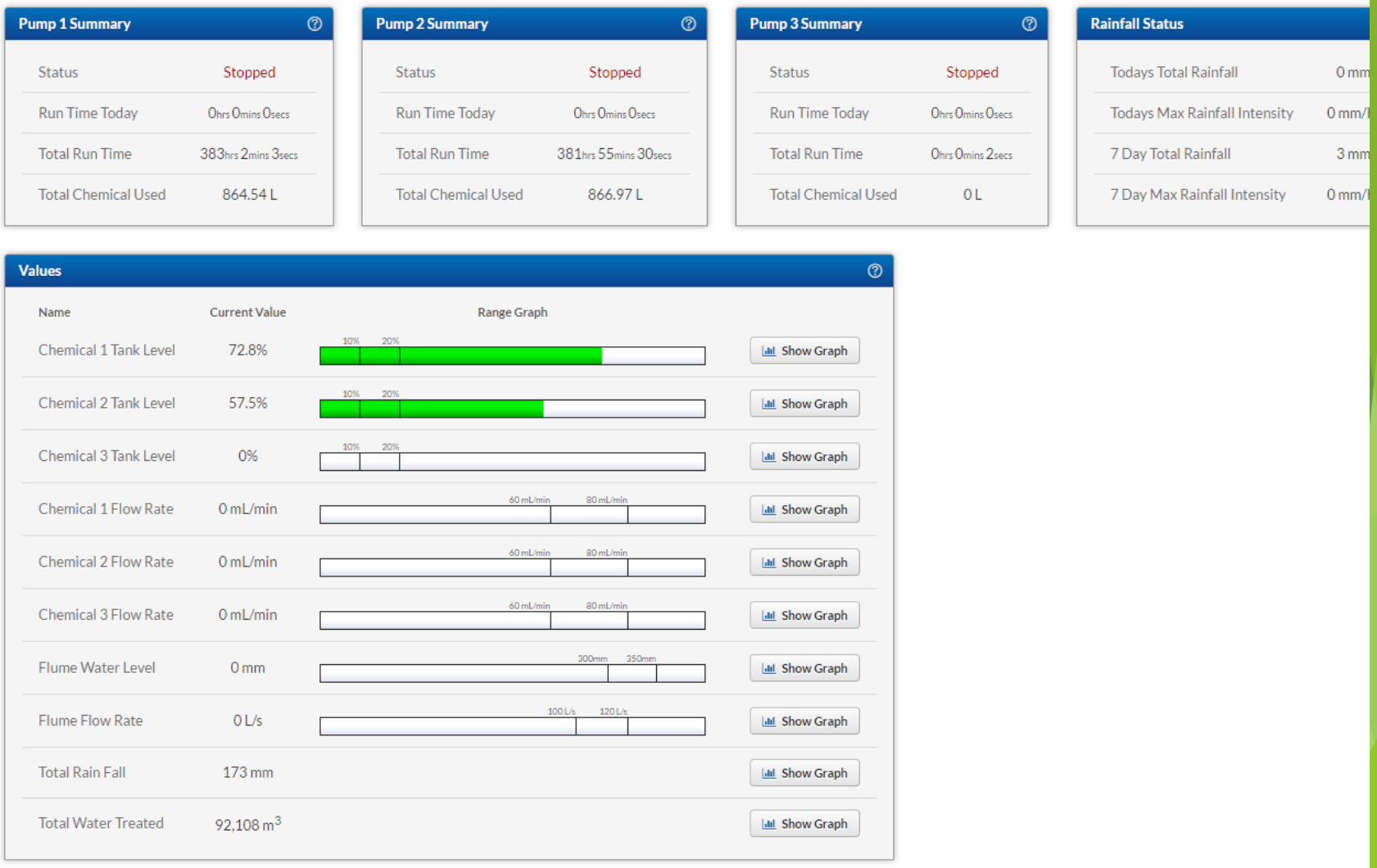
EDD Setup On Site



Installed EDD with an additional solar panel


RST Environmental Solutions
9 Francis Way
Palmerston North 4446
NEW ZEALAND
ON/OFF
PUMP ON/OFF
DC105-12
DEEP CYCLE Group: 27
FULLRIVER
BATTERY
FLUME SENSOR
TANK LEVEL SENSOR
RAIN SENSOR

Site Summary



Pump 1 Summary

Status	Stopped
Run Time Today	0hrs 0mins 0secs
Total Run Time	383hrs 2mins 3secs
Total Chemical Used	864.54 L

Pump 2 Summary

Status	Stopped
Run Time Today	0hrs 0mins 0secs
Total Run Time	381hrs 55mins 30secs
Total Chemical Used	866.97 L

Pump 3 Summary

Status	Stopped
Run Time Today	0hrs 0mins 0secs
Total Run Time	0hrs 0mins 2secs
Total Chemical Used	0 L

