

How to Put a Library Under a Mesic Meadow Ecosystem

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Abstract

CASE STUDY – Oaklyn Branch Library
How to Put a Library Under a Mesic Meadow Ecosystem

Design challenges often lead to design innovations. The challenge for this 18,500 square-foot branch library was how to accommodate a program that called for a single-level-facility, with parking, on a wet, sloping site that drops 50 feet from its frontage road to a floodplain below. The innovation was to build into the hillside and let the natural mesic (moist) meadow landscape flow seamlessly onto the roof of the building.

We were skeptical about placing a wet meadow on a roof, but our research revealed that European garden roof technology was slowly taking hold in America. Typical garden roofs use sedums and mosses in relatively thin, light soil layers from two to four inches deep. This system had to be deeper to simulate the environment to which the meadow plants were adapted. Instead of merely shedding water like a normal roof, it had to retain some of it and it had to provide water to the deep roots even in a prolonged drought. Using German technology, the team designed a custom layered system of drains and ponding elements and a fourteen-inch soil mix. The waterproofing membrane is a robust double-layered, heat-welded system over four inches of insulation and a composite concrete deck.

Although the cost of the roof garden came in at about \$28 per square foot, it allowed for an economical earth-sheltered design that is essentially three inexpensive concrete retaining walls with one expensive window wall. To counter the stigma usually associated with going underground, daylighting was maximized through the core of the building. The front façade overlooks the Pigeon Creek valley through a dozen 11-foot tall windows to maximize view and daylighting. A tall clerestory, reminiscent of a Hoosier covered bridge, stands above the garden roof to flood the main lobby and circulation area with natural daylight. The LightBridge clerestory forms a lantern-like icon in the landscape from the top and creates a dramatic tall central atrium in the building below.

Although this branch will have a meadow blooming on top, it will also be one of the most daylit branches in the system and one of the most energy efficient. Commissioning of the heating system was complicated by the fact that the building was not calling for heat when the outside temperature fell below freezing. This was due to the thermal lag effect of the well-insulated, earth-sheltered structure.

This presentation will focus on practical garden roof detailing and lessons learned during construction.

Three primary learning objectives

1. Earth Shelter buildings can be daylit, open and exciting.
2. Garden roofs can save money, energy, water, reduce the heat island effect and recreate a diverse ecosystem.
3. It is possible to have a dry building under a wet meadow with the right waterproofing technology and attention to detail.

Keywords

Garden roof, earth-sheltered library

Bio

No bio on record