Pervious Pavement Alternatives

Presented by:

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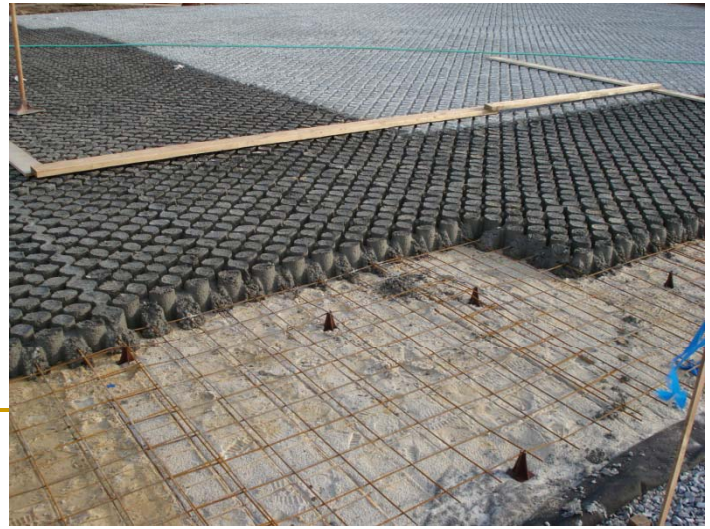
Basic Types of Pervious Pavements

- Pervious Concrete

- Porous Asphalt

Basic Types of Pervious Pavements

- Permeable Pavers
  - Precast concrete product
- Grass-crete
  - Cast-in-place concrete



What is Pervious Concrete?

- **15-25% Void Space**
- **Also Called No-fines Concrete**

What is Pervious Concrete?

- **up to 1,800 in/hr porosity**

Texture Comparison

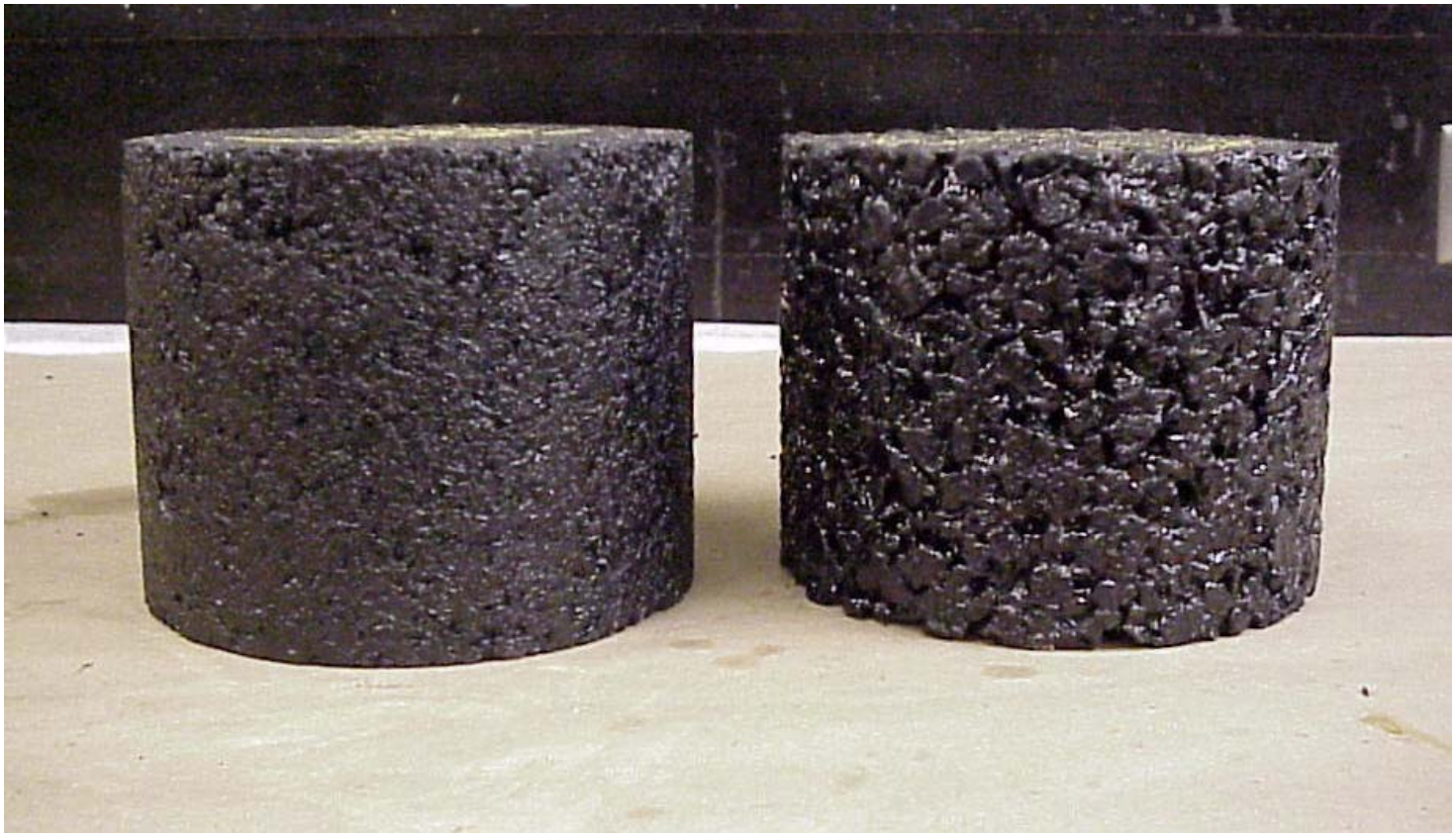
What is Porous Asphalt?

