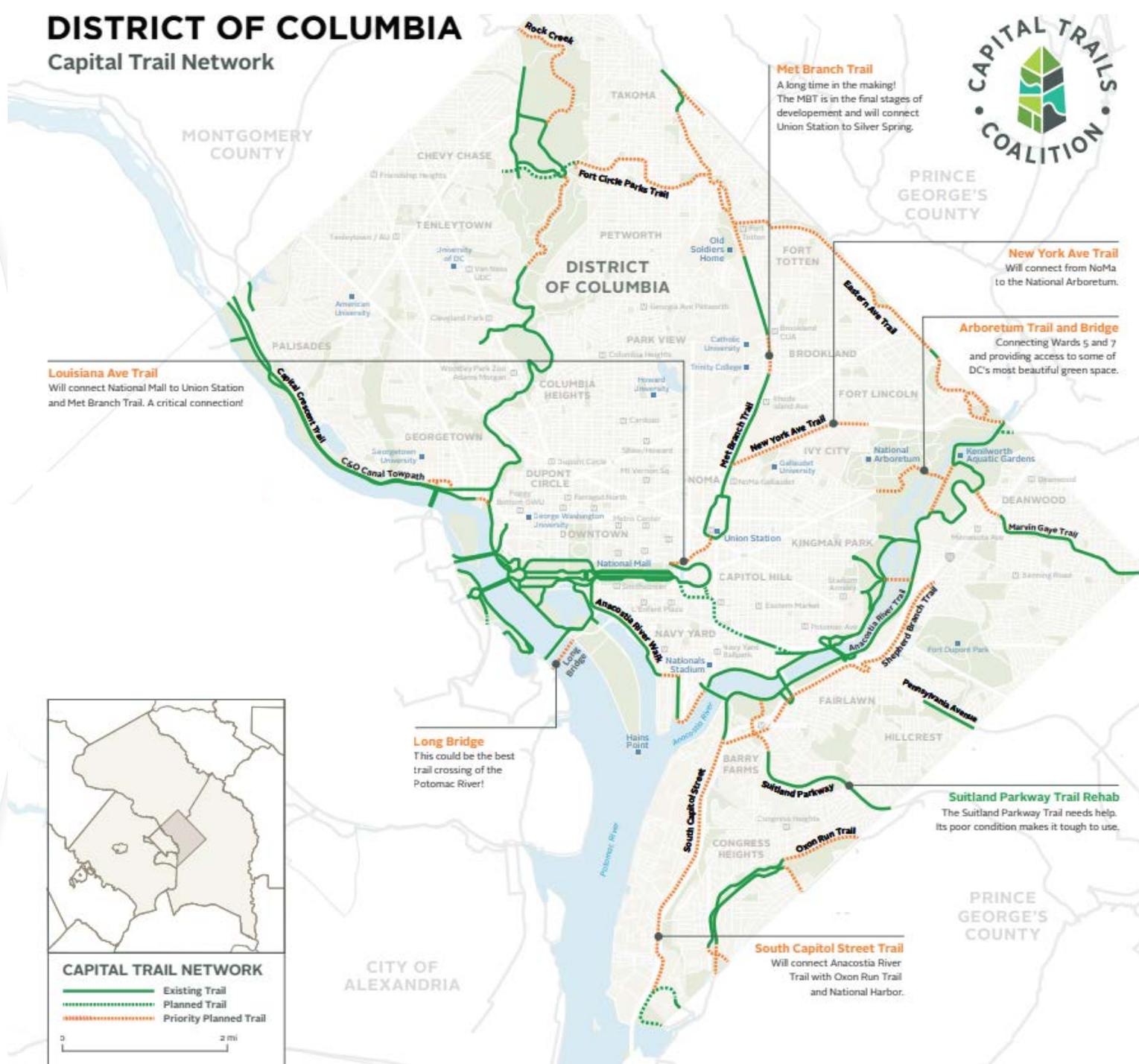


# Porous Flexible Pavement, Porous Asphalt, or Asphalt?

Lessons learned  
for multi-use trails  
in the District of Columbia



The District of Columbia currently has 62 miles of multi-use trails.



# Panelists



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# Material Types

## Porous Asphalt

\$\$\$

A type of type porous pavement structure specifically designed to **allow rainfall and runoff to flow into and through the pavement.**

A distinct aggregate mixture with a bituminous binder that has a high percentage of interconnected air voids to provide water drainage and adequate resistance to both raveling and permanent deformation.

