



# LANDSCAPE PERFORMANCE SERIES

**Erie Street Plaza – Milwaukee, WI**  
**Methodology for Landscape Performance Benefits**  
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**Environmental**

**Saves 495 gallons of potable water and \$220 annually by using river water for irrigation of planted areas.**

The Landscape Architect worked closely with city personnel to strategize a method for reclaiming river water for irrigation use for the plantings. The city’s Landscape Architect suggested the use of the pump, which would function during seasonal increases in water use age. Information regarding the specifics of this pump were limited, however the site was evaluated to determine irrigation need based on regional climatic parameters.

Climate Zone	City	State	Low-density Micro-climate	Average-density Open climate	High-density Intense exposure
Humid Continental/ Cool summer	Milwaukee	WI	0.00	0.13	3.47

**Table 1.** Annual Irrigation factors for landscaped areas  
*Courtesy: U.S. Department of Energy – “Guidelines for Estimating Landscaping water use”.*

Total area of plantings (tree groves, marshes) = 3,812 square feet

3,812 square feet x .13 gallons per sqft/per year = 495 gallons  
 495 gallons annually across site = 66 Ccf approximate equivalent to a single family use of potable water annually. This cost equates to 55.00 per quarter, or \$220.00 annually.

*Water rates and usage provided by the City of Milwaukee Department of Public works, based on data available from 2012.*

**Limitations:**

1. Gallons per year assumes optimal irrigation efficiency with proper system maintenance and scheduling.
2. Annual irrigation factor is determined on annual precipitation per city.
3. Limited information was available regarding the re-circulating pump system.

**Reduces surface temperatures by an estimated 5°F, by replacing 100% of the asphalt on the site with concrete pavers and plantings. The 121 poplar trees will also cool the plaza by providing approximately 4,840 sf of shade when they reach half-maturity.**

According to the USGBC New Construction and Renovation Reference Guide, Version 2.2 Heat Island Effect LEED credit, asphalt has a very low Solar Reflective Index (SRI) of zero and reflectance of 0.05, whereas concrete (permeable pavers) have an SRI of 35 and reflectance of 0.35. Solar reflective index is “a measure of the constructed surface's ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation” (USGBC Glossary, accessed via <http://www.usgbc.org/glossary/term/4817>).

In field experiments conducted by Spectra turf, 24 color samples of granules were classified based on their thermal emittance and solar reflectance. Each color value is compared against a medium wind speed to determine SRI. A light green surface (in this case vegetation) carries an SRI of 9.

As a baseline, the site's previous asphalt surface (13,000 square feet) was calculated for its surface temperature based on a reflectance of .05 and an emittance of .9.

Conversion into surface temperature utilized SRI calculator provided by Heat Island Group, Lawrence Berkeley National Laboratory. This tool calculates SRI and roof surface temperature based on test surface properties using ASTM standard E 1980.

Previous asphalt surface: 179 degrees F  
Vegetation (marsh and tree groves): 174 degrees F

Shade in the poplar groves figured using a species size list provided by Georgia Tech. Given the immature nature of the Poplars on site and size restricted root mass in this urban environment, full woodland canopy size was divided by two in this calculation.

*Average Mature Tree Dimensions (ht/diameter/caliper)*

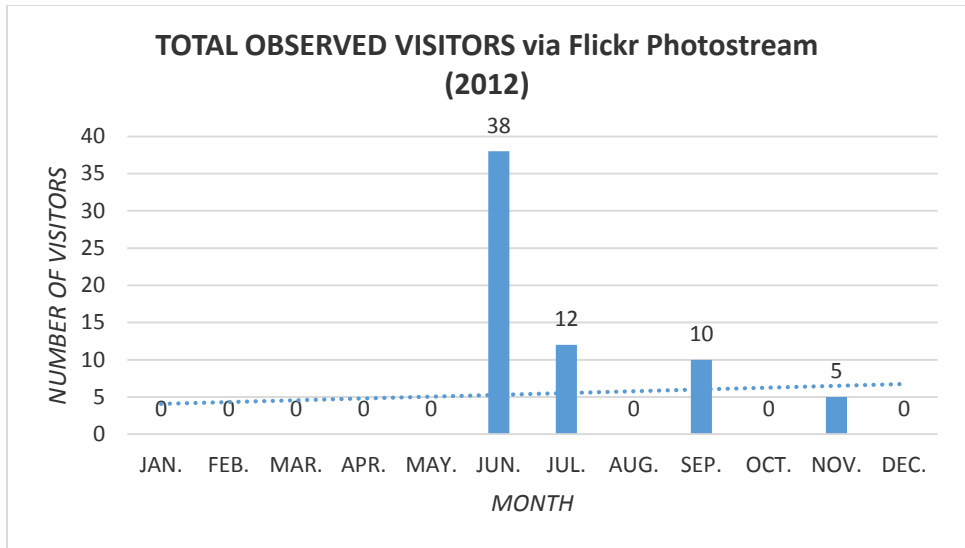
Balsam Poplar 60-80 1-2 – assumes half maturity: 40 feet of mature canopy x 121 = 4,840 square feet.

