



INDUSTRIAL FLOW SOLUTIONS™

A SMART WATER APPROACH TO WET WELLS

JAMES HUCK- BUSINESS DEVELOPMENT MANAGER

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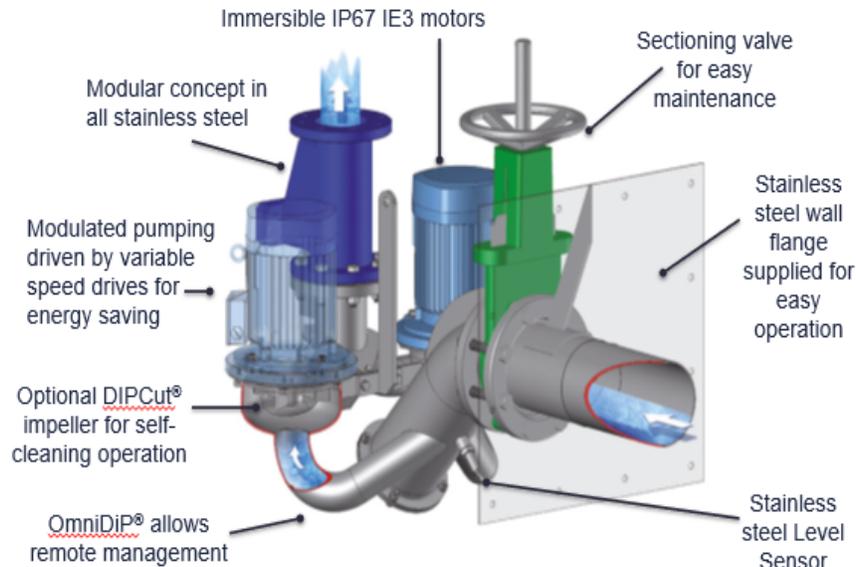
Imagine a future with smart pumping stations and no more wet wells. It seems almost impossible, right?

For the last 100 years, the way we have managed lifting influent or storm water from gravity pipes has been the same. Fill a tank, signal the drive with a high-level float, then pump like hell until the tank minimum level float activates. Does not sound very efficient, right? With so many hazards associated with retaining such caustic and just disgusting liquid, why do we continue to do something that is so archaic? If a car can drive itself down the road, maintain speed with other vehicles and avoid obstacles, don't you think it is about time our lifting stations do the same? Well, it is no longer a figment of imagination, but a completely new way of thinking about how we design, maintain and control lift stations.

The effects of COVID on United States' water utilities has had some significant changes to the way we go about our day-to-day business. And like in other industries, innovations in technology are extremely important for improving workplace safety and efficiency. When combining the pandemic effects along with that of an aging infrastructure, tomorrow's wet wells cannot continue down this dead-end path.

It is time for a completely autonomous, smart water solution for wet wells. The **OverWatch™** Direct In-Line Pumping Technology, by Industrial Flow Solutions™ uses smart control to react to its environment in real-time, changing operation conditions with the incoming flow, and allowing for complete remote condition monitoring. Utilizing one's digital device, an operator can view a station's status and understand its performance, or even take control of the system from anywhere in the world. Additionally, the **OverWatch™** Direct In-Line Pumping system creates an environment that eliminates wet well maintenance, exposure to dangerous gases and hazards, reduces ground works, while saving 30% on energy costs and 65% total savings over the life of the pump. With over 2000 installations globally, **OverWatch™** Direct In-line Pumping Technology is maximizing safety and minimizing maintenance by retrofitting current and new lift stations all over the world.

The technology is simple. A traditional wet well collects wastewater and then pumps once the system's predetermined level is reached. A technology dating back to the early 1930's, this process enables the



Only patented system to lift effluent directly at the point of entry

Figure 1: The OverWatch™ system utilizes a duplex pumping system consisting of one 304L stainless steel hydraulic body, two IP67/IE3 immersible motors and driven by variable speed drives. One pump is in service while the second pump is in standby.

collection of materials to potentially solidify and clog the impellers. Not only is there risk of damage to the impellers and pump equipment, but the structure may erode from the build-up of abrasives materials and acidic solutions. This all leads to premature wear, pump failures, extensive maintenance, and replacement costs. A system designed specifically to lift influent directly from the inlet to the discharge while detecting solids from the gravity lines, The **OverWatch™** Direct In-Line Pumping system solves many traditional wet well issues. This unique system consists of one 304L stainless steel hydraulic body and two IP67 premium efficiency immersible motors controlled by variable speed drives.

