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Navy Pier Redevelopment Project Serves as Model of Sustainability Using Green Infrastructure

TRAINING TYPE

Peer-to-Peer Case Studies

CONTACT

Lisa Cotner

SCALE

Site

LOCATION

Navy Pier
Chicago, Illinois

We'd love to hear from you.

The Takeaway: Learn about one green infrastructure technique that Navy Pier is using to manage stormwater runoff.

Summary

Chicago's Navy Pier undertook a major redevelopment project to reinvent 50 acres of urban lakefront. The Illinois Coastal Management Program and Navy Pier, Inc., applied green infrastructure techniques to demonstrate a model of sustainability that will both improve the health and vitality of the local community and inspire future adaptation projects.

“This was one of our first construction projects. We were glad to be able to fund a project to help meet these goals.”



Lisa Cotner
Natural
Resources
Specialist
Illinois Coastal
Management

“We were very excited when Navy Pier approached us with their goals of wanting to reduce stormwater impacts in a more natural way. We suggested the use of green infrastructure, and Navy Pier pursued this idea. This was one of our first construction projects. We were glad to be able to fund a project to help meet these goals.”

– Lisa Cotner, Natural Resources Specialist with Illinois Coastal Management

Lessons Learned

- **One size does not fit all.** Navy Pier worked with designers, engineers, and funders willing to try new approaches and tailor designs specifically for this project site.
- **Have an outreach plan ahead of time.** While the Illinois Coastal Management Program wanted to share project information with pier visitors, they lacked the necessary resources. Perhaps sharing this need early in the project would have allowed partners to fill this gap.
- **Partial funding pays for projects.** The Illinois Coastal Management Program received only partial funding, but the program's contribution represented an essential part of the tree tub project.
- **Communicate grant requirements.** Federal funding has specific reporting requirements, so make sure the grantee knows what documentation is needed. The Illinois Coastal Management Program worked closely with Navy Pier on this aspect of the project, since the project was complex and used multiple contractors who had never worked on a federally funded project.

The Process

Pursuing Partnerships and Funding

The 3,300-foot-long Navy Pier, located on the shoreline of Lake Michigan, is Chicago's number-one tourist attraction. The pier and its facilities encompass approximately 50 acres and feature a 45-meter-tall Ferris wheel, the Chicago Children's Museum, the Chicago Shakespeare Theater, shops, restaurants, and an exhibition hall. Navy Pier, Inc., which manages the complex, is also overseeing its redevelopment.

Unfiltered stormwater runs off the Navy Pier into the Chicago River, potentially causing pollution and flooding issues. To address these impacts, Navy Pier officials sought partners and funding to update their stormwater management system to a more sustainable model that would improve the health and vitality of the local community.

Navy Pier met with the Illinois Department of Natural Resources' Coastal Management Program about its goals. The program saw this as a perfect opportunity to apply green infrastructure techniques to reduce flooding and pollutants, and recommended that the company apply for funding through a NOAA Coastal Zone Management Act Section 306 grant, which resulted in a \$125,000 award.

Utilizing Tree Tubs to Help Absorb Stormwater

Trees were planted on the pier in "tree tubs" planters. Designed specifically for Navy Pier, the tree tubs were equipped with steel baskets placed in each tree tub opening, forming the 'green spine' necessary to support the weight of a steel vault, concrete tub, soil, and the root base of a tree. Once planted, each tree was covered with a steel lid made flush with the adjacent grade of the pier and surrounded by permeable pavement.

By providing the underground support structure necessary to grow a healthy root system for each tree, the steel baskets made it possible to replicate a natural hydrological process. Stormwater that falls on the South Dock now nourishes the trees before being filtered and slowly drained into Lake Michigan. Stormwater that is not absorbed by the tree tubs is captured by surrounding permeable pavement, passed through bio-infiltration basins, and directed to storage cisterns for reuse as the main source of irrigation for other landscaped and planted areas.

Stormwater captured by approximately 43,000 square feet of permeable pavement and 77 tree tubs is significantly reducing the volume of runoff and the amount of pollutants from Navy Pier. According to the Environmental Protection Agency's urban runoff and pollutant reduction calculator, tree tubs and other filtration components of the system contribute to an annual reduction of phosphorous (3 lbs.), nitrogen (47 lbs.), sediment (2 tons), and chemical oxygen demand (1,191 lbs.) to the Chicago River and Lake Michigan. Based on Chicago's annual average precipitation of 27.1 inches, the system has the capacity to detain and slowly release 2.3 million gallons of water per year.

Lisa Cotner says, "We are pleased by the project and the use of a more natural way to reduce, re-use, and conserve water. Our future plans are to develop an educational venue around these best management practices to help build awareness about their benefits to people and nature. It's a perfect spot with the best management practices and Navy Pier's number of visitors."

In addition, the trees planted in tubs reduce the heat-island effect and improve the air quality and micro-climate of Navy Pier. Most of the trees have been locally-sourced and are native to the Chicago eco-region. Each species has been carefully selected from the Morton Arboretum to create a new green habitat with recreational appeal. The Marmo maple is a resilient variety of the Freeman's maple originally bred at the Morton Arboretum, and the American sycamore is one of the largest hardwood trees of the eastern forests in the United States. On the surface, Navy Pier's southern boardwalk has been transformed into an open promenade lined with locally sourced trees and native plants that bring great long-term environmental and social benefits to the community.

This project is also helping other Illinois Coastal Management Program investments promote nearshore health by protecting watersheds from polluted runoff and coastal nonpoint source pollution.

“We are looking forward to future opportunities to build educational components around the green infrastructure projects on Navy Pier, and build awareness about how natural and nature-based solutions can help clean and absorb water to reduce pollution and flooding,” said Lisa Cotner.

Next Steps

The Illinois Coastal Management Program’s funding for this project has motivated Navy Pier, Inc., to become more involved in community sustainability efforts.

Contributing Partners

Illinois Coastal Management Program

NOAA

Navy Pier, Inc.

More Details

Tools Used



- Low impact development for stormwater management
- Partnerships
- Federal funding

Funding



- NOAA Coastal Management Program Funding – Section 306

To Learn More



- navypier.org/support-the-pier/making-a-difference/sustainability (<https://navypier.org/support-the-pier/making-a-difference/sustainability/>)