## Porous Flexible Pavement (PFP)

\$\$

A mix of recycled tires, aggregate stone, and binding agent. This mix allows for water to infiltrate through the stone and rubber mixture voids to reach the tree roots. The composition allows for a level of decomposition to help with the growth of the nearby trees.

## Asphalt

\$

An asphaltic composition used for pavement applications with no ability for infiltration.

# DC Trail Network

## Porous Asphalt

- Klinge Valley Trail
- Virginia Avenue Trail
- Portions of the Rock Creek Trail
- Oxon Run Trail

## Porous Flexible Pavement

- Maine Avenue cycle track
- Michigan Avenue Trail
- Portions of the Metropolitan Branch Trail at Eastern Ave NW

## Asphalt

- Metropolitan Branch Trail
- Anacostia River Trail
- Marvin Gaye Trail
- Malcolm X Trail

# Factors of Consideration

**Cost**

**Tree  
Roots/Tree  
Cover**

**Maintenance  
Vehicles &  
Vehicle  
Access**

**Level of Use/  
User Types**

**Square Feet/  
Mileage**

**Stormwater  
Requirements**

**Aesthetics/  
Historic**

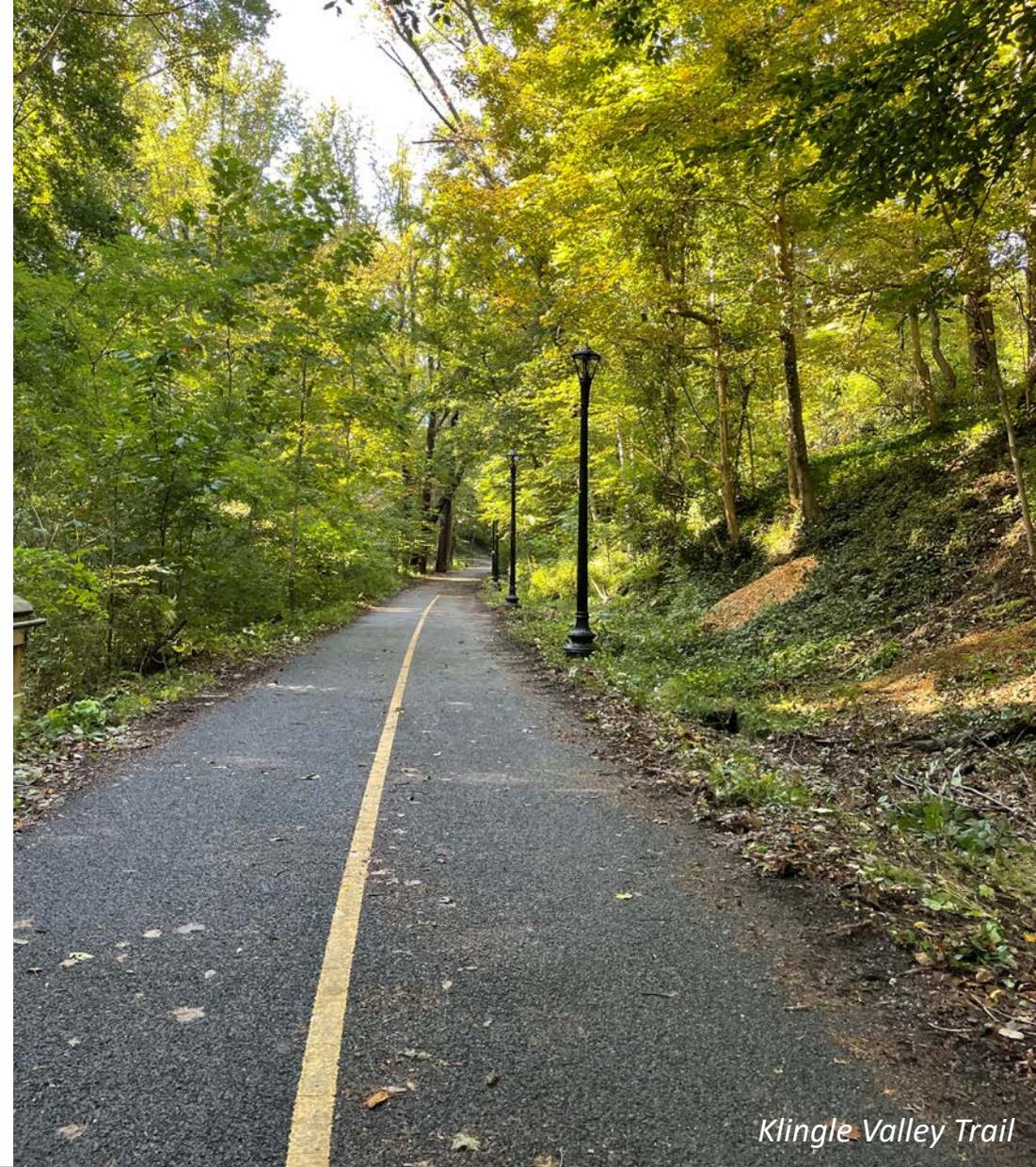
**Political  
Influence**

*Anacostia River Trail*

*Photo Credit: Washington Area Bicyclist Association*

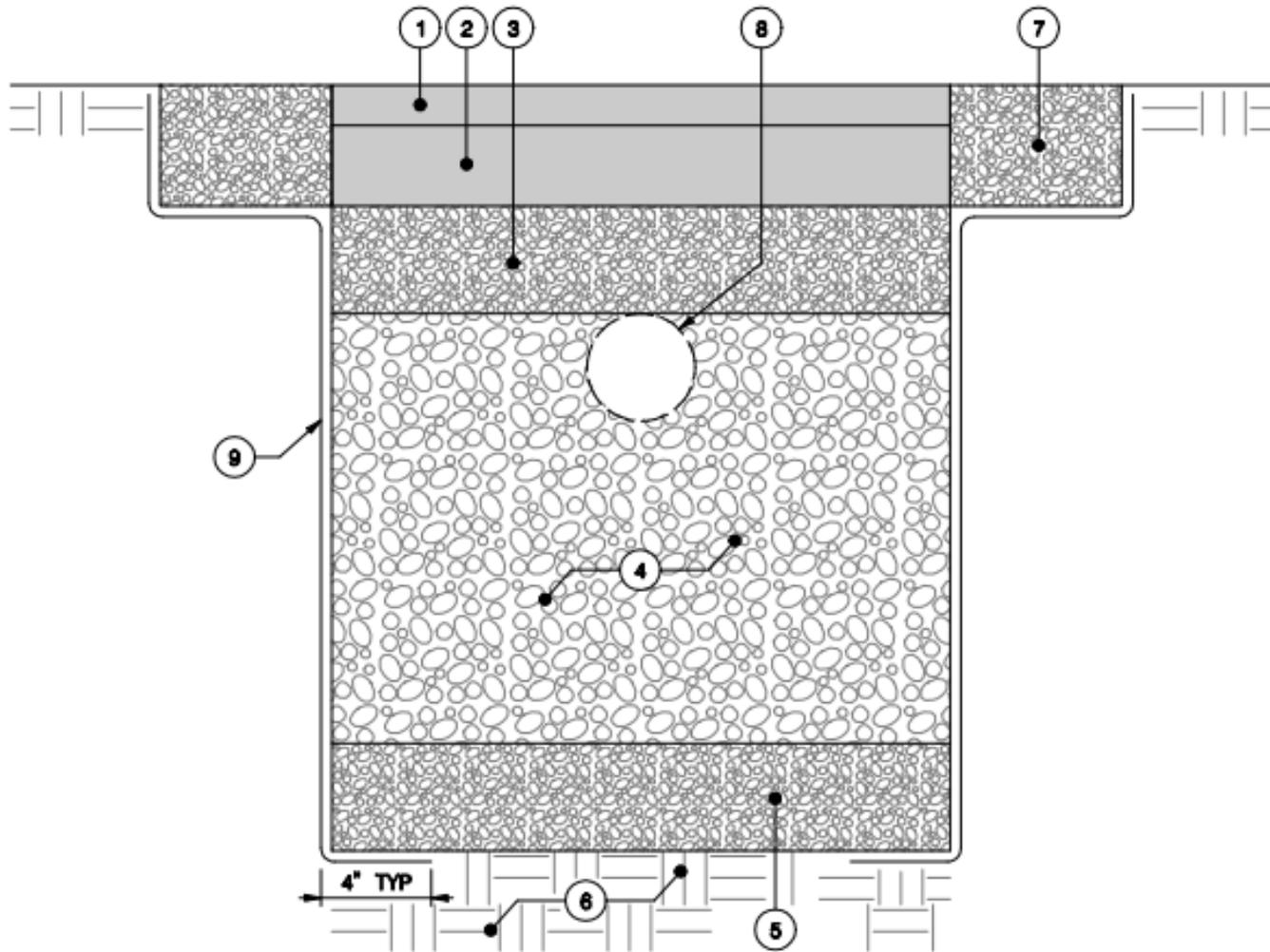
# Porous Asphalt

- Tool in the toolbox if you can't fit it bio-retention to meet stormwater requirements.
- Can receive a Department of Energy & Environment (DOEE) stormwater credit when used.
- ~9-inch depth
  - Layers of gravel, rock, and then porous asphalt.



