

# landscape architecture

THE MAGAZINE OF THE AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS 7/2006 • US \$7/CAN \$9



# ECOLOGY



## ON THE SIDE OF THE ANGELS

Landscape architects restore the Olmsted Woods at the Washington National Cathedral.

By Linda McIntyre

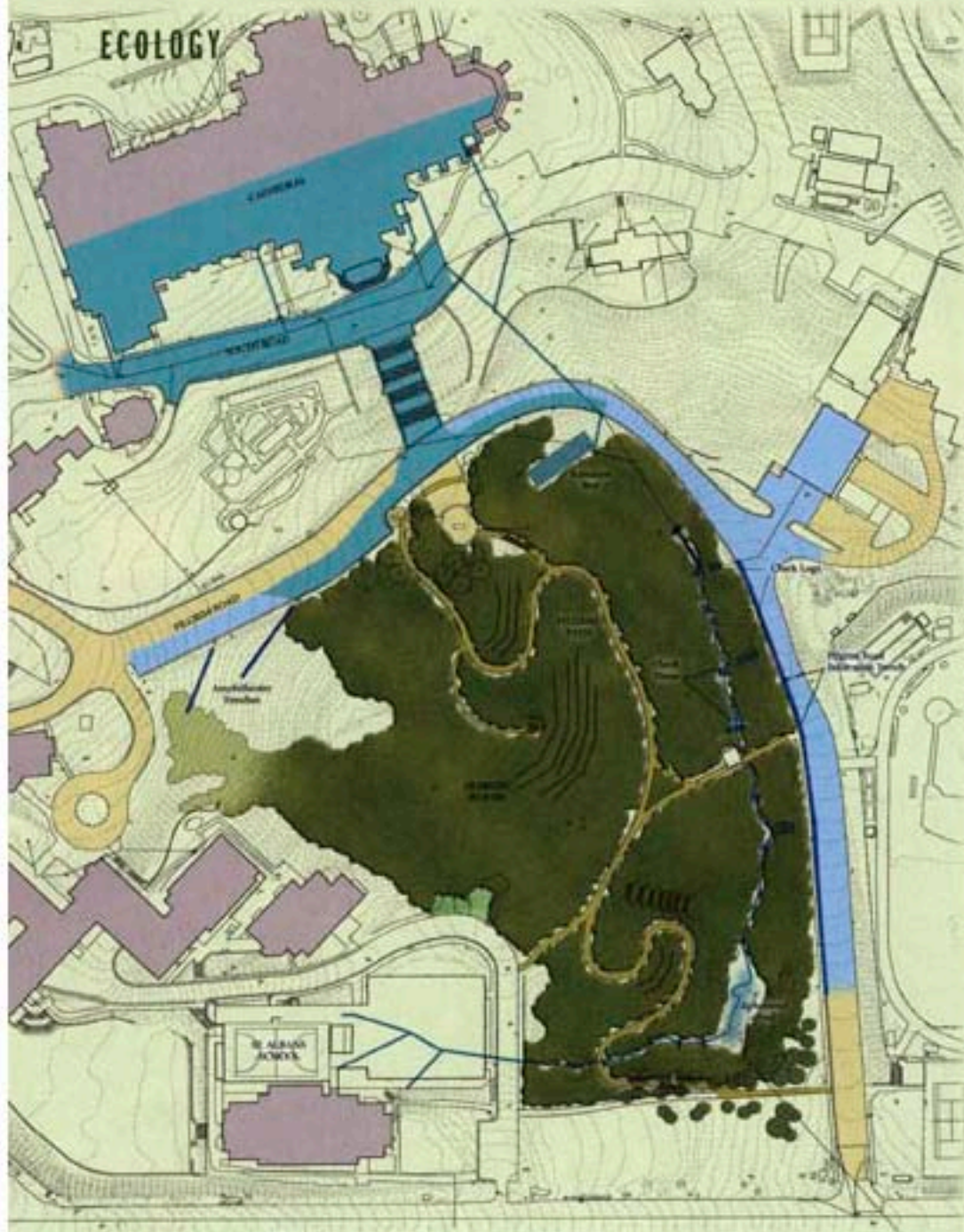
**H**IGH ON A HILL in a mostly residential neighborhood sits the Washington National Cathedral, a Gothic edifice at which much of official Washington gathers to mark occasions and mourn the loss of their own. While the cathedral itself, like so much architecture in the capital city, is staunchly traditional despite its relatively recent vintage, the renovation of a five-acre woodland on its grounds is using the best modern design and technology to help a historical landscape by legendary landscape architect Frederick Law Olm-

**Pilgrim Way, above, installed as part of the Olmsted Woods restoration, leads visitors through the woodland to the Washington National Cathedral. The cathedral, right, looks out over the city through the woods' tree canopy.**



sted Jr. survive the vicissitudes of the twenty-first century.

