



# LANDSCAPE PERFORMANCE SERIES

## Portage Lakefront and Riverwalk – Portage, IN Methodology for Landscape Performance Benefits

### Environmental

- ***Increased the total size of Portage City Parks by 14% through the addition of 57 acres of dunes, trails, and lakefront and provides the city's first free public lake access.***

According to the Portage Parks and Recreation website, Portage has 12 public parks totaling 462 acres, including this project (<http://www.ci.portage.in.us/department/division.php?fDD=8-31>). By adding 57 acres to the preexisting 405 acres of municipal parks, total park area was increased 14%. Previously, the city did not have its own public lakeshore access; the community could make use of the adjacent Indiana Dunes National Lakeshore facilities for a fee of \$6 per car per day. The city leases the property of the Portage Lakefront and Riverwalk from the National Park Service, and access is free to all visitors year-round. (Personal communication with Gregg Calpino, 6-6-2-11; <http://www.nps.gov/indu/planyourvisit/feesandreservations.htm>).

- ***Provides habitat for at least 683 species of plants, birds, mammals, amphibians, reptiles and insects, including 8 federally threatened or state rare species.***

Documentation for LEED NC 2.2 SS Credit 5.1: Site Development: Protect or Restore Habitat shows that 1,994,655 square feet (45,79 acres) of the 2,387,163 square foot site (54.80 acres) were restored using native and/or adapted species. The acreage restored amounts to 83.6% of the project site. These findings are supported by measurements of the construction document package (as provided by Gregg Calpino of JJR).

A pre-construction survey of plant species from JJR (2006, provided by Neal Billedeaux) and the National Park Service Environmental Assessment (Portage Lakefront Park, Indiana Dunes National Lakeshore 2007) report 89 plant species, 37 mammal species, 352 bird species, 18 amphibian species, 27 reptile species, 100 butterfly and moth species, and 60 dragonfly and damselfly species. While the JJR plant survey was conducted only within the boundaries of the Lakefront and Riverwalk site, some of the numbers reported by the National Park Service are drawn from surveys in the extensive adjacent areas of protected national lakeshore.

The site lies in the range of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened bald eagle (*Haliaeetus leucocephalus*). Four plant species reported to be present onsite are state rare, including bearberry (*Arctostaphylos uva-ursi*), jack pine (*Pinus banksiana*), common juniper (*Juniperus communis* var. *depressa*), beach sumac (*Rhus aromatica* var. *arenaria*), while a fifth, Gillman's goldenrod (*Solidago simplex* var. *gillmanii*), is state threatened. One federally threatened plant species, Pitcher's thistle (*Cirsium pitcheri*), has been seen on the site. (National Park Service Environmental Assessment, Portage Lakefront Park, Indiana Dunes National Lakeshore 2007; JJR plant survey, 2006).

No survey of plant or animal species taken after construction has been located as of 7-26-2011. Based on the very limited area impacted by construction on site, the fact that most area where construction took place was on the footprint of an existing road and removed building, and the requirements laid out in the Environmental Assessment to identify, relocate, collect seeds from and re-propagate rare species if necessary, we assumed that the project did not eradicate any of the species present before construction and serves to protect them.

## References

California State Parks, 2005

National Park Service. 2007. National Park Service Environmental Assessment: Portage Lakefront Park. Indiana Dunes National Lakeshore.

- ***Infiltrates up to 46 million gallons or 90% of annual rainfall on the site. The remainder drains off the site into Lake Michigan following natural drainage patterns.***

LEED documentation reports that 11.35 acres land drained off site into Lake Michigan and Burns Waterway before construction (Stormwater Management Narrative.pdf, provided by JJR). The construction did not alter this, and 43.53 acres continues to be contained in a subwatershed onsite. Within the total 54.88 acres of the site, impervious area increased but drainage patterns were maintained such that runoff is directed to natural and designed depressions which allow infiltration through the existing sand of the site. The infiltration rate of water through sand is 12 inches per hour, meaning that runoff from all areas will quickly infiltrate.

Documentation for LEED NC 2.2 SS Credit 6.2: Stormwater Design: Quality Control (provided by JJR) show that 0.9% of annual rainfall volume is treated by bioswales, 26.5% through the disconnection of impervious areas, 16.2% through dry wells, and 54.1% through natural depressions used as detention ponds, for a total of 90% of annual rainfall being treated onsite. The same document indicates that the sand on-site infiltrates water at a rate of 12 inches per hour, which is assumed to be efficient enough to infiltrate 100% of rainwater that falls on the 43.53 acre subwatershed.

The NOAA's National Climatic Data Center (NCDC) 1981-2010 Climate Normals show that the average annual precipitation at the Indiana Dunes National Lakeshore is 39.14 inches (station number USC00124244; <ftp://ftp.ncdc.noaa.gov/pub/data/normals/1981-2010/products/station/USC00124244.normals.txt>, retrieved 7-21-2011 by Robin L. Burke). If 39.14 inches of rain fall over 43.53 acres and 100% of it infiltrates through sand, then 46,240,861 gallons of water infiltrates on site annually. Calculations are as follows:

43.53 acre subwatershed = 1,896,167 sf  
39.14 inches of rain annually = 3.26 ft  
3.26 ft x 1,896,167 sf = 6,181,504 cf  
6,181,504 cf = **46,240,861 gallons of water infiltrates on site annually**

- ***Eliminates the need for irrigation, saving an estimated 230,000 gallons of potable water by using 13,000 sf of native and drought tolerant plants in ornamental garden settings in place of more traditional perennial plant choices.***

The total area of native plants installed by JJR in ornamental gardens near the roadway, parking areas, paths and pavilion is 13,667 square feet (as measured in AutoCAD from the construction documents L1.1 and L1.2, supplied by Gregg Calpino of JJR). These areas are planted with native and drought-tolerant plants and no irrigation system is installed. Native plants were installed or were already present across much of the rest of the site. These areas are not included in the calculations for water under the assumption that they were to appear naturalistic and irrigation would not have been installed no matter the plant choice.