*Klinge Valley Trail*

# Klinge Valley Trail Pavement Section



1. 1.5" Porous Asphalt Pavement Surface Course
2. 3" Porous Asphalt Pavement Base Course
3. 4" Choker Layer-AASHTO
4. 16" Reservoir Layer
5. 4" Filter Layer
6. Uncompacted, Undisturbed Subgrade
7. 4.5" Stabilized Edge
8. Underdrain Pipe, 4 inch, perforated
9. Geotextile, Class II

# Challenges with Porous Asphalt

- Temperature Sensitive and can be difficult to place
- Up to 3-day cure time
- Very expensive
- Depends on soil type
- Not a good treatment for projects close to large trees with large root zones



*Klinge Road NW before the trail*

# Patching & Repairing Porous Asphalt



*Repairing the Klinge Valley Trail following a downed tree*

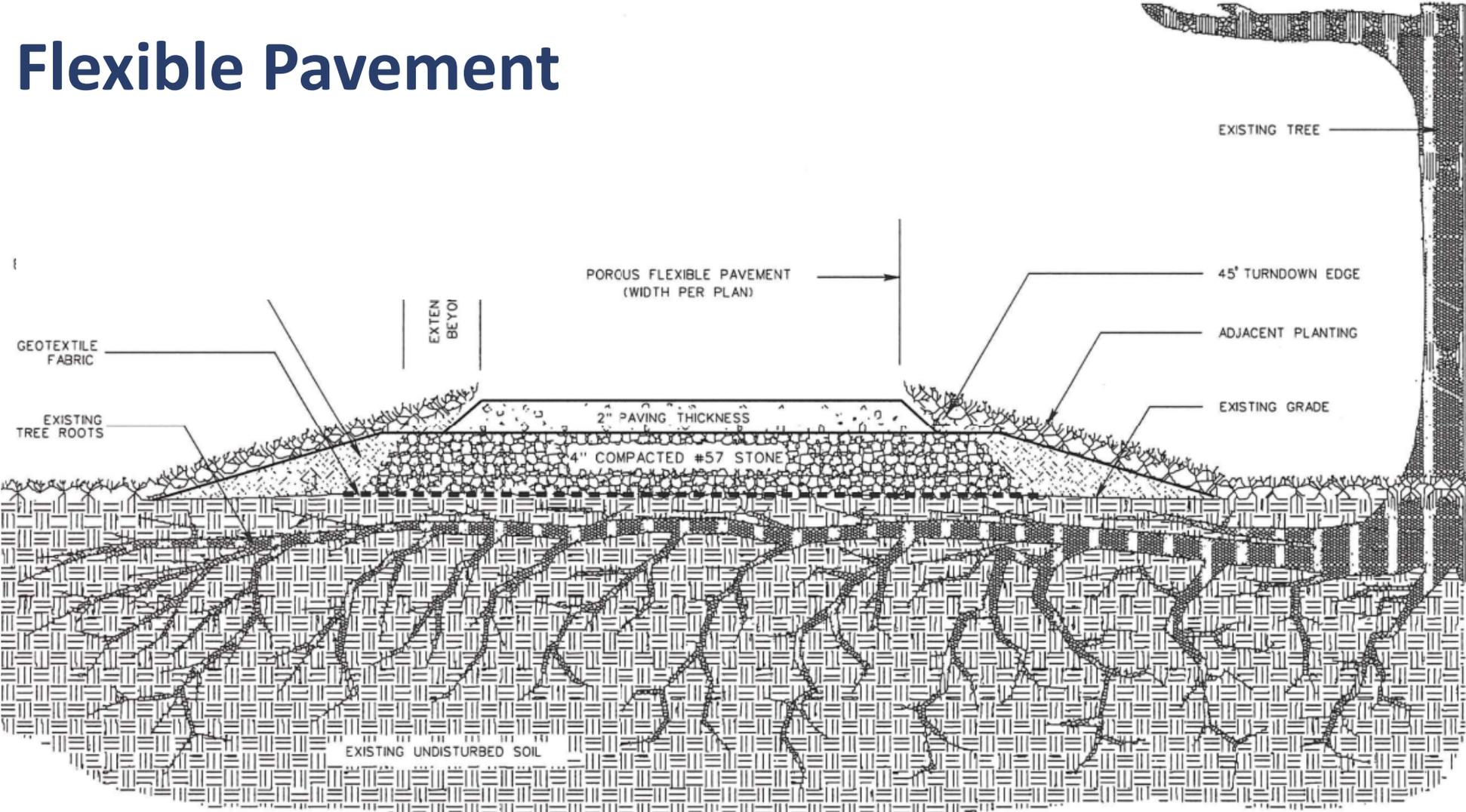
# Porous Flexible Pavement

- Porous flexible pavement is good for small areas around roots or challenging tree spots.
- Porous Flexible Pavement is 4-6 inches of gravel and 2-4 inches of rubber.