Preservation of the site's five-acre woodland—once a large stand of old-growth oak and beech forest—was part of Olmsted's original master plan for the cathedral grounds, developed and refined over 20 years, starting in 1907. Olmsted envisioned visitors approaching the cathedral through a woodland walk and arriving refreshed. "The great charm of approaching the cathedral through and up a wooded hillside, having the city far behind and below, helping one to forget the hurly-burly, the busy-ness of a work-a-day world, must be taken advantage of to the fullest extent," he wrote in 1932. "The great sweeping branches of the



The stormwater management plan shows how runoff was slowed and dispersed by measures including a large infiltration bed on the north side of the site, check dams, and infiltration trenches along Pilgrim Road.

farmhouses to a fashionable area of large houses, apartment buildings, shops, and restaurants, and their roads bore increasingly heavy commuter traffic. As in urban landscapes throughout the country, exotic species escaped cultivation, depleting resources available to native trees and plants.

Perhaps the worst damage, though, was done by water. After storms and heavy rains, runoff from the paved road and parking areas, the paved area immediately surrounding the cathedral building, and the cathedral roof (about 37 percent of the area draining to the ravine was impervious) would fill a ravine running through the east side of the woodland with 10 or 12 feet of water, according to project cochair Anne Elsbree. EPA guidelines characterize a stream channel as "stressed" when its drainage area has an impervious surface area of more than 10 percent, and they indicate that when that level rises to more than 20 percent it's virtually impossible to maintain a natural stream and woodland ecosystem. The ravine itself was a product of poor water management—engineers working on the restoration say it started out as a swale 100 years ago, says Elsbree.

Early attempts to control stormwater with a network of drainpipes and infiltration dry wells backfired as the soil dried out and trees began declining and dying. Furthermore, down-cutting in the ravine bed was causing groundwater to leach out of the steep slopes.

The All Hallows Guild (AHG), a group that oversees the care of the cathedral gardens and raises funds for their enhancement, initiated the ambitious project to restore the Olmsted Woods in 1997. In addition to restoring and enhancing the

trees seem to brush off, as it were, the dust of the city, so that one at last reaches the cathedral cleansed in mind and in spirit." Despite this inspiring vision, an inviting path luring visitors from the south side of the property up through the woods to the cathedral had never been fully realized—the only path was a mulch trail going halfway through the woodland.

The woods themselves had remained intact while the cathedral and its grounds, known as the Close, were developed over

the ensuing decades. But they suffered considerable damage, both natural and man-made. During construction of the cathedral and its outbuildings, fill dirt and debris from excavations changed the topography of the site. Visitors and students from the three schools associated with the cathedral trod through the woodland and used the woods as a playground. The surrounding neighborhoods of Cathedral Heights and Cleveland Park changed dramatically over the years, from a sleepy area dotted with

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## ECOLOGY



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native woodland ecosystem while maintaining Olmsted's vision, they hoped the restoration would serve as a national model of urban environmental stewardship and education.

To get this project off the ground, the AHG engaged Philadelphia-based Andropogon Associates to draw up a master plan and begin the restoration. Andropogon principal Leslie Sauer's

book, *The Once and Future Forest*, "had served as a primer for us as we planned this project," says AHG president and project cochair Dede Petri. Andropogon is known for its commitment to ecologically sensitive and innovative planning and design, and the firm had worked on other landscapes designed by the senior and junior Olmstedes such as



The health of trees and ground-plane plants, top, is improving thanks to the water management system. Parched soil had taken a toll on plant life, above, before the system was installed. Check dams, left, constructed of logs, slow the flow of rainwater in an attractive and unobtrusive manner.

The Ramble in New York's Central Park, Prospect Park in Brooklyn, New York, Fairmont Park in Philadelphia, and the Louisville, Kentucky, park system.

Andropogon's broad-based master plan broke the restoration project into three parts—the installation of a new system of paths including the main path, called Pilgrim Way, and the construction of a new

## ECOLOGY

plaza to let visitors, for the first time, enter from the south as Olmsted had envisioned; ravine restoration and control of stormwater; and regrading and rehabilitation of an outdoor amphitheater (not part of the original Olmsted design) to further control water and provide for outdoor worship services and performances.

