



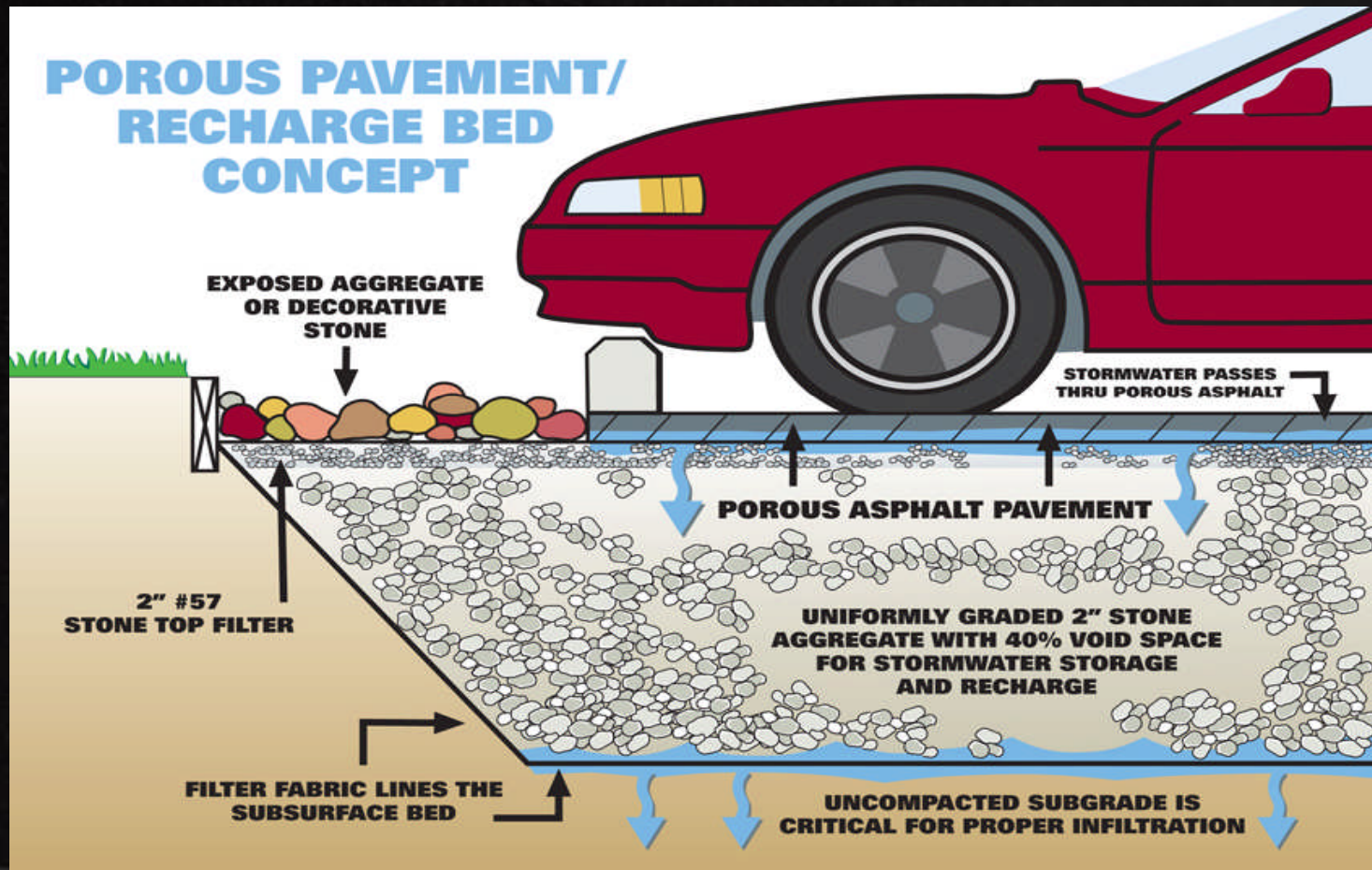
Porous Asphalt Pavement Design, Construction and Maintenance

Asphalt ... Defining Value !
Safe, Smooth and Sustainable

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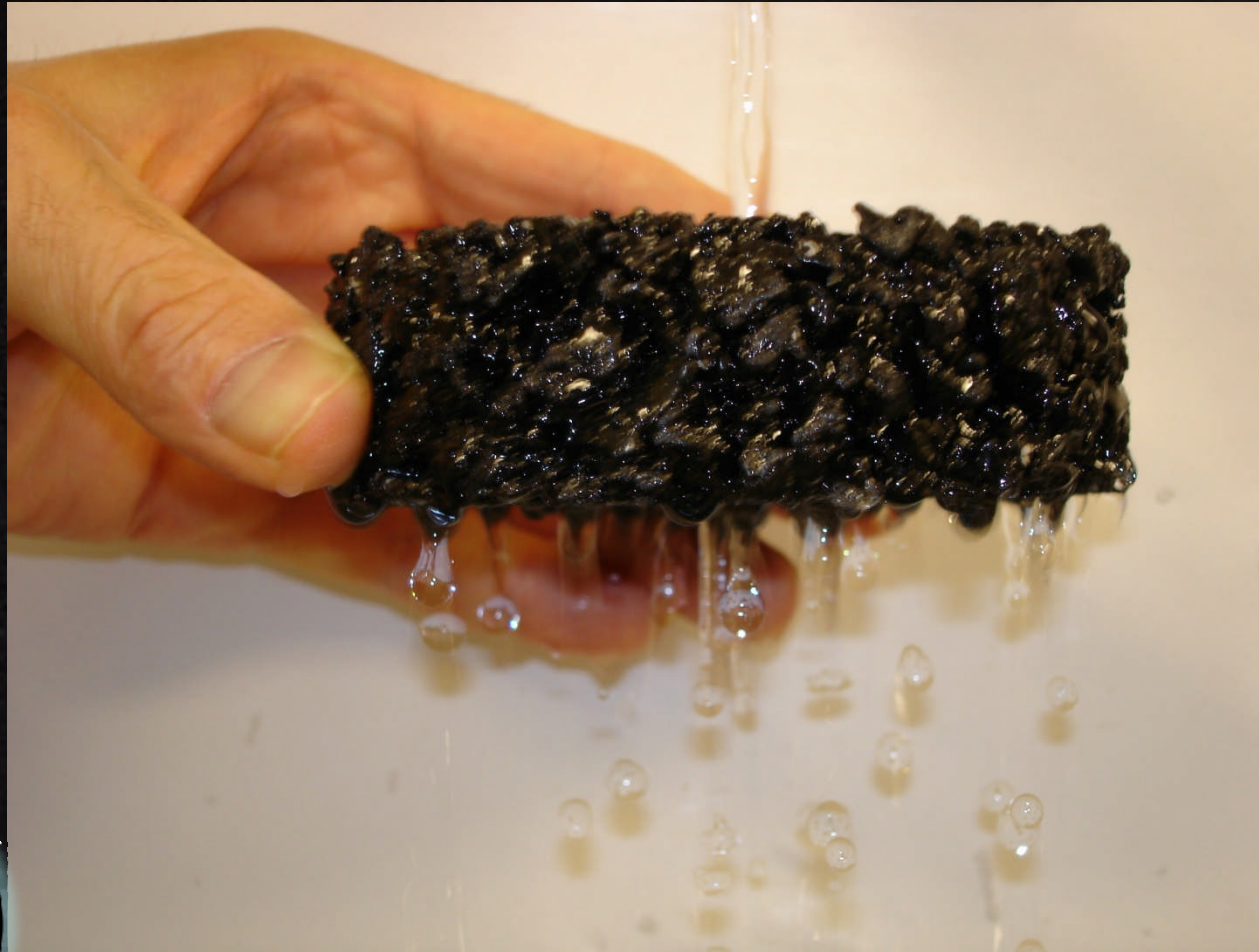
What are Porous Pavements?



