



## **METCALFE**

ARCHITECTURE & DESIGN

### **Morris Arboretum's Tree Adventure exhibit "GREEN" HIGHLIGHTS**

#### **Structure**

Out on a Limb's structure does not touch the trees as touching them could cause them harm. The structure is comprised of recyclable metal and wood. It is a "lightweight structure" of steel and six inch diameter "micro pile" foundations. These foundations are delicately located amongst the trees. Typical concrete foundations of 24" in diameter could kill the trees.

This lightweight structure can be relocated, as the forest is an ever-changing environment. It was important to create a semi-permanent structure so that it can be rebuilt without totally starting over should something happen to one of the trees.

The whole project is sustainable in that the structure is lightweight. If a tree dies in the Squirrel Scramble area that is surrounded by netting, the exhibit may need to be relocated. In that case, a new micro-pile foundation can be dug in a different location, and the structure can (with a crane) be relocated.

#### **Sustainability**

Out on a Limb – is intended to 'tiptoe' through the trees' root systems using small foundations called "micro-piles. According to Alan Metcalfe, "We built this 450-foot walkway exhibit right through the middle of a museum collection of trees. Our exhibit focuses on their tree specimens. If we dug the foundations too close to the trees' roots, we could have killed the basis of our exhibit." Therefore, one important sustainability issue was to determine locations to avoid the root systems of each tree in or near the exhibit.

The use of micro piles made it easier to avoid the roots. This issue became especially important at the Chestnut Oak, a 250-year-old tree that is the centerpiece of the exhibit and is surrounded by structure and decking. Arborists assisted the team by blowing away the soil that surrounded the root systems (using a kind giant leaf blower) so the engineers could carefully place foundations in areas that would not disturb the ancient tree's extensive root systems.

Off-site pre-fabrication of the structure also minimized site (and tree disturbance) because *Out on a Limb's* pieces arrived by truck and were boomed in by a 160- ton crane where site workers bolted it to the foundations.

It is also structurally sustainable as all pieces are independent. If a tree falls onto *Out on a Limb* and destroys part of the deck, the rest of the project will remain safely standing. All the pieces are structurally independent of each other.

**The Boardwalk** consists of sustainably harvested black locust wood decking, locally cut (within 500 miles per LEED requirements). This wood is naturally bug and rot resistant, and has been used over the centuries for fence posts. It has gained a new popularity because it is locally available and does not need chemical treatment like pressure treated lumber that has been used over the last 30 years (this could be harmful to little children who are sitting on it). This issue has been a contentious subject over the last five years with municipal governments (Atlantic City and Ocean City) arguing about the use of rot resistant pressure-treated or rainforest wood products for boardwalks. New York City now uses black locust in their park benches.

This **shop built** exhibit (structure and interpretive components) was built and assembled off-site in a manufacturing plant rather than onsite. This lessened the impact of *Out on a Limb* on the environment and Morris Arboretum's natural wooded site

**LED lighting** offers lower energy consumption, smaller size, longer life and greater brightness than conventional incandescent lighting.

**Tree protection** is important especially for the Chestnut Oak, a 250-year old tree that is the centerpiece of the exhibit. To protect its roots, layers of mulch with stabilizing fabric were installed to insulate it from traffic on the soil above the root systems.

To safeguard the tree trunks, a protective casing of wood slats has been placed around the trees in the construction site from the ground level to six feet upward. This technique is also replicated 30 feet up to shield the upper trees from damage by the construction cranes.