



Green Infrastructure & Stormwater Management CASE STUDY

Charles City Downtown Permeable Streetscape

Location: Charles City, IA

Client: The City of Charles City, Iowa

Design Firm(s): Conservation Design Forum

Landscape architect/Project contact: Thomas Price

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ASLA Chapter: Illinois



Project Specifications

Project Description: The downtown historic residential district of Charles City, Iowa was suffering from crumbling streets and stormwater catch basins. Charles City retained CDF to develop a comprehensive plan to address the streets and stormwater issues and evaluate the expected performance of the existing and proposed system.

Conservation Design Forum worked with the City to develop a Permeable Streets plan for a 17 block area of the City. Plan alternatives included permeable paving, parkway bioretention, bioretention intersection narrowings, and infiltration beds. CDF prepared models and conducted the hydrologic design of the system to capture runoff from streets, yards, and alleys and provide

complete infiltration for the 2-year storm event. Peak discharges for the 10-year storm will be reduced by over 90%. Reduction in stormwater runoff, also reduces replacement of the existing storm sewers. The final project included permeable paving streets, parkway bioretention, and cobble infiltration beds.

Project Type:

Transportation
corridor/streetscape
A retrofit of an existing
property

Design features: Bioswale, porous pavers, curb cuts, cobble infiltration areas at each intersection, and bottomless alley trench grates. The “bioswales” were biofiltration areas behind the curbs to intercept sidewalk and front yard runoff.



This project was designed to meet the following specific requirements or mandates:

State statute, developer/client preference – the minimum design criteria was the State stormwater standards but these standards were far exceeded. The system also had to meet the conventional standard of a 10-year level of protection against street flooding. The high standard (nearly 10-year zero discharge) was a bonus achieved by the selected system.

Impervious area managed: greater than 5 acres

Amount of existing green space/open space conserved or preserved for managing stormwater on site: 5,000 sq/ft to 1 acre. This was a retrofit of an existing neighborhood. No green space or homes were displaced by the system.

The regulatory environment and regulator was supportive of the project.

Did the client request that other factors be considered, such as energy savings, usable green space, or property value enhancements? The City of Charles City requested that the redevelopment preserve and maintain the historic character of the neighborhood.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: \$1,000,000-\$5,000,000 (Public funding: Federal, state, local, Iowa Department of Natural Resources (DNR) I-Jobs grant - \$100,000, American

Recovery and Reinvestment Act State Revolving Fund (ARRA-SRF) low-interest loan and grant - \$631,000, City of Charles City - \$2,988,782)

Related Information: Design and permitting fees: \$200,000 Construction: \$3.7M

Was a green vs. grey cost analysis performed? No. A cost analysis was only performed in a qualitative sense. Also, the green infrastructure approach brought outside funds to the project.

Cost impact of conserving green/open space to the overall costs of the site

design/development project: The nuisance flooding and downstream storm sewer capacity problems were addressed without displacing any homes. The social cost of removing homes to construct stormwater basins would have been enormous.

Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)? Did not influence costs. The project did not displace any open space.

Number of jobs created: Not available

Job hours devoted to project:

Planning and Design: 1,400

Construction: Data not available

Annual Maintenance: Less than standard street maintenance (no seal coating or mill and overlay for 50 years).

Performance Measures

Stormwater reduction performance analysis:

See Performance Analysis:

http://www.cdfinc.com/xm_client/client_documents/CharlesCityPerformanceAnalysis.pdf

Community & economic benefits that have resulted from the project: The project has resulted in numerous community benefits including reduced flooding in the streets and neighborhoods, beautified streets, and reinforcement of the City's recent images as "green." The project has been very popular and neighboring blocks are requesting that their streets be done in a similar manner.

Additional Information

Links to images: All photos are from Conservation Design Forum:

http://www.cdfinc.com/Project?project_id=83

This project is the first of several green infrastructure initiatives in Charles City, including green streets, riverfront park expansion, and a downtown whitewater course that will replace a low-head dam. All of these measures are structured to add value and amenity to the city, while at the same time improve water quality and reduce flooding. This in turn is helping to establish Charles City as a progressive, green town, and attracting new business and employment interests- two new companies have chosen to locate in the city recently, which will add over four hundred new skilled jobs to the community.