

IN-SITU WORKSHOP Q&A

1. Are you saying it provides greater runoff volume control than a similarly sized facility with 18" of gravel below 2' of soil media?

Mike: No, the runoff volume control should be approximately the same. The key difference is that the cost of the In-Situ design is about 50% less than traditional design. Therefore, for a given budget, you can build 2 in-situ bioretention facilities and thus control twice as much volume.

2. Can this work for all Hydrologic Soil Groups?

Katie: This would depend on the soil investigation and the history of the site. If it was a compacted or urban site that is HSG C or D, then looking at the surrounding soil mapping may show that it was originally an A or B soil that was developed.

3. Can you provide more background resources on research that has been done on the soil interactions?

Mike: I have attached a few references on this topic.

4. Where do you source the pine fines? How much is required or what ratio to in situ soil?

Mike: Pine fines are finely screened particles of pine bark (typically under 3/8 inch) used as a soil conditioner to improve aeration, drainage, moisture retention, and long-term soil structure. They are naturally acidic, slow-decomposing, and widely used in garden beds, clay-heavy soils, and professional potting mixes. This material can be sourced at most nurseries and even Lowe's and Amazon. It is mixed in to the native soil at 10% by volume. Typically this means spreading 3-4 inches of compost to a depth of 2-3 feet.

5. Can you provide more background resources on research that has been done on the soil interactions?

Mike: I have sent a few references on this topic.

6. Are there studies looking at what soil/engineered media best supports a wide range of native plants?

Mike: I am not aware on much research on soil plan interaction. This is an area where more research would be helpful.

7. I feel like I'm missing something...it's not clear to me how the soil is assessed, how amendments and excavation decisions are made, how that might scale for different practices using these techniques. And put another way, in what cases can the least impactful (to the site) work be done? Where is more needed (like extremely heavy clay)?

Katie: Using an infiltrometer or a PVC pipe and an auger, the approximate infiltration rate of the soil can be determined. The soil texture can be determined by creating a ribbon if there is clay present and feeling for gritty sand. Dr. Guoin has a paper about decompaction of soil that includes soil nutrient testing and amendments.

8. Do the amendments need to be mixed homogenously with the in situ soils? if so, how is that done? is it a layer?

Katie: Hopefully, my slides explained this a little, see Dr. Guoin's paper, too. It may depend on the water table. Typically, use a trencher to go down 18-24", incorporate 3-4" compost and lime within the top 6", add 2" mulch to the top.

9. I'm attempting to slowly build an in-situ nano-bio-retention/nano-rain garden in the hellstrip between the sidewalk and street in front of my house, in PG county, collecting the sidewalk runoff in shallow ditch swales and self-watering native trees I planted there. But I got a county citation/violation for having open/eroding soils/holes. What's the best way to talk to the county inspector about what I'm building?

Mike: Good luck with this. You may want to contact the DoE Office of Sustainability for advice. Specially contact Ms. Mary Abe

10. Hope the discussion will get to the fit between native/ in situ soils and the selected plants

Mike: We are currently looking into that on a CBT grant to Town of Edmonston.

11. Is the grass solution dependent on having media vs in situ soils?

Katie: Usually, if you are required to have soil media, then the specifications are stricter and turfgrass may not be allowed. Need to talk to the permitter. Native grass is encouraged and can be planted with either provided soil or in-situ soil.

12. If the native fine fescue are being mowed down, are they still providing the benefits of being "native"

Katie: Sure, and according to Robert Traver, if you remove the grass, you are removing nitrogen.

13. But heavy mowers will compact the soils, no?

Katie: This would be a good question to ask James Houle from UNH where they worked with the Town to install turfgrass rain gardens. Hopefully, for landowners, the mowers will be light push mowers.

14. Great topic and information. Regarding underdrains, have any of the presenters worked with valves on the underdrains? Orifices? This can help with extending drawdown times and overall pollutant removal. Related to it, to promote in-situ soils, have anyone looked to limit the footprint of bioretention soil mixes just above the under drain?

Katie: For the Town of Glen Echo project, the underdrains were submerged below the outlet. This was my way of slowing down the water to give it time to infiltrate.

15. Who is making that kind of effort that they're testing bioretention mulch for heavy metals? Are they assuming them if they are taking road runoff?

Katie: I was just quoting the MDE specifications from the SWM manual. The take home is that the mulch only needs to be replaced as needed.

16. How is a bioswale different from a rain garden?

Katie: A bioswale is a rain garden on a slope with check dams to hold the water back to allow it to infiltrate.

17. I understand that in-situ soil is amended soil so you can mix clay with compost, but how does that increase the drainage of the soils around it? How can it have a good infiltration rate in clay?

Katie: With the sites I have seen, there is some presence of clay, but it is not everywhere. Decompaction and compost can help break through any clay lenses and increase infiltration. If the site is truly mostly clay such as the soil map series that Mike Clar pointed out, bioretention will probably not be a good solution for water quality and water volume management.

18. Mulch vs green mulch? Thoughts from the presenters?

Katie: I think green mulch is great. Whatever way you can get more plant coverage is good. It would need to be approved by the landowner.