North Hudson Sewerage Authority

Hoboken Flood Risk Reduction Zoom Workshop

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October 13, 2021, 6:30 – 8:00 PM
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NHSA Collection System – How the System Works

• Services Hoboken, Weehawken, West New York, and Union City

• NHSA Infrastructure Includes:
  – Adams Street Wastewater Treatment Plant (WWTP)
    • 20.8 million gallons per day (MGD)
  – River Road WWTP
    • 10 MGD
  – 16 Combined Sewer Overflow (CSO) Regulators
  – 10 CSO Outfalls
  – 11 Pump Stations
  – 107 miles of combined sewers (including interceptors, siphons and force mains)

• Sewer Maps are available online at: https://www.nhudsonsa.com/sewer/sewer.html
The collection system is comprised of the sewer lines, catch basins, manholes, and pump stations.

The combined sewer system primarily flows by gravity with use of targeted pumping.

The 5th Street and 11th Street (at Washington) Pump Stations are used to convey both dry and wet weather flow to the plant.

Managing the sanitary flow is not an issues. Managing the wet weather flow is.
NHSA Collection System – How the System Works

• During storm events excess combined flow that cannot be treated at the plant is discharged directly to the Hudson River. This is known as a Combined Sewer Overflow (CSO).

• If the rain event is during high tide, the H1 and H5 Wet Weather Pump Stations turn on and assist in discharging the flow.

• Outfalls allow us to discharge excess flow during rain events. All outfalls are protected from the Hudson River backing up into the system by Tide Gates (large check valves).

https://www.redvalve.com/tideflex
• Capacity of the Treatment Plant
  – A lack of capacity at the treatment plant is not what causes flooding.
  – The Adams Street Plant is rated to treat 20.8 Million Gallons per Day (MGD) of flow.
  – Daily average flow to the plant for the last 12 months is 12.26 MGD.
  – During a rain event we can see spikes in flow between 30-36 MGD.
  – The treatment plant has excess dry weather capacity for future development, as well as capacity to treat 36 MGD of wet weather flow.
Why Does it Flood?

• Capacity of the Combined Sewer System
  – The capacity of the sewer system is a problem.
  – Most Hoboken pipes have a capacity for a 2-year storm. New sewers, in contract, are designed based on a 25-year storm.
  – Hoboken 1915 engineering records indicate that even then during high tide conditions the collection system will not drain on its own even during dry weather.
  – Replacing all under-sized pipes in the City is not feasible, given the cost of over $1 Billion.

• Elevations in Hoboken
  – The same sewers are even less effective during flood and/or extreme tidal events, with the problem of capacity exacerbated by elevations.
  – Approximately 75 percent of Hoboken lies in the 100-year floodplain.
  – Several locations throughout the City are at an elevation below the high tide level.
Why Does it Flood?
Storm Preparation and Ida

• NHSA Storm Prep Includes
  – Ensuring all Pump Stations, Regulators, and Solids and Floatables Facilities are cleaned and ready for operation.
  – Targeting known problem areas for additional catch basin cleaning right before the storm hits.
  – Requiring all collection crew personal to be on site and ready to respond to issues during the storm.
  – Extensive cleanup activities and responding to issues for days following a storm.

• Tropical Storm Ida
  – This was the most rain we have recorded in a single storm since 2016. 6.54 inches in about 8 hours.
  – Peak 15 minute rainfall intensity was 4.32 inches per hour. The only storm more intense was on 7/22/20 at 4.72 inches per hour.
NHSA Recent Improvements

- H1 Wet Weather Pump Station Commissioned October 17, 2011 and has reduced street flooding in Southern Hoboken. The pump station has two large pumps and is rated to pump 50 MGD.

- The H5 Wet Weather Pumping Station went online on October 31, 2016 and is designed to protect and reduce street flooding in the northern half of the City. The pump station has two large pumps and is rated to pump 40 MGD.

- We have seen a tremendous success rate at reducing the flooding events since the pump stations have gone online.
NHSA Recent Improvements

• The wet weather pump stations are designed to turn on when the sewer system is at a level that would cause street flooding.

• Every time a pump turns on (when the pump station is activated), flooding is being prevented on a city street.

• Before the pump stations Hoboken would flood 30-40 times per year, and water would stay on the street for a much longer period.

NHSA Storm Events
With Wet Weather Pump Station Activation

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Storms with Pumping</th>
<th>H1 Active</th>
<th>H5 Active</th>
<th>Flooding</th>
<th>Percentage of Flooding Prevented</th>
<th>Notes</th>
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<tbody>
<tr>
<td>2016</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>0</td>
<td>100.0%</td>
<td>November and December</td>
</tr>
<tr>
<td>2017</td>
<td>39</td>
<td>38</td>
<td>31</td>
<td>5</td>
<td>87.2%</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>47</td>
<td>42</td>
<td>43</td>
<td>6</td>
<td>87.2%</td>
<td></td>
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<tr>
<td>2019</td>
<td>45</td>
<td>43</td>
<td>39</td>
<td>4</td>
<td>91.1%</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>37</td>
<td>34</td>
<td>37</td>
<td>5</td>
<td>86.5%</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>38</td>
<td>38</td>
<td>36</td>
<td>6</td>
<td>84.2%</td>
<td>January through September</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>205</td>
<td>194</td>
<td>26</td>
<td>88.0%</td>
<td>November 2016 - September 2021</td>
</tr>
</tbody>
</table>
NHSA Sewer Maintenance Programs

- Comprehensive maintenance program that includes several elements.
  - The comprehensive Asset Management Program is utilized to inform all of our capital investments.

