Denver Botanic Gardens

Building a Rooftop Garden and Deck for Education and Research


Photo: Mark Fusco

Green Roofs Improve:

- *Air quality*
- *Wildlife habitats*
- *Quality of life*
- *Property value*
- *Energy consumption*
- *Heat island effects*
- *Roof membrane lifespan*

Denver Botanic Gardens built Denver's first publicly accessible rooftop garden and pedestrian deck to research, educate and test best practices of green roof installation. Located near the Gardens' entrance, visitors can access the green roof to learn about construction, the importance of plants and benefits.

Looking beyond the important environmental benefits of green roofs, you'll see an urban-style, rooftop nature retreat elevated up and away from asphalt and confined spaces. Rooftop gardens have positive benefits for our earth while pedestrian access provides a respite and outdoor breathing space for people.

Bison Deck Supports is a proud sponsor of this green roof project at Denver Botanic Gardens.

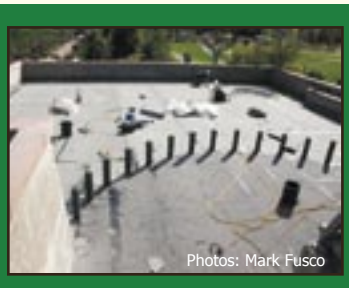
Bison Highlight: A curved rock wall is attached to the roofing structure and properly contains the Bison Deck Support System. Bison Wood Tiles and Deck Support system offers remarkable installation flexibility by accommodating this special application.

Watch Videos Online: Rooftop Deck Planning and Installation at Denver Botanic Gardens

Read more: *"DBG Shows How Green Roofs Improve the Built Environment,"* by Mark Fusco, Senior Horticulturist at Denver Botanic Gardens

Project Information

Architectural Plans


Photos: Mark Fusco

BISON DECK SUPPORTS & WOOD TILES

We welcome your questions.
(800) 333-4234 Click to email us.
www.BisonDeckSupports.com
→ Click Project Profiles

Denver Botanic Gardens
Project Information

Project Location	Denver Botanic Gardens, 909 York St, Denver, CO 80206 www.botanicgardens.org
Bison Deck Support	Level.It Adjustable Deck Supports
Decking Material	Bison Ipê Wood Tiles
Green Roof Size	2000 s.f.
Wood Tile Deck Size	433 s.f.
Landscape Architect	Jill Kurth of Civitas

When installing a green roof, there are many considerations regarding structural weight load, roofing membrane/drainage and plant viability. This green roof showcases drought-tolerant plant material, lightweight growth medium, drip irrigation for supplemental watering, copper flashing, a stunning curved rock wall, and a wood deck constructed with Bison Wood Tiles and Deck Supports.

Take a step-by-step look at building a green roof at Denver Botanic Gardens.

1 Starting with empty rooftop space, engineers determine structural weight capabilities.

2 Prior to installing the new roofing membrane, wall posts are attached to the roofing structure to properly contain the Bison deck system.

3 New roofing membrane is installed around wall posts. A water containment study is performed to ensure watertight seals.

4 To keep wall lightweight, a rock veneer is utilized.

5 Rock wall is installed using sandstone rock & mortar.

Go to Page 2

Photos: Mark Fusco

Denver Botanic Gardens
Project Information


6 A gap is left under the wall so water can flow to roof drains.

7 Irrigation system is installed for supplemental watering.

8 Moisture retention mat and drainage layer cover waterproof membrane.

9 Light weight planting medium depth range from 4-12 inches.

10 Rooftop space is ready for pedestrian decking with Bison Wood Tiles and Deck Supports system.


11 Installation of decking: View online videos for complete information.

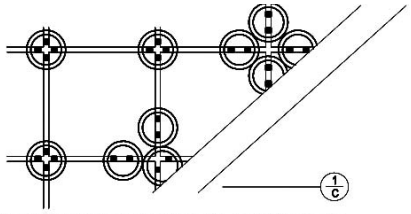
12 Deck is installed and green roof is ready for planting.

13 Showcases plant material from semi-arid climates that might eventually survive with little to no supplemental irrigation.

