

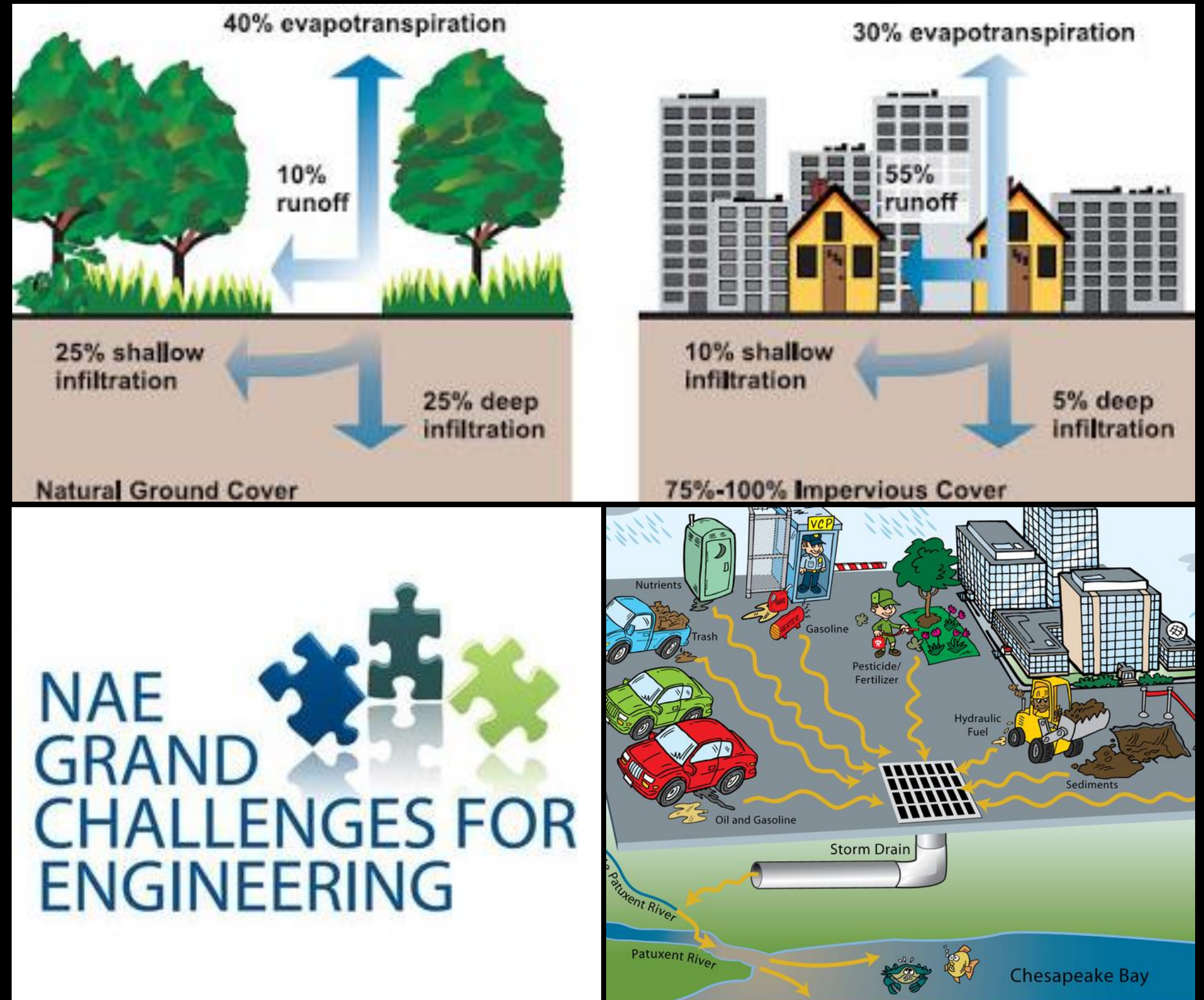


Permeable concrete and their use to regulate the efficiency of watersheds in urban areas

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THE PROBLEM

- Deficit in underground watersheds.
- High increase in water runoff.
- Transportation of polluted water to rivers, lakes, and seas.





MAP OF THE PRESENTATION

Properties

- Compressive strength.
- Density and Porosity.
- Permeability

Environmental benefits

- Hydraulic performance.
- Heat island effect mitigation.
- Traffic noise reduction.
- Skid resistance improvement.

Applications

- Sidewalks.
- Residential roads.
- Parking lots.

Inspection and maintenance

- Control samples.
- Weight and thickness.
- Interconnected structure.



PROPERTIES

Compressive Strength

The statistical mean compressive strength is close to 2500 psi (17 mPa).

There is no standardized method for PC according to ASTM standards.

Density and Porosity

The number of voids and the type of coarse aggregate determine the density of PC .