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Porous Asphalt

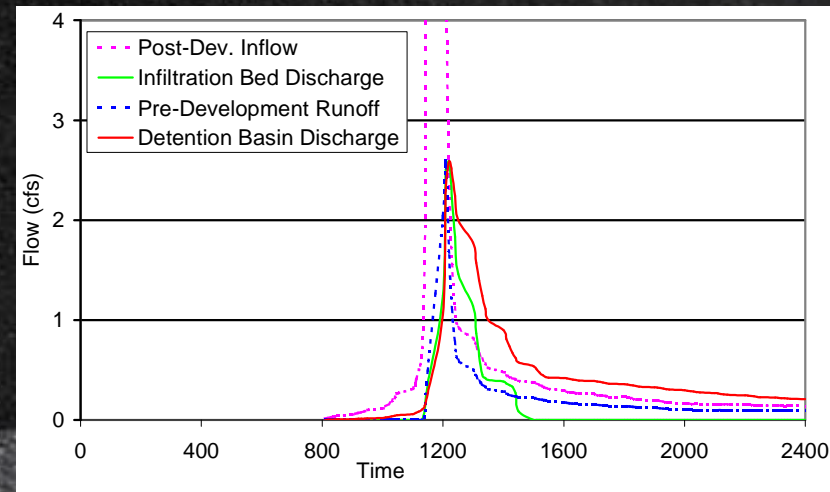


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Why Porous Pavement?

- New stormwater regulations
 - Reduce total volume (not just peak flow)
 - Limiting impervious area
 - Improve runoff quality
 - Taxing runoff
- Sustainability
- Build lot flat,
- no puddles



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Porous Asphalt Pavement Development

- Concepts developed by the Franklin Institute under US EPA grant – 1972
- Tested in pilot projects during 1970's
- Franklin Institute Press – Porous Pavement by Thelen and Howe - 1978
- Development of geotextiles in 1979
- Current design since 1980
- Cahill Associates (now CH2MHill) has built over 150 projects since 1980
- Outstanding engineering project - 2000

Porous Asphalt Use – Light Duty Parking Facility



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Porous Asphalt Use – Light Duty Parking Facility



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Porous Asphalt Use – Light Duty Roadway



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POROUS PAVEMENT FOR STORMWATER CONTROL

- Design
- Construction
- Maintenance



POROUS PAVEMENT

Design, Construction, Maintenance

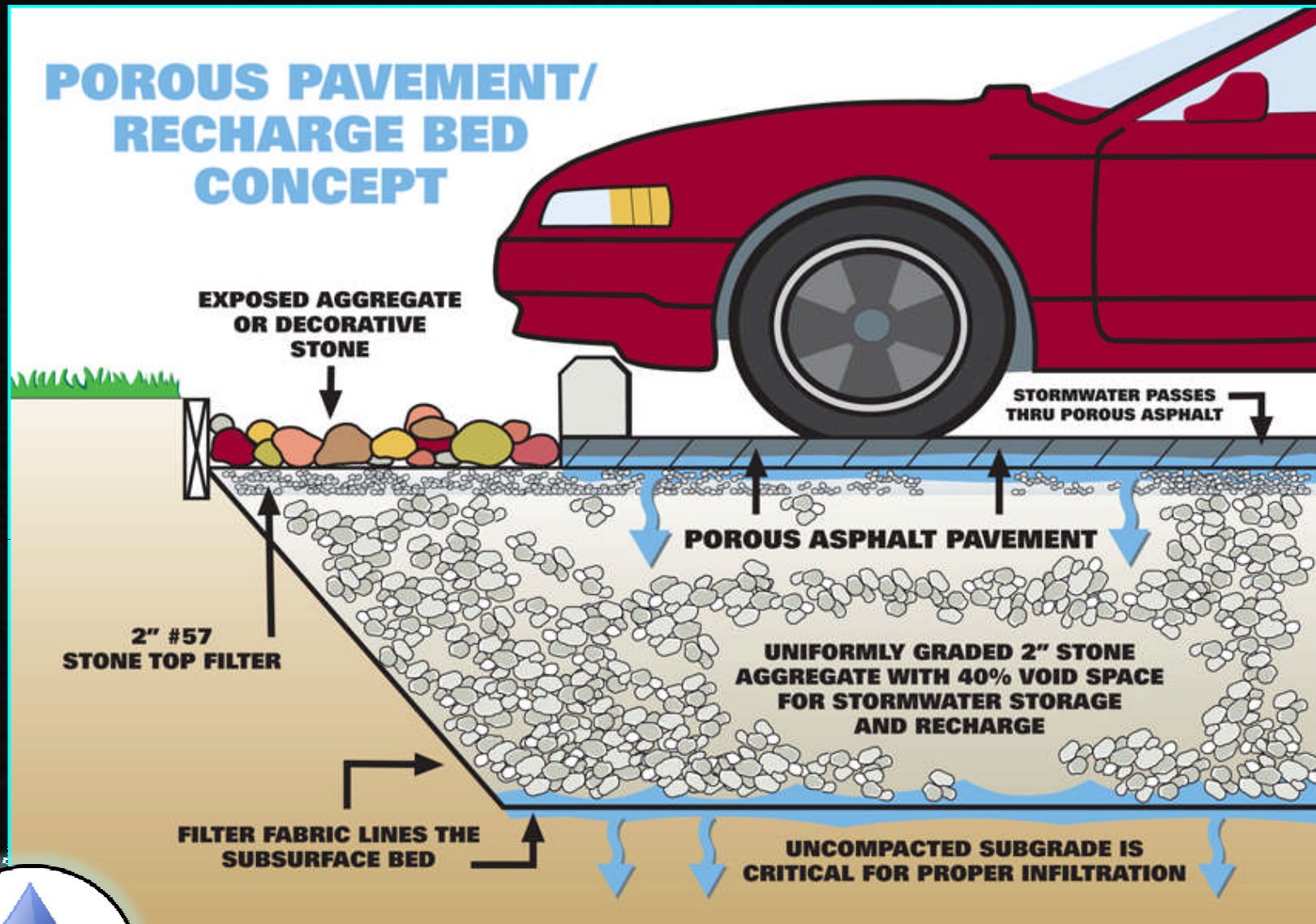
- **Components of a porous pavement system**
- Performance
- Design considerations
- Constructing a porous pavement system
- Ensuring long life through proper maintenance