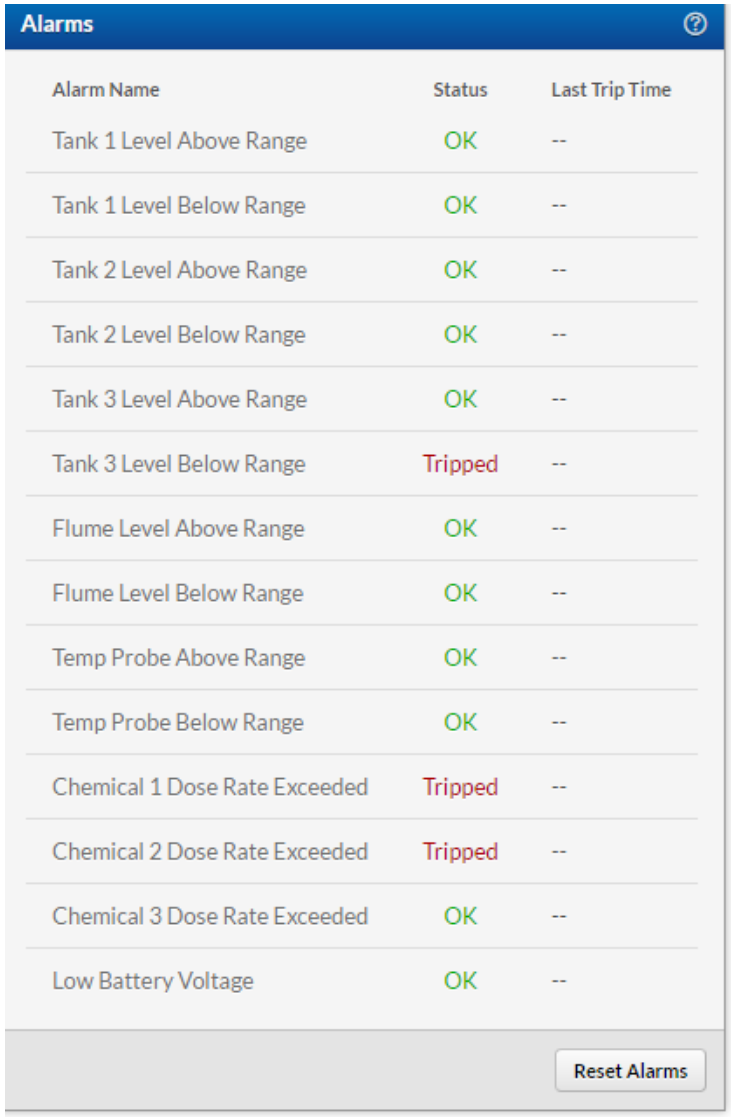
Rainfall Status

Todays Total Rainfall	0 mm
Todays Max Rainfall Intensity	0 mm/
7 Day Total Rainfall	3 mm
7 Day Max Rainfall Intensity	0 mm/

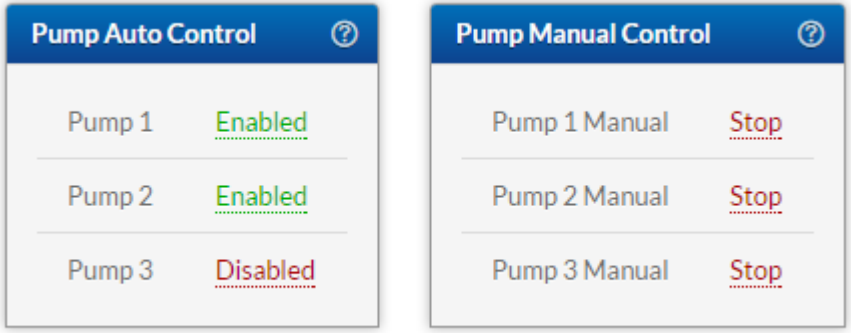
Values

Name	Current Value	Range Graph	
Chemical 1 Tank Level	72.8%	10% 20%	Show Graph
Chemical 2 Tank Level	57.5%	10% 20%	Show Graph
Chemical 3 Tank Level	0%	10% 20%	Show Graph
Chemical 1 Flow Rate	0 mL/min	60 mL/min 80 mL/min	Show Graph
Chemical 2 Flow Rate	0 mL/min	60 mL/min 80 mL/min	Show Graph
Chemical 3 Flow Rate	0 mL/min	60 mL/min 80 mL/min	Show Graph
Flume Water Level	0 mm	300mm 350mm	Show Graph
Flume Flow Rate	0 L/s	100 L/s 120 L/s	Show Graph
Total Rain Fall	173 mm		Show Graph
Total Water Treated	92,108 m^3		Show Graph

Alarms


Alarms
Alarm Name
Status
Last Trip Time
Tank 1 Level Above Range
OK
--
Tank 1 Level Below Range
OK
--
Tank 2 Level Above Range
OK
--
Tank 2 Level Below Range
OK
--
Tank 3 Level Above Range
OK
--
Tank 3 Level Below Range
Tripped
--
Flume Level Above Range
OK
--
Flume Level Below Range
OK
--
Temp Probe Above Range
OK
--
Temp Probe Below Range
OK
--
Chemical 1 Dose Rate Exceeded
Tripped
--
Chemical 2 Dose Rate Exceeded
Tripped
--
Chemical 3 Dose Rate Exceeded
OK
--
Low Battery Voltage
OK
--
Reset Alarms

Pump Control



System set up

Chemical Setup

Setting Name	Dose Rate	Tank Volume	Tank Height
Chemical 1	99 mL/m^3	150 L	850 mm
Chemical 2	99 mL/m^3	150 L	850 mm
Chemical 3	15 mL/m^3	0 L	0 mm

General Setup

Terrain Style: Steep

Setting Name	Setpoint
Assigned Catchment Area	3 Ha
Flume Height	425 mm

Weir and Flow Sensor

Magnetic flow meter option


KROHNE


EDD Location
LATTEY
CAT