

North Yonkers Pump Station Retrofits Unreinforced Masonry Walls to Meet City Mandate



NYC mandates mitigation of flood hazards for wastewater infrastructure.

BACKGROUND

Since the costly devastation of Hurricane Sandy in 2012, the New York City Department of Environmental Protection (NYC DEP) has been implementing measures to minimize the impact of the next superstorm on critical infrastructure in the region. A Climate Risk Assessment and Adaptation Study has become the basis for evaluating the hazard posed by flooding to New York City's wastewater infrastructure. While predicting when and where the next storm surge will occur is nearly impossible, the climate analysis portion of the study establishes future storm surge conditions for which the city's wastewater infrastructure must prepare. In 2013, FEMA selected a hundred-year advisory base flood elevation (ABFE), plus 30" for future sea level, as the critical flood elevation against which wastewater infrastructure facilities would be assessed.

Risk analysis and adaptation analysis studies have identified at-risk wastewater facilities and informed the adoption of flood-proofing strategies to prevent damage and minimize recovery times for storm surge events anticipated over the next 50 years.

As an incentive to local wastewater companies, NYC DEP has been offering low-interest loans to facilities that are deemed structurally adequate to withstand hydrostatic pressure generated by the ABFE-plus-30" floodwater elevation.

PROJECT INFORMATION

Category

Water and Wastewater Facilities

Project Owner

North Yonkers Pump Station
Yonkers, New York

FRP Installer

ECCO III

Application

Flexural reinforcement of unreinforced concrete masonry unit (UCMU) walls

Simpson Strong-Tie Products

CSS-CUCL code-listed unidirectional carbon laminate; CSS-EP epoxy paste and filler

CHALLENGE

Following their Climate Risk Assessment and Adaptation Study, NYC DEP structural engineers deemed the North Yonkers Pump Station's unreinforced concrete masonry unit (UCMU) exterior walls inadequate to resist the hydrostatic pressure of ABFE-plus-30" floodwater levels.

SOLUTION

The contractor installed 200 sq. ft. of Simpson Strong-Tie code-listed unidirectional carbon laminate (CSS-CUCL1512), the solution offering the smallest disruption to continued facility operations.

RESULTS

The facilities now meet NYC DEP flood-proofing criteria, making the station eligible for low-interest loans from the city.

THE CHALLENGE Make stations' unreinforced masonry walls adequate to resist pressure of ABFE-plus-30" floodwaters

The North Yonkers Pump Station, Yonkers, New York, was originally constructed in 1876, causing it to be added to the National Register of Historic Places in 1982. Following their Climate Risk Assessment and Adaptation Study, however, NYC DEP design professionals identified the station as an essential, at-risk wastewater facility in need of flood proofing. Specifically, structural engineers deemed the station's unreinforced concrete masonry unit (UCMU) exterior walls inadequate to resist out-of-plane bending from the hydrostatic pressure that ABFE-plus-30" floodwater levels would cause. In weighing retrofit options for out-of-plane flexural reinforcement of the walls, the engineers found precured carbon laminate strips the most economical solution.

THE SOLUTION Reinforce walls with code-listed precured carbon laminate from Simpson Strong-Tie

ECCO III, a contractor trained by Simpson Strong-Tie, installed 200 square feet of Simpson Strong-Tie code-listed unidirectional carbon laminate (CSS-CUCL1512; 1.2 mm thick x 150 mm wide), the first code-compliant precured laminate manufactured in North America. Carbon laminate was specified because it is less labor intensive than glass-fabric products and because overall it offered a solution involving the lowest likelihood of disruption to the operation of the facilities.

Project specifications called for individual strips of the laminate running in vertical strips from the floor to the underside of the roof and spaced every 24" on center. Using Simpson Strong-Tie CSS-EP epoxy paste and filler for adhesion, the installers applied 15' strips as specified on the UCMU walls, expertly working around equipment, light fixtures and wall penetrations, as well as under wall-mounted conduits and services.

Total time to complete the work was approximately four weeks, spread out over several months.

THE RESULTS Facilities meet city safety standards

The owner was pleased both with the appearance and the timeliness of the carbon-laminate reinforcements. More importantly, the facilities now meet NYC DEP flood-proofing criteria, making the owners eligible for low-interest loans from the city.

Simpson Strong-Tie has been working with design professionals and facility owners in the metro New York City region to provide preliminary, no-fee design services on a number of other wastewater and transportation infrastructure facilities.



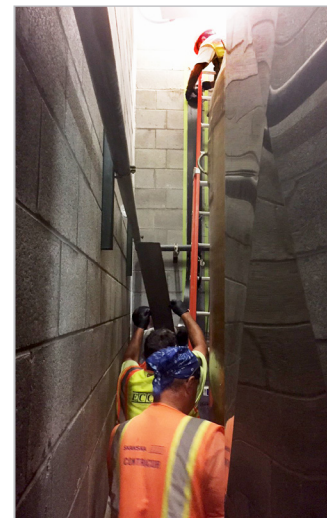
Installed laminate.



Installed laminate.



Wall obstructions prior to laminate installation.



Positioning laminate beneath wall obstructions.

**MORE
INFO**

Call (800) 999-5099 or visit strongtie.com for more information about Simpson Strong-Tie **Composite Strengthening Systems™ (CSS)** and other retrofit solutions for water and wastewater facilities.