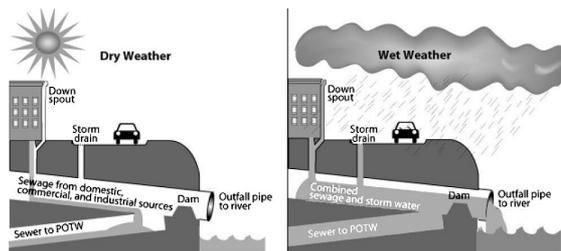




THE FACTS ABOUT HOBOKEN AND WET WEATHER

It wasn't that long ago that a heavy rainfall with a high tide in the Hudson River combined to severely flood the low-lying southwestern and northwestern areas of Hoboken. Rainwater mixed with sewage would rise as high as three feet and remain on the streets for up to 48 hours. Longtime residents of these neighborhoods know what it used to be like. Yet, many new residents don't realize the vast improvements made in the last seven years.

Hoboken is a Combined Sewer Overflow (CSO) system. There are essentially no separate pipes to convey rainwater collected on roofs, on properties and on the streets, so rainwater and sewage mix in a single piping system – a combined sewer. In heavy rainstorms, excess flow is diverted into the Hudson River, where it undergoes primary treatment before discharging. Flooding occurs during severe storms when flows cannot be discharged to the river because of high tide or when the system is at capacity.



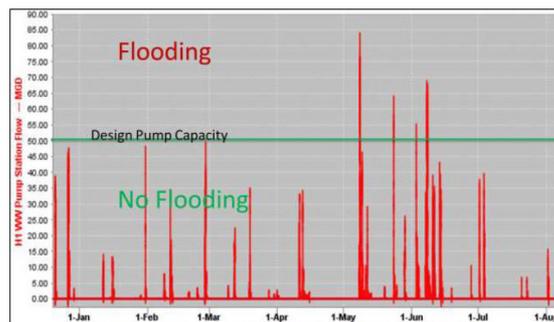
Credit: U.S. Environmental Protection Agency

In 2011, at the cost of \$18 million, the North Hudson Sewerage Authority built its first Wet Weather Pump Station (H-1) on Observer Highway at Washington Street to address the flooding in the southwest neighborhoods. Its two massive 50 million gallons per day (mgd) pumps can pump flow out of the City and into the river against high tide. The pump station has had an immediate beneficial impact.



H-1 Wet Weather Pump Station

An independent review by EmNet, a firm specializing in combined sewer system monitoring, examined rainfall data from December 2012 to August 2013. During this period, there were 36 rain events that triggered the pumps. Previously, these events would have caused significant street flooding. With the pumps operating, only four events saw street water pooling which was rapidly drained off by the pump station.



H-1 WWPS flow rates from December 20, 2012 through August 10, 2013

North Hudson and the City of Hoboken entered into a partnership in 2014 to address chronic flooding in the neighborhoods around ShopRite. The City paid for the construction of the H-5 Wet Weather Pump Station on 11th Street at Hudson Street. North Hudson assumed responsibility for the design, easements, and operations and maintenance. The H-5 Pump Station has two 40 mgd pumps which, along with the control system, are entirely underground in a landscaped island on 11th Street.



H-5 WWPS pumps during construction.



Finished H-5 WWPS

Between November 2016 and April 2017, the new pump station handled four storms large enough to previously cause flooding along 9th and Madison. In each case, the pump prevented flooding. It was not until the extreme storm of May 5, 2017 that street water was seen in this area, and the pump station rapidly drained the water from the roadways.



Before H-5 WWPS, May 31, 2015: Looking northwest at Madison and 9th Streets. (Credit: Hoboken411)



After H-5 WWPS, October 27, 2018: Looking southwest at Madison and 9th Streets. (Credit: NHSA)

Even with the pumps operational, extremely intense storms may cause some flooding. When residents see water ponding in the streets, some wonder if the pumps are working properly. They are. During intense storms, the rain falls so quickly that the catch basins and combined sewer lines fill up within minutes. The pumps kick in and begin pumping water out of the lines even against the tide, but some pooling of water on low-lying streets will occur. The pumps handle the rainwater as fast as it can be conveyed, the limitations being low street grades, water infiltration, and sewer capacity.

If capacity is an issue, why don't we just tear up the streets, rip out the old sewers and install larger ones with more capacity? Even if this were financially and operationally feasible -- which it is not -- this would not solve the problem. "Capacity" is not just about the size of the sewer. Capacity is determined by the slope, size and condition of the pipes.

To address the problem of slope, street grades must be raised in low lying areas, probably by an average of four feet. Water infiltration also reduces capacity. Since 2008, North Hudson has spent \$45 million to reline and replace scores of sewers, which partially addresses the capacity issue. But alone this will not eliminate road flooding -- unless street grades are raised.

The key to mitigating the climate-induced wet weather effect is to address the problem of street elevations and continue with green and gray infrastructure initiatives (such as bioswales, green and blue roofs, and storm water detention systems). Fortunately, in cases of extreme wet weather, we have the pumping capacity to rapidly clear street ponding. The wet weather pump stations are also an essential component of the Rebuild-by-Design project and our State-mandated CSO Long Term Control Plan.

Although we have made a great deal of progress in the last 20 years, we remain committed to further improve wet weather flood control in our service area.

The North Hudson Sewerage Authority

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