

DEWATERING ON INTERSTATE 4 CONSTRUCTION



Interstate 4 is one of Florida's most heavily traveled highways. Running east and west-bound, I-4 connects Daytona Beach on the east coast, and Tampa on the west coast and runs right through the heart of downtown Orlando, and supports the rapid growth of residences and businesses currently calling Central Florida home. I-4 is host to not only everyday commuter traffic into Orlando, Tampa, and other surrounding areas; it also handles tourist traffic from the airport and to the many attractions and theme parks on both coasts and points in between. Understandably, I-4 is easily congested with all of the traffic it receives.

The Florida Department of Transportation has planned projects and awarded contracts to construction companies in order to alleviate some of the traffic issues presently plaguing I-4.

The most heavily affected area is in Polk County, between Orlando and Tampa, where Martin K. Eby Construction Co., Inc., and other contractors are trying to complete work well before the specified time frame.

Eby Construction has been awarded the longest segment of construction in Polk County – approximately 16 miles of highway reaching from U.S. 98 to County Road 557 – and the most expensive, with project costs totaling upwards of \$75-million. Jeff Holaday, Superintendent for Eby Construction, said that Eby Construction was responsible for widening I-4 from two lanes to three lanes in both east and west bound directions, widening most of the existing bridges and exits and replacing four of the cross-over bridges with new bridges.



A Thompson Pump 8-inch Vacuum Wellpoint Pump dewatering a stormwater drain under an overpass on Interstate 4 near the Polk County line.

Along with that, Eby Construction is also responsible for installing 9,000-feet of new noise-deadening sound walls to reduce the noise concerns of residences and businesses located close to the busy interstate. They will also be installing 35,000-feet of new stormwater pipe, and excavating for the installation of 27 new ponds to better accommodate the heavy rains experienced in the area.

Dewatering has definitely played a major part in the construction efforts. Eby Construction partnered with Thompson Pump's Sarasota Branch to address the dewatering concerns. Eby chose Thompson Pump because of the successful projects the two companies completed in the past, and the expert customer service Thompson Pump has provided. "In Florida, it rains everyday," reports Holaday. "We have two kinds of soil out here [on the west coast of Florida]. One is a very granular, sandy soil, which is very easy to work in. The other is more of a dense clay material, which doesn't allow the water to seep into the ground [which causes the rain to collect on the highway]. A half-inch of rain causes the pumps to operate for long periods of time."



A Thompson Pump 8-inch Vacuum Wellpoint Pump dewatering a rim ditch to assist with the construction of a new bridge that will cross over the busy interstate.

Gary Stark, Thompson Pump's Sarasota representative and the team at Thompson Pump's Sarasota Branch offered complete support throughout the project. Stark reported that some of the dewatering projects Eby Construction were to face varied greatly.

Eby Construction needed cased wellpoint dewatering during the excavation of one pond, sock dewatering for the installation of ponds, a new stormwater system and box culverts. Other dewatering projects included a stormwater system bypass allowing its repair, box culvert dewatering, the excavation of more ponds, and general rainwater dewatering.

With the many different types of dewatering the project demanded, Thompson Pump recommended that Eby Construction utilize their Vacuum Wellpoint Pump. Thompson Pump's Vacuum Wellpoint Pumps produce a maximum of 2,600-gallons per minute and combine two of the most sought after technologies in pumps: solids handling and air-handling capability.

The combination of high flow capability, solids handling and air-handling capability would allow Eby Construction to use the same pumps on several different applications. The Vacuum Wellpoint Pump employs a self-priming centrifugal pump along with an external air-handling vacuum pump, which alone can handle up to 200-cubic feet of air per minute. This gives the pump the ability to achieve and maintain prime on it's own and provides minimal priming times.

With the self-priming centrifugal pump and vacuum pump combination, Thompson Pump's Vacuum Wellpoint Pumps can be used in not only wellpoint and sock applications, where large amounts of air-handling is required, but also in many other different dewatering applications where solids have the chance of passing through the pump.

Thompson Pump also recommended a Double Diaphragm Pump for some of the general dewatering applications. With a integral fuel tank that provides enough fuel for 100 hours of operating time, the Thompson Pump Double Diaphragm Pump can pump continuously for more than 24-hours on a single tank of fuel. The design of the Thompson Pump Double Diaphragm Pump does not allow the pumped water to come into contact with any rotating parts, allowing it to run dry indefinitely. Thompson Pump's Diaphragm Pumps are able to produce a maximum flow of 270-gallons per minute.

Eby Construction purchased two 8-inch Vacuum Wellpoint Pumps and two 4-inch Double Diaphragm Pumps. Over the course of the project, the pumps performed well in the applications they were used. But that's not to say all went smoothly.

One of the biggest obstacles experienced occurred when dewatering one of the 24 ponds on the I-4 project. The pond itself needed to be dewatered in order for crews to come in and excavate the pond to the desired depth, and install a rubber ground lining to protect the integrity of the pond. While the pond water was being removed from above, the groundwater was infiltrating the bottom and banks of the pond making the installation of the liner difficult. Holaday determined that in order to remove the groundwater effectively; a wellpoint system should be installed. The soil in the

area comprised of a dense clay material. Holaday recognized that rather than self-jetting the wellpoints, a casing would have to be used to accommodate installing the wellpoints.

