

Lift Stations

By Mike Lucas, Wastewater Technician

I receive numerous phone calls and emails concerning lift stations from operators, consultants, funding agencies and Village Board/City Council members. Lift stations can be major energy users and the source of problems for many wastewater collection systems. Many times lift station pumping records are based on hour meters and the pump's nameplate gallons per minute (gpm) capacity.

At least annually the pumps should be calibrated to determine their actual pumping rate. These should be recorded to reveal trends as the pumps wear. Flow meter accuracy can also be verified. Calibration is a relatively simple process requiring a tape measure, stopwatch and calculator. Make all measurements in inches.

With circular wet wells calculate the surface area by taking the radius squared times 3.14. In square or rectangular lift stations multiply the width by the length. Measure down from a fixed point to the level where the pumps kick on and again where they kick off. Time how long it takes for each pump individually to pump it down. This difference in length times the surface area gives you the volume pumped in cubic inches. Convert the cubic inches to gallons by multiplying by .0043. Convert the time in seconds to minutes. If there is flow coming into the lift station while you are test pumping it down then time how long it takes to refill and the pumps to kick back on. You previously determined the volume so calculate the rate of flow into the lift station. The actual pumping rate then is the volume in gallons divided by the time in minutes for the draw down with the gpm flow into the lift station added to it.

Do this several times for each pump. If new pumps were installed and they aren't pumping at the nameplate there may be a blockage. One particularly astute operator determined that a check valve on the lead pump was stuck open. Replacing the check valve reduced the energy usage at the lift station by nearly half. I've heard of other instances where a check valve was stuck open.

If you would like assistance calibrating your lift station pumps contact me on my cell (402)443-6157 or email me at lucas@nerwa.org.