- **15-25% Void Space**
- **Also Called No-fines Asphalt**

What is Porous Asphalt?

- **up to 400 in/hr porosity**

Texture Comparison



What are Permeable Pavers?

- **Voids are a factor of paver type and/or joint distance**
- **Paver block itself is not pervious**

What are Permeable Pavers?

- **Joints/voids filled with pea gravel or grass**
- **Up to 800 in/hr porosity**

Parking Lots

Driveways

Sidewalks

Nature Paths/Parks

Streets, Alleys, Cul-de-sac's

Heavy-Duty Applications

Loading Dock, Forsgate Industrial Park, NJ

4,500 psi mix

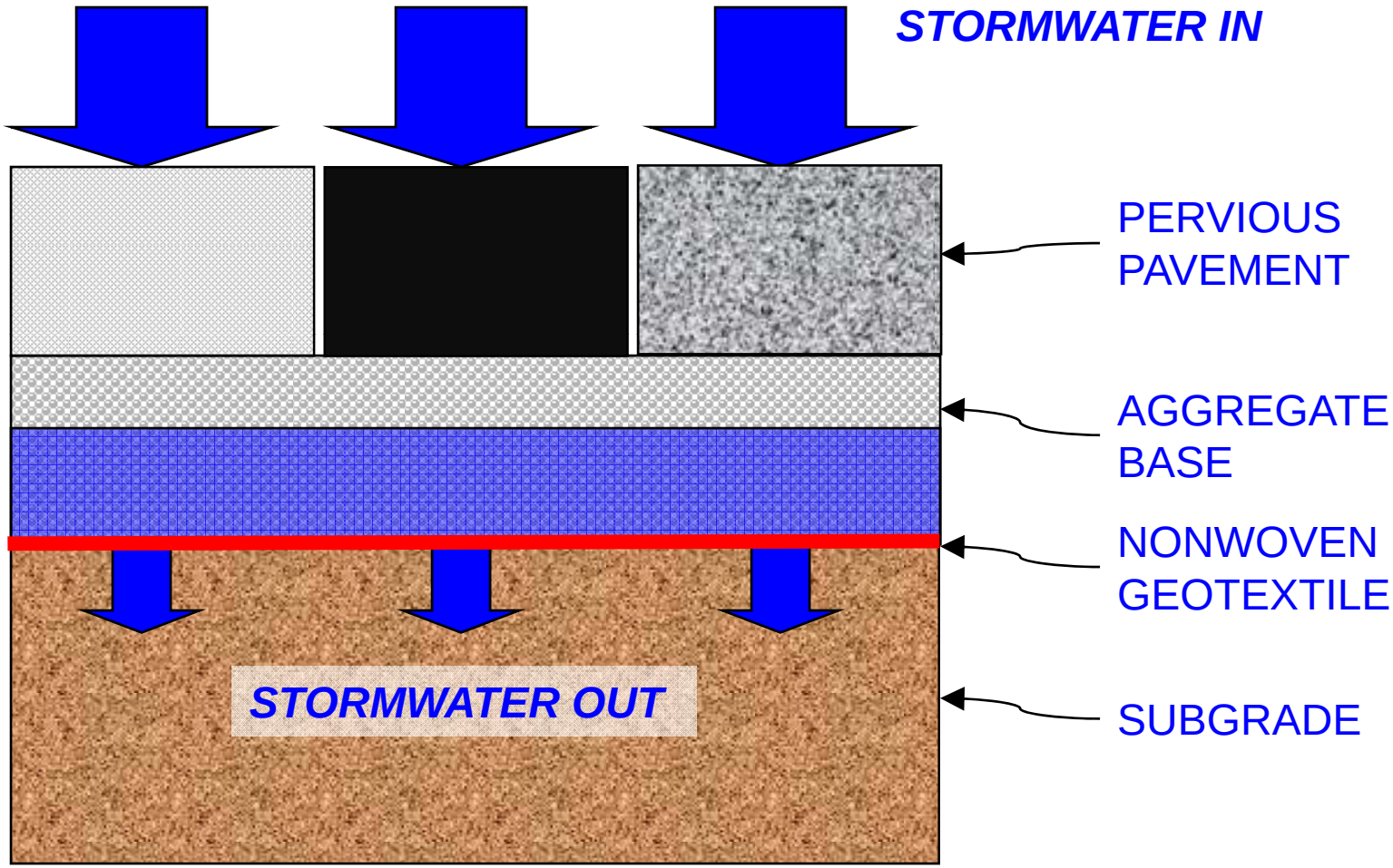
Emergency Access Roads or Overflow Parking Areas