Density range: 100 lb/ft³ (1600 kg/m³) to 125 lb/ft³ (2000 kg/m³)

Coarse aggregate characteristics, the volume of bond paste, and consistence determine the porosity degree in PC

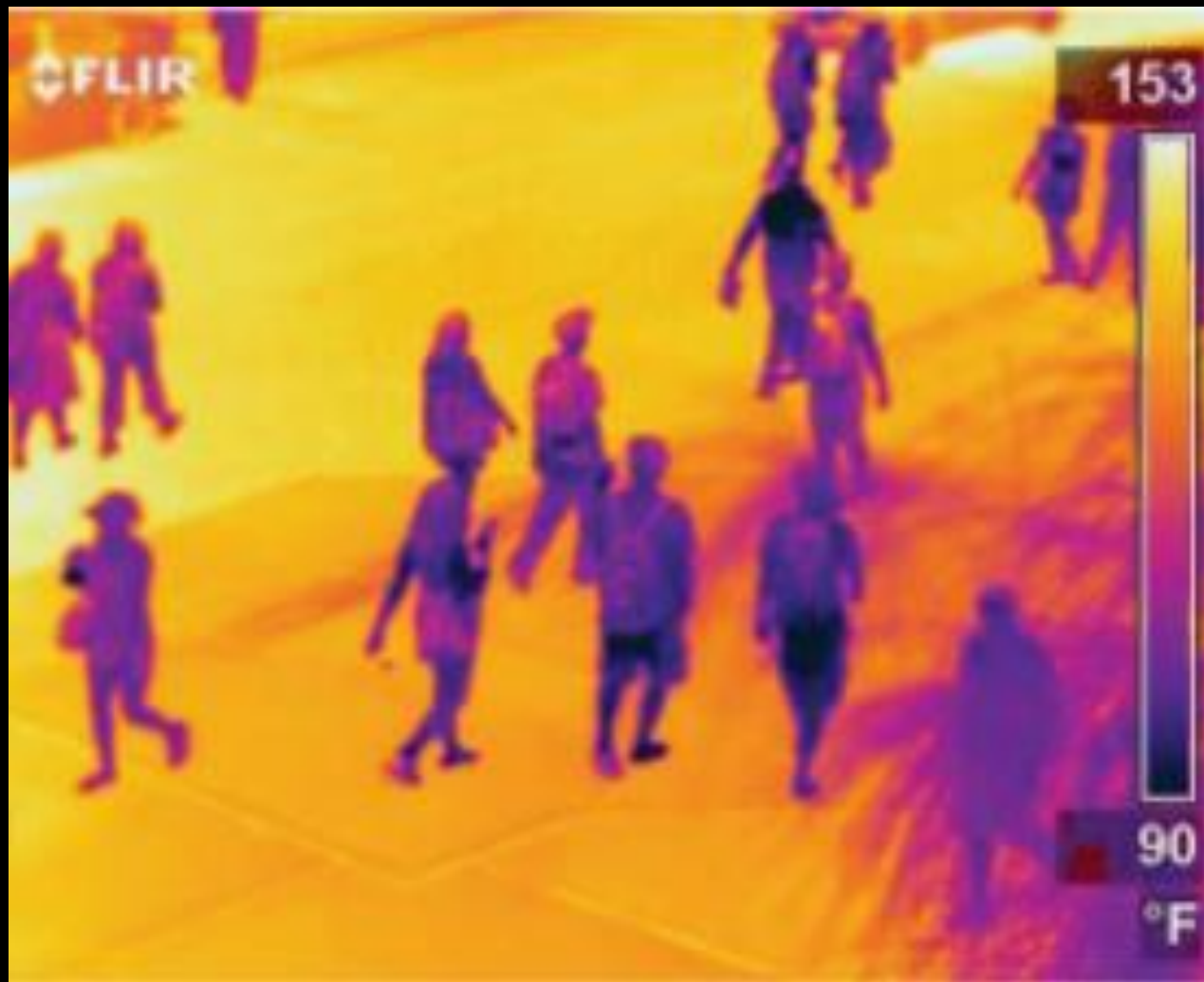
Permeability

It provides significant benefits to the environment.

The water filtration rate varies between 3 gals/ft²/min (120 L/m²/min) to 8 gals/ft²/min (320 L/m²/min).



Environmental benefits



01

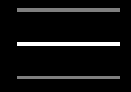
Hydraulic performance.

- Increasing capacity to regulate stormwater runoff.
- Providing resilience to the transportation system.
- Reducing pollutants that enter the soil and the watersheds.

Heat island effect mitigation.

Reduction of heat-island implies:

- Increasing human quality of life in urban areas.
 - Decreasing the energy cost for air conditioning.
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Environmental benefits



02

Traffic noise reduction.

- Reduction of noise pollution produced by cars or motorbikes.
- Noise levels of traditional concrete: between 100 [dBA] and 110 [dBA] vs. Permeable concrete with a thickness of 80 [mm]: an acoustic absorption capacity of 48 [dBA].

