



# Green Infrastructure & Stormwater Management CASE STUDY

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## Greilickville Harbor Park

**Location:** Elmwood Township, Leelanau County, MI

**Client:** Elmwood Charter Township

**Design Firm(s):** Gosling Czubak Engineering Sciences, Inc. - Sustainable Site Design Studio  
NW

**Landscape architect/Project contact:** Klaus D. Heinert, RLA, ASLA

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**ASLA Chapter:** Michigan



Photo: Gosling Czubak Engineering Sciences, Inc.

## Project Specifications

**Project Description:** Sustainable site development and universal accessibility became fundamental guiding principles of the new GHP re-development project. The project site design program was based on the regional low impact development (LID) guidebook and Sustainable Site Development best practices. Key project components included reusing the former main

pavilion's roof and structural members, incorporation of permeable pavers and other extensive on-site stormwater management (including a rain garden), and management and restoration of both creek corridors that delineate the park's northern and southern boundaries as well as emergent coastal wetlands. Universal access components were also integrated.

**Project Type:**

Open space - park

Part of a redevelopment project



**Photo:** Gosling Czubak Engineering Sciences, Inc

**Design features:** Bioretention facility, rain garden, porous pavers, and curb cuts. Other design features include creek corridor native vegetative buffer widening and in-planting; new no-mow areas, native wetland tree/shrub, herbaceous plant and seed installations, and the use of deep rooting fescue native grass seed blend for all park "lawn" areas.

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

County ordinance, Low Impact Development (LID) Regional Guidebook

**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:** 1 acre to 5 acres. Efforts to improve two streams bordering the park by increasing the buffer zone, adding over 170 new native trees/shrubs and conducting seasonal invasive species management. Removing aging parking lot and direct stormwater discharge

structures and relocating parking further from water bodies and installed with permeable pavements and LID features.

**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 Township desired to retain the maximum amount of paved parking spaces as possible and/or not increase parking. The project design enabled parking to be maintained with only a 10 net space loss, but yet relocate parking facilities further from the water resources (creeks/and bay) while utilizing LID stormwater measures, techniques and solutions not previously in place.

### Cost & Jobs Analysis

**Estimated Cost of Stormwater Project:** \$50,000-\$100,000 (Public funding: State, regional, local, private foundations, and private companies (at cost efforts))

#### Related Information:

- Site Prep (demo) \$13,000;
- Earthwork/grading \$12,000;
- Permeable paver areas \$40,000 (\$20,000 pavers, \$20,000 labor);
- Curbing/Scuppers \$11,600;
- Drainage stone (6AA) \$4,700;
- Storm pipe, Standpipe, rip-rap spillways \$1,700;
- Native Plant material, plugs, seeds \$3,300;
- Global re-leaf Creek restoration plantings \$5,000 + volunteer labor.
- Overall project construction budget: \$700,000+

**Was a green vs. grey cost analysis performed?** Yes, cost comparisons for the LID measures proposed versus traditional collection and retention methods were done. Efforts were made to exemplify how additional best practices proposed ultimately benefit the natural resources, public and owner.

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

**design/development project:** Implementing all LID measures resulted in an overall increase in project costs of about 10-15%, however all qualitative and quantitative factors were discussed and weighed during the construction plan preparation phase. Additional funding was also sought to offset these costs.

**Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)?** Significantly increased. (See comments from #12 above).

**Number of jobs created:** Temporary contractors and subcontractors - 8-10 laborers

**Job hours devoted to project:**

Planning and Design: 50-80 hours

Construction: 40-60 hours

Annual Maintenance: 12-20 hours

Other: Grant writing/amangement 40 hours

## Performance Measures

**Stormwater reduction performance analysis:**

Nearly 100% of stormwater generated is retained on site and filtered through permeable pavements, and two sequenced rain gardens with restricted overflow standpipes limiting post re-development storm water direct discharge to the creeks and the bay to very low quantities, velocities and suspended solids.

**Community & economic benefits that have resulted from the project:** While direct economic benefit cannot be measured, maintaining or improving water quality, improving aesthetics, natural habitat, accessibility and sustainability in terms of operation and maintenance efforts for the park, will provide economic benefit in the form of cost savings to the community. The direct economic impact of the park as a catalyst project for the commercial/mixed use subarea and waterfront of Greilickville it serves, has already been felt by nearby businesses who have seen increased patronage attributable to the growing visitation and use of the park and waterfront. This is only expected to grow.

## Project Recognition

NW MI Council of Governments (NWMCOG) - Planning Implementation Award - 2011; North MI Environmental Action Council (NMEAC) - Environmental Professional Award '11

## Additional Information

The project design and planning process engaged many stakeholder groups including high school ecology honors classes (Global re-leaf project); volunteer work bees for invasive species removal and native rain garden/creek buffer installations, and numerous nearby Non-governmental groups including the Great Lakes Children's Museum, Maritime Heritage Alliance, Watershed Center, and Traverse Area Community Sailing. These groups supported LID best practices, education and interpretive efforts for water/nat. resource elements and facility amenity programming. In this way, the project process as well as place have and will continue to grow understanding, stewardship and engagement in sustainable site BMP's.



Photo: Gosling Czubak Engineering Sciences, Inc.