May 25, 2018

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Hello Dan,

On behalf of Old Schoolhouse Brewing (OSB) please accept this description of the process wastewater pH control system. The purpose of this is to share information and satisfy WAC 173-240-130.2.g. This is an accurate representation of the process and concept. Please feel free to ask questions.

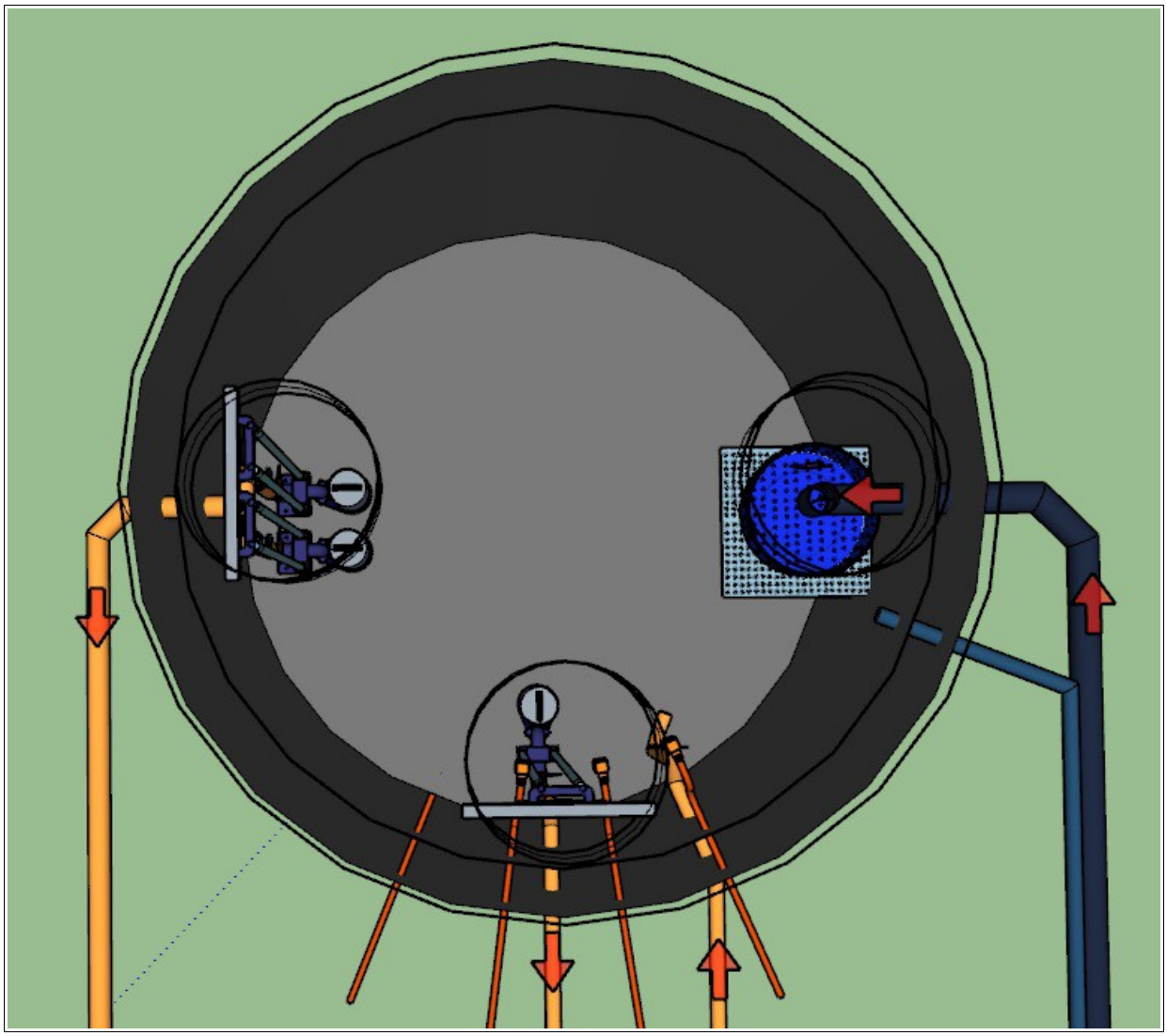
Process wastewater from the brewing, fermentation, and packaging processes will enter a dedicated drain floor drain system inside the brewery. Sanitary wastewater from restrooms, the future tasting room, sinks, or any kitchen space will be kept separate from the process wastewater system, and will discharge direct to sewer. This document describes the process wastewater control system.