Stormwater is Polluted

- Oils and Greases
- Metals
- Sediments
- Fertilizers

Elimination or reduction of expensive detention / retention ponds or underground storage systems, making more land available for development

Solution to Stormwater Management

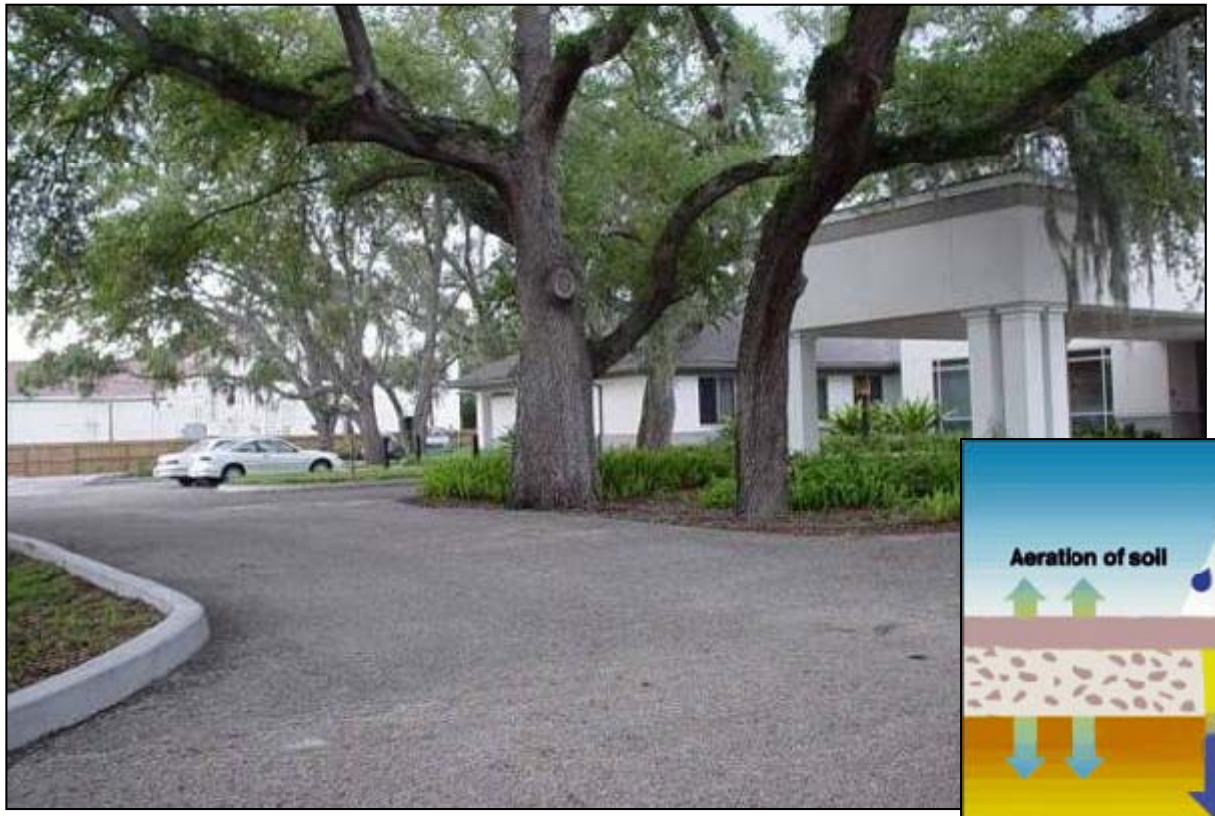


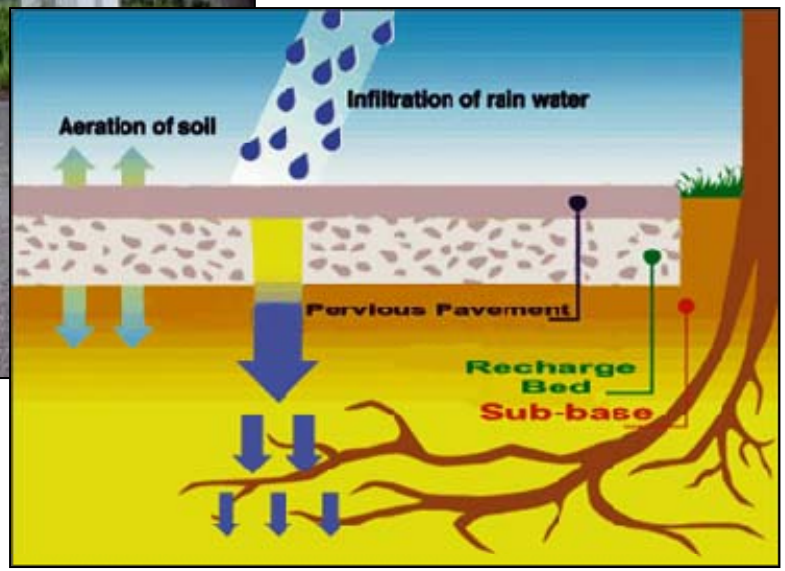
Turns your pavement into a DRY DETENTION POND!

Sustainability

- Low-Impact Development
- Pollution Treatment
- Recharging Groundwater
- Tree Protection
- LEED Requirements
- Cool Communities

Protects Trees





Can pave within the drip line
Water and air filters to roots

Meets LEED Requirements

- Reduce stormwater runoff
- Improve stormwater Quality
- Reduce urban heat islands
- Recycled Materials
- Regional Materials

Basic Ingredients

- Cement
  - Portland Cement
  - Liquid Asphalt
- Coarse Aggregate
- Water
- Admixtures

- *Little or No Sand / Fines*

Aggregate

- Texture and Porosity Affected by
  - Aggregate Size
  - Aggregate Grading
  - Aggregate Angularity
  - Paving Equipment

