



Green Infrastructure & Stormwater Management CASE STUDY

Cole Center

Location: Aurora, IL

Client: Fox Valley Park District

Design Firm(s): Fox Valley Park District-lead designer, Engineering Enterprises, Inc.-consulting engineer.

Landscape architect/Project contact: Fox Valley Park District/ Greg Stevens RLA, ASLA

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ASLA Chapter: Illinois



Photo: Fox Valley Park District

Project Specifications

Project Description: Founded in 1947 to preserve and protect scenic vistas along the Fox River, the Fox Valley Park District is a dynamic and growing district that serves a diverse population of more than 200,000 people. A population boom, along with the passage of a \$2.4 million dollar referendum for land acquisition and park planning, led to the need for the District's

administrative offices and operational facilities to look for larger office space to accommodate the demand. Mandated by the District's Board of Directors, it was imperative that the new design retain sustainable, environmentally sensitive stormwater design components. The District's planning and design team, led by in-house landscape architects, began working to achieve these goals.

Because of the District Board's foresight to show-case environmentally sensitive design and planning, a brand new building located on a "greenfield" site was out of the question. So the search was on for an existing "greyfield" site within the Aurora city limits that could accommodate the desired needs of the District.

As luck would have it, a large manufacturing company was relocating their operation from the existing industrial/manufacturing building to a new location outside the City limits. Because of this relocation, the District was able to acquire the 72,000 sq/ft building situated on 4.3 acres of land. With the purchase of this property, the District was able to secure over eight contiguous acres of land adjacent to the Fox River, one of the largest rivers in Illinois, ultimately leading to the Mississippi River.

The District's landscape architects played a direct role in the site design and development by integrating many green infrastructure design elements into the plan. Planning and design work began in the spring of 2010 with the site work beginning in late summer of 2010. As of this date, the finalization of the site work is still progressing with the final acceptance anticipated for the end of May, 2011.

First and foremost was the management of water within the site. Seeing that the site's stormwater runoff dissipates directly into the Fox River it was paramount that the stormwater management system retain as much on-site water as possible. The landscape architects designed and engineered the complete stormwater management system including; an underground rainwater harvesting system, infiltration basins (which replace conventional storm detention basins), permeable paver parking lots, rerouting downspouts into rain gardens and rain barrels. The 10,000-gallon rainwater harvesting reservoir utilizes a percentage of the roof and site runoff for reuse in the washing the District's maintenance vehicles and machines used on a daily basis. To date, it is the largest rainwater harvesting system for a municipal complex in Illinois. The remaining roof runoff is directed through downspouts into rain gardens and bioswales leading to a large infiltration basin/dry creek bed feature at the front of the building. The water is then directed into a 20,000 sq/ft permeable paver parking area before filtering into a second infiltration basin prior to overland dissipation into the Fox River. Remaining roof runoff is directed into two demonstration rain barrels that capture water used for irrigating ornamental plant material during drought conditions. The balance of the site is being transformed from a 2.5-acre manicured lawn to a native short grass prairie and wildflower meadow, reducing the need for conventional irrigation and chemical applications. As part of the Fox Valley Park District's ongoing commitment to education, interpretive signs are being installed in outdoor

viewing areas to educate the more than 6,000 annual visitors to the virtues of sustainable site design and green infrastructure.

Project Type:

Government complex

A retrofit of an existing property

Design features: Bioretention facility, rain garden, bioswale, cistern, rain barrels, downspout removal, and porous pavers.

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

County ordinance, local ordinance

Impervious area managed: 5,000 sq/ft to 1 acre

Amount of existing green space/open space conserved or preserved for managing stormwater on site: 5,000 sq/ft to 1 acre

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? It was requested that we consider preserving as much green space as possible and what green space was preserved to use native plantings which require less maintenance and watering once established.

Cost & Jobs Analysis

Estimated Cost of Stormwater Project: \$500,000-\$1,000,000 (Public funding: Local)

Related Information:

- Demolition: \$ 51,000.00
- Erosion Control: \$9,500.00
- Earthwork: \$ 25,750.00
- Stormwater Control: \$ 58,000.00 (of which \$38,000.00 in underground rainwater harvesting system)
- Pavement: \$250,000.00 (includes 20,000 sq/ft of permeable pavers/base)
- Landscaping: \$ 51,000.00 (includes native prairie, rain garden and bioswale)
- Lighting: \$ 58,000.00 (LED parking lot lighting)
- Site Amenities: \$260,000.00 (includes monument signs, fencing, pedestrian lighting, foot bridge, stonework, flag poles, interpretive signs, etc.)
- Total: \$ 763,250.00

Was a green vs. grey cost analysis performed? Yes, there was less than 25,000 sq/ft of new impervious paving over and above what was already existing. Therefore, per City ordinance, there wasn't a requirement for a stormwater detention basin. However, there was a direct cost savings of nearly \$20,000.00 in underground storm piping and an annual water savings of \$5,000.00 to \$8,000.00 for using harvested rain water to wash company vehicles rather than municipal water. A greater savings was in the renovating the existing building. A cost savings of \$7 million to \$ 8 million was realized with the purchase of an existing structure versus constructing a new facility.