The process wastewater control system will be fully automatic, and is designed to comply with local regulations, specifically the local pH limits of 5.5 to 12. Discharge flow will be measured with a flow meter, and a full datalog will be maintained. The controls allow for remote access, so employees can monitor from their office, at home, or their mobile device. I can also access the system from my office in Colorado.

Projected flows during the first year of operation will average 467 gallons per day. These flows will increase as the brewery grows, expected to average 1,325 gallons per day in the 5th year of operation. These forecasted figures are based primarily on future sales targets; significant changes in flow may be realized if sales are higher or lower.

Process wastewater will enter the floor drain system inside the brewery and gravity flow to an underground tank/lift station outside the building. This lift station is unique. There is a screen inside to capture large particles, and a mixer to circulate water past a pH electrode. Automatic chemical addition for pH balancing will occur as needed. The discharge pumps will be interlocked to pH, preventing discharge pump operation if the pH is out of range.

Here is an overview of the lift station with the lid removed:



One mixer pump is visible on the bottom, with two discharge pumps on the left. The discharge pumps alternate with each pump cycle.

Wastewater enters the lift station through the pipe on the right of the image. The water falls through a coarse barrel screen, designed to catch large items such as pallet chunks, shrink wrap, tools, bottles, etc. If the barrel screen plugs, water simply overflows in to the lift station.

The mixer pump turns on at 30% tank level and will run continuously until the tank level drops to 10%. The mixer pump will then turn off and activate again at 30% tank level.

Activation of the discharge pumps occurs automatically, and there is an interlock between pH and discharge pump activation. If the pH is in range the discharge pumps are enabled; if the pH is not in range the interlock activates and the discharge pumps are disabled. More specific logic is:

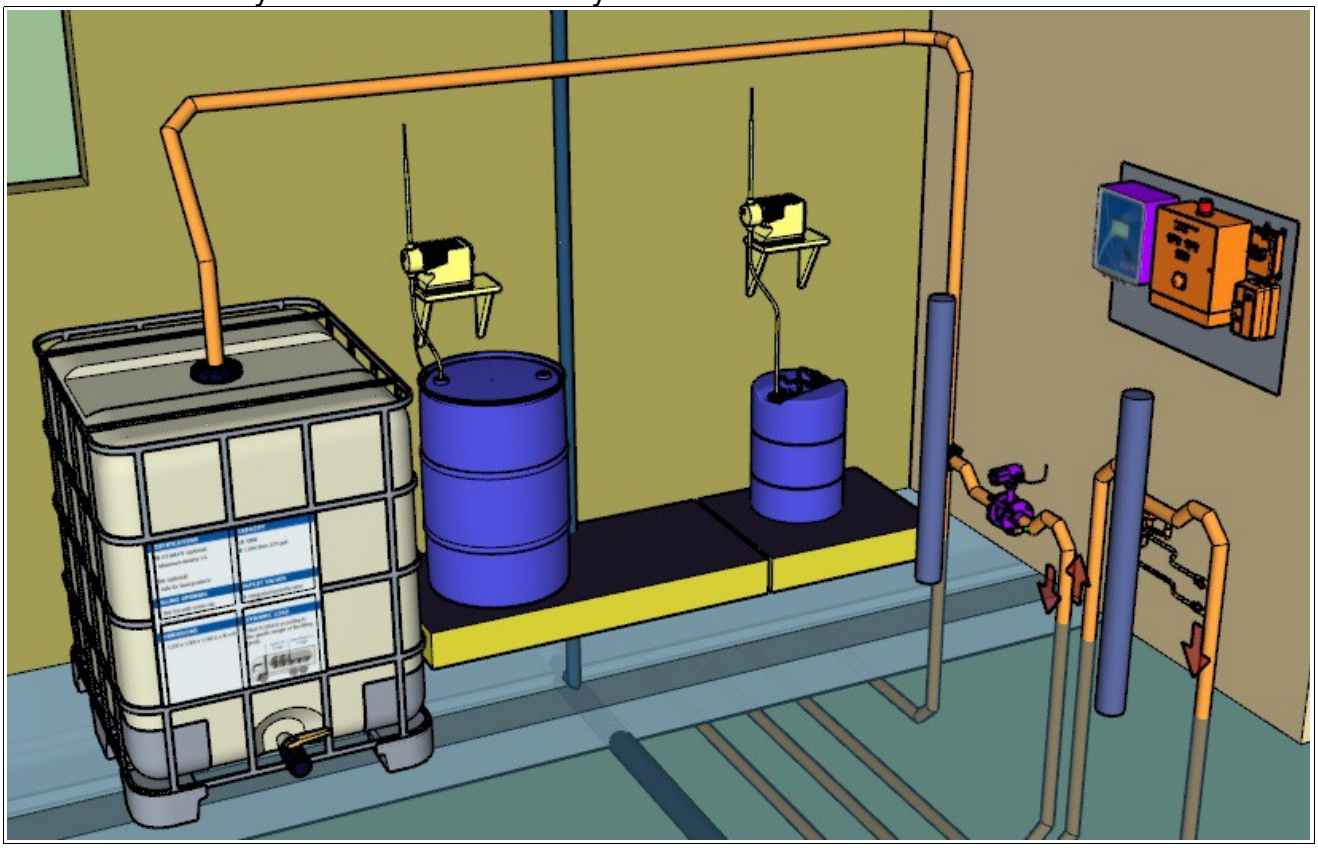
- When tank level reaches 40% and the pH is in range, enable the discharge pumps.
- The discharge pumps will pump down to 10% tank level.
- If, during pump down, the pH goes out of range for 60 consecutive seconds, disable the discharge pumps.
- If the tank level reaches 40% and the pH is not in range, disable the discharge pumps.

