United States
Environmental Protection Agency

Office of Water (4203)
Washington, DC 20460

EPA-841-B-00-005C
October 2000

Street Storage for Combined Sewer Surcharge Control

Skokie and Wilmette, Illinois

Key Concepts:

- Street Storage
- Flow Regulation
- Street & Inlet Modifications
- Source Control

Project Benefits:

- Elimination of Surcharge
- Community Acceptance
- Cost Savings

LOW-IMPACT DEVELOPMENT CENTER

Introduction

This case study describes the use of street storage and catch basin modifications to reduce the rate of runoff entering combined sewer systems (CSSs). These modifications help alleviate residential basement flooding that results from CSS surcharging during rainfall events. Because building relief sewers would be both expensive and disruptive, the communities of Skokie and Wilmette, Illinois, were willing to try alternative approaches. The communities decided to modify street cross sections and storm drain inlets so the street surfaces could store and convey runoff during peak storm events and reduce hydraulic loading to the combined sewer. This process required extensive coordination with regional, state, and local officials and residents to ensure that safety and community acceptance concerns were satisfied.

Project Area

The street surface storage projects were conducted in the towns of Skokie and Wilmette, Illinois, suburbs of Chicago. The entire 8.6 square miles of Skokie and a 2-square-mile section of Wilmette are urban areas served by a CSS. Skokie has approximately 23,000 households (65 percent of which occupy single-family homes) and Wilmette has approximately 9,000.

Figure 1. Runoff temporarily stored on a street surface.

Project Description

To alleviate system surcharging, a strategy that combined the following elements was used:

- Street storage
- Downspout disconnection
- Flow regulators
- Subsurface storage
- New storm and combined sewer systems
- Improvements to existing storm and combined sewer systems

The goal of the project was to take full advantage of the street and inlet system for stormwater control as an alternative to installing expensive underground facilities such as complex configurations of storage vaults with flow regulators or additional pipes for increased storm drainage capacity.

The alternative street storage approach was based primarily on installing a system of street berms 7 to 9 inches high at the curb line that detain water on the street surface. Figure 1 is a photograph that shows this technique. In addition, installing flow regulation devices at catch basin outlets reduced the rate of storm water flow to the CSS so both the inlet structure and the street can be used

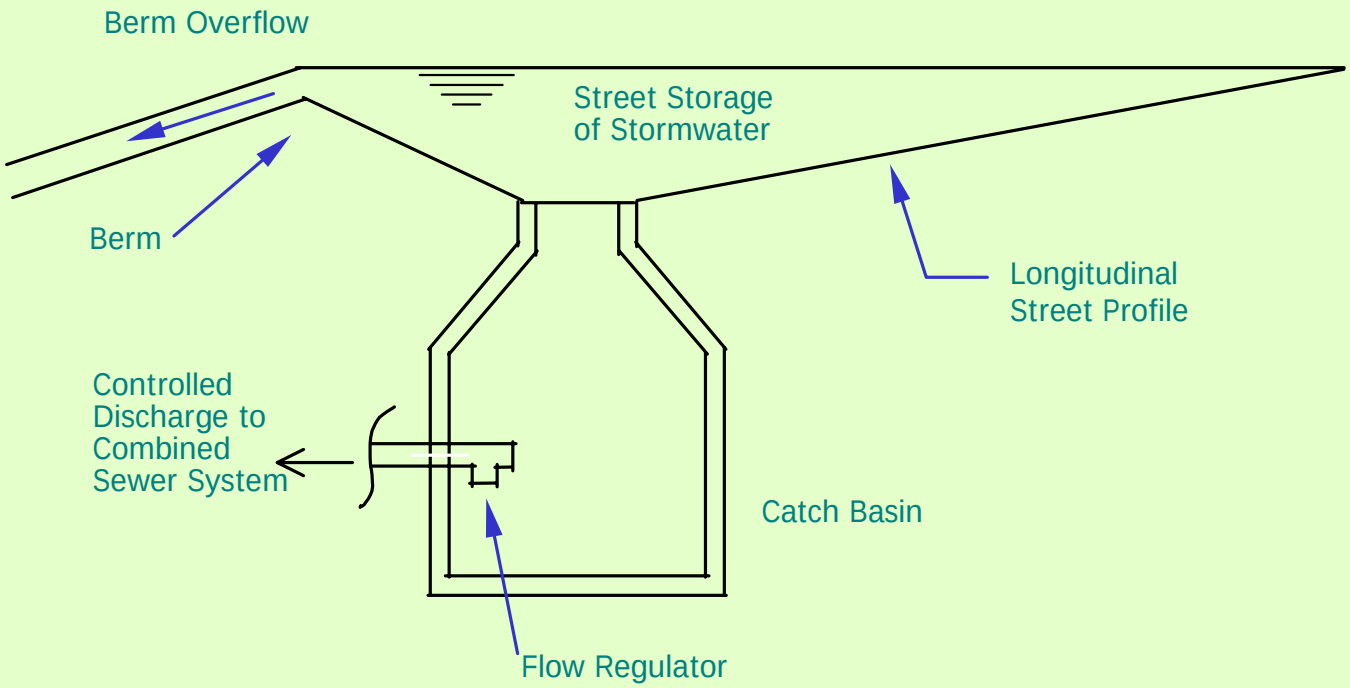

Figure 2. Schematic diagram of the street storage system (Note: not to scale and great vertical exaggeration).