One pump is in service while the second pump is in standby. Operation is based on continuous pumping and decreasing backups by lifting influent directly at the point of entry, without a wet well. Since fibrous material is handled as it arrives, there is no ability for rags, fats, grease, or oils (FOG) to solidify and collect near the pump's suction. Combining the technology of a liquid level sensor at the inlet and variable

frequency drives that adjust with incoming flow, the system will automatically adapt to the constantly changing flow rates in real time. This configuration allows for a completely autonomous controlled lifting station. The technology watches over the pumping units to determine if there is a clog. Should a restriction be detected, the unit will reverse the rotation of the impeller and divert flow to the standby pump. The pump will cycle itself to determine when the clog has been freed and then resume normal operation. If the system detects elevated flow levels, it will increase the speed of the pumping unit. If the flow is exceeding the capabilities of the single unit, the second pump will turn on for simultaneous pumping. This unique operating mode provides a long-term durable solution, with minimal need to replace, repair, or maintain your water lifting system.

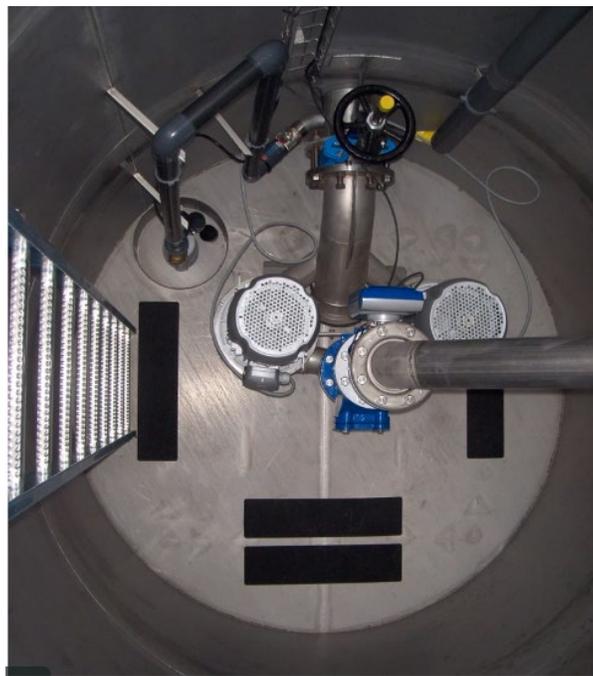


Figure 2: Influent is lifted directly from the end feed, eliminating the need to retain raw sewage, keeping a clean, dry environment.

Maintenance is eliminated and repairs are simplified. Eliminating the need for a wet well prevents hazards associated with retained influent. The buildup of gases such as hydrogen sulfide and methane directly impact the environment, the health of those exposed, and presents possible dangers of explosions

when combined with a source of ignition. Containing the pumped liquid within the stainless-steel body of the system removes odors, while allowing for a completely dry installation of the valving, metering, and control system. There is no longer a need for a separate valve chamber and the potential for uneven settling between vaults is eliminated. When designing into a new application, only 24 inches below the inlet is required, greatly reducing the excavation depth required for traditional systems by 6 to 8 feet. Also, without sediment collection, or the need for catch baskets, regular maintenance is eliminated. Since the system is contained within a single vault, the required footprint is greatly reduced. Less space is required above grade as only a single inspection port is needed. When the required footprint is limited due to environment limitations, or the depth is compromised by water tables or rock ledges, these configurations can allow for adaptive installations. Say goodbye to odor compression systems and additives - with no exposed influent, odor is contained within the system.