- Continue mixing the tank and adding chemical as needed.
- If the pH comes in range, enable the discharge pumps.
- If the pH does not come in range, at 70% tank level an autodialer will email and text message alarms. A local alarm light and buzzer will activate as well.
- Continue mixing the tank and adding chemical as needed.
- If the tank level reaches 90%, enable the discharge pumps down to 65% tank level, preventing an overflow.
- If the tank reaches 70% tank level again, the alarm sequence will occur again.

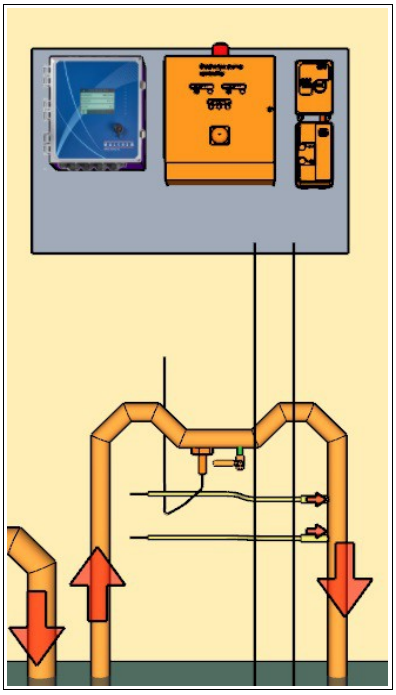
All of these settings are able to be changed, on the fly, and remotely if needed.

If there is a spill in the brewery, such as a batch of wort down the drain or a chemical spill. We can turn the discharge pumps off, switch a valve inside, turn pumps back on and deliver the water to a calamity tank. This way any sort of spill can be contained and disposed of at leisure. Any sort of accident like this is rare, likely less than once a year, but this simple system provides protection against these spills.

