**Summary of the Operational Process for Wastewater Treatment**

***Overview of updated changes***

To combat potential increases in instantaneous liquid waste to the site’s effluent pre-treatment sump, a further waste treatment stream has been added. Three new high-speed sump to tank pumps have also been installed. The increase in treatment volume capacity and transfer speed will alleviate any issues around the existing pre-treatment sump capacity. There will be no increase to the total outflow limits. The system monitors the total outlet flow and modulates each of the four treatment discharge pumps, ensuring the combined total flow always remains within consent limits.

***Description of effluent treatment techniques:***

The Envirogen Plant controls pH values of the waste liquid by dosing HCL or NaOH depending on the pH value. There were three 75m³ effluent tanks operating on a batch process, however, this is being extended to four and as such will create four individual process streams. Each tank has a recirculation line that contains flow and pH monitoring equipment. Independent recirculation, assessment, and treatment phases occur for each effluent batch.

***Description of process monitoring to ensure adequate treatment:***

Each 75m3 effluent tank has mag flow meters to offer real time flow rates of the recirculating effluent. These are fed back to a PLC using a 4-20mA signal, with the PLC code including signal monitoring alarms. In addition to the flow monitoring equipment, each line is fitted with two pH probes that offer real time feedback to the PLC. Again, these signals are 4-20mA and have independent watchdog alarms. The PLC monitors the value from both probes and compares the values for discrepancies / erroneous values. All probes are installed on quick release connections for ease of calibration.

***Description of emission monitoring:***

When the treated wastewater is being discharged, the route is via the two pH probes dedicated to that effluent tank. The alarms detailed above regarding the signals and probe discrepancies are active during this cycle. Should the pH alter beyond the set tolerances, the process will return to the recirculation, assessment, and dosing regimen of the control sequence.

***Justification of the choice of treatment:***

The parameter that required control was the pH value of the wastewater being discharged.

***For the wastewater treatment facility you need to identify options (including consideration of membrane techniques such as membrane bioreactor) for re-use of the treated effluent and justify if re-use is not proposed.***

Envirogen produce a range of wastewater treatment systems including anaerobic & aerobic digestion with membrane bioreactors. These are installed to control COD & BOD loadings, with an option for waste to energy solutions via anaerobic digestion and methane gas production. The design of this plant was to deal with pH only.

***Description of process monitoring.***

All process parameters are fed back to the PLC in real time using 4-20mA signals, all of which have associated watchdog alarms. pH values are recorded and trended during discharge phases.