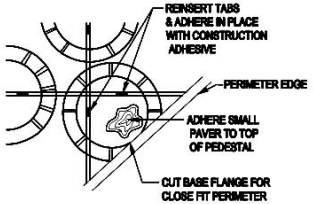
Photos: Mark Fusco

Denver Botanic Gardens Architectural Plans

Bison Specifications | Download CAD Details



ENLARGED PLAN VIEW AT DIAGONAL PERIMETER EDGE



TOP VIEW OF PEDESTAL

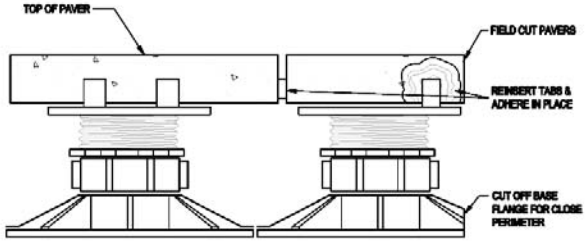
ADHERE SMALL PAVER SECTIONS TO TOP OF PEDESTAL WITH WATERPROOF ADHESIVE

BOTTOM VIEW OF PEDESTAL

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.
3. CONTRACTORS NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info REFERENCE NUMBER 512-054.

DESIGN AND INSTALLATION DETAILS

3. TYPICAL DIAGONAL PERIMETER PLACEMENTS, SIMILAR PLAN VIEW



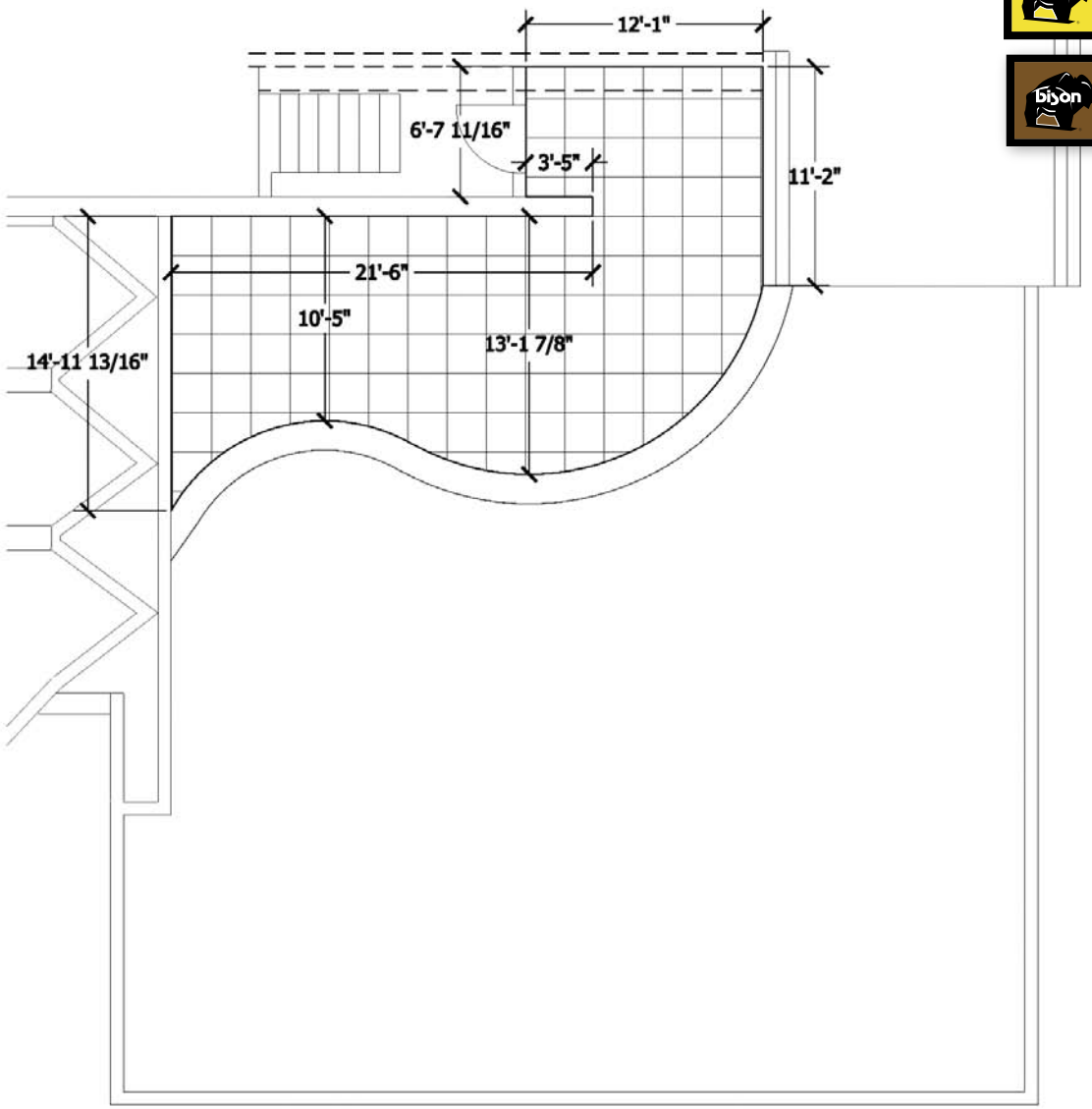
TWO PEDESTALS SHOWN WITH TABS REMOVED AND REINSERTED AS NECESSARY

SECTION VIEW

NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.
3. CONTRACTORS NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info REFERENCE NUMBER 512-055.

DESIGN AND INSTALLATION DETAILS

4. TYPICAL DIAGONAL PERIMETER PLACEMENTS, SECTION VIEW



LEVEL IT ADJUSTABLE DECK SUPPORTS

WOOD TILES

DENVER BOTANIC GARDENS	
PRODUCT	TOTAL
LC	148
4.5mmTAB	148
FS1	88
IPE	124
B11	174
PS1	15

BISON DECK SUPPORTS

MADE IN THE U.S.A.

Contains 20% Post-Industrial Recycled Material

Denver Botanic Gardens

DBG Shows How Green Roofs Improve the Built Environment

by Mark Fusco, Senior Horticulturist at Denver Botanic Gardens

Photos: Mark Fusco

In 1995, in Fukuoka, Japan, a green roof was used on the ACROS building to offset the impact of new development. The 100,000-square-foot terraced roof, covered in plants grown in a foot of planting media, doubled the size of the adjacent park.

In 2003, in Dearborn, Michigan, Ford Motor Company added 454,000 square feet of green roof to its new truck assembly plant. The all-sedum roof, grown in two inches of planting media, captures 447,000 gallons of storm water annually.

Both of these projects, assembled for vastly different purposes, share many common benefits and add value to the building, the community and the environment. The rest of the world is beginning to understand what the Europeans have known for decades: Green roofs improve the built environment. Studies have proven that they reduce energy use, capture storm water, improve air quality, protect the roof membrane, create wildlife habitat and add much-needed green space to cities.

Green roofs are now commonly integrated into new construction in the North American cities of Toronto; Chicago; Atlanta; Washington, D.C.; Portland; and Seattle. City and state governments are beginning to understand the long-term economic benefits, offering incentive programs to offset the initial costs.