Pervious Concrete vs. Paver Mix

Truck Mixed

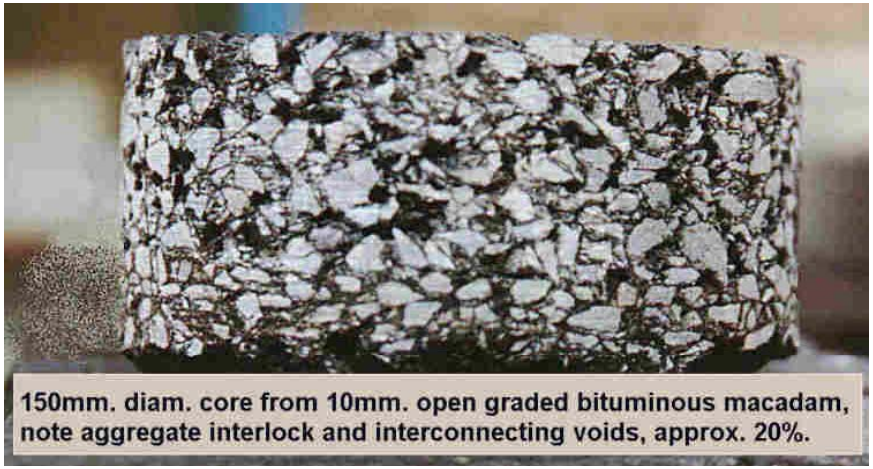
- Truck Mixed
- A load of pervious concrete should be mixed for at least 70 to 100 revolutions of the mixer drum in a truck mixer
- Mix on jobsite prior to placement

Permeable Pavers

- Precast in a manufacturing plant
- Specified by:
  - Type
  - Size
  - Shape
  - Color
- Up to 4” thick, typically 2-¼” thick

Porous Asphalt

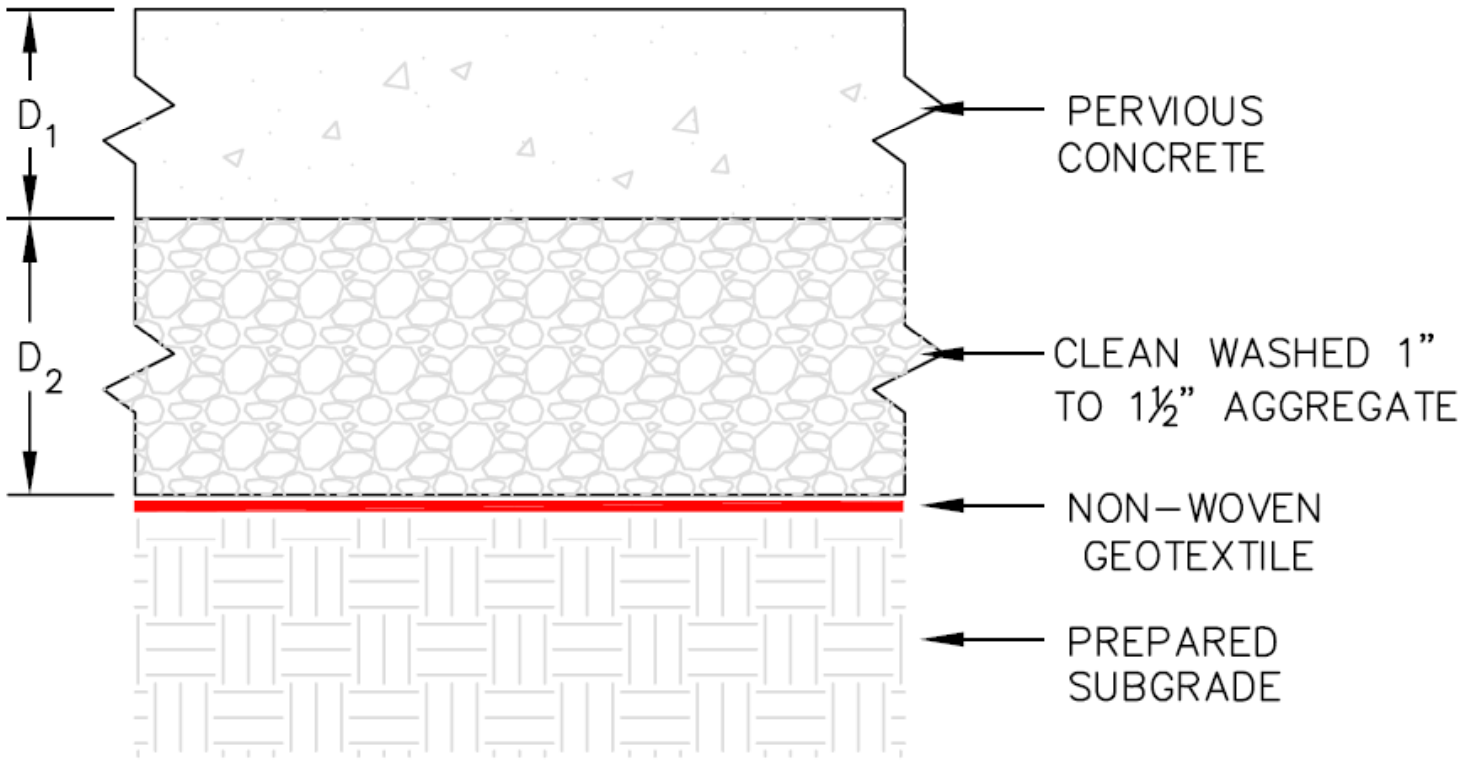
- Minor changes to mix design
- An added advantage to porous asphalt is that it does not necessitate proprietary ingredients
- Does not require the contractor to have special paving equipment or skills