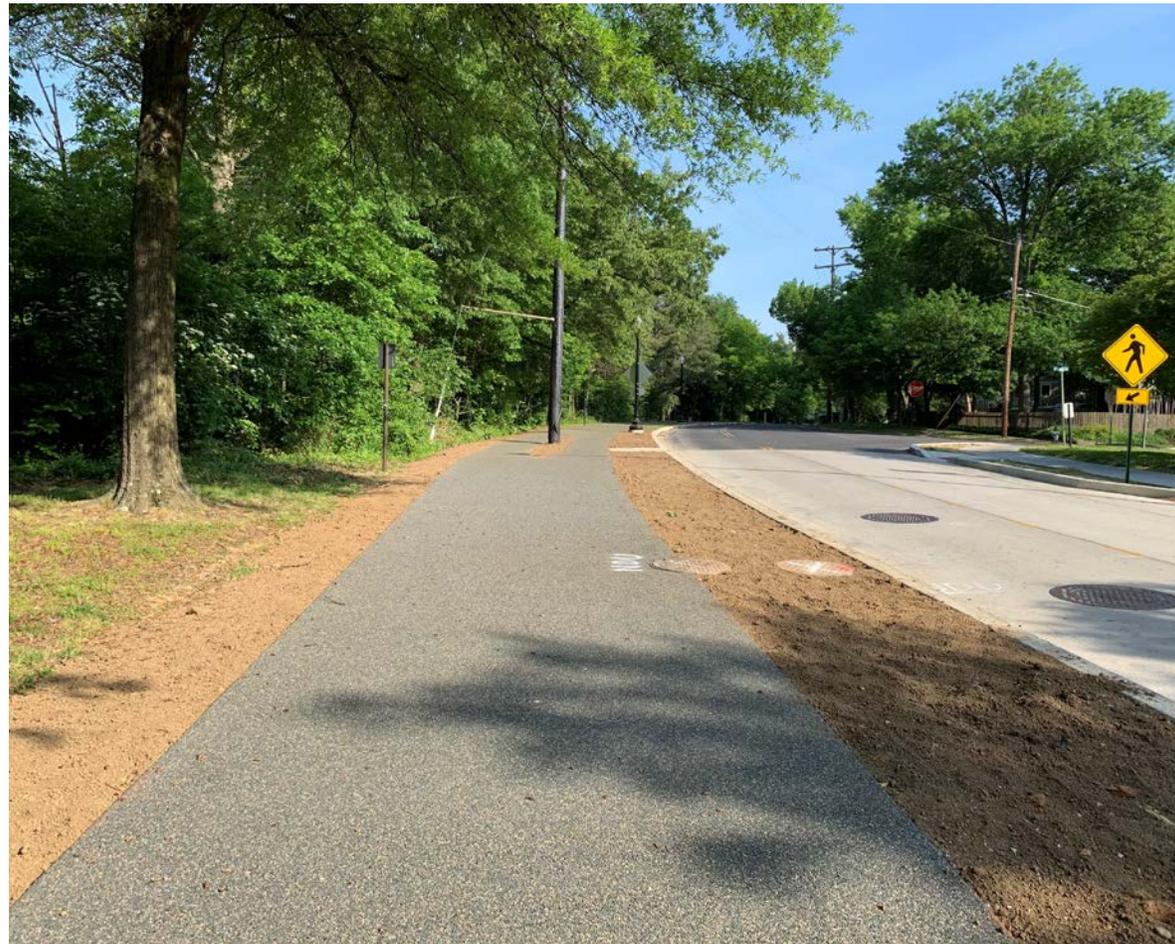
• *Maine Avenue SW*

# Porous Flexible Pavement



Cross section for Eastern Avenue NW: Metropolitan Branch Trail

# Porous Flexible Pavement



*Metropolitan Branch Trail on Eastern Avenue NW*

# Challenges with Porous Flexible Pavement

- Have experienced major issues just 4-5 years after being installed
- Does not do well with any heavy vehicle traffic
- Issues with the surface markings
- Is significantly more money than regular asphalt (1.5 x more expensive)



*Maine Avenue SW*

# Maintenance Requirements

## Porous Flexible Pavement (PFP)

- Blow off debris (grass leaf clippings etc) from the surface.
- To unclog, apply low levels of water from a hose to wash through the section and flush or displace the loose fines. If excessive sand clogs PFP, use a vacuum sweeper to flush through the section.
- Remove snow with shovels or a light tired snowplow that has a rubber blade to not dislodge the top stone and rubber surface.
- When sloughing happens, repair the area beyond the portion disturbed to ensure a complete repair.