Go to page 2

Despite the proven track record of green roofs throughout the world, the Rocky Mountain West region has been slow to adapt. Perhaps it is the misperception that this region does not receive enough rainfall or that added irrigation will nullify the benefits. The green roof at Denver Botanic Gardens was designed and constructed to change these perceptions and educate visitors about the benefits of green roofs in our arid climate.

The green roof was designed and constructed by the Gardens' staff with support from a local landscape architecture firm, Civitas Inc. Utilizing a similar system commonly used in Europe, the Gardens' green roof utilizes a lightweight growth media, moisture retention mat and drainage layer over a waterproof membrane. It differs from a traditional European roof in terms of plant selection; this green roof showcases drought-tolerant plants from the western United States and Asia. The planting medium ranges from 4-12 inches. The varying depth affords the opportunity to test smaller cacti, herbaceous perennials, and small trees and shrubs. It is designed to test a wide spectrum of plants, mostly native but also from similar semi-arid climates, that might eventually survive with little or no supplemental irrigation. In addition to the inevitable Sedum lanceolatum, you will find penstemons, buckwheats and a wide range of xerophytes that provide vivid color in bloom and foliage.

Located above the Gift Shop, just inside Denver Botanic Gardens' entrance, visitors can access the green roof for a first-hand look at a true Western green roof. This is the first publicly accessible green roof in Denver and is complete with interpretation about benefits, construction and the importance of plants. Although still in the test phase, it is living proof that plants can have a positive impact on humanity's built environment. And what could be better than integrating architecture with nature?

Within the green industry, the potential implications are broad. As we strive to create cleaner, healthier living conditions within cities and manage habitat displacement in areas of new development, green roofs will serve an integral role. Reduction in storm water runoff means cleaner streams; the addition of plants, in an urban setting, improves air quality; cooler roofs reduce energy consumption and extend the life of roof membranes; and people with access to green space are proven to have improved quality of life.

Please visit the green roof at Denver Botanic Gardens: www.botanicgardens.org. ~

Photo: Mark Fusco