Skid resistance improvement.

- Road safety increase by avoiding formation of water mirrors or superficial freezing.
 - Improvement of the permeability, compressive strength and skid resistance of permeable concrete by using furnace slag in the mixture.
 - RCA (Recycled Coarse Aggregates) use.
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Applications

Permeable concrete can be used in:

01 - Sidewalks



02 - Residential roads



03 - Parking lots





INSPECTION AND MAINTENANCE



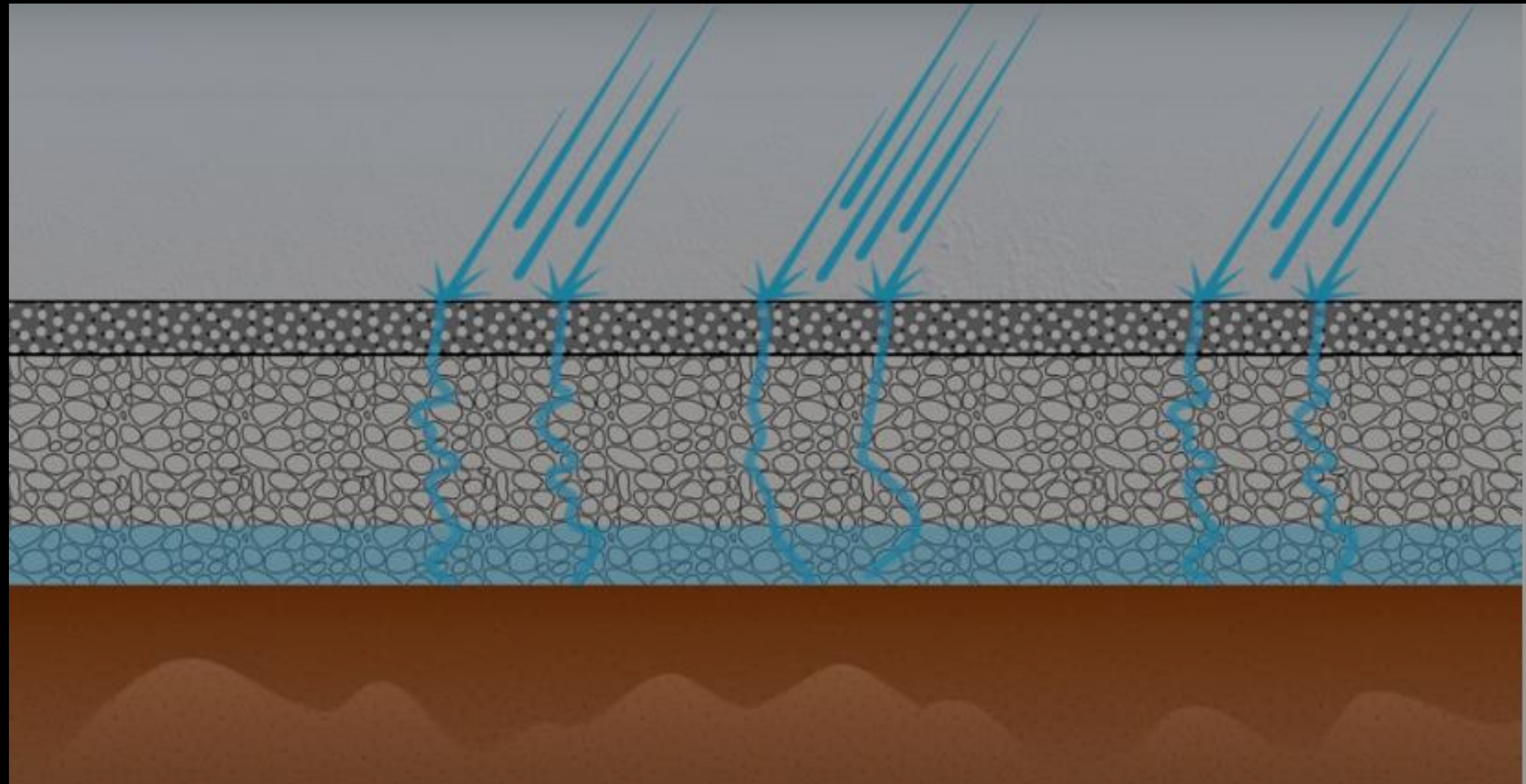
Testing and inspection

- Three cores per 100 yd³ (75 m³) must be analyzed.
- Compressive strength tests are not recommended.
- Weight should not less than 5 lb/ft³ (80 kg / m³) of the design unit weight.
- The thickness should not be less than 1/2 inch (13 mm) of the design thickness.

Maintenance

- Control of voids.
 - Sand particles, soil, leaves, and rocks are clog agents
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CONCLUSION



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Thanks!

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