Dewatering by wellpointing involves installing a series of small wells (wellpoints) into the ground, connecting the small wells to a common manifold (header pipe) and connecting the manifold to a pump capable of large amounts of vacuum – thereby closing the pump system. The vacuum produced by the pump carries to the wellpoints in the ground and water is pulled through very thin slits cut into the wellpoints, through the manifold and out the discharge side of the pump. Depending on the soil conditions, wellpoints are usually installed with the aid of pressurized water from a high-pressure jet pump. The pressurized water disbursts the soil and bores a hole in which the wellpoint is pushed in by hand.

When the soil is too dense for the wellpoint to be installed solely with the aid of pressurized water, as in the case on I-4, a casing is used to penetrate the dense soil. A casing is a large metal cylinder in which the wellpoint, and riser pipe are inserted. With the aid of highly pressurized water and the downward pressure of a backhoe, the wellpoint is forced into the ground.

Two wellpoint systems were installed comprising of more than 200 wellpoints, more than 1,000-feet of PVC pipe, as well as four more Vacuum Wellpoint Pumps supplied by Stark and Thompson Pump’s Sarasota Branch. With the wellpoint system installed and the Vacuum Wellpoint Pumps set up to handle the groundwater, the surface pond water removed, the excavation took place and the liner installed.

Another form of underground dewatering that was used on the project was sock dewatering. Sock is a dewatering method in many ways similar to wellpointing, but instead of using small vertical wells (as wellpointing does), sock involves a long, corrugated plastic hose with perforations that accept underground water. Installation of the sock would begin with creating trenches in the ground along the area where dewatering was needed. The sock is then laid horizontally in the trench and buried underground. The pump is then attached to the sock and when started a vacuum is created and the ground is dewatered. The groundwater is discharged to a pre-determined collection pond for further handling.

Eby Construction used sock dewatering on previous construction jobs and relied on it again for their efforts on I-4. Sock dewatering was used before excavation could begin to install a new storm drainage system and before excavation of new ponds.

Stark proved to be a valuable resource to Holaday and Eby’s efforts on I-4. “That personal knowledge of having someone that’s been in the industry, it’s always good to bring in a fresh [point of view]. You don’t get someone saying, ‘Well, I don’t know. You’re the contractor!’ Customer service is a big thing,” Holaday said.

At times when Eby’s fleet of Thompson Pump’s were being utilized in other applications, more pumps were needed. Stark provided pumps that would handle the dewatering application quickly and efficiently at the lowest cost. One of the



newest additions to Thompson Pump’s product line is their Piston Wellpoint Pump, which was suggested on a sock application.

When asked how he liked the Piston Wellpoint Pumps, Holaday said he was impressed. “We tried [the Piston Wellpoint Pumps], and they were great!”

Thompson Pump’s Piston Wellpoint Pumps use pistons rather than an impeller or a diaphragm, as the other pumps Eby was using. The Piston Wellpoint Pump is extremely efficient as it can operate more than one week without refueling – consuming up to only 5 gallons of fuel per day. It is equipped with a sound-attenuated enclosure, which reduces sound to 64-dB(a) at 23-feet. The pump is also capable of running unattended for long periods of time. All of this, and its high air-handling capability, made the Piston Wellpoint Pump perfect for wellpoint and sock applications.

Another Thompson 8-inch Vacuum Wellpoint Pump dewatering a pond that will be further excavated and a rubber lining will be installed to protection the pond floor.



A Thompson Pump Diaphragm Pump dewatering rainwater that collected in an already dewatered pond location. Rain was an issue that had to be dealt with each day. Because the soil was dense in some areas, rainwater could not seep into the ground. New ponds were excavated in order to provide a place for rainwater that landed on the dense soil to collect.

something that can wait, we'll wait for it. Again, it's the personal attention and customer service that helps. Like anything else in this world, we are going to have problems – anything mechanical will break eventually," Holaday said. "My past experience is really what sent me in this direction – that and customer service. Knowing the people you're dealing with, and having the people you deal with treat you as a person – not a number, is a big part of my decision to use Thompson Pump."

With nine months left on the project, and a very active hurricane season, the construction efforts on Interstate 4 are moving along with the team of Eby Construction and Thompson Pump.

After almost 3 years of being involved with this project, Holaday said retrospectively, "This project has been a tough one. We're coming into the home stretch. This is not a project that [Eby Construction] or anybody else could have done alone. [Most construction companies are] used to running our own jobs; take on a 15 or 20-million dollar job and you go out there and run it yourself, and get your hands around it."

Holaday appreciated the professionalism, expert advice and reasonable pricing Stark and Thompson Pump provided, as well as the piece of mind knowing that he had a valuable partner who was genuinely concerned with the success of his operation. Holaday also appreciated the relationship between Eby Construction and Thompson Pump.

"I think the relationship is very good and I think it has helped when we have had issues with the pumps. It doesn't matter if it's Saturday or Sunday, or Friday, at 7:00pm, I can always get somebody on the phone and if it's a big problem, it's taken care of quickly; if it's