



Between the World
and The Weather
Since 1928

TECHNICAL BULLETIN

No. 105

HELPFUL HINTS FOR BIDDING GREENROOF-ROOFSCAPES® INSTALLATIONS

1. It is assumed that estimating and pricing of the basic waterproofing, insulation and flashings is well understood and is not addressed herein.
2. After the flashings and membrane is completed and Electric Field Vector Mapping (EFVM) testing completed (required with all Greenroof warranties) the protection course, insulation, aeration mat and "Green" portion of the roof is ready for installation.
3. Generally, the following components will be installed, in sequence, over the membrane:
 - Protection Course
 - Insulation
 - Aeration Mat (roll size 495 sq ft, 68lbs).
 - Polyethylene Root Barrier, RB 20 (roll size 2000 sq ft, 180lbs).
 - RB 30 (roll size 1000 sq ft, 270lbs) as per specifications with RB 20 Tape
 - Drainage/Retention (roll size of Ram Drain 1241 is 200 sq ft, 40lbs, and Ram Drain 2451 is 300 sq ft, 80lbs).
 - (optional) Moisture Retention Mat (roll size various sizes, 6oz/yd).
 - Engineered Soil - thickness varies (42 lbs. C.F. dry weight) (from Skylands).
 - Erosion Control Blanket or (optional) Soil Consolidation Spray.
 - Vegetation (cuttings, plugs, plants, hydroseeding) (sourced from Emory Knolls Farms).
 - There is also the option of installing a modular system of trays which are available from "Live Roof", "GreenGrid" and "St. Louis Metal Works" among others.
4. • Soil - Skylands "Extensive" (low profile) and "Intensive" (high profile) soils as specified: if not specified, as recommended by Skylands.
 - Inform Skylands that it is a Barrett Greenroof-Roofscape® for favorable pricing and single source warranty coverage.
 - Skylands soils are FLL certified (the Gold Standard). The soil can be delivered two ways; one cubic yard "Super Saks," craned to the roof and unloaded into a hopper or wheelbarrels, or bulk delivery, blowing the soil onto the roof with blower trucks. On larger projects, blowing is usually most economical.
 - Dry bulk weight is 42lbs per cubic foot; moist material will obviously weigh more. Always calculate a 20% loss to settlement and compaction, which from an estimating standpoint means a 25% "add" to compensate, i.e., 125 c.f. of loose soil will give 80 c.f. after installation. To wind up with a net-compacted 100 c.f., add a 25% factor, which equals 100 c.f. loose soil. The simplest way of calculation is converting "board feet" (12" x 12" x 1") to cubic yards (324 b.f. per c.y.) including the 25% "add" compensation for settlement.
 - Skylands has 8 shipping locations at present,
 - Ladenburg, PA (Philadelphia area)
 - Harrisburg, NC
 - Cumming, GA
 - New Milford, CT
 - Canton, MA
 - Cleveland, OH
 - Glen Ellyn, IL
 - South Charleston, OH
 - Seattle, WA, more locations are coming.
 - Skylands contact, 877-268-0017, www.skylandswa.us.
Be prepared to provide the following information; square footage, soil thickness desired after installed, settled and compacted; project location; packaged or bulk; blower truck or crane; any other unique specification or site specific requirements including any union requirements.

5. Vegetation - Emory Knolls Farm is our preferred supplier for basic greenroof plants. Inform them the project you are bidding is a Barrett Greenroof-Roofscape[®], the location of the project and any conditions they should consider, i.e., shaded areas (which may vary with the seasons); slopes; hot air exhaust areas; soil depth; salt air exposure; irrigated or non-irrigated; roof elevations; urban or rural; specification requirements and any other fact that might impact plant survivability in addition to specific species specified, density of plantings specified, warranty requirements, estimated time of planting, etc.
- At this point in time, Emory Knolls ships from Street, Maryland, a little N.W. of Baltimore. In the near future, there will be six or more shipping points from the eastern U.S. Emory Knolls contact, 410-452-5880 www.greenroofplants.com
 - The U.S. is divided into "Hardiness Zones," (1 thru 11, with 10°F increments, (maximum average cold temperature), which is then subdivided into "a" and "b," with 5°F differentials), by the USDA ,(USDA Misc. Publication No. 1475, January 1990), the website <http://www.usna.usda.gov/Hardzone/ushzmap.html>.
 - The map shows average annual minimum temperatures from zone 1 @ below -50°F; zone 5a @ -20°F to -15°F; zone 5b @ -15°F to -10°F; zone 6b @ -5°F to 0°F; zone 7a @ 0°F to +5°F; zone 9a @ 20°F to 25°F and zone 11 above 40°F. as examples.
 - Vegetation used must be appropriate to both the zone and the specific project microclimate. See attachment on microclimates. The time of year of planting is also limited in different geographical areas. Many areas north of the Mason-Dixon Line have a 6-7 month planting season. Do not plant past the cutoff. The plants may not survive.
 - A usable water source must be available for every greenroof. We strongly encourage consideration of a drip irrigation system on all greenroofs. They are relatively inexpensive and will reduce establishment maintenance requirements.
6. Labor
- Labor costs for a three (3) inch deep manual installation of soil should be similar to that of a heavy stone ballast installation. Blowing the soil onto the roof is generally less expensive on larger projects and cranes more efficient on smaller projects.
 - Labor costs for the drainage/water retention mat installation should be about the same as for common drainage mat.
 - Labor costs for Aeration 600 should be a bit lower than the cost to install the drainage mat.
 - Labor costs for the 20 or 30-mil root barrier with taping should be similar to the costs to install common drainage mat; hot air welding will likely be a little more time consuming than taping and requires more skill.
 - Labor costs for erosion control geo-textile fabric should be about the same as filter fabric installation. Erosion control fabric or soil consolidation is strongly encouraged on all Greenroofs.
 - Labor costs for planting vegetation will vary considerably with the density and type of plantings, as well as the worker's motivation. The typical, two plugs per square foot density should run about 30-45 plants per man-hour. Cuttings will be more productive.
 - Hydroseeding will be significantly more productive on many projects.
7. Modular systems are another approach to greenroof systems. We do not have any special alliances with modular suppliers generally the only thing to install over the XPS board is a filter fabric then the modules.
8. Also available are pre-grown mats, not unlike a form of sod, where the soil and plants are pre-grown in an inch thick fiber mat, rolled up and shipped to the job site to be unrolled over engineered soil. Generally there is a long lead time for this type of product, which Emory Knoll Farms can supply.
9. For specific questions pertaining to Greenroof-Roofscales[®] installations, contact the Barrett Company at 800-647-0100.