Porous Asphalt

- With the proper information, most asphalt plants can easily prepare the mix and general paving contractors can install it
- Acceptance testing similar as regular asphalt paving

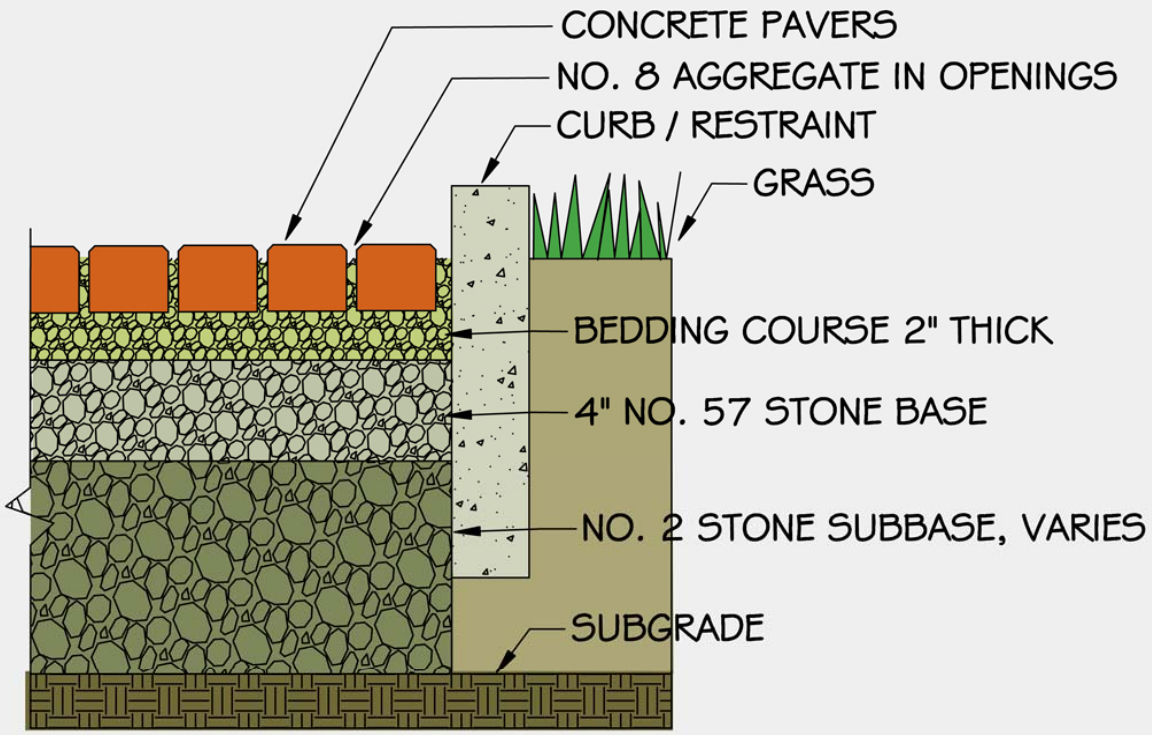
Pervious Concrete Profile



PERVIOUS TYPICAL SECTION

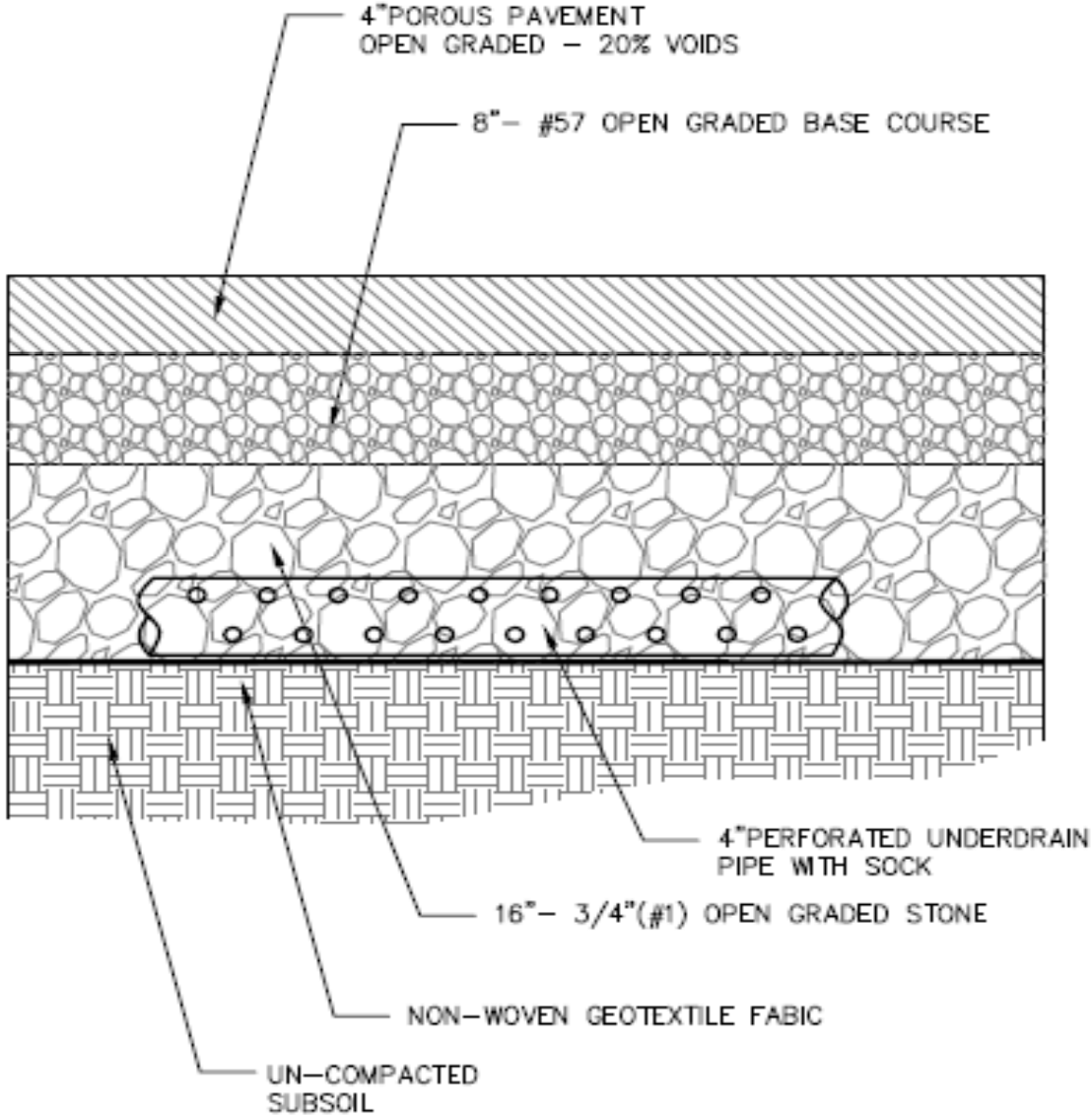
NOT TO SCALE

Permeable Paver Profile



CONCRETE PAVERS

Porous Asphalt Profile



Can Pervious Pavement Withstand Freeze-Thaw?

- **15-25%** void structure means little moisture trapped in matrix
- Stormwater is stored below concrete in **aggregate base**
- Expansion of moisture due to freezing does not exert undue pressures on matrix

Freeze Thaw Comparison

- Melting snow on impervious pavements can become “black ice”

Freeze Thaw Comparison

- Melting snow on a pervious pavement parking lot does not leave a “trail” of water that could become black ice
- Melting snow goes through the pavement

Pervious Concrete Pavement Thickness

- Minimums
  - 5” Sidewalks / Paths
  - 6” Parking lots
  - 6” Residential Driveways
  - 8” Streets
  - 8” Commercial Driveways
- Consider Conventional Concrete Pavement
  - Heavy truck traffic
  - High volume traffic

Add 1” of thickness over regular concrete to account for the 20% voids!