## Porous Asphalt (PA)

- Benefits from a minimum of 2-4 cleanings per year using a vacuum sweeper to keep the voids free of debris.
- Requires flushing the underdrain and clean outs with high pressure water hose.

# Asphalt

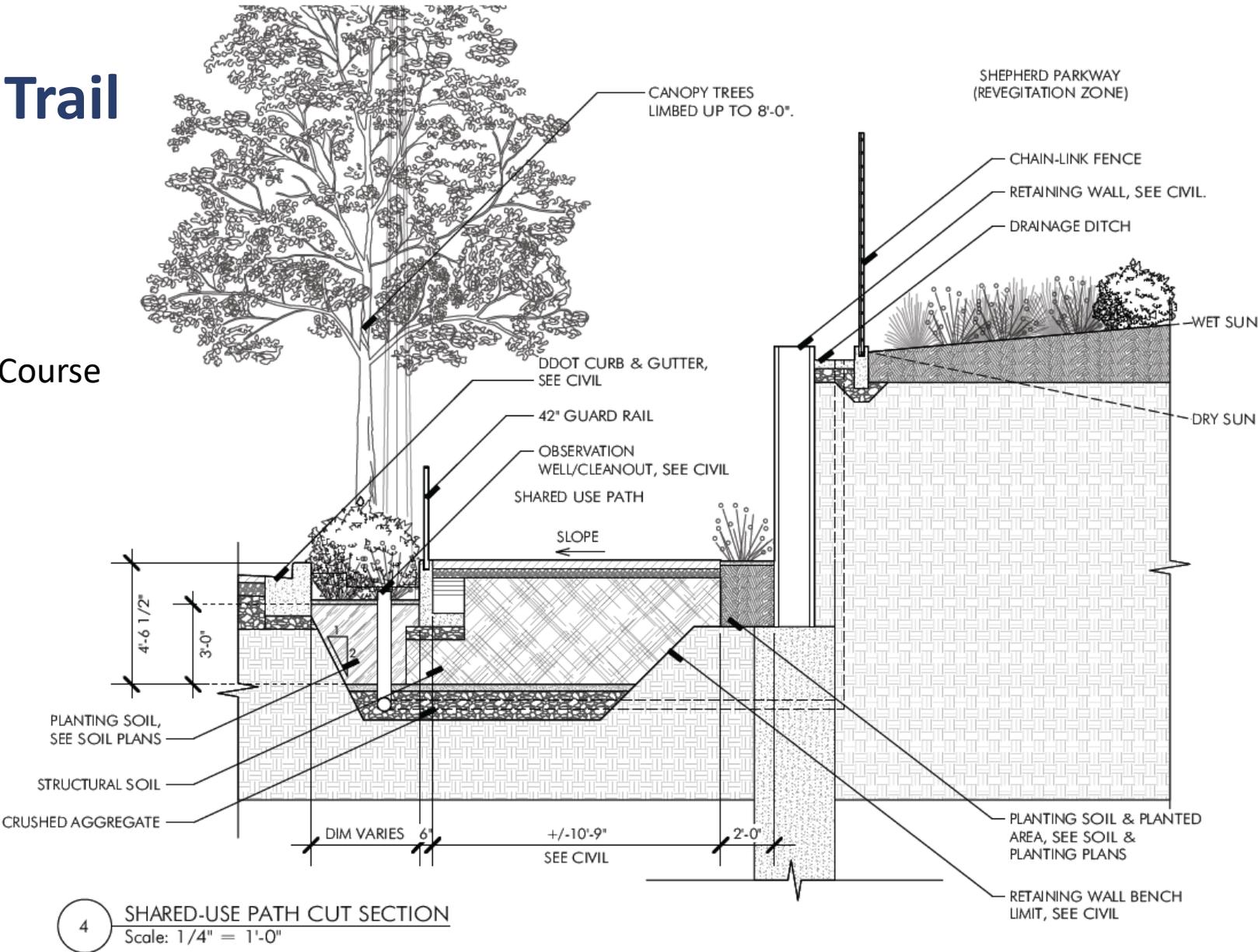
- Cheapest option
- Most durable surface material
- Surface markings adhere to asphalt well
- Easy to install trail counters
- Easiest material to maintain



