

PIPELINE

Michigan Association of County Drain Commissioners

DRAIN CLEANING GOES HIGH TECH IN MACOMB COUNTY PUBLIC WORKS

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Drain Cleaning Goes

HIGH TECH

Submitted by Gene
Schabath, Macomb
County Deputy Public
Works Commissioner

In Macomb County
Public Works





Pre-project conditions in Sharkey Drain, under I-696 in Macomb County.

Editor's Note: the Sharkey Drain project was recognized with an Honorable Mention from the MACDC Innovation and Excellence Awards Committee.

Keeping Macomb County drains clean has been the mantra for Macomb County Public Works Commissioner Anthony V. Marrocco during his twenty years in office. "Only Rain in the Drain" is the motto Commissioner Marrocco has adopted to remind residents that keeping storm drains clean is important to the environment.

Commissioner Marrocco reached new heights in drain cleaning technology on a project for the Sharkey Drain, a large enclosed drain that serves as one of the primary storm water conductors for approximately 1.4 square miles of residential, commercial, and industrial areas in the cities of Warren in Macomb County and Madison Heights in Oakland County. Marrocco and the Drain Board for the Sharkey Relief Drain hired the engineering firm of Spalding DeDecker Associates, Inc. (SDA) and Doetsch Environmental Services, Inc. (Doetsch) to inspect and clean the Drain's clogged siphons that run under the I-696 Freeway, just east of Dequindre Road in Warren.

At Dequindre Road near the I-696 freeway, the drain enters a chamber where the flow is split into three 72" diameter pipes. The pipes drop approximately thirteen feet to cross under the freeway before rising again at the other side of I-696 and joining at a downstream chamber. This "siphon" configuration was required to accommodate construction of the I-696 freeway. Flow from the downstream chamber is discharged through the 114-inch diameter Sharkey Drain.

As part of the County's maintenance program, Public Works Commissioner Marrocco authorized SDA personnel to enter the drain to determine the condition of the siphon pipes and the volume of accumulated sediment. The three siphon pipes are submerged at all times; SDA sub-contracted for dewatering services to enable physical inspection of the pipes.

The three access manholes into the siphon are located on the edge of the service drive to the I-696 freeway near Dequindre Road. One lane of the service drive was closed to allow access to the manholes. Since the adjacent ramp is within the Michigan Department of Transportation (MDOT)



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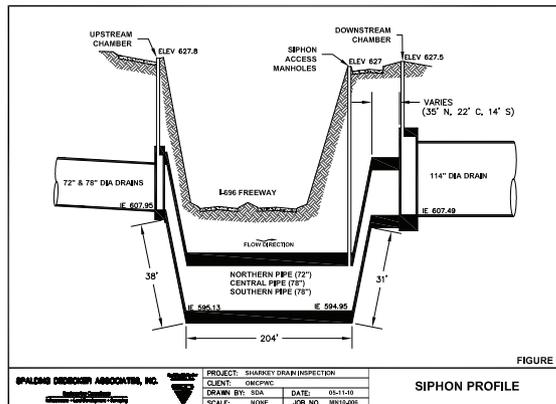
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Sharkey Drain profile

Right-of-Way, an MDOT permit was required to close the service drive lane. The drain could only be entered when rain had not occurred for at least two days.

Ms. Maria Sedki, the SDA Engineer on the project, reported, "Once in the drains, we observed that the northern and southern siphon pipes were full of hard compacted sediment from the start of the siphon at the upstream end to the end of siphon at the downstream end. Within the sediment (we found) trash, including plastic bottles and medical syringes. The two pipes were completely blocked and did not allow any water passage."

The central siphon pipe had about two and a half feet of sticky/mucky sediment for about six feet (just past the access manhole). The sediment was extremely difficult to walk through. There were also large chunks of debris, including an 8' traffic sign, plastic bottles, medical syringes, styrofoam, and grease. Beyond the six feet of sticky/mucky sediment, the remainder of the siphon pipe through to the upstream chamber was in good condition, with approximately nine inches of fine silt at the bottom of the pipe.