Permeable Paver Thickness

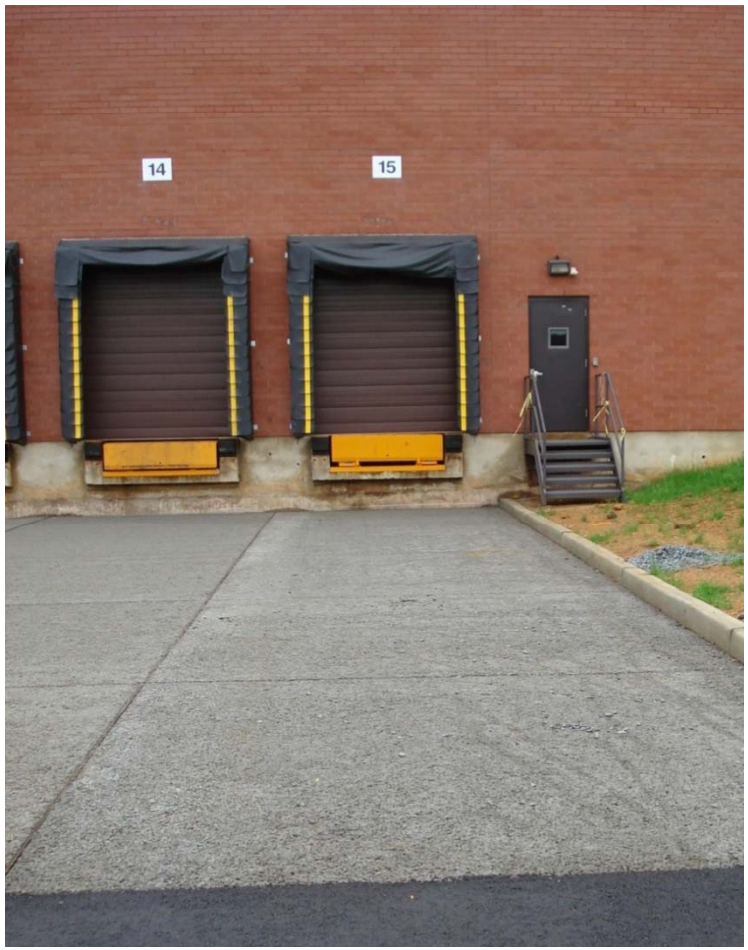
- Pavers typically come in standard sizes

Porous Asphalt Pavement Thickness

- Minimums
  - 2” Sidewalks / Paths
  - 2” to 4” Parking lots and Residential Driveways
  - 4” Streets
  - 4” to 6” Commercial Driveways

Pervious Concrete Strength

- Add sand into mix
  - 5% up to 25%
  - Adds up to 1,000 psi
  - Sacrifice porosity for strength
- Synthetic Fibers
- Larger Aggregate Size
  - For areas where high heels, wheelchairs are not a concern
- Thicker sections



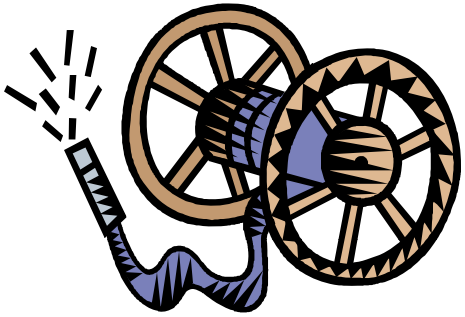
Cost of laying pervious pavement exceeds that of traditional pavement, historically:

- Pervious pavement is approximately 4%-15% higher than regular pavement,

BUT . . .

- Higher installation costs can be off-set by elimination of the need for curbs, gutters, storm drains and large retention ponds.

Broom and/or garden hose



Leaf Blower

Power Washing

Vacuuming

Street Sweeper – Vacuum Sweeper

Thank You