# Asphalt: Malcolm X Trail

Thickness of the pavement:

- 2" 9.5 mm surface course
- 6" Graded Aggregate Base Course



# Additional Considerations

## 1) Landscaping

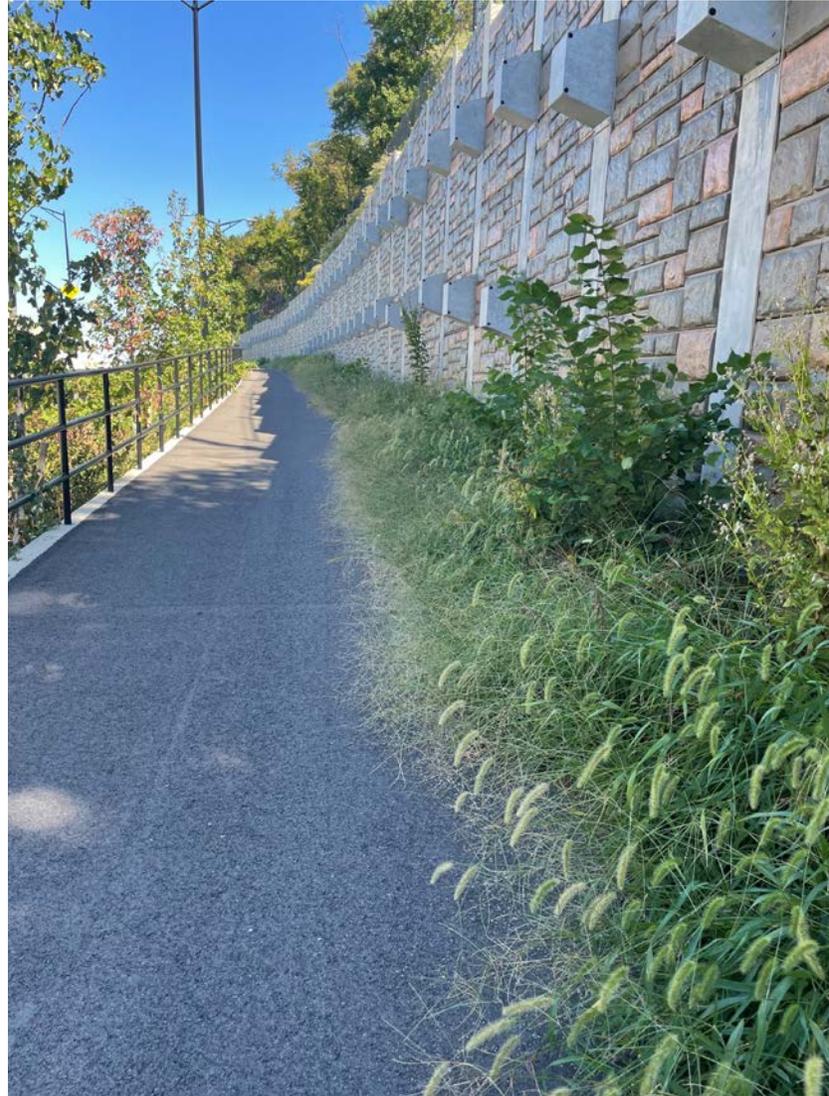
- Maintenance during establishment - trash, watering, overgrowth

