

Drains and Green Roofs

By: Craig J. Froeter

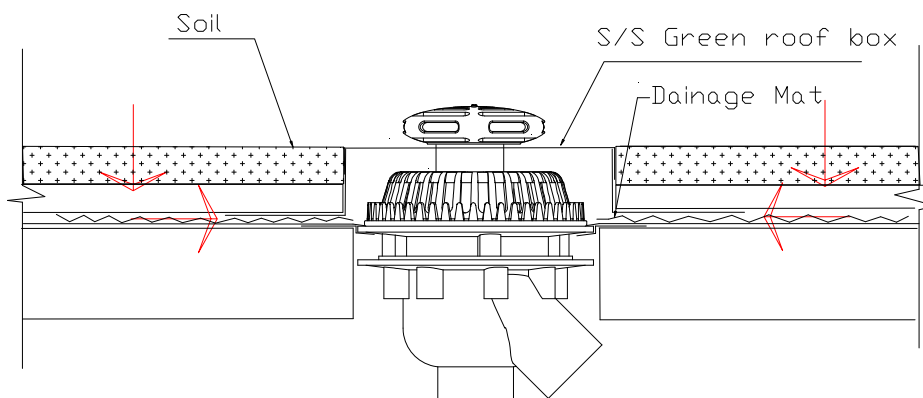
Now this is a combination that by looking around the industry, very few truly understand how this all works. A green roof is a very unique beast, and being done wrong will have extremely high cost associated with it. The day a green roof starts to leak is when the cost is going to start to get out of hand.

The roofing material under a green roof is living (or dying) based on the moisture quantity and the length of time it has to be subjected to it. The membrane is also much like the waterproofing on a foundation wall because it is in much the same environment.

One thing I learned very early in my in my waterproofing installing career was that installing a membrane that was going to be underwater the majority of time was going to be failing very quickly. The key to a long lasting waterproofing system is to get the water away from it as quickly as possible. So as long as you keep that in mind and don't allow any component of the system to cause water to not drain away you are ahead of the game. You must also be sure to choose components are designed properly and will not start to become blocked from green roof debris. That is not as easy as it sounds because some manufacturers just don't get it.

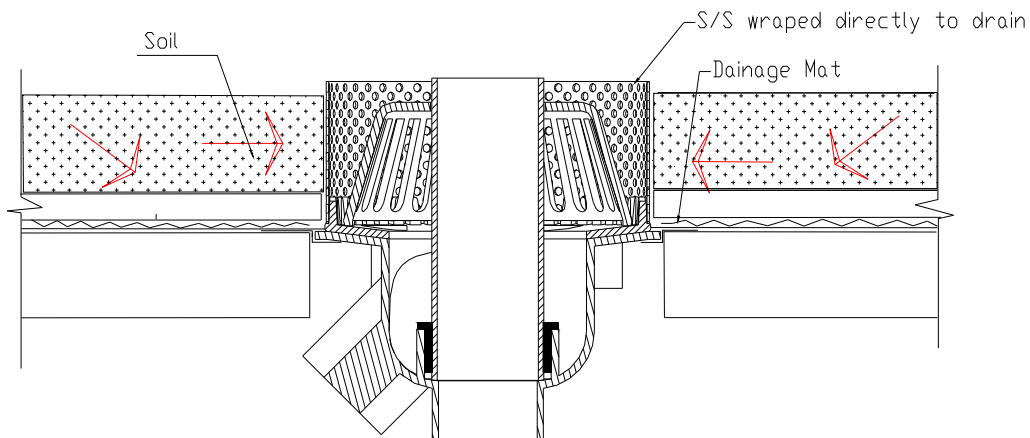
A Green Roof is a debris creator, unlike a conventional roof that may catch some debris over time a green roof actively produces it. So with that said a drainage system must be designed to properly deal with the debris. What is going to be the plan to deal with the debris? Are you going to cover every drainage path with a screen or perforated stainless steel, as many manufacturers do? Are you going to design it so that if every screen becomes plugged the green roof will still drain?

We will discuss an extensive/intensive green roofs first. The key to this design draining properly is the installation of a drainage mat. It consists of a plastic waffled or corrugated shaped sheet that has a geo-textile fabric attached to one side. That is to be installed with the fabric side up under the green roof, this allows the water to freely drain to the drainage system. The key to this working properly is the use of a green roof box. Now I define a green roof box as a separate box structure that sits over top of the drain and (the most important part) over the drainage mat.



This will allow the green roof to always drain directly to the drain. By directly I mean that the water from the drainage mat will not have to pass through a perforated drain enclosure, but directly from the drainage mat into the drain. Now the problem with other drain manufacturers they thought that it would be a good idea to take the perforated S/S material and wrap it directly to the drain ring of the drain and enclose the drain completely. Now the problems with this are many and are as follows:

1. All drainage water must pass through the perforated S/S
2. The perforated S/S is very restrictive it takes three times the required strainer free area to drain the same GPM.
3. The perforated S/S plugs with debris very quickly
4. The enclosure has to be dug up to be cleaned
5. If gravel is used around the drain to improve flow it will only do so initially because the free area of the gravel will allow more debris to reach the perforated S/S and plug it much quicker.



One of the main distinctions between these two designs is that the figure with the green roof box has a free area of the entire square foot of the drainage mat for that drainage area. The other design only has the free area of the perforated stainless steel.

Tray/Modular type green roof:

With type of green roof a green roof box will not work because drainage mat is not used. The reason is that the trays are up on legs so the water can freely drain under them. We do not recommend using the perforated Stainless Steel due to the fact the green roof media is contained in the trays and the S/S would only provide hindrance to the flow of water and no benefit to the drain.

Intensive Green roof up to 6"

With this type of green roof you have a couple of different options.

A perforated S/S barrier (IRMA guard) with an open top can be used. The height of the guard should not be above the green roof media so that during heavy rains the area can drain without ponding water. This design will require more frequent maintenance to provide proper drainage. With this design the media around the drains should be checked to assure the perforated S/S has not become clogged throughout the life of the green roof.

A green roof box can also be used but only if drainage mat is also used and the green roof box is installed on top of the drainage mat. The drainage mat will handle about 90 to 95% of the drainage so the green roof box will require very little maintenance. The key to proper performance is that the drainage mat must flow unrestricted to the drain and not through a perforated S/S barrier.

Extensive Green roof over 6"

With this type of green roof a green roof box is the only realistic option if you desire to have proper drainage for the long term. This type needs to have drainage mat and it must also be designed to drain unrestricted to the drain. Now the green roof boxes can be made in numerous configurations from a simple box to heel proof grading on the top of the boxes for pedestrian traffic. There really is no way to make a one size fits all green roof box due to the fact that I have not yet seen two green roofs the same. The box needs to be designed to the job requirements in fact most jobs have boxes with different requirements at different locations.

Green roofs are very expensive to install and even more expensive to replace so you do not want to cut any corners and you want to make sure you have your details correct. You want to be sure you are using products from manufacturers that have a full understanding of what is required and how to do it correctly!