Typical irrigation of an office site would be 1 inch per week (Sustainable Sites Initiative, 2008). The cost of water in Portage is \$4.64 per 1,000 gallons, plus \$19.45 bimonthly for metering charges. To determine the cost-savings of using plants that don't require irrigation, it was assumed that 27 weeks of irrigation per year (May-October) at a rate of 1 inch of water per week

over the area of the ornamental gardens is being prevented at the Portage Lakefront and Riverwalk. Calculations are as follows:

Irrigate May-October: 27 weeks at 1 inch per week = 27 inches  
27 inches = 2.25 ft x 13,667 sf = 30,750.75 cf = 230,031.584 gallons of water per year  
230,031 gal / 1000 = 23.031 x 4.64 = 106.86 + (19.45 x 3) = **\$165.21 per year**

#### *References*

Sustainable Sites Initiative, 2008, <http://www.sustainablesites.org/cases/show.php?id=14>, accessed 8-2-2011 by Christopher Ellis

- ***Recycled or otherwise diverted 100 tons of waste from landfills, 75% of the waste generated during the construction process.***

LEED documentation (consisting of the LEED-NC 2.2 Submittal Template) dated 8-24-2010 supports the assignment of the MR Credit 2.1/2.2: Construction Waste Management: Divert 50% / 75% From Disposal to the Portage Lakefront and Riverwalk site. LEED documentation dated 1-26-2009 in support of the LEED-NC 2.2 MR Credit 4.1/4.2: Recycled Content:10% / 20% (post-consumer + 1/2 pre-consumer) lists the total actual cost of building materials for the site as well as an itemized list of construction materials used, the percentage of pre- and post-consumer recycled content for each material, and the actual money spent on these materials. The documentation was completed by Victor Landfair of Skillman, Corp. and was provided to the research team by Gregg Calpino of JJR.

#### **Social**

- ***Provides outdoor recreation opportunities for 140,000 annual visitors. Among 110 people observed on the site, 77% of activities included swimming, walking, running, and surfing while 23% of activities included sitting on the beach/benches and watching people/nature.***

The National Park Service counted 100,618 visitors to the Portage Lakeshore and Riverwalk in 2009 and 140,304 in 2010 (personal communication with Garry Traynham, Deputy Superintendent, Indiana Dunes National Lakeshore). Educational programs brought approximately 700 kindergarten through fifth grade students to the site during the 2010 school year. Yoga sessions attract 15 people every week, three lectures were attended by 175 people in 2010, and five stargazing events are planned. Approximately 75 senior citizens visit the site through city-organized activities each month (personal communication with Garry Traynham, Deputy Superintendent, Indiana Dunes National Lakeshore). Pam Passera, Recreational Program Coordinator for Portage Parks & Recreation, indicated the types of events and estimated number of attendees at each (personal communication).

Outdoor recreation has been associated with physical health benefits, including a reduction in the risk of obesity and chronic diseases (California State Parks, 2005 p.13). Mental health impacts of spending time in parks include a reduction in stress levels that becomes more pronounced with more time spent in a park, relief of depression associated with physical activity, and increased feelings of satisfaction with one's life (California State Parks, 2005 p.19-22). Regularly visiting park facilities and engaging in outdoor recreation makes adults more willing to serve as volunteers and fosters environmental and political awareness (California State Parks, 2005 p.24-25). By providing the opportunity for physical activity, the park promotes these health and social benefits among its visitors.

We observed 110 people's behavior at Portage Lakefront and Riverwalk between 10 am and 5 pm on June 10. The weather was overcast and hazy with temperatures ranging from 64 to 70 degrees and winds up to 12 mph. There were 158 activity observations (some people engaged in

more than one activity). Active behaviors (77%) included wading (8), walking on beach (16), showering (2), walking on stairs (11), walking on pier (17), walking on asphalt (31), running on pier (1), playing on beach (28), swimming (3), and surfing (5). Passive behaviors (23%) included fishing (8), sitting on pier rocks (3), sitting on beach (8), sitting on pavilion bench (6), watching people/nature (3), sitting in the car (1), and sitting on a seatwall (7).

#### *References*

California State Parks, 2005

- ***Educates 700 school children every year through park outdoor education programs.***

See Methodology for previous bullet.

#### **Economic**

- ***Created three part-time, seasonal jobs and generated approximately \$26,000 in revenue in 2010 for the Portage Parks and Recreation Department through the sale of concessions and use permits for the pavilion.***

Garry Traynham, Deputy Superintendent of the Indiana Dunes National Lakeshore, indicated in personal communication that three part-time, seasonal jobs were generated, that revenue from concessions in 2010 was nearly \$25,000, and that permitted use of the pavilion is available for a limited range of activities, with 27 permits issued at a \$65 charge since the site opened totaling \$1755. Assuming half of the use permits were issued in 2010, \$877.50 can be added to the net revenue of approximately \$25,000 from the concessions, totaling approximately \$26,000 in revenue during 2010.