## 2) Construction Inspection

- Importance of construction inspection for trails and landscaping

## 3) Warranty Inspection

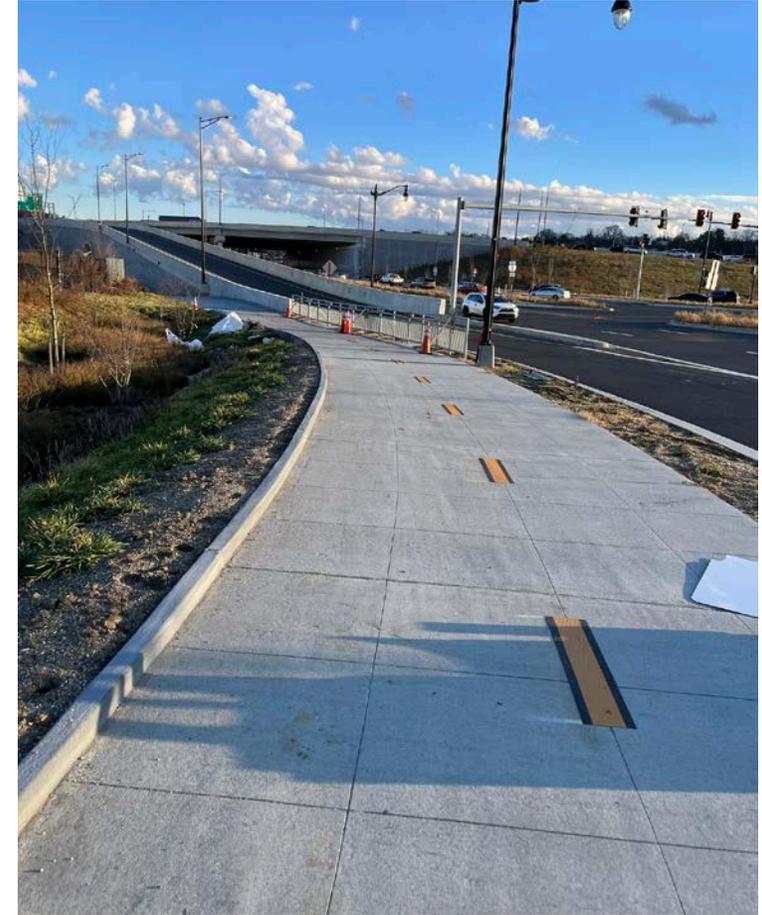
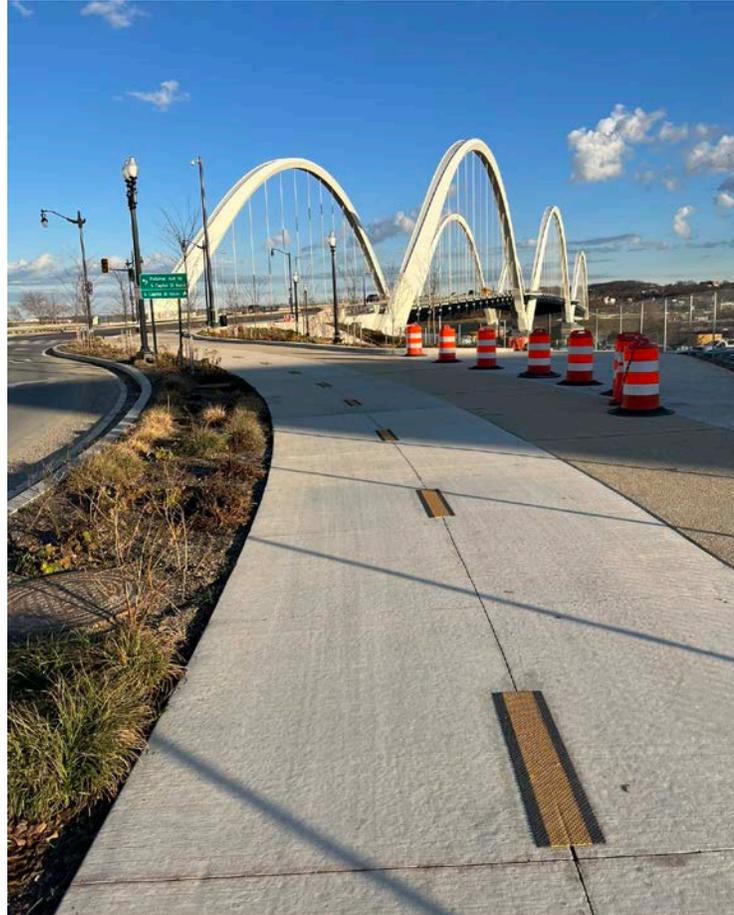
- Perform comprehensive inspection with representation from relevant agency groups - trails, green infrastructure, streetlights, maintenance, etc.



*New Malcolm X Trail in Ward 8*

# Additional Design Considerations

- Finish that considers the rider experience:
  - Concrete joints for deliberate cracking patterns
  - Placement, angle, and width of construction joints



*Frederick Douglass Memorial Bridge  
Photo Credit: David Cranor*

# Additional Design Considerations

- Brick pavers at key pedestrian crossing zones
- Use different materials as a speed management tool depending on the adjacent uses
- Permeable pavers are available in DDOT design guide



*Metropolitan Branch Trail at Alethia Tanner Park*

# Conclusion

- Program should look to grow maintenance pot of funding when using capital funds to build these facilities.
- Maintenance capability should be a strong design driver. Consider maintenance lift before installing.



*Trail cleanup on the Anacostia River Trail*



**QUESTIONS?**

# Thank You!

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*DDOT staff bike ride on the Anacostia River Trail*