Maintaining clean pipeworks becomes less of a challenge as well. Since the flow virtually never stops, solids never settle. Minimum flow set points can be adjusted by the operator on site. As the system starts to detect higher heads from restricted flows downstream, motor speed will ramp to force flush the line

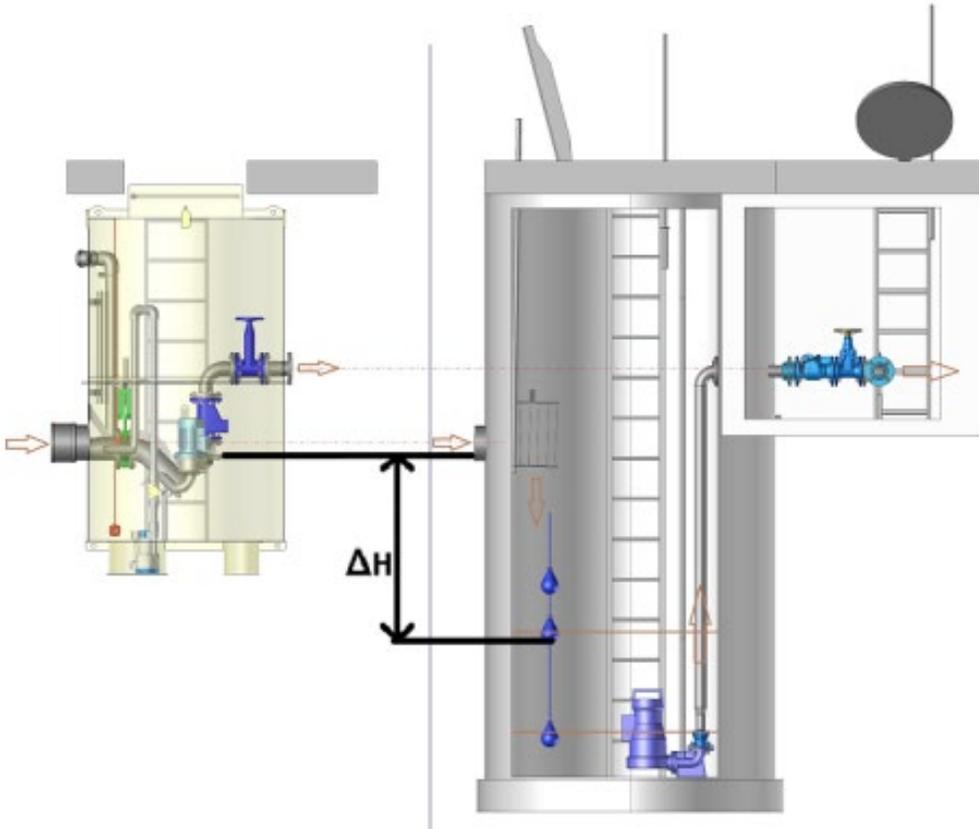


Figure 3: A Dry Well System utilizing **OverWatch™** technology (left) versus a traditional wet well utilizes less ground depth and requires less head.

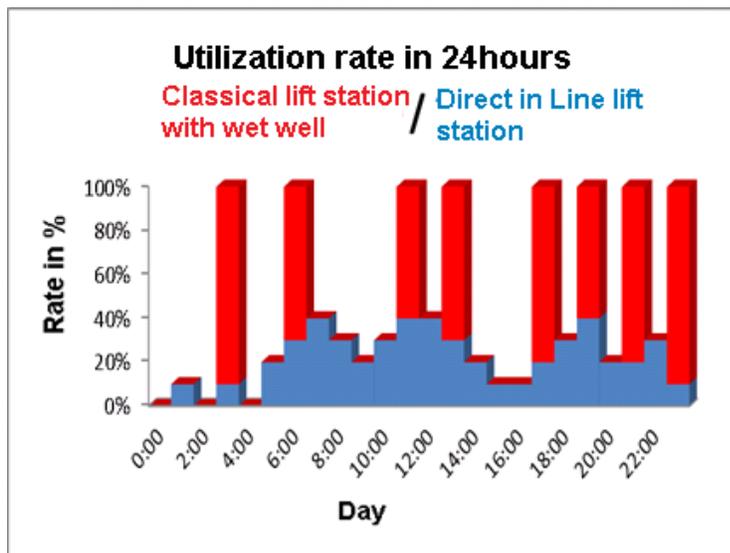
A smart system that keeps you informed. The OverWatch™ Direct-In line pump system is driven by variable speed drives. Based on principles of hydraulic regulation and variable speed, operation is no longer based on “all or nothing” pumping but continuous pumping directly from the influent inlet, performing all the functionality of a traditional lifting station without the need for additional equipment. Speed variation and simplified controls on the same panel allow regulation in any configuration, including the most complex combined sewage systems. If you desire remote monitoring and notifications from your system, an optional SCADA system can be added. This allows advanced remote functions such as resetting, remote unclogging, and fault notification communication via secured internet interface and/or standard SCADA controllers.

