NEBRASKA WATER ENVIRONMENT ASSOCIATION

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highlights

South Omaha Industrial Area Wastewater Improvements Help Protect Public Health and Water Quality

By David White, PE, Wade Trim and Jeffrey Ray, PE, Wade Trim

The conveyance of high strength industrial waste, primarily from the meat packing industries in South Omaha, through the combined sewer system has a long history which is quickly coming to a conclusion under the implementation of Omaha's Long Term Control Plan. In the Monroe Basin, there are currently six industrial facilities that discharge higher strength wastes into the sewer system. In 2008, the City of Omaha Public Works Department initiated a study with the intent of providing a separate conveyance and treatment system, thus eliminating the potential for overflow of these high strength waste streams to the Missouri River during wet weather events. Per study recommendations, a three-phase upgrade involving sewer separation, conveyance, and treatment improvements in the South Omaha Industrial Area (SOIA) is underway. This project is included in the City of Omaha's Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) and will provide for a significant improvement to water quality in discharges to the Missouri River.

In the 1950s, wastes from Omaha's meat packing plants discharged directly to the Missouri River with little or no treatment. With the construction of the Missouri River Wastewater Treatment Plant (MRWWTP) in the 1960s, efforts were made to pre-treat the meat packing waste streams at a remote facility. Thus, a City of Omaha Water Pollution Control Facility was built to remove paunch manure and grease from the industrial wastewater. The site soon became known as the "Paunch Plant". The facility utilized the Carver-Greenfield process to separate the paunch manure and grease from the waste stream with the water being returned to the combined sewer system for further treatment at the MRWWTP. However, due to operational difficulties with the facility, it was eventually decommissioned, the meat packers implemented pretreatment on site, and the resulting flows were conveyed through the combined sewer system for treatment at the downstream MRWWTP.

Wastewater from meat processing activities carries high levels of biochemical oxygen demand (BOD), fats, oils, and grease that become significant pollutant loadings during wet weather overflows to the Missouri River. Completed in 2010, the SOIA Sewer Separation Project was the first step in removing these industrial flows from the combined sewer system through new sanitary sewers and storm sewers constructed at 10 project sites. The industrial flow now enters the City of Omaha sewer system via the Packinghouse Extension sewer.

In construction since 2011, the conveyance phase projects consist of a new lift station, force main and gravity sewer that will transport the high-strength industrial wastewater to the MRWWTP for treatment. These improvements will reduce odors as well as prevent the industrial flows from discharging at three combined sewer overflow points (CSOs 102, 118, and 119). A diversion structure will be constructed and the Packinghouse Extension sewer routed to a new lift sta-

The SOIA Lift Station includes a Screen Building (left), Odor Control Enclosure (middle), and a Pump Building (right).

SOIA Project Area Location Map in Omaha, NE

tion that will pump wastewater through a 1-mile-long, dual 18-inch force main to a high point in the alignment along 13th Street where it will then flow by 24-inch gravity sewer to the MRWWTP.

The lift station's firm wet weather capacity will be 17.4 million gallons per day (MGD), although typical dry weather flows will be lower (e.g. approximately 6 MGD). The lift station is sited on the location of the former industrial pre-treatment facility known as the "Paunch Plant". The lift station provides preliminary treatment through ¼-inch mechanical screens that remove materials associated with meat processing, such as bone. The wet well, designed to new Hydraulic Institute standards, features anti-rotation baffles and a trench style configuration. Through the use of a 4,000-gpm dry pit submersible pump intake set at an invert below the working bottom of the wet well, the system will have the capability to run in a "self cleaning" mode to pump down as needed to remove solids build up. An extensive odor control system using biofilters is also included along with an emergency power generator.

A built-in pigging system will allow for operations staff to clean the lift station discharge header and force main. Polyfoam pigs will be launched from the pump station, tracked and retrieved to keep the pipeline clear and operating at optimum energy efficiency. The pig is a cylindrical object, twenty (20) inches in diameter and approximately three (3) feet long that is pushed through the force main by water pressure, scraping accumulated fats and debris from the interior pipe wall as it progresses forward. The use of dual force mains allow the system to remain in operation during cleaning cycles.

CONGRATULATIONS TO THE FOLLOWING WHO PASSED THEIR OPERATORS CERTIFICATION!

Class	Name
II	Anderson, Brent M
III	Conklin, Lance J
II	Emick, Tom G
IV	Geiser, John L
IND-1	Hassett, David P
II	Ismail, Ihab M
I	Kwiatkowski, Lance D
IV	Lindeen, Timothy B
II	Mayhew, Lynn M
II	McHugh, Gregory T
L	Negley, Justin B
III	Rice, Donald W
L	Ross, Michael A
IV	Rowley, Donnie L
III	Ryan, Jeffery L
II	Schmitz, Ryan
III	Stuart, David C
II	Uher, Tim J
II	Weyhrich, Scott A
I	Wiedel, Jerrod B
II	Zobel, Rob
II	Bach, Clinton N
II	Brasch, Jon W
I	Church, David
II	Dieckhaus, Christopher J
L	Fabricius, Paul C
III	Hurst, Ryan T
II	Lang, Jeff L
II	McLaughlin, Douglas L
I	Norton, Dwain
II	Noyd, Rueben
L	Shanle, Aaron
II	Smeby, Jacob B
III	Stewart, Joseph D
III	Sund, Dennis J
II	Wiruth, John M

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The pump station features a white roof that reflects solar rays to reduce heat gain and lower energy use. A bioretention pond was created onsite along with an underground permeable detention system to control stormwater.

The sewer separation and conveyance phase projects were designed by Wade Trim. Roloff Construction Company constructed the sewer separation, force main and gravity sewer improvements. Eriksen Construction Company is constructing the lift station which is anticipated to be complete by the end of 2013. Improvements are also in progress at the MRWWTP where a dedicated primary treatment system is being designed for the high-strength industrial flow. These flows are given priority at the MRWWTP to ensure it always receives full secondary treatment and disinfection prior to being discharged to the Missouri River.

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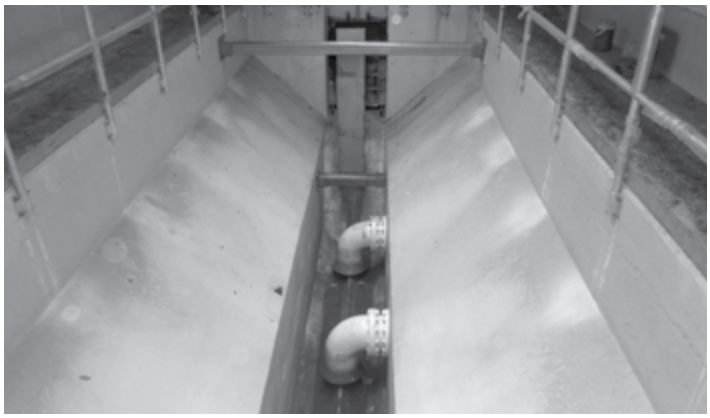
Each of the four dry pit submersible pumps will deliver up to 4,000 gpm.



The trench style wet well is designed to provide for ease of cleaning of the fats, oils and greases expected.

A courtyard behind the lift station provides access to the main working areas and screens most maintenance activities from the view of nearby residents and businesses.