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POROUS PAVEMENT/ RECHARGE BED CONCEPT

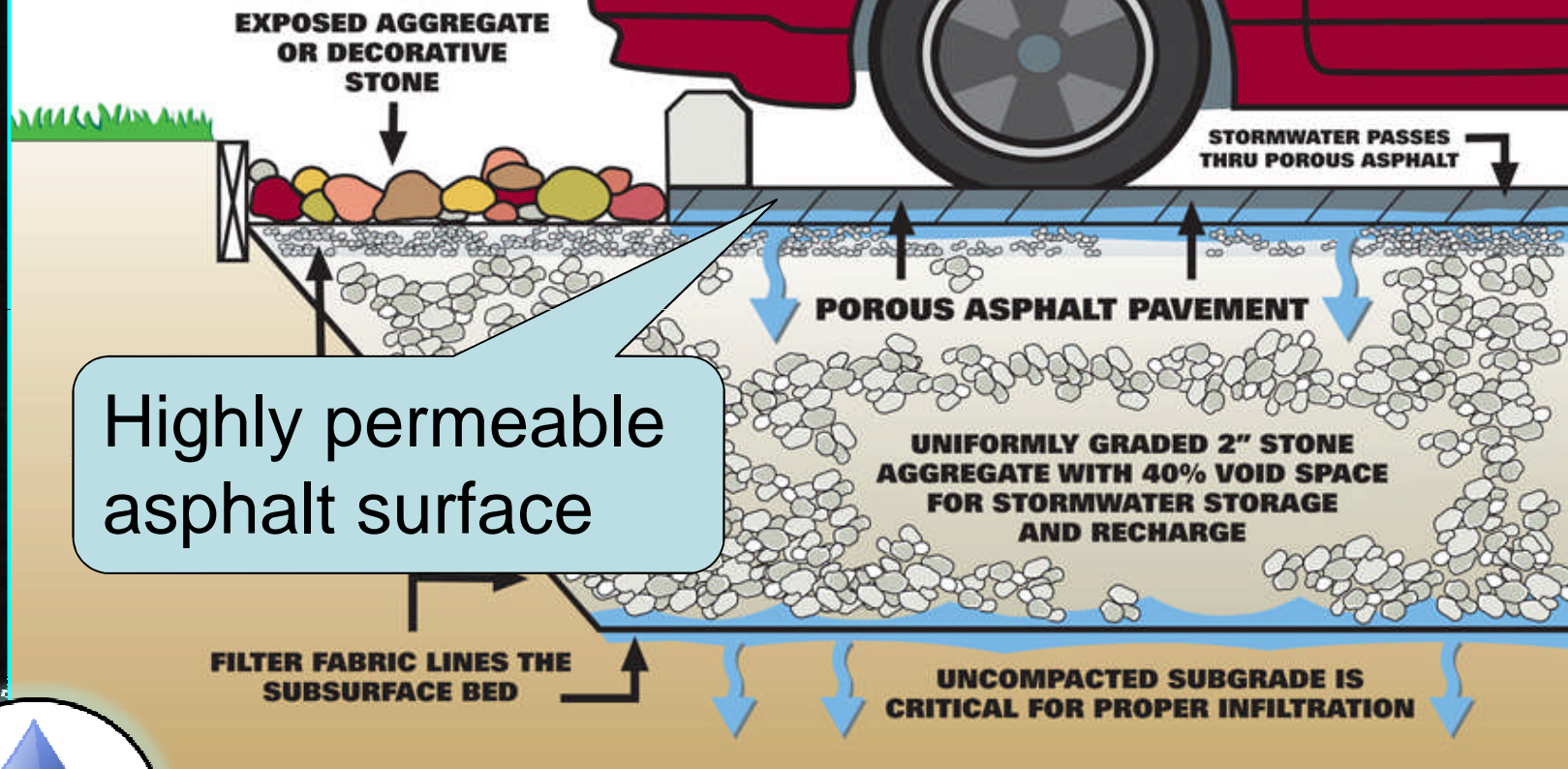


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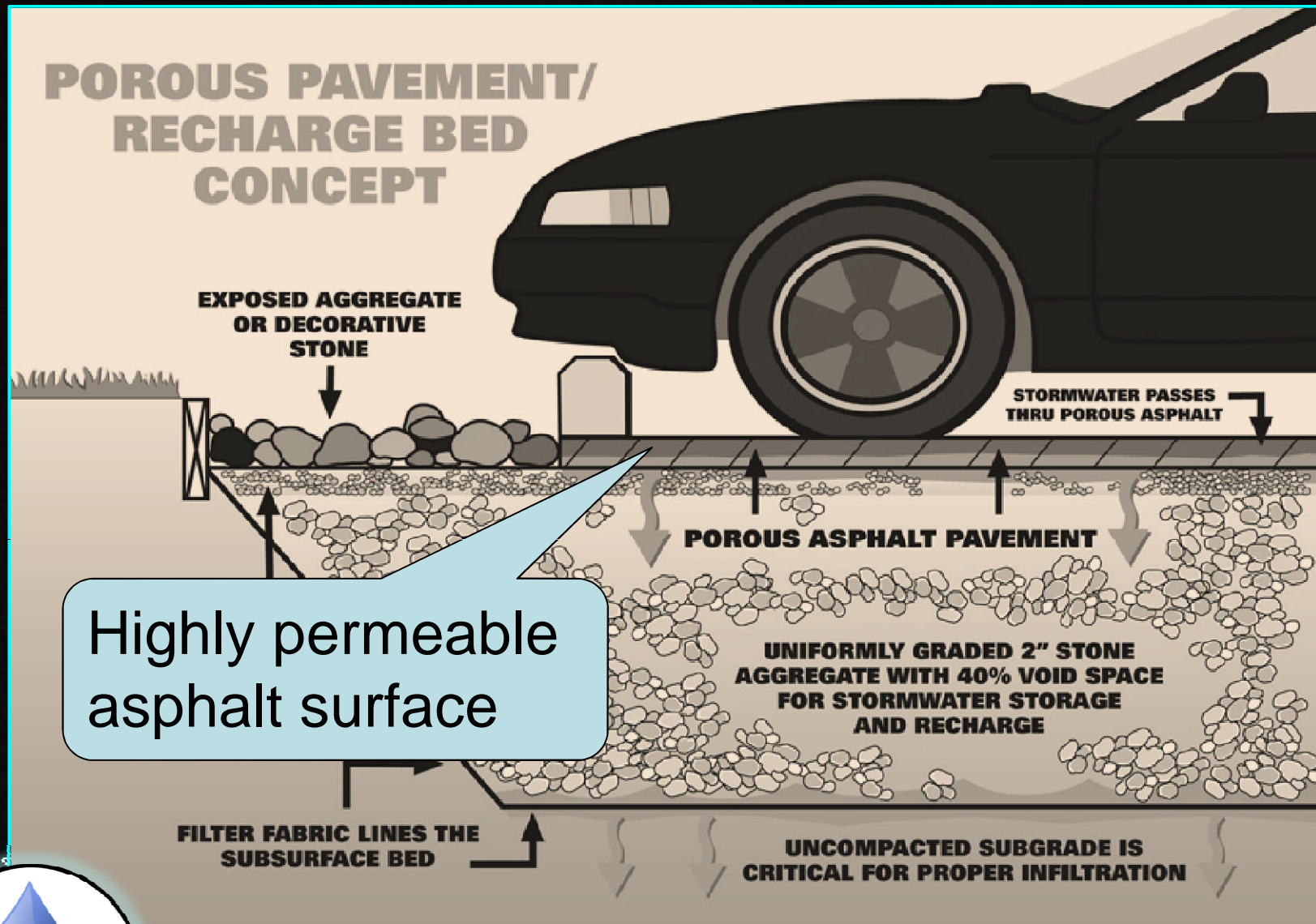