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

design/development project: By replacing existing manicured turf with native prairie an annual cost savings of \$8,000.00 to \$10,000.00 in maintenance costs along with an additional cost savings of \$20,000.00 to \$25,000.00 in materials for an automatic irrigation system will be realized.

Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)? Slightly reduced costs (1-9% savings).

Number of jobs created: Hired mainly local contractors - 30 jobs

Job hours devoted to project:

Planning and Design: 600 man hours

Construction: 1,500 man hours

Annual Maintenance: 300 man hours

Performance Measures

Stormwater reduction performance analysis:

2-year, 24-hour storm event= 0.1 acre-feet or 35,000 gallons of runoff that will be stored within the permeable pavers and rainharvesting reservoir. This is approximately 20% of the total site runoff during that storm event.

Community & economic benefits that have resulted from the project: The building and site have definitely increased the property value of this site as well as adjacent sites and has had a marked effect on the public awareness of sustainable design features. Because of this project, other areas adjacent to and across the river have begun improvements to their respective properties. This project is extremely visible to the public, not only for the 6,000 annual guests that walk through the District's front doors, but to the hundreds, if not thousands of people that pass directly by the facility while using the adjacent Fox River bike trail. The District is showcasing the project as an educational and environmental model for public awareness of

large scale sustainable design and green infrastructure features.

Project Recognition

Conservation Foundation - 2011 Sustainable Development Award

Additional Information

Links to images: <http://foxvalleyparkdistrict.org/node/1596>

Additional Site considerations:

- The parking lot features light emitting diode (LED) lights that use 75% less electricity than fluorescents and last 10 times longer.
- The site location promotes connectivity in the community with a centrally located site that is conveniently accessible via walking, bicycling and public transportation, which may help reduce automobile traffic and encourage active modes of transportation.

Additional Building considerations:

- The building provides secure bicycle storage for all employees to encourage the use of bicycle commuting on adjacent trails.
 - The building provides shower and changing facilities for employees who commute by bicycle and/or exercise during the work day.
 - Water saving urinals, toilets and motion sensor faucets reduce the potable water consumption.
 - A new energy efficient, direct fired heating system for the large operation's garage area is used.
 - Outside air economizers were installed on the air handling units using outdoor air for cooling office areas that lessen the use of electricity.
 - New air handling units that use no chloroflourocarbons (CFC) based refrigerants were installed.
 - High efficiency water heaters were installed throughout.
 - Interior lighting was designed to use less than one watt per sq/ft.
 - The building maintained nearly 100% of existing exterior walls and roof structure, and over half of existing interior non-structural elements.
 - Contractors were required to divert waste from landfills and maximize recycling of construction and demolition debris.
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- Certain materials were selected specifically to minimize waste including carpet tile over broadloom carpet.

- Carpet tiles contain as much as 50% recycled content.
- Certain materials were salvaged from the existing building and saved for reuse within the new construction. This included steel staircases, acoustical wall panels and concrete retaining wall blocks.
- Many products contain high levels of either pre-consumer or post-consumer recycled material content. Among them are concrete, structural steel, ceramic tile, carpet tile and cast stone.
- Old-growth timber was prohibited. Wood-based products were manufactured using sustainably harvested wood materials.
- Low-emitting materials were used throughout including, adhesives, sealants, paints and other coatings and carpet systems.
- Track-off carpet tiles were specified for the new entry vestibule to capture dirt and particulates and reduce the amount of pollutants that enter the building.
- Office areas have multi-level lighting to allow at least 50% light reduction while maintaining uniform lighting levels throughout.
- Ribbon windows were added to provide day lighting and views for the new office space.
- The Cole Center is a smoke-free building in accordance with Illinois law.
- The Cole Center follows the USGBC Regional Priorities for the area code 60506: No. 1- Sustainable Sites - Alternative transportation No. 2- Sustainable Sites - Stormwater Quantity and Quality Control.