## **Social**

**Transformed a former parking lot into a flexible social space used for strolling, jogging, reading, viewing, biking and kayaking, as observed in a collection of over 100 site photographs.**

An observational photographic study was conducted remotely by the research team in an effort to quantify the social benefits offered by the Plaza. These observations do not highlight the potential for activity throughout the year, but rather employ a methodology which uses a specific timeframe to convey the most-widely observed human activities taking place.

1. A collection of Flickr photographs of the Erie Street Plaza would be studied by the team to determine which month within a calendar year catered to the highest volume of visitors.
2. Photographs from this given month would then be further analyzed to determine which days bring the most activity to the site, or frequency of use/per month. (Note: photographic evidence for the months of March, April and May was not available).



**Table 2.** Total visitors in 2012

- The next point in this study takes into account the specific activities fostered by the site. Based on observations for 2012, the month of June has the highest rate of use. Given this notion, specific activities can be quantified in relationship to their frequency.

	MONTH											
	J	F	M	A	M	JU	JL	AU	S	O	N	D
FISHING	0	0	N/A	N/A	N/A	0	0	0	0	0	4	0
DOGWALK	0	0	N/A	N/A	N/A	0	0	0	0	0	1	0
VIEWING	0	0	N/A	N/A	N/A	9	0	0	0	0	0	0
BANQUET	0	0	N/A	N/A	N/A	0	0	0	10	0	0	0
DINING	0	0	N/A	N/A	N/A	0	12	0	0	0	0	0
SITTING	0	0	N/A	N/A	N/A	10	0	0	0	0	0	0
STROLLING	0	0	N/A	N/A	N/A	11	0	0	0	0	0	0
BIKING	0	0	N/A	N/A	N/A	2	0	0	0	0	0	0
KAYAK	0	0	N/A	N/A	N/A	2	0	0	0	0	0	0
JOGGING	0	0	N/A	N/A	N/A	2	0	0	0	0	0	0
READING	0	0	N/A	N/A	N/A	2	0	0	0	0	0	0

**Table 3.** Observed activities per month in 2012.

**Serves 100 weekend adult patrons of the neighboring Sail loft bar and restaurant by providing an outdoor space for games. On a typical Saturday, an estimated 400 restaurant patrons also spend time in the plaza as a stop on a local river boat tour.**

According to management staff of the adjacent Sail loft bar and restaurant, the plaza is most frequently used on Saturdays during daily boat tours of the area on the river. The owner stated that the plaza was used by his patrons as a venue for gathering on weekends.

## Economic

**Contributes to the economic development of the expanding Third Ward district, with 243 condominium units planned and adjacent mixed-use development attracting more than \$120 million in investment capital within a previously derelict area.**

Harbor Front and Hansen's Landing mixed use development  
160 condominium units  
Total investment of approximately \$65.9 million

Marine Terminal lofts  
83 condominium units  
Total investment of approximately \$54.4 million.

*Source: City of Milwaukee – Department of City Development*

## Methodology for Cost Comparison

**Value engineering on the project led to switching from a custom to a standard unit paver and eliminating 1,600 sf of paved area, which then became a “soft” vegetated surface. This reduced the cost of the plaza by \$44,999.**

As read on “revised statement of costs” provided by Stoss LU:

Total Initial Paving (Area) – 5,190 square feet  
Value Engineering at redesign (Area) – 3,574 square feet  
1600 square feet (reduced)

Total Initial Paving: Custom Units Pavers @ 5,190 square feet/total cost = \$184,720  
Value Engineering: Standard Unit Paving @ 3,574 square feet/total cost = \$140,221  
\$44,499

**The design competition entry featured not a poplar grove but a bamboo grove, accompanied by heated steam pits that would allow the bamboo to grow and survive in winter. Elimination of the steam pits during the design process saved \$118,860 in construction costs associated with electrical utilities, water distribution and labor. This helped reduce final project costs by nearly 12%.**

As a TIF funded project, the plaza stands as part of a larger revitalization effort within the Third Ward district. As a model for economically sustainable public space, careful observation of project costs led to a successful completion, which came in significantly under budget. Many of the original design elements which were part of the initial “vision” were either reduced or eliminated due to access issues, public perceptions and city input.

As read on “revised statement of costs” provided by Stoss LU:

Well- Water collection

Pump pit  
Distribution manhole  
Steam pits (3'-10" x 7'-4")  
Water distribution – PE 3"  
Pumps, Filters, Valves  
Heaters for steam pit  
Power- pumps and heaters  
Outlets for heaters  
Wet-pool  
Galvanized trench grates  
\$118,860.00 total steam pit reduction cost

Other significant reductions came from changing the slabs for the fiberglass benches, reducing paving areas, and shrinking the area of the originally proposed IPE boardwalks. The designer worked effectively alongside the city to assure code was met and costs were kept under budget.

Overall original budget: \$947,000  
Costs after savings: \$524,814

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