Pilgrim Way, constructed of cut flagstone with a rain gutter of mortared river stones and stretches of a stabilized aggregate product called NaturalPAVE, was completed in 2000. This path was carefully laid out to take advantage of gaps from lost trees and minimize additional damage to the landscape, according to Andropogon landscape architect Marita Roos, ASLA. To avoid further compacting the soil and damaging tree roots, the construction was done mostly by hand. The path was built on existing soil, without excavation, and soil was aerated to protect tree roots.



**A large infiltration pit was built to collect runoff, allowing it to seep into the soil rather than directing it off the site as the existing drain pipes had done.**

Infiltration pits were built along the path at intervals of about 50 feet to allow water to gradually disperse into the soil.

An informal secondary path, the mulched

Woodland Trail, was also planned, but it became clear that stormwater management and remediation of the leaching were more urgent priorities. "The damage to



**The completed infiltration pit is not visible to Olmsted Woods visitors, in keeping with the naturalistic aesthetic of the site.**

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the woods had continued, and the trees were under more severe stress than had been realized," says Roos. While the problem was not limited to stormwater, heavy

rains underscored the runoff issues. In 2001, eight inches of rain fell over two days, causing floods and toppling a 165-year-old chestnut oak.

Phase two of the project, water management and stabilization of the ravine, was completed in 2002. The existing network of drainpipes had been positioned along Pilgrim Road, which follows the edge of the Olmsted Woods along the north and east sides. The network was dotted with infiltration trenches made of flexible perforated pipe so that water could seep back into the soil. A 20-foot by 70-foot Rainstore brand catch basin, comprising a series of vertical columns made of recycled resins, was installed at the top of the ravine, on a site where no trees had to be taken down, to capture runoff from the cathedral roof and release it slowly, creating ephemeral pools. Stone check dams and cedar logs were placed along swales, creating weirs to stanch the flow of stormwater and allow it to filter gradually into the soil.

The renovation of the amphitheater, phase three of the project, is also related to water management. In early assessments, it was clear that this uninviting part of the site, with its steep grade, was a significant contributor to runoff problems. A detailed

## ECOLOGY

design has been drawn up by Michael Vergason, FASLA, an adviser to the AHG, and construction recently began. The slope will be irregularly terraced to more closely mimic nature, with a simple installation of stone walls and grass. The amphitheater at Swarthmore College's Scott Arboretum is a model for this aspect of the project.

Throughout these phases of construction, removal of invasives and planting of native species was ongoing, and it continues under the direction of Joe Luebke, the cathedral's director of horticulture and grounds. Oak, hickory, and beech trees were planted to restore lost canopy. Understory trees and shrubs such as flowering dogwood, shadblow, fringe trees, viburnums, and chokeberries attract wildlife, provide ornamental interest, and discourage foot traffic off the paths. Sassafras and red maples were plant-



**Trunks of dead trees, shorn of their canopies to avoid wind damage, are left in place to provide habitat for woodpeckers and other wildlife.**

ed along the woodland edge. Wildflowers, ferns, and flowering "spring ephemerals" such as trout lilies, spring beauties, and trillium were planted on the forest floor. Sometimes, though, the desire to maintain ecological habitat wins out over sheer aesthetics. Trunks of dead trees are left in place, and fallen logs, twigs, and branches are left to decay, providing habitat for birds, foxes, and other wildlife.

In theory, this project is unassailable: a historic landscape, overseen by a dedicated group that hired a cutting-edge landscape architecture firm to develop a restoration plan. How is it working in practice?

The Pilgrim Way path is in many ways successful. It is attractive, and people keep to the path rather than traipsing across the soil, which has eased compaction problems. "I was a little bit skeptical of Andropogon's claims that if we built the path, people would stay on it," says Luebke, "but they do. It has really changed the mind-set of the people in the community."



Visitors enjoy the new Pilgrim Way path on its opening day in fall 2000. Before it was installed, foot traffic compacted the soil throughout the site, causing severe stress to trees.

The stabilized aggregate, NaturalPAVE, however, while beautiful and natural looking, has not worked out so well on steeper slopes, he says. It has tended to wash away

and form gullies in heavy rains. "We love the feel of the paths," says Elsbree of the AHG, "but it's just not practical." Andropogon agrees. Roos says they were looking

for alternatives to asphalt, which the AHG did not want despite its durability. Although Andropogon had laid out a test piece before installing Pilgrim Way, the aggregate did not hold up as well as the landscape architects had hoped it would because of the steep grade of the path.