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POROUS PAVEMENT/ RECHARGE BED CONCEPT



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POROUS PAVEMENT/ RECHARGE BED CONCEPT

EXPOSED AGGREGATE
OR DECORATIVE
STONE

Highly permeable
asphalt surface

FILTER FABRIC LINES THE
SUBSURFACE BED

Permeability: 352 to 6000
ft/day (soil: 6 in/hr)

100% crushed stone for
strength & stability

Polymer modified asphalt
binder (6% min)

Layer thickness: 4 to 6
inches

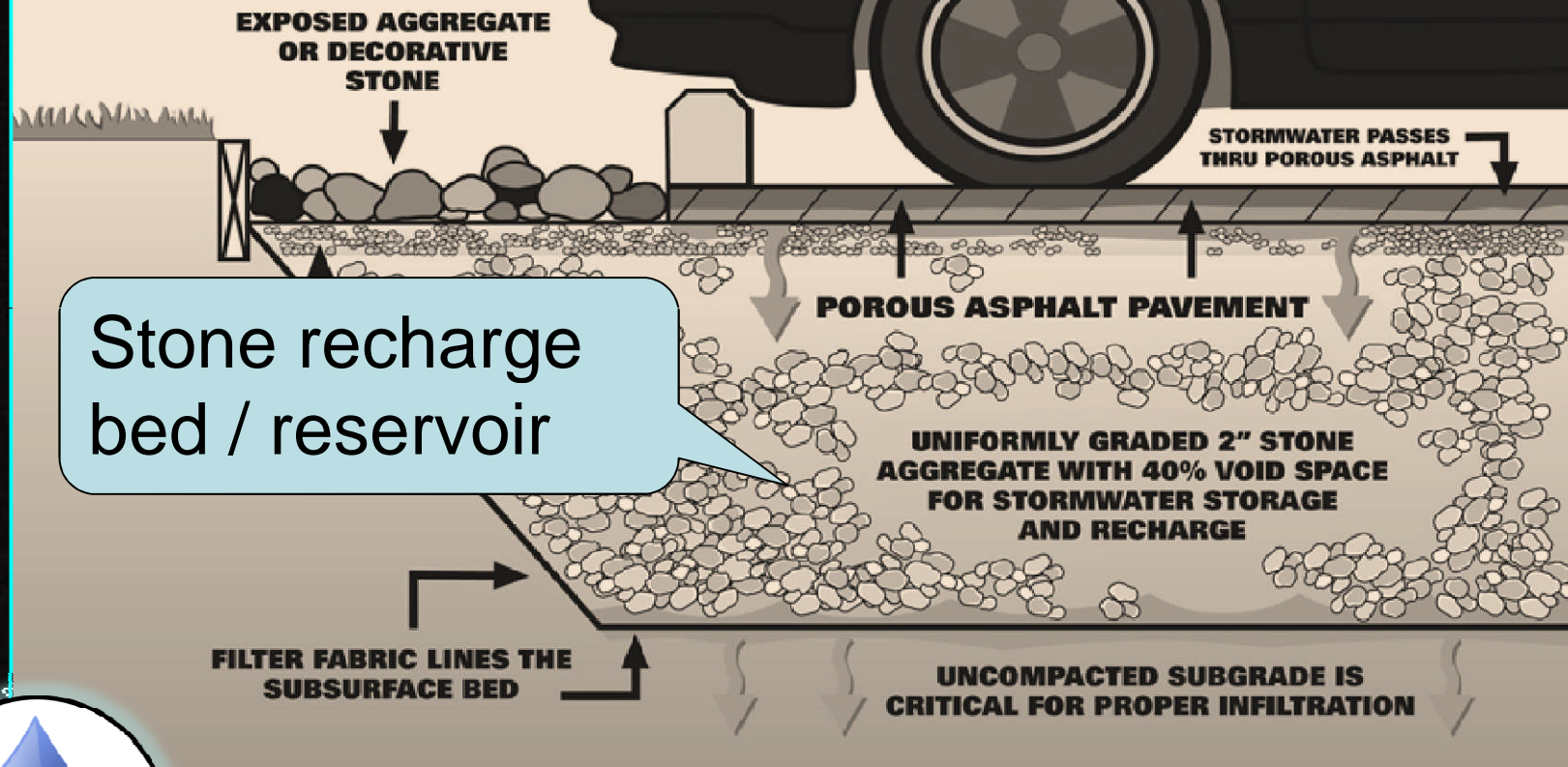
Modeled after ODOT SS803
(open graded friction
course)