Shredding off Clogs. If flushable and other fibrous materials are causing your pumps to backup or clog, “non-clog” or grinder pumps are typically selected. While these technologies work well independently, water supervisors have been forced to pick one or the other; “Do I handle the potential clog at the lift station or manage it at the plant?” Newer impeller technology makes it possible for the unit to be both a non-clog and a grinder. This variable vane impeller design utilizes a



vortex style impeller with hinged vanes that fold flat and expose blades for shredding capability when operated in reverse rotation. Coupled to the variable frequency drive and managed via the smart self-monitoring system, this impeller changes its function when the direction of rotation reverses to cut snarled long fibrous materials and rags, and then removes them without human intervention, or losing its high hydraulic pumping efficiency.

65% savings over the total life of the pump. With the reduction of lift required and variable frequency drives, the **OverWatch™** system operates more frequently but with far less energy consumption, allowing



for savings of up to 30% (figure 5). This frequent runtime helps eliminate solidification of FOG and fibrous materials that would traditionally cause unplanned downtime, suction trucks, and pump repairs. Construction and foundation support work are simplified. The large and heavy concrete basins requiring tremendous foundation support can be replaced with stainless steel or fiberglass basins. The flexibility and durability of these materials will allow for less well maintenance and longer service life for years to come. Since the wet well has been eliminated, regular cleaning of the well is also a thing of the past.

A Proven Technology. The village of Sherman in upstate New York had a real messy problem with serious safety concerns that was eliminated in just 12 hours of work. The town's lift station before the headworks would experience frequent clogging. The pumps were aging, and the village was experiencing significant down time. Once a week, associates were needing to either take the pumps apart to remove mop rags or clean bar screens. A septic cleaning truck was also needed every two to three months to pull everything out of the tank. Additionally, the village wanted to improve on employee safety due to a confined space entry through a 36-inch silo access and a 20-foot descent to the submersible pumps. While looking for the best solution for their community, they determined that the OverWatch™ Direct In-Line Pumping System was the answer to their concerns. The system is delivered essentially plug-and-play, as shared in Treatment Plant Operator's May 2018 article: *How we do it: Direct inline pumping in Sherman, New York*, Chief Operator Jay Irwin shares: "It's a very innovative technology. It got rid of our confined-space issues. I know it's going to save us a lot of man-hours". Approximately \$8,600 is saved in maintenance each year over the traditional wet well system.



Figure 4: The complete system installation shows a dry space with easily accessible equipment in place of a hazardous wet well environment (Picture provided by the Village of Sherman, Treatment Plant Operator, May 2018)

Bibliography; James Huck- Business Development Manager at Industrial Flow Solutions™ of New Haven Connecticut holds a Mechanical Engineering degree and has spent 11 years engineering systems and components into various industrial markets. Industrial Flow Solutions™ proudly designs and manufactures hydraulics and the control systems right here in the USA. On a mission to change the way the world thinks about wet well design, he is backed by a full engineering staff and experience pumping professionals. the team at Industrial Flow Solutions™ is ready to solve the most challenging of flow issues.

Reference:

Treatment Plant Operator, May 2018; *“How we do it: Direct inline pumping in Sherman, New York”*