Here is a view of the system inside the brewery:



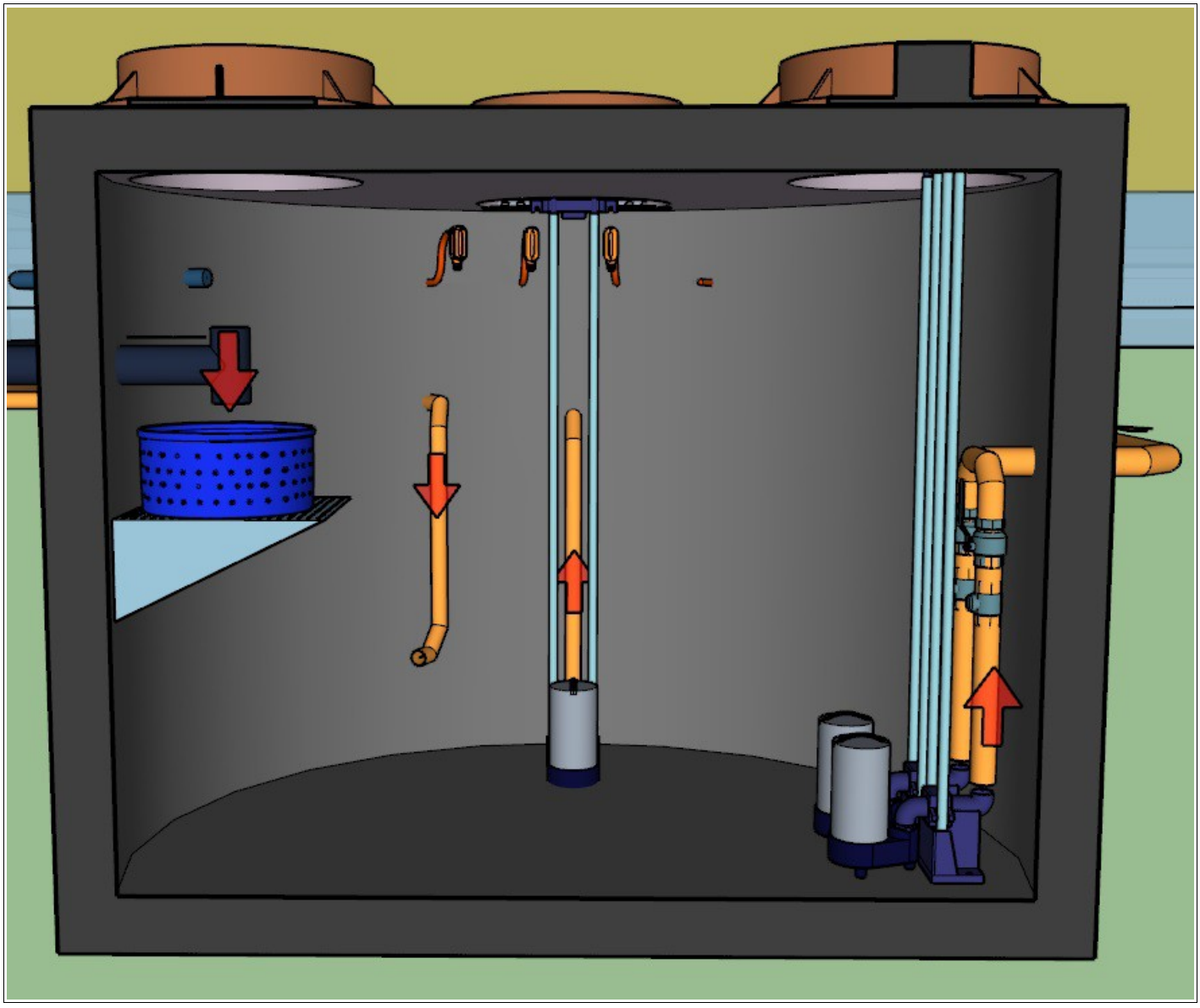
From left to right, we can see the calamity tank, chemical pumps and drums, flow meter loop, mixer loop, and controls. Here is a closer view of the controls and mixer loop:



The mixer pump circulates water through a loop inside the building. This pH control loop contains, in order, a pH electrode, sample port, and two chemical addition ports. The mixer and chemical addition system will run any time the tank level is greater than 30%.

The low spot in the pipe for both the pH electrode and flow meter is to keep them submerged in liquid at all times.

Here is a cross section of the lift station tank:



Wastewater enters the tank on the left and falls through the screen. Mixer pump in the center of the image with the mixer return to the left. Discharge pumps on the right.

Please see the attached Process Flow Diagram detailing this system.

I hope you appreciate this description of the proposed process wastewater control system at Old Schoolhouse Brewing. Please let me know if you have any questions or comments, or if you need more information. Thank you.

Signed,

John Mercer
Owner, Brewery Wastewater Design, LLC