

Green Stormwater Infrastructure: Vegetated Swales – Commercial Parking Lot

[00:06] Mark Clark: I'm Mark Clark.

Eban Bean: And I'm Eban Bean.

[00:09] Mark Clark: We're here in a relatively new development to talk about some of those innovative stormwater approaches as part of the treatment train. Typically, we'd have rainwater falling on this parking lot and it's got to go somewhere to be managed, but where we're standing, it's got to flow through this particular system to get to an outlet. So, can you tell us a little bit about what's going on here?

[00:29] Eban Bean: Well, typically in a conventional parking lot in this kind of setting, typically we have just drains in the middle of the parking lot, in the middle of the roadway that would funnel that stormwater into the storm system and into some big pond, probably behind the stores or out of site. What they've done here is they start to utilize the space in between the parking areas, so water flows in from the street and the driveway, right into this apron here. Water then flows in through this vegetated area and flows through that space to where it then overflows into a drop inlet.

[01:04] This is similar to a bioretention cell. We might call this a bioswale, because basically we have biological vegetation here, and it's conveying the water through here. It doesn't have as much storage on top as a bioretention cell. So, we're having a little bit of volume capture and removal.

[01:22] In this design, I believe there is an under drain where some of that water can flow through and then be captured and then be filtered before it goes into the storm inlet, but otherwise basically the stormwater runoff flows through this vegetated filter, removing a lot of the fine and coarse particles and helping to improve the water quality, sort of the first car on that treatment train before it goes into the stormwater system.

[01:46] Mark Clark: So, really, we're capturing as a first filter a lot of the fine particles. You can see some garbage in here that's being filtered out. So, the water that actually makes it to the stormwater basin doesn't have to be treated as much because we're capturing quite a bit of that right here.

[01:58] Eban Bean: That's right. So, think of those large stormwater basins. It's basically only having to be used for when we have those really large stormwater, storm events where flooding may be an issue. We've got to capture all that volume somewhere. But before it gets in there, when we had those really small storms that don't necessarily have to go into a flood mitigation area, we're able to kind of capture, filter and treat a lot of first amount of water runoff to remove those pollutants right here on the site and in the landscape.

[02:27] Mark Clark: So, although this is one of those treatment train pieces, we talk sometimes about in-line treatment versus offline treatment. So, what's the difference and why might one be better than the other?

[02:38] Eban Bean: Well, inline treatment is basically when all the water would go through that practice, and there might be some water that's retained here, but eventually all the water that comes off of this lot is going to end up going through here and into the main system.

[02:51] Mark Clark: So, that's what we've got going here, this is an inline system. All the water has to flow through here, and although we might capture some of it,

[02:56] Eban Bean: That's right.

[02:58] Mark Clark: all the water's still going to move through this pathway.

[03:00] Eban Bean: And there's always a risk that there could be something that gets resuspended or gets carried out through the end of the basin. That is one of the aspects of an inline system. An offline system, we could redesign this to where this fills up and then backs up into the roadway or backs up into this spillway and forces any extra runoff to bypass this and go into a larger stormwater receiving area.

[03:23] So, anything that comes in here in the offline would stay in here and would not have any opportunity basically to be flushed back out into the into the main storm system.

[03:33] Mark Clark: And so the idea there is that the first flush, or the most contaminated runoff, from, say, a parking lot that accumulated material in between storm events would get captured, stored here and then later in the storm as the cleaner water can't get in here anymore, can bypass but not essentially impact or add as much to the stormwater basin further downstream.

[03:52] Eban Bean: That's exactly right.

[03:55] So, Mark, I wanted to show you this over here. I appreciate your walking over. You know, this is the overflow where the water that came into this bioswale would overflow and go into the main stormwater system. And as you see around the edge here, there's quite a bit of buildup of mulch, even some older pine straw that's collected here. This wood material here can float.

[04:16]. That's one of the maintenance and management things that we have to take into account with these types of practices. It's kind of a very simple fix, though, I mean this stuff floats. What we see in a lot of practices, or other practices in places, is, you just have to have a skimmer around it. So, basically water has to go, as the water rises, it rises above the bottom of that skimmer, and the water has to flow under that, and then over the top of the drop Inlet structure to flow in it.

[04:42] Mark Clark: So, anything floating gets caught. Basically, it doesn't go down the drain.

[04:45] Eban Bean: That's right. There are some other materials, maybe like a triple shredded hardwood has been used pretty effectively to not be a floating mulch material, but otherwise, basically a skimmer would be enough to keep this on site.

[05:00] Mark Clark: But really, the key part that I just heard was that these ideas, although really good, have maintenance components that we need to work on.

[05:12] And so, some added design might help to minimize this, basically, the wood mulch, it tends to want to float here from going in the hole.

[05:15] Eban Bean: Yep. Well, and the vegetation here, you notice it's fairly dense. So, that works if the mulch does float, and it's being moved, it works as a filter to hold it back as well. So, maintaining a thick stand of this vegetation will help to maintain that.