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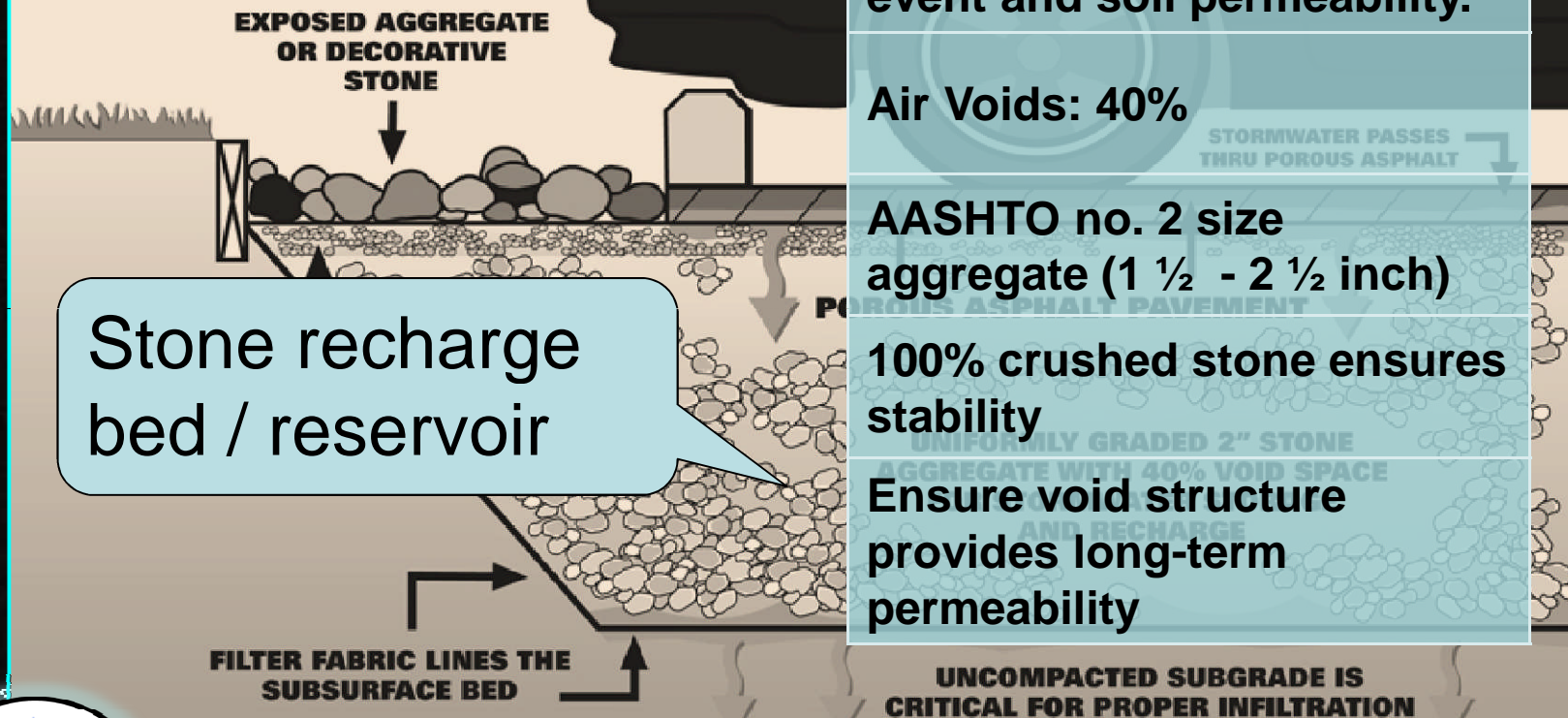


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POROUS PAVEMENT/ RECHARGE BED CONCEPT



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| Aggregate Size | Voids (Average %) |
|------------------|-------------------|
| No, 2 Limestone | 41 |
| No. 4 Limestone | 41 |
| No. 57 Limestone | 41 |
| No. 8 Limestone | 42 |
| No. 7 Limestone | 42 |
| Limestone sand | 36 |

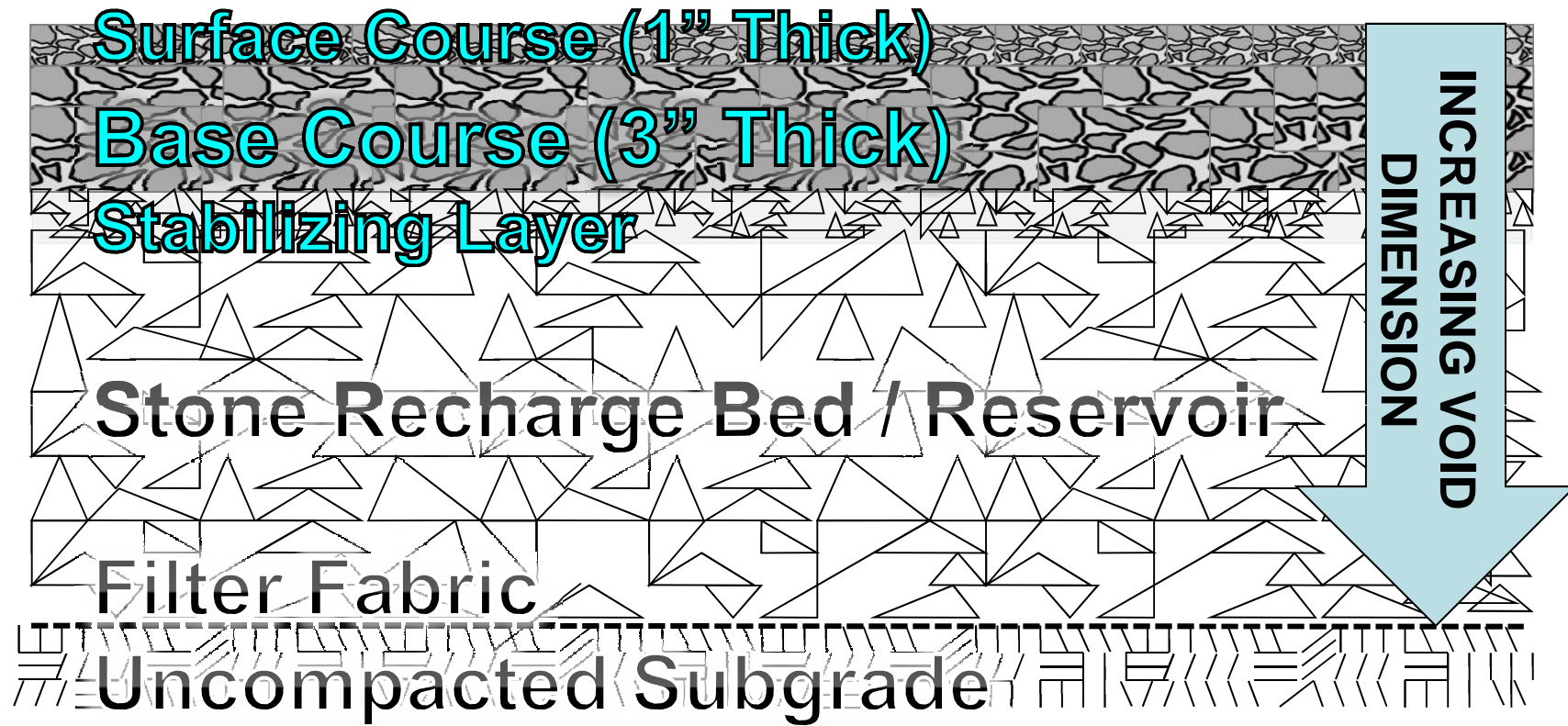
Source: Ohio Aggregates and Industrial Minerals Association



