

Why install a Green Roof?

The decision to install a vegetated roof on the city owned building at 809 North Broadway was influenced by a variety of issues.

- The reduction of the amount of storm water is the most significant affect of installing the “green” roof. For every inch of rainfall, the roof will prevent about 10,500 gallons of water from going into the sewer system.
- The absorption and reflection of the sunlight by the plants and slow evaporation of the retained water during the summer reduces the heat gain of the roof which reduces the cooling load and decreases the need for air conditioning.
- The irregular surfaces of the plants break up the wind currents, which helps to reduce heat loss through the roof during colder weather. The plant and soil layers together also have an “R-value” of 6.
- The vegetated layer prevents U.V. rays from reaching the protective membrane of the roof and reduces rapid temperature fluctuations. This is estimated to extend the life of the roof membrane by at least 10 years, providing a savings of about \$84,000 to the City of Milwaukee.
- Plants use carbon dioxide and produce oxygen which improves air quality. They also act as a filtration device by capturing some of the airborne particulates which contribute to the formation of smog.
- Hard surfaces like concrete, asphalt and typical roofing materials store the heat from the sun and slowly release it back into the air creating the urban “heat island” effect. This effect often causes urban areas to be several degrees warmer than less populated areas. By reflecting the sun’s rays and through the process of transpiration, green areas help to cool the urban environment.

A green roof is more than just an elevated planter.

The roof *system* starts with a vapor barrier at the lowest layer to prevent moisture from migrating through the concrete deck from the building interior. Moisture would diminish the effectiveness of the insulation. Next, 5 inches of rigid insulation is glued down with an asphalt adhesive. The roof membrane a single -ply (EPDM) rubber, (ethylene propylene diene terpolymer) 90 mils thick (about 1/10 inch) which is glued to the insulation. Over this, a protection fabric is installed to reduce the possibility of puncturing the rubber layer. The next layer is a root barrier to prevent any plants from digging in too deep. On top of this a drainage board is added. This is like a series of miniature egg cartons with little pockets to hold water that the plants can soak up slowly. Over the drainage board, a moisture retention mat is installed. Then comes the “soil”. It is a 3-4” layer of 70% kiln expanded shale with 30% organic compost. The “green” part goes on the top. It is a mix of varieties of “sedum”, commonly known a stone crop. These are shallow rooted succulent species with small flowers and have proven to work very well in this type of application. They can resist high winds and cold as well as intense heat and minimal rainfall. They come in a wide variety of colors which bloom at different times, so the “green” roof is more likely to be a constantly changing patchwork of greens, reds, yellows and pastels.

The existing roof membrane is being recycled under a new program sponsored by the EPDM Roofing Association and the existing insulation and metal flashings will also be recycled.

The existing 3" polystyrene insulation that is dry will also be recycled. The insulation under the new roof will be polyisocyanurate with an "R-value" of 30. Calculations indicate that during the first year the heating and cooling costs should be reduced by \$711.00. As energy costs increase, savings will be greater.

The F.J.A. Christiansen Roofing Co. Inc., a member of the TECTAMERICA Corporation, is installing the roof on the 809 Building. They have previous experience installing green roofing systems and have a similar roof installed on one of the buildings at their facility on Milwaukee's north side.

We will be installing temperature sensors below the insulation, at the lower level of the soil layer and at the plant level to monitor the effectiveness of the various components.

The Milwaukee Metropolitan Sewerage District is providing a grant of \$35,200 through "Storm Water Best Management Practices" program to assist in funding this project.

Source:

http://www.city.milwaukee.gov/display/displayFile.aspx?docid=13217&filename=/User/cmses/809_green_roof.doc