

Introduction

In 2010 The Morris Arboretum completed construction of its \$13.4 M Horticulture Center at Bloomfield Farm. Integral to the Center's platinum LEED designation awarded by the U. S. Green Building Council are two green roofs atop equipment garages. The roofs work in concert with other stormwater best management practices (BMPs) that include cisterns and rain gardens.

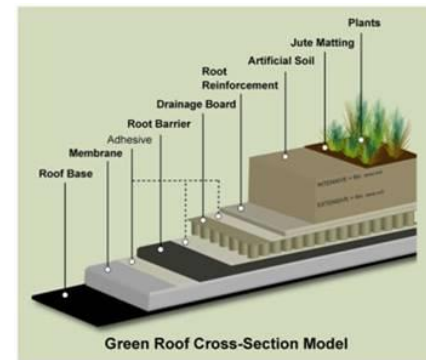
Design Concepts

- minimize the building's footprint on the landscape
- provide public and private benefits
- incorporate plants thought to be amenable to green roof conditions



Materials

Equipment garages were built to accommodate the extra weight of the green roofs, averaging between 20-50 lbs/ft² when fully saturated. Green roof medium and plants were locally sourced within 500 miles, adding LEED points.



Green Roofs Types

Extensive: medium depth 3-6", limited plant selection, lower cost, maintenance, and irrigation
Intensive: medium depth > 6", wider plant selection, increased maintenance and irrigation



Construction Challenges

- "Unsuitable soils" shrink-swell clay loam
- Sinkholes developed during construction due to underlying limestone
- Additional \$100,000 in construction costs

Installation

Extensive roof: pre-vegetated 3' x 6' sedum mats sourced from Sempergreen® to cover 2500 square feet. Installation took 12 hours with two crews of 2 each to install.

Intensive roof: a loose laid system of thousands of small plugs, 3", 4" and 1 quart perennials were installed over a 30 day period by teams of two to cover 3650 square feet.

Green Roof Benefits

- reduced stormwater runoff peak flows
- reduced urban heat island effect
- vegetation captures airborne pollutants
- garage roof life extended up to 40 years
- vegetation dampens noise
- provides insect and bird habitat
- aesthetically pleasing

Additional Stormwater BMPs



Cisterns



Rain Gardens

Horticulture Center Morris Arboretum

LEED Facts	
for LEED Building Design + Construction	
Certification awarded Feb 2011	
Platinum	53
SUSTAINABLE SITES	9 OF 14
WATER EFFICIENCY	5 OF 5
ENERGY & ATMOSPHERE	15 OF 17
MATERIAL & RESOURCES	7 OF 13
INDOOR ENVIRONMENTAL QUALITY	12 OF 15
INNOVATION	5 OF 5

Educational Goals

- Penn students, local school students, interns
- professionals in architecture, landscape architecture, environmental studies, horticulture
- external lectures and site tours to municipalities and community groups

Horticulture Center Awards

- 2011 Platinum LEED Certification, U.S. Green Building Council
- 2011 Merit Award for Design Excellence, American Institute of Architects
- 2011 Montgomery County Land Development Award
- 2012 American Architecture Award by Chicago Athenaeum

