



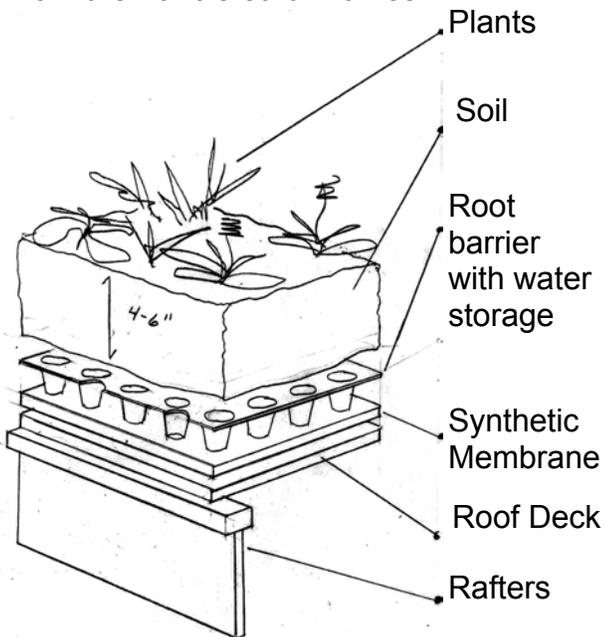
Dakota County's mission includes providing for premier environmental and outdoor education.

The Lebanon Hills Master Plan promoted the mission by focusing on sustainable architecture to reduce short and long term impacts to the environment.

This resulting facility and site provide a model of sustainable choices, including a vegetated "green" roof.

THE ROOF'S DESIGN STRUCTURE

Experience (particularly in Europe) and technology have created simplified soil/plant roof system that is very different from the 1970's earth homes.



SOIL SELECTION

The generic engineered soil components by volume are:

- ◆ 65% Hydrolyte sized ¼ to 3/8
- ◆ 15% Horticultural Grade Perlite
- ◆ 20% Coir
- ◆ 3#/cubic yd dolomite limestone
- ◆ 1#/cubic yd slow release Osmocote 17-6-12

PLANT SELECTION

Plants were selected based on experiences and recommendations from across the world. For the greatest success, roof plants must:

- ◆ be able to tolerate extreme variations in environmental conditions. Fleshy plants allow water storage within the plant itself. Waxy coatings and reduced leaf exposure conserve water and reduce transpiration;
- ◆ have the physiological ability to quickly and efficiently rotate between a dormant condition and an active growing condition;
- ◆ be available, affordable;
- ◆ require minimal maintenance.

In addition, plants were selected for an extended bloom season, allowing for maximum variety and color.

PLANTING

Over 6,000 young plants are spread across the rooftops. The plants were grouped together with a minimum of four to six plants per grouping, using a one-foot spacing. Initially, even with this many plants, there is more soil showing than plant leaves or stems.

WHAT ARE THE BENEFITS OF A GREEN ROOF?

- ◆ Reduces storm water runoff through soil absorption and consequent evaporation and plant transpiration
- ◆ Reduces heat island effect
- ◆ Increases seasonal production of oxygen through photosynthesis
- ◆ Creates habitat, especially for birds
- ◆ Cleans the air
- ◆ Reduces interior noise
- ◆ Creates aesthetic improvement
- ◆ Reduces building utility costs
- ◆ Creates benefits to, and public interest of, space that is typically wasted
- ◆ Helps “naturalize” the building site
- ◆ Minimizes building footprint with efficient space planning

COST

Through alternates in the bidding process, the lowest responsible bidder provided these cost differentials when comparing the green roof (6,039 sq. ft. building) to other roof systems:

- ◆ \$44,000 more than a typical wood shingle roof or...
- ◆ \$61,000 more than a typical asphalt shingle roof

The roof is expected to have a return on investment through increased energy savings.

MAINTENANCE

With the plants selected, minimal maintenance is expected; however, a vegetated roof of this design is new in Minnesota!

Maintenance strategies include:

- ◆ No mowing. Plant height was considered during selection.
- ◆ Watering as needed. Watering is necessary for plant establishment. Plant selection requires little long term watering, except during a rare, prolonged drought.
- ◆ Weeding. As the plants mature, less weeding will be required. Some blown-in seeds may be invasive -- dandelions, ragweed, and other species. Routine observation is needed manage weeds without creating excessive soil disturbance or other negative consequences.
- ◆ Natural fertilization from rain, birds and blown-in dust is preferred. Plant growth observations will determine future needs.

WATCH IT GROW!

Each of the 17 species planted will grow at its own pace and in response to varied environmental conditions. Wet years will benefit some species, while dry years will benefit others.

The diversity of plants will allow the roof to grow and change with the environment and will bring a variety of visual experiences for the visitor.