

Bucksport, ME

Storm King® Halts the Impact of CSO Related Flooding

Wet Weather Case Study - Project Profile

Objective

The Town of Bucksport, ME required a solution to the CSO related flooding from the nearby Penobscot river that wouldn't disrupt their community at an affordable price.

Solution

An 18' diameter Storm King® system used as satellite treatment was smaller, more economical, and more efficient than conventional solutions that were considered.

Hundreds of municipalities across the country have combined sewer systems in place – the result of turn of the 20th century (or earlier) urban development where both sanitary sewerage and stormwater runoff flow downstream through the same pipes. Today, these communities serve roughly 40 million people in older cities and towns throughout the Northeast and Midwest.

During periods of heavy rain, these sewers will fill beyond capacity causing a combined sewer overflow, or CSO. Historically, CSOs were handled by discharging the sewage at designated outfall points into nearby bodies of water. However, the National Pollutant Discharge Elimination System (NPDES) portion of the Clean Water Act has mandated that communities with CSOs take action and handle their overflow in a more environmentally conscious manner.

While everyone wants to protect the environment, cash-strapped cities and towns across the country are struggling to fund CSO mitigation projects in the midst of the current recession. Improvement projects often cost millions of dollars that local taxpayers cannot afford to pay, leaving cities stuck between expensive government mandates and unhappy constituents.

One town in Maine faced this problem in 2007. But with an alternative treatment method and some old-fashioned Yankee ingenuity, the town turned an eyesore into a local landmark, without costing the town's taxpayers a single dollar.

Bucksport is a working-class community on the Maine coast, located at the mouth of the Penobscot River, on the main thoroughfare to Acadia National Park. Each summer, thousands of tourists drive up Route 1, many stopping in Bucksport before the last hour of their drive southeast to Bar Harbor.

"It is exactly what we wanted and more."

- Roger Raymond, Bucksport Town Manager

Project Highlights

- Untreated combined sewerage discharged to the Penobscot River during intense storm events
- Grant funding meant that the entire project cost local taxpayers nothing
- Aesthetically pleasing building has become a focal point for the community
- Significantly reduced the amount of fecal bacteria, total suspended and biological solids to the Penobscot River

However, Bucksport's two CSO outfalls were located within eyesight of Route 1, defacing an important part of the town's downtown district. "It was an eyesore," said Town Manager Roger Raymond about the CSO at the heart of four dilapidated buildings.

In 2000, Raymond formed a Sewer Committee, comprised of wastewater treatment operators, citizens and town council members to investigate the town's CSO abatement alternatives.

Bucksport, like many New England cities, faced several options to address their CSO issues. It could add a significant amount of capacity to the WWTP located downstream of the overflows or it could split stormwater and wastewater flows by constructing a 'separate' collection system. Either option would be a costly and disruptive proposition. Land would be required for the project, downtown traffic would be significantly impacted, and extensive work would be required to stabilize sediment in areas with unstable native soil. Bucksport's third option was satellite treatment within the collection system – provided by Hydro International.

Satellite treatment involves treating wet weather flows further upstream, before such flows reach the treatment plant. Solids break down as they travel through the collection system. Capturing both floatable and settleable solids (and their associated pollutants) early in the system provides the greatest opportunity for removing high levels of solids and associated pollutants without more complex treatment processes.



Interior Storm King® Facility



Bucksport Ribbon Cutting Ceremony

Satellite treatment proved to be the most cost-effective alternative for the town. However, local leaders still had to fund the \$3.1 million project. Instead of having taxpayers shoulder the bill, they came up with a novel idea. With the outfall located next to several neglected buildings, they used this as a community betterment initiative.

This transformed a neglected downtown block into a community focal point. With the help of several rural development, community development, public infrastructure and enterprise grants, Bucksport had the funding it needed. In May 2007, the project was underway.

Bucksport contracted Wright Pierce, an engineering firm headquartered in Topsham, Maine to design the new downtown treatment center. Given that the Town's main pump station could transport only 1.0 mgd to the treatment plant, the objective was to route excess wet weather flows via a new diversion structure and pump station to an advanced hydrodynamic vortex separator for treatment, the Storm King® provided by Hydro International.

Flow is introduced into the Storm King® via a tangentially positioned inlet causing a rotational flow path around the dip plate. As the flow spirals down the wall of the chamber, solids settle out by gravitational and rotational forces. Settleable solids collect in the base as the center cone directs flow up and around the center of the shaft into the inside of the dip plate cylinder. The upward flow rotates at a slower velocity than the outer downward flow. The resulting 'shear' zone scrubs out the finer particles.

The collected settleable solids are gravity fed from the base of the unit to the sewage treatment plant. The system also doubles as a chlorine contact and mixing chamber for the reduction of fecal coliforms being discharged into the Penobscot River. The unit was designed to incorporate a Swirl-Cleanse screening component in the future. This component would capture all floatables and neutrally buoyant material greater than 4 mm in diameter. An air regulated siphon would backwash the screen to prevent it from blinding.

When the project broke ground in the fall of 2007, it was greeted by locals with skepticism. A wastewater treatment facility is not generally regarded as a community beautification initiative. "We were questioned regularly when we chose that location," said Raymond.

When the project finished in the fall of 2008, the Storm King® was effectively taking the pressure off of the plant and treating all wet weather events that would have been discharged without treatment in the past. Since the Storm King® was commissioned in 2008, all rain events the system has handled have been treated in accordance with regulatory requirements.

To the residents of Bucksport, initial skepticism has changed to resounding approval. Two years after the project, the site is now the most publicly used area in the community. In addition to the

CSO facility, the site contains a cupola, fishing pier, fountain, Veteran's memorial, water wheel and pond. In front of the site stretches a mile-long waterfront walkway and picnic tables where the public can enjoy the view of Penobscot Bay, the Penobscot Narrows Bridge and the 19th century Fort Knox located on the other side of the river. "It gives an unbelievable view of the fort and the new bridge," said Town Manager Roger Raymond. "We built a building that people think is a restaurant or museum. No one would think that it's a CSO treatment facility."

When visitors drive up Route 1 to Acadia, they have the option of turning right, continuing their trip or turning left, into downtown Bucksport. Due to some creative funding and alternative technology, Bucksport is a town that's turning heads in the left direction. "It's exactly what we wanted and more," said Raymond. "People can be proud of the fact their waste is treated."



Bucksport CSO Facility From Fishing Pier



Exterior View of CSO Facility and Fort Knox (Across the River)

"It gives an unbelievable view of the fort and the new bridge."

- Roger Raymond, Bucksport Town Manager