for storage. Figure 2 illustrates this concept. Subsurface storage facilities were installed in the street right-of-way and in other public areas as part of the storm drainage system at critical points in the system and in high-traffic areas, parking areas, and pedestrian walkways where ponding was not acceptable. Overall, street storage accounts for over half of the total stormwater storage capacity. The other half is accounted for in subsurface and off-street storage.

Project Summary and Benefits

Many benefits were realized from this project. First, researchers estimate a cost advantage from using street storage over conventional sewer separation systems to alleviate CSS surcharges. Figure 3 shows the estimated costs for the Skokie system to be approximately 38 percent of the costs for conventional approaches to sewer separation. A breakdown of costs associated with the street storage approach reveals that berm/flow regulator installation is a small fraction of the overall project cost, as shown in Figure 4. The street storage system could aid in traffic control because the berms function much like speed humps as traffic calming structures. Also, the storage system reduces the frequency and volume of combined sewer overflows, resulting in fewer stormwater-related pollutant events in receiving waters. Since the system's installation in 1983,

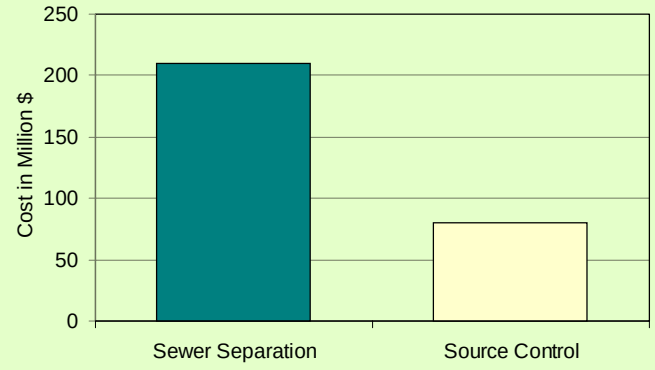

Figure 3. Cost comparison between the traditional sewer separation approach and a source control approach using street surface storage.

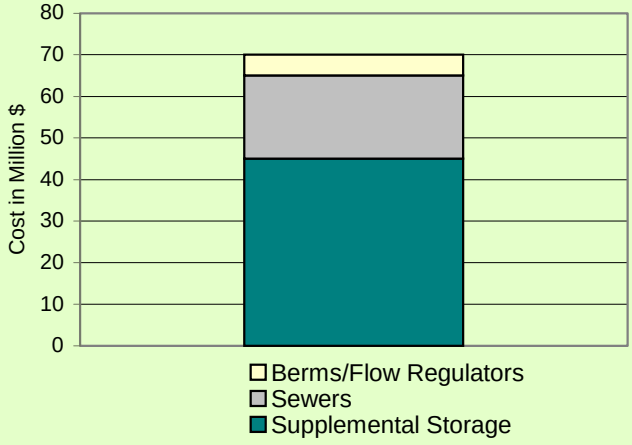

Figure 4. Costs associated with the CSS surcharge relief project.

consisting of 2,900 flow regulators, the Skokie Public Works Department has not reported any problems with icing of ponded areas during winter weather because the water typically remains on the street surface for less than 30 minutes.

Several lessons were learned as a result of this project. First, researchers emphasized the importance of using a comprehensive approach to stormwater management that explores funding and cooperation from different sources, including streetscaping and revitalization programs. Second, early and frequent stakeholder involvement and strong outreach and education programs that clearly identify the benefits of street storage were necessary to gain support for the project from citizens. Finally, a comprehensive inspection and maintenance program with training for public works staff was essential to ensure that street storage systems functioned as designed.

References

USEPA. 2000. *Street Storage System for Control of Combined Sewer Surcharge*. EPA/600/R-00/065. U.S. Environmental Protection Agency, Washington, DC.

Walesh, S., and R. Carr. 1999. Street Surface Storage for Control of Combined Sewer Surcharge. In *WRPMD '99: Preparing for the 21st Century*, ed. M.E. Wilson. Proceedings of the 26th Annual Water Resources Planning and Management Conference, Tempe, Arizona, June 6-9, 1999.

Contact Information

Stuart G. Walesh, PE
Consultant
3006 Towne Commons Drive
Valparaiso, IN 46385-2979
Phone: (219) 464-1704
Fax: (219) 464-2978
stuwalesh@aol.com

Robert Carr
Senior Water Resources Engineer
Earth Tech
1020 North Broadway, Suite 400
Milwaukee, WI 53202
Phone: (414) 225-5135
Fax: (414) 225-5111
bob_carr@earthtech.com