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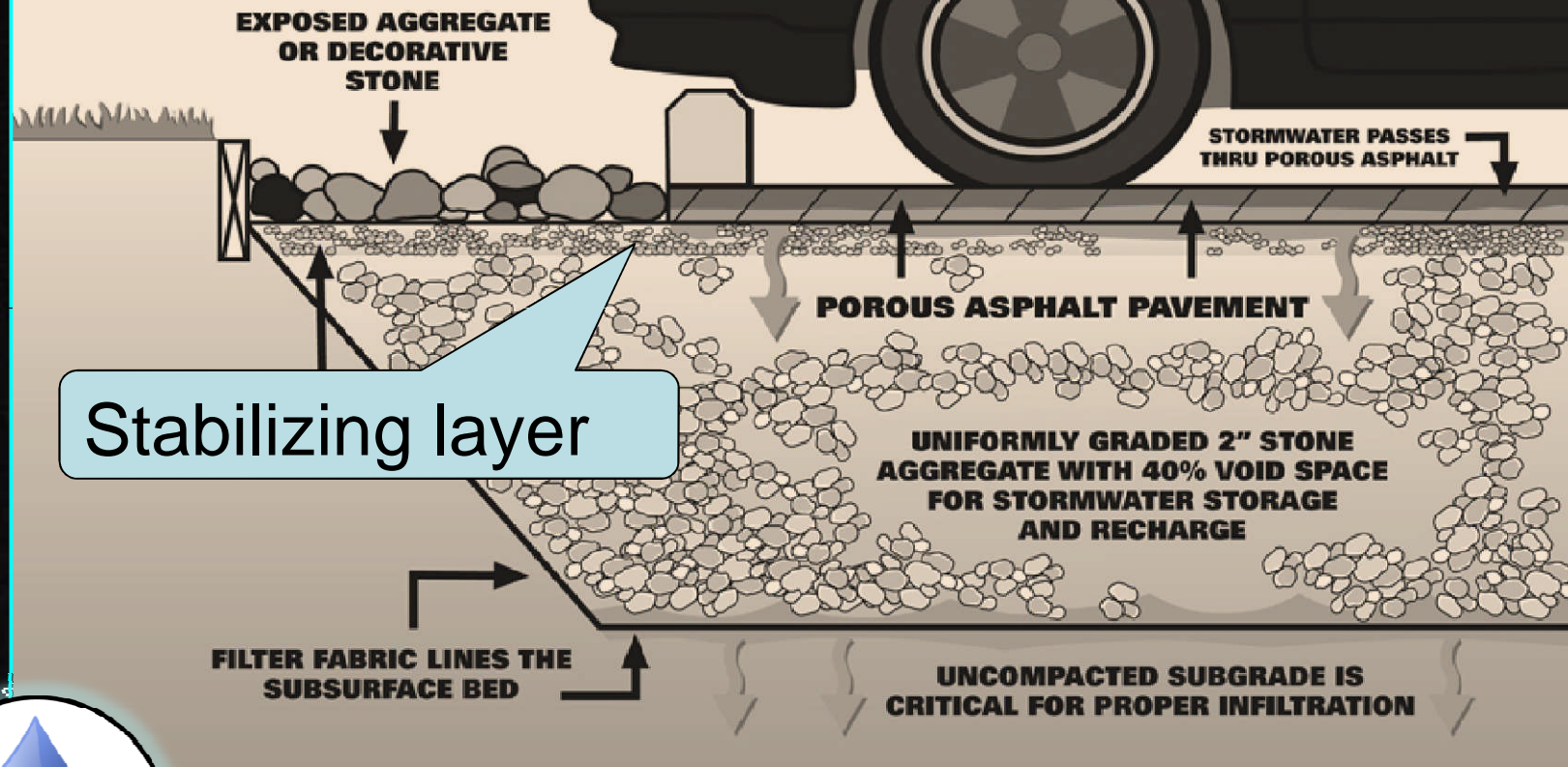
Porous Asphalt Pavement



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POROUS PAVEMENT/ RECHARGE BED CONCEPT



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POROUS PAVEMENT/ RECHARGE BED CONCEPT