Upon being notified of the inspection results, Mr. Marrocco immediately authorized SDA to prepare bidding documents for the cleaning of all three siphon pipes under the freeway. Doetsch Environmental Services was the lowest bidder and was awarded the contract to clean the drain siphon under the I-696 freeway. The low bid was \$245,994, more than \$100,000 below the engineer's estimate of \$350,000.

Using a HyJector with Grand Volumetric Recycler, Doetsch was able to clean all three siphon pipes in 14 work days. During the cleaning, SDA performed the construction contract administra-



Macomb County Public Works Commissioner Anthony V. Marrocco (right) examines the massive water filtering and sediment extraction system parked along the I-696 Freeway Service Drive in Warren. Joseph Schotthoefer, (center) vice-president of Doetsch Environmental Services explains how the system works. Also on the on-site tour was Steve Benedettini (left), president and CFO of Spalding DeDecker Associates, the engineering firm on the project. The front rig is the 20-yard sediment-holding container and the trailer behind it contains a series of tanks used in the filtering process.

tion and inspected to verify the volume of sediment being removed each day.

After Doetsch completed their work, SDA personnel performed a post-cleaning inspection of the three pipes to confirm sediment removal. Inspectors also checked the condition of the siphons that could not previously be inspected due to the sediment accumulation.

Innovative Application of New Technology

The drain siphon cleaning incorporated new and “green” technology. The usual method for cleaning a drain requires the use of large amounts of clean drinking-quality water to stir the sediment in the pipe and then vacator the water and sediment out of the pipe.

Doetsch developed a new method for the cleaning of the drain that incorporated a Hylector with Grand Volumetric Recycler. Water from the siphons themselves was used to loosen the sediment in the siphon. The sediment and water were

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Public Works Commissioner Marrocco (second from left) meets on site with the project team.

then vactored out through the manholes. Sediment was separated from the water using large strainers. The water was passed through several filter systems in equipment parked on-site and then returned to the drain where it was used to remove sediment from the next segment of pipe. “We purify the water so it doesn’t clog the nozzles on the cleaning head,” said Joseph G. Schotthoefer IV, an engineer and vice-president for Doetsch. Schotthoefer invented the HyJecter/Recycler system.

“Because of the filtering process, the water in the drain ends up cleaner than when the process started,” Commissioner Marrocco said.

Social, Economic, and Sustainable Design Considerations

By using the water from the drain, the project did not stress the local water system. If potable water had been used, approximately 130,000 gallons of water per day would have been needed for each day of the Sharkey Drain Siphon cleaning.

Over the 14 work days, total water usage would have been approximately 1.8 million gallons of water. With this amount of high pressure water required, the use of hydrants would have caused the water in nearby businesses and homes to become brown and would have resulted in noticeable drops in water pressure.

Complexity

Because the Sharkey Drain Siphon is located under the I-696 freeway at Dequindre Road and 11 Mile Road, access to the siphons presented challenges throughout the project process. In addition to the need to close a lane of the freeway service drive to perform the original inspection, the drain cleaning, and the post-cleaning inspection was, accommodations were also needed for a nearby hotel. Work hours and noise were restricted to accommodate the hotel guests.

SDA performed the original siphon inspection under live conditions. As a result, confined space



Crew uses vector to clear the Sharkey Drain siphons.



Televised image of interior inspection.

entry and rescue procedures were implemented and adhered to vigorously. Weather conditions were monitored for weeks prior to the live inspection to select a period when it had not rained for several days and rain was not expected for another few days. Any sign of rain would necessitate a postponement; the project was delayed several times. During the cleaning period, no equipment could be left in the drain overnight due to the possibility of rain. All equipment was required to be removed at the end of each work day

Despite the delays, the project team was able to clear the drain of sediment and trash. Use of the HyJecter/Recycler system saved time and resources for Macomb County residents

For additional information, contact Macomb Deputy Public Works Commissioner Gene Schabath at 586.469.7424 or Maria Sedki, PE at Spalding DeDecker Associates, Inc. at 248.844.5400.



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