

Brightwater Reclaimed Water Divert to Drain Operation

The Brightwater Reclaimed Water (RW) distribution system is programmed with automated controls to prevent off-spec RW from being delivered to customers. The distribution system is also furnished with additional controls that can direct RW to perform ancillary functions throughout the Influent Pump Station (IPS), North Creek Pump Station (N. Creek), York Pump Station (York), and the conveyance system. Details regarding each of these operations is described below.

Off-spec RW Divert to Drain Control Strategy

To ensure off-spec RW is not distributed to customer sites, the control strategy diverts off-spec water under the following conditions:

1. **Turbidity:** Turbidity is measured IPS. Values exceeding 0.5 NTU will cause the primary distribution valve (301) to close. The system will open the divert to drain valve at IPS (510) and flush off-spec RW to the wet well until turbidity values meets compliance values. Shortly thereafter, the 510 valve will close and the 301 will open, allowing RW distribution to resume.
2. **pH:** pH is measured at IPS. Values less than 6.0 or greater than 9.0 will cause the 301 valve to close. The system will open the 510 valve and flush off-spec RW to the wet well until the pH meets compliance values. Shortly thereafter, the 510 valve will close and the 301 will open, allowing RW distribution to resume.
3. **Chlorine Residual:** Total chlorine residual is measured at IPS and York.
 - a. **At IPS:** Due to the variable chlorine demand of the makeup water, variation of customer flows, and the distance to the customer sites, there is the potential that chlorine concentration will not meet spec by the time it arrives at York for distribution. The total chlorine residual is measured at IPS is primarily used as a monitoring point to ensure chlorine concentrations will sustained throughout the conveyance system and reduce potential for invertedly distributing off-spec RW to customer sites. Concentrations less than 0.75 mg/L will cause the 301 valve to close. The system will open the 510 valve and flush RW to the wet well until measured total chlorine residual is greater than 0.75 mg/L. Shortly thereafter, the 510 valve will close and the 301 will open, allowing RW distribution to resume.
 - b. **York Pump Station:** Total chlorine residual is measured at York. Concentrations less than 0.5 mg/L or greater than 4.5 mg/L will cause the customer distribution valve (507) to close and prompt the divert to drain valve (502) to open. Off-spec RW will flush to the York wet well (via the North Creek Force Main Diversion Structure) until the measured residual is greater than 0.5 mg/L or less than 4.5 mg/L. Shortly thereafter, the 502 valve will close, and the 507 will open, allowing RW distribution to resume.

RW Diversion for Ancillary Functions

Both compliant and non-compliant RW can be automatically or manually diverted using the same diversion piping systems described above for the following purposes:

- **Wet well corrosion and odor control:** At IPS, North Creek, and York, RW is used to supply chlorinated water to the respective wet wells. Chlorinated water reacts with the hydrogen sulfide in the wastewater to prevent it from corroding the concrete chamber and mitigate foul odors from the system. Brightwater operations staff can operate diversion valves from Main Control and send RW North Creek and York wet wells as needed from East Offsite operations staff. This operation is automatically performed at IPS when off-spec RW is diverted to drain, but can also be performed manually as needed.
- **Equipment Flushing:** RW is used at IPS for flushing the wet well influent sluice gate to remove accumulated debris and material and ensure reliable operation of the gate. The system operates on an operator adjustable timer and supplies RW to the water lances directed at the gate.
- **Conveyance Flushing:** The system can be manually operated to continuously flush RW through diversion piping (at IPS, North Creek, or York) to support miscellaneous conveyance needs, such as nitrogen removal, as well as ensuring RW remains compliant throughout the distribution system.