- Sewer Inspection
  - NHSA engineers and operators know the system very well. The majority of collection system was televised in 2016-2018.
  - To stay on top of maintenance, NHSA purchased a CCTV Sewer Inspection Truck in 2020.

- Vactor Sewer Cleaning
  - Three Vactor Trucks clean NHSA’s entire 107 miles of sewer lines once every 3.5 years, in line with EPA recommendations.
  - Trunk lines are inspected routinely and cleaned as required.
  - Scheduling of sewer line cleanings depends on the characteristics of each system. Our collections crew inspect the sewers on a very frequent basis and know when cleaning is required.

Optimizing Operation, Maintenance, and Rehabilitation of Sanitary Sewer Collection Systems by the New England Interstate Water Pollution Control Commission December 2003, Page 7-4
NHSA Sewer Maintenance Programs

• Special Maintenance
  – We have identified catch basins in “hot spots” which often flood in severe storms. Prior to the storm we send out collection crews to inspect and clean catch basin hot spots.
  – We have identified sewer line “hot spots” that tend to see a faster buildup of grease, debris, or sediment. These sewer lines are scheduled for additional cleanings on an annual basis.

• Sewer Lining and Rehabilitation
  – Over the last 20 years, 24,273 feet of the 212,028 total feet of sewer lines in Hoboken have been rehabilitated. This is 11.4% of the system in Hoboken, and was at a cost of over $9 Million.
  – Rehabilitation includes Gunite Repair (spray concrete), cured in place sewer lining, and sewer pipe replacement.
NHSA Sewer Maintenance Programs

• Catch Basin Cleaning
  – Sump pit cleaning of the catch basins are done with clam or vactor trucks.
  – In the past, catch basins were cleaned on a three-year cycle. We have ordered new trucks and will now be cleaning on a one-year cycle, and an ongoing as needed basis.
  – We clean the inside of the catch basins to ensure street water flows through the catch basin lateral pipe without obstruction. The city of Hoboken cleans the streets that keep debris from blocking the catch basin grate.

• Routine Monthly Repairs
  – Each month, NHSA completes about 15-20 routine repairs and maintenance to the collection system.
  – This mostly includes repairs and replacement of catch basin and manhole frames and covers.
NHSA Current Programs

• Additional projects will further reduce flooding potential
  – The Northwest Resilience Park H6/H7 Pump Station and High Level Storm Sewer System.
  – Madison Street Infrastructure Improvements

• Stormwater Detention
  – Has been required for new sewer connection applications since 2001.
  – NHSA incentivizes green infrastructure to meet stormwater detention requirements.
  – Stormwater Storage Tool available online at https://www.nhudsonsa.com/sewer/sewer.html

• New connection requirements are being introduced to address sewer backups in at-risk areas.
  – Roof leaders must be separated from the sanitary systems in new construction and gut rehabilitations.
  – Ejector Pumps are required in flood zones.
  – Properties over 10,000 square feet need automated controls on their stormwater detention systems.
Property Owner Flood Mitigation

• It is difficult to recommend any one solution. Each property is different and requires an assessment by a qualified plumber or engineer.

• We DO NOT recommend:
  – French Drains
  – Seepage Pits

• We DO recommend:
  – Disconnecting roof leaders from the house sanitary system and send it directly to the combined sewer system
  – Properly designed check valves and ejector pump system
  – Properly designed Stormwater Detention Systems
Property Owner Flood Mitigation

• Homeowner Options
  – Disconnecting roof leaders from the sanitary system.
  – Check Valves keep flow from backing up and Ejector Pumps to force flow out.

• Grant Program
  – The Authority is developing a grant program to assist eligible customers with alleviating backups into their basements/lower levels.
  – The grant program will reimburse up to $5,000 of the cost of the design and installation of appropriate mitigation measures.
  – NHSA is establishing objective criteria that our engineering team will use to evaluate whether a customer is eligible for this grant program.
Conclusion

• What does not cause flooding in Hoboken:
  – System Maintenance – We have a very robust maintenance program.
  – Plant Capacity – The plant has capacity to treat flow.
  – Development
    • Development impacts dry weather flow, for which we have capacity
    • Development contributes to the management of stormwater with our stormwater detention requirements for connection to the sewer system.
  – Inoperable Pumps – All pump stations pumps are online and work during every rain event.
  – Leaving “tide gates” open – Tide gates are now check valves, that do not require opening and closing every time the tide comes in.

• The causes of flooding in Hoboken are:
  – The capacity of the sewer system
  – The street elevations
  – The increasing intensity of storms
Conclusion - What Can Be Done

• We have already done a great deal to reduce system flooding, including the wet weather pump stations.

• We will continue our emphasis on maintenance of the collection system and our commitment to capital investment in the sewer infrastructure.

• The H6/H7 Pump Station with high level stormwater sewer system and the Northwest Resiliency Park will help to remove stormwater from the system.

• We will continue moving forward with green infrastructure projects and promoting stormwater detention systems.

• Raising street elevations in the low lying areas of Hoboken will help to reduce flooding.

• Roof leader separation or the installation of check valves and ejector pumps in individual properties will help protect homeowners.

• NHSA will support Hoboken residents as they explore these options.
Thank You