EXPOSED AGGREGATE
OR DECORATIVE
STONE

Thickness: approx. 2 inches

stability

Stabilizing layer

UNIFORMLY GRADED 2" STONE
AGGREGATE WITH 40% VOID SPACE
FOR STORMWATER STORAGE
AND RECHARGE

FILTER FABRIC LINES THE
SUBSURFACE BED

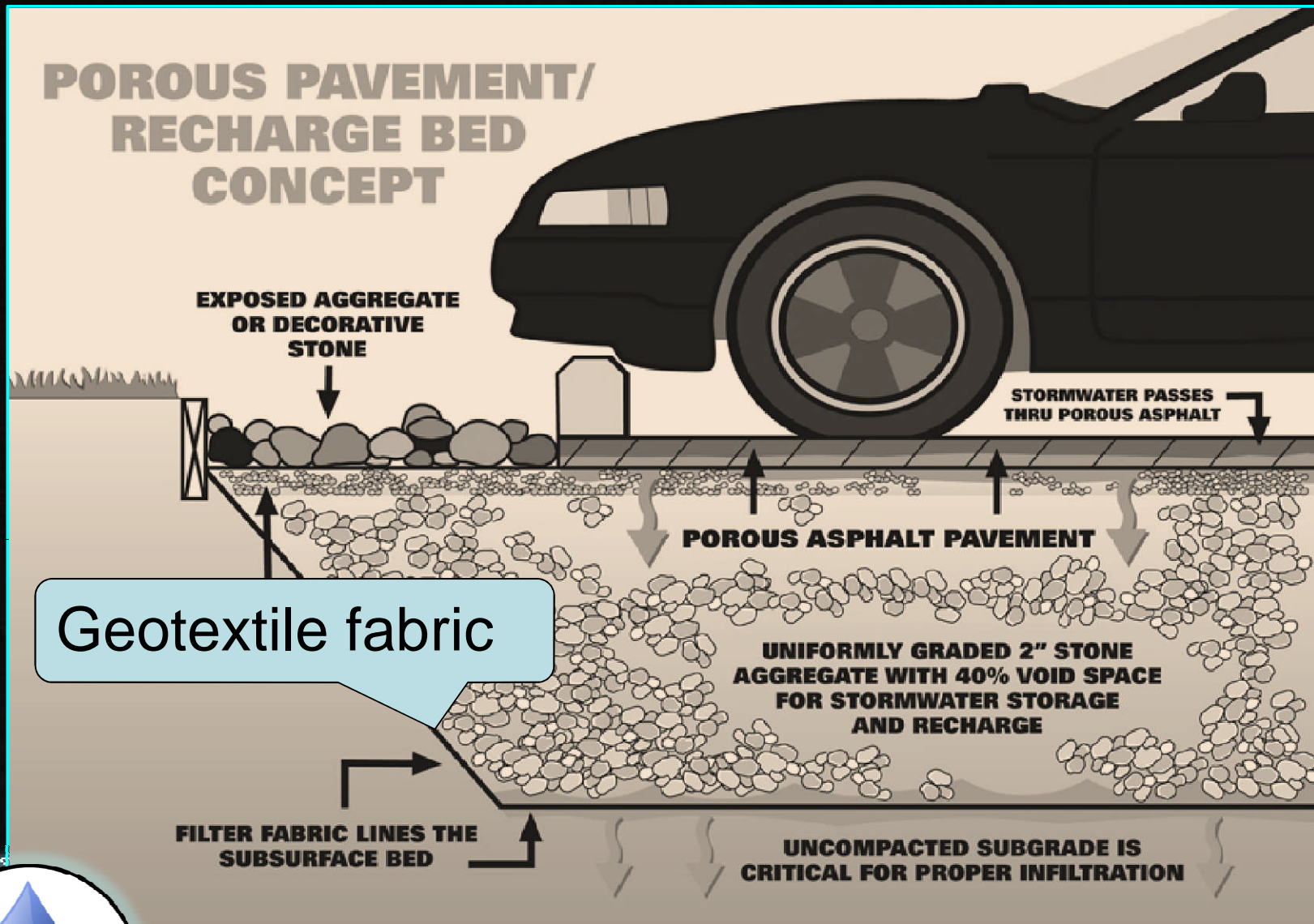
UNCOMPACTED SUBGRADE IS
CRITICAL FOR PROPER INFILTRATION

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POROUS PAVEMENT/ RECHARGE BED CONCEPT

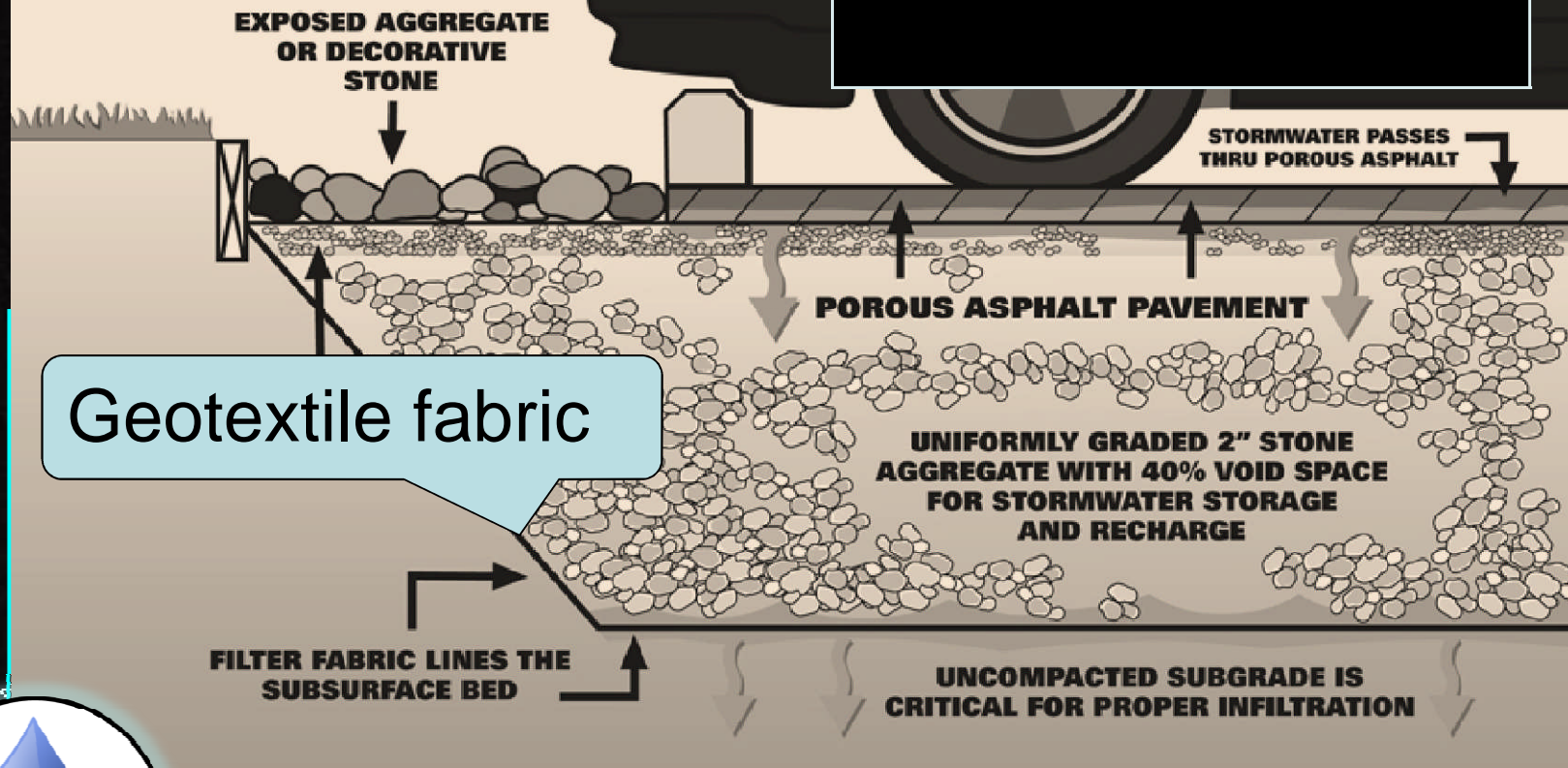


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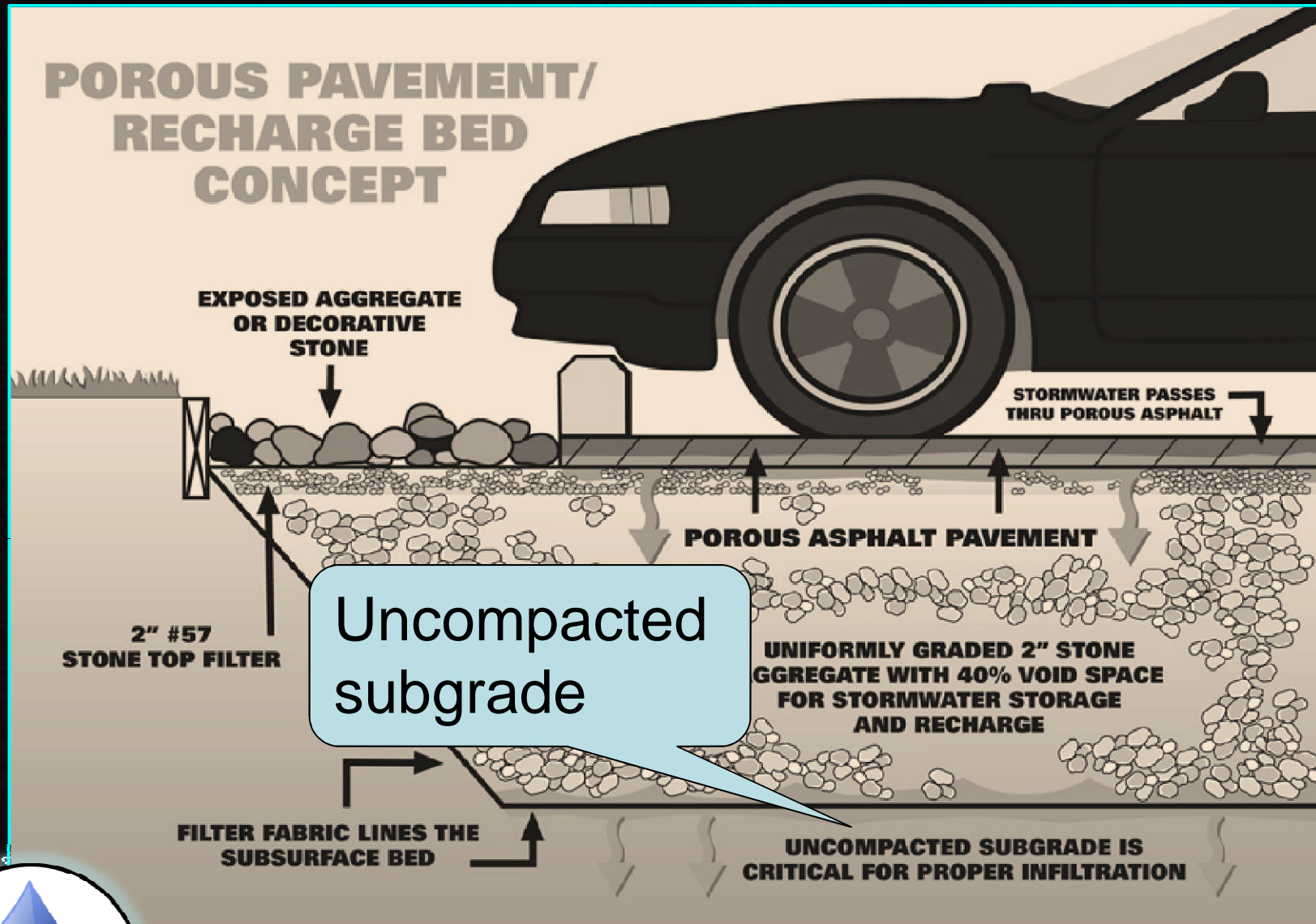


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POROUS PAVEMENT/ RECHARGE BED CONCEPT

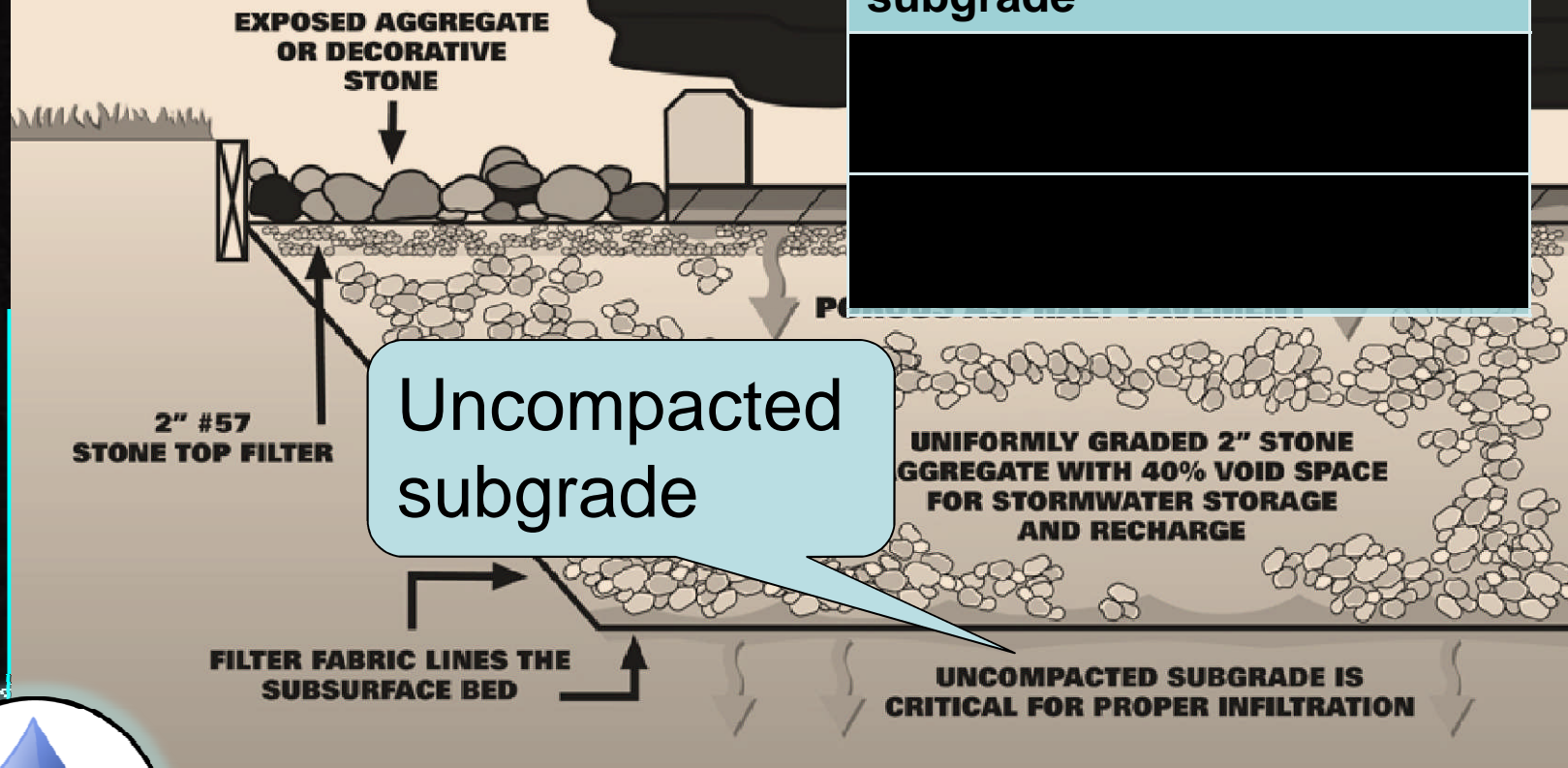


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POROUS PAVEMENT/ RECHARGE BED CONCEPT



Avoid any activities that would result in compacted subgrade

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POROUS PAVEMENT

Design, Construction, Maintenance