The water management plan is by all accounts a triumph. It passed a difficult test with flying colors in 2003 when Hurricane Isabel blew through Washington. While the storm's high winds led to the loss of 16 specimen trees in the Olmsted Woods, some of which were believed to be more than 100 years old, the much-higher-than-average rainfall was ably handled by Andropogon's water management measures. Luebke has already noted a positive impact on the health of plants and trees, especially the white oaks, tulip poplars, hickories, and beeches, as well as visible mitigation of the runoff.

Many of the fruits of Andropogon's and the AHG's labors are apparent on a walk through the woods on a fresh spring morning after a rain. Despite a heavy

## ECOLOGY

downpour a day and a half before, there are no large pools of standing water, though there is a bit of debris from trees and the aggregate paths. The tree canopy is lush and green. There are, however, a lot of weeds growing between the cut stones and along the rain gutters of Pilgrim Way, especially toward the southern part of the site. Aggressive vegetation in that area is also encroaching on some native plantings such as a large oakleaf hydrangea. A small group of AHG volunteers does yeoman's work pulling out invasives such as English ivy, Japanese honeysuckle, multiflora rose, and garlic mustard. But the volunteers can only do so much, and the increased sun from the loss of mature trees has given some of the invasive species renewed energy. Even the native jewelweed has become aggressive. Eventually the AHG would like to develop and maintain bog plantings in the

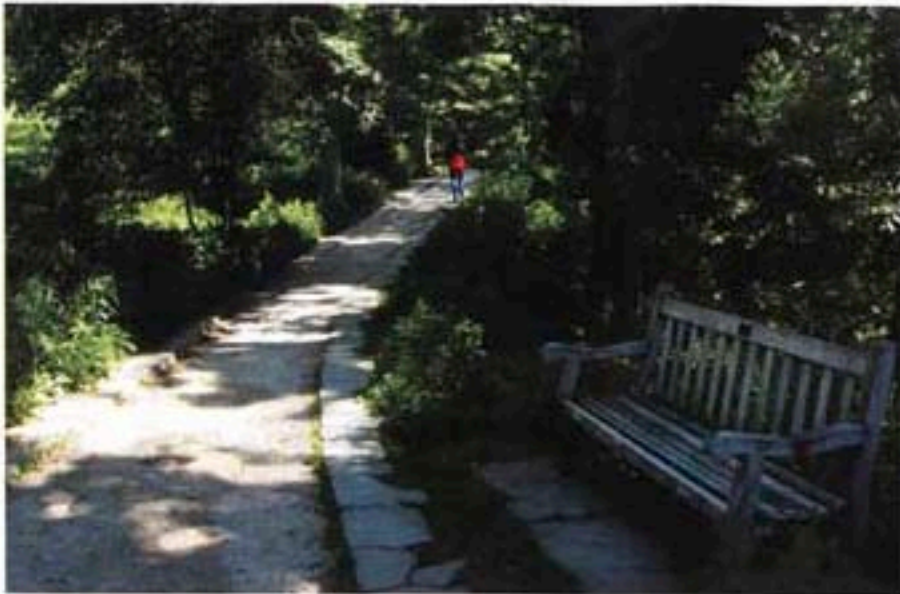


**Renovation of an outdoor amphitheater, to be used for worship services and performances, is the final step in the Olmsted Woods restoration project. It's due to be completed in fall 2006.**

ravine, but for now it's a riot of weeds, invasives, and some young tulip poplars and other trees. Elsbree hopes that as the trees mature it will become easier to control

these problems, but monitoring and removal will have to continue in perpetuity, says Luebke.

Despite the proliferation of unwanted



**Comfortable wooden benches are tucked into niches throughout Pilgrim Way to provide for quiet rest and thought. There's also a somewhat larger contemplative space, with a circular sitting wall, that can be used by small groups.**

plants, the woods do foster the contemplative serenity Olmsted had in mind. At many points along Pilgrim Way, it's hard

to believe you're in the nation's capital, a quick walk away from major roads and chic restaurants. Many species of birds sing

and flit around, and other animals scurry through the undergrowth. There are comfortable and well-placed wooden benches where you can sit and take it all in. Lots of neighbors stroll down Pilgrim Way, though many are absorbed in cell-phone conversations or downloaded music.

The restoration of the Olmsted Woods has brought the best contemporary landscape architecture practices to a historic landscape, improving it in the process. "There is no static interpretation of a landscape that is viable," says Roos, noting that all important landscapes will have to find ways to adapt in the face of increased development, invasive plant species, and climate change.

But Olmsted's vision remains intact. "When you're in other parts of the city and you see the cathedral floating above a canopy of trees, it's gorgeous," says Luebke, "and when you're in the Close looking out over the treetops, you get a similar effect. Thank goodness someone had the wisdom back then to see this and preserve it." LAW