

# First Defense® Packs Big Punch on Small Site

Cost Savings, Easy Maintenance and Smooth Installation Make for a Successful Project

## Project Profile

### Objective

Small commercial development required simple, cost-effective stormwater treatment to facilitate easy and timely completion of construction.

### Solution

A 4-ft diameter First Defense® unit was specified by the design/build contractor to achieve the required level of stormwater treatment with a cost-effective, low-maintenance device that is easy to install.

## Product Profile

- Compact footprint made for quick, economical installation
- Specifically designed for small sites by optimizing cost and treatment performance
- Direct access to the pollutant storage sump from a surface lid allows for hassle-free maintenance with a standard vector truck

Find more about the First Defense® at [www.hydro-int.com](http://www.hydro-int.com)

PERKINS TOWNSHIP, Ohio - Janotta & Herner Inc., one of the most active design-build firms in northern Ohio, has designed and built hundreds of commercial buildings in and around Sandusky, an industrial stretch about 55 miles west of Cleveland.

It has built warehouses, manufacturing plants, restaurants, water parks, hotels and other facilities along the Erie shore, handling logistical and fiscal issues along the way.

In recent years, the company has faced a new challenge – more stringent stormwater regulations. The state of Ohio has implemented new rules requiring stormwater quality to be addressed on every new commercial development, including smaller sites.



*Fig. 1 The First Defense® is delivered to site pre-assembled, facilitating quick and easy installation.*

The issue came into play when Janotta & Herner was getting ready to build a real estate brokerage office in a heavily developed section of Perkins Township just south of Sandusky. LinDale Properties Limited had proposed an 8,000-square-foot building on a wooded, 1.7-acre site behind the Sandusky Mall, with parking for 42 cars.

To address the runoff issue, the Janotta & Herner design-build team considered a variety of options, including creating a wet pond, incorporating a set of sand filters or installing a surface inlet device that removed impurities from the passing flows.

“When a new regulation gets introduced, we look at many options to make sure we’re providing the right solution for a particular site,” said John Penza, Design Manager for Janotta & Herner. “You want to provide the level of treatment that meets regulatory guidelines while still remaining as cost effective as possible.”

Janotta & Herner worked with Hydro International to select the appropriate stormwater treatment device and chose to implement the 4-ft First Defense®, an enhanced vortex separator, supplied by Hydro International, that provides stormwater treatment within a standard 4-ft or 6-ft manhole.

The First Defense® uses vortex technology to separate sediment, oils and other debris from stormwater runoff and capture the pollutants in a storage sump. The device is deployed in a wide array of applications, including small and medium-sized catchments, new developments and retrofits, source control for streets, parking lots and maintenance yards, and pretreatment for filters, infiltration and storage. Performance verification has proven its ability to remove more than 80 percent of total suspended solids with a median particle diameter of 106-micron.

The system takes in contaminated stormwater through an inlet chute from a surface grate and from the storm line inlet pipe oriented tangentially to the side of the unit. The inlet introduces flow into the chamber tangentially to create a low-energy vortex flow that directs

sediment downward into the sump while oils, floating trash and debris rise to the surface.

The opening of the outlet chute is located opposite to the direction of the inlet chute enhancing vortex separation by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet. The submerged outlet chute oriented in the opposite direction allows captured floatable oils and trash to float within the manhole while allowing treated stormwater to flow out.

One of the most expensive issues with stormwater treatment devices is dealing with the peak flows that come during heavy rains. To bypass these peak flows, many stormwater treatment devices must use an extra manhole upstream as a bypass chamber. The First Defense® incorporates a bypass mechanism within the internal components, allowing higher flows to bypass the treatment chamber and flow directly to the outlet chute, eliminating the expense of external bypass control structures. Previously captured floatables stored in the internal components are diverted away from the bypass chute into the treatment chamber through the floatables draw-off port prior to bypass flow activity, preventing these previously captured pollutants from being washed into the downstream drainage system.

“We looked at other water quality options, but the [First Defense®] just looked like a better choice for this site, more ‘plug and play’ with less to go wrong.”

John Penza, Design Manager  
Janotta & Herner

Periodic removal of the pollutants captured and stored in the manhole sump is conducted by running a vacuum hose through the surface grate to collect sediment on the floor and oils and trash floating on top of the water.

Penza said several factors led the design-build team to choose the vortex separator over the other available options. One was maintenance. “Maintenance of the vortex separator is easy. Periodic cleaning once or twice a year with a vac truck to remove debris is required. We looked at other water quality options, but the separator just looked like a better choice for this site, more ‘plug and play’ with less to go wrong,” he said. “Water quality outlet structures and basins require ongoing maintenance to insure proper operation.”

Second benefit: The system works well on small sites. With just 1.7 acres to fit a building, parking and access lanes, the developer wanted a stormwater mechanism that used as little land area as possible. The First Defense® unit’s compact size – 4 feet in diameter – fit the terrain and avoided the need for a spacious retention pond.

A third benefit was the fact that the First Defense® is a preassembled device which also helped to speed along the design-build construction project, where designers, engineers, architects and contractors all work for the same firm.



Fig. 2 “Maintenance of the vortex separator is easy. Periodic cleaning once or twice a year with a vac truck to remove debris is required.” Says Penza.

A fourth consideration: installation. The product is easily assembled on site. Four manhole sections stack like a tower, and the contractor just has to slide the pipes up to the inlet and outlet sections and then backfill.

Cost was a principal factor not only in choosing a vortex separator but the First Defense® itself. In previous jobs requiring stormwater treatment in compact sites, Janotta & Herner used a competing separator.

On this job, the team considered other alternatives and found that the First Defense® offered a significant cost savings over the competing brand. The First Defense® had been approved for use in stormwater treatment applications in Erie County, so the team went forward with the alternative model.

Penza said he expects to use First Defense® units in future sites in Erie County. “It’s locally approved, and easy to figure the flow and to size the unit,” he said. “I think it’s a very viable option for tight, small properties in a highly developed area such as along the Route 250 corridor. You try to use every bit of the site, and this unit fit well for what we needed.”