



# LANDSCAPE PERFORMANCE SERIES

## ASLA Headquarters Green Roof – Washington, D.C. Methodology for Landscape Performance Benefits

### Environmental

- ***Prevented 27,500 gallons of stormwater -- 77% of all precipitation hitting the roof -- from flowing into Washington, D.C.'s overburdened sewer system during the initial monitoring period, from July 2006 to May 2007.***

Flow meters and rain gauges are in place on the ASLA green roof to collect data on stormwater retention. Data collection for one began on July 6, 2006 and ran through May 27, 2007. During this period, a total of 11.83 inches of rain fell on the green roof. Total roof runoff during this period was over 27,500 gallons, meaning that 77% of rain was retained by the green roof\*. For a full table of measured rainfall and runoff for each rain event, see pages 7-8 of "Green Roof Water Quality and Quantity Monitoring" by Dr. Charles C. Glass, Associate Professor, Howard University Department of Civil Engineering and ETEC, L.L.C., available at: [http://www.asla.org/uploadedFiles/CMS/Green\\_Roof/Green\\_Roof\\_Water\\_Monitoring\\_Report.pdf](http://www.asla.org/uploadedFiles/CMS/Green_Roof/Green_Roof_Water_Monitoring_Report.pdf).

*\*The initial calculation, which was provided to and included in Dr. Glass's report, underreported the total rainfall on the green roof. Specifically, the calculating error used 1 gallon = 331 cu. in., whereas the calculation should have been 1 gallon = 231 cu. in.*

- ***Reduces the amount of nitrogen entering the watershed, according to results from water quality testing.***

ETEC, LLC monitored water quality and quantity on the green roof for five rain events in the fall of 2006 and the spring of 2007. The sampling and monitoring were performed in accordance with the standard operations for collection and measurement promulgated by the USEPA. pH, temperature, total suspended solids (TSS), total dissolved solids (TDS), dissolved oxygen (DO), chemical oxygen demand (COD), and nutrients (ammonia, nitrite, nitrate, phosphate, and total phosphorus) were measured on rain water collected on the roof and runoff collected from the downspout from the green roof. Results from nitrate and ammonia measurements are shown in the tables below:

Figure 8: Nitrate

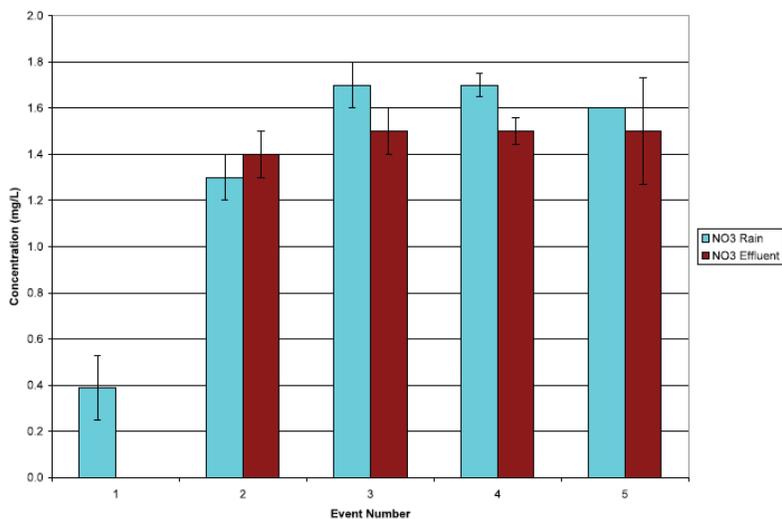
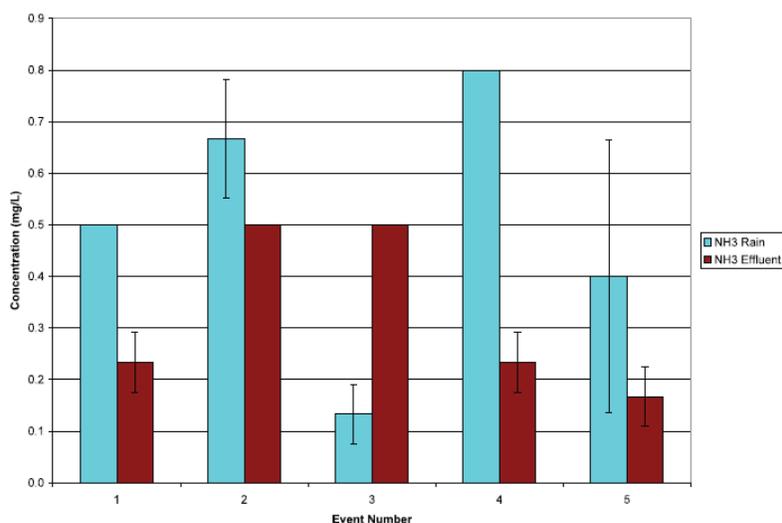


Figure 11: Ammonia



Nitrogen concentrations measured in the ASLA green roof runoff were similar to the values measured in the rainwater indicating that, when combined with the measured volume reduction, a significant overall reduction of nitrogen in stormwater runoff from a green roof can be expected. More information can be found in "Green Roof Water Quality and Quantity Monitoring" by Dr. Charles C. Glass, Associate Professor, Howard University Department of Civil Engineering and ETEC, L.L.C., available at: [http://www.asla.org/uploadedFiles/CMS/Green\\_Roof/Green\\_Roof\\_Water\\_Monitoring\\_Report.pdf](http://www.asla.org/uploadedFiles/CMS/Green_Roof/Green_Roof_Water_Monitoring_Report.pdf)

- ***Keeps the roof surface temperature as much as 43.5 degrees cooler than on neighboring conventional black roofs on the hottest summer days.***

Temperature sensors are in place on the ASLA roof and on the roof of a neighboring building to enable temperature comparisons during the hottest months. Temperatures on the ASLA green roof have been 43.5 degrees cooler than a nearby tar roof. Taken annually, these temperature differences are expected to increase as the ASLA green roof matures. The first readings, taken in 2007, had a temperature difference of 39 degrees on the hottest days.

- ***Reduces building energy use by 10% over the winter months.***

ASLA's methodology to determine energy reduction in its headquarters building was by reviewing the kilowatt hours used before the construction of the green roof and again after its installation. It was concluded that a 10 percent savings was had on its energy costs due to the insulating properties of the new roof in addition to the plants, which all contributed to less power needed to heat and cool the building, thus alleviating the burden on the building's heating and cooling systems.

## **Social**

- ***Has received approximately 5,000 visitors to date, ranging from First Lady Laura Bush to educators, grade school, high school, and college students, landscape architect professionals, local and federal government officials, and international visitors from as far as China, the Middle East, and Australia.***

ASLA uses an online sign-up system to determine the number of visitors to the green roof. In addition to the online system, visitors are asked to sign the guest book to capture additional data for future use. Groups have included school field trips, which may be from grade school through master's level landscape architect students, in addition to government officials who are seeking information about the positive aspects of green roofs and industry professionals who are interested in doing more green roofs for perspective clients.

- ***Provides documentation and educational resources via ASLA's dedicated green roof website, which had 35,000 page views in the last year.***

Using Google Analytics as the source, from October 2009 – October 2010 total page views for "Green Roof Central" were 17,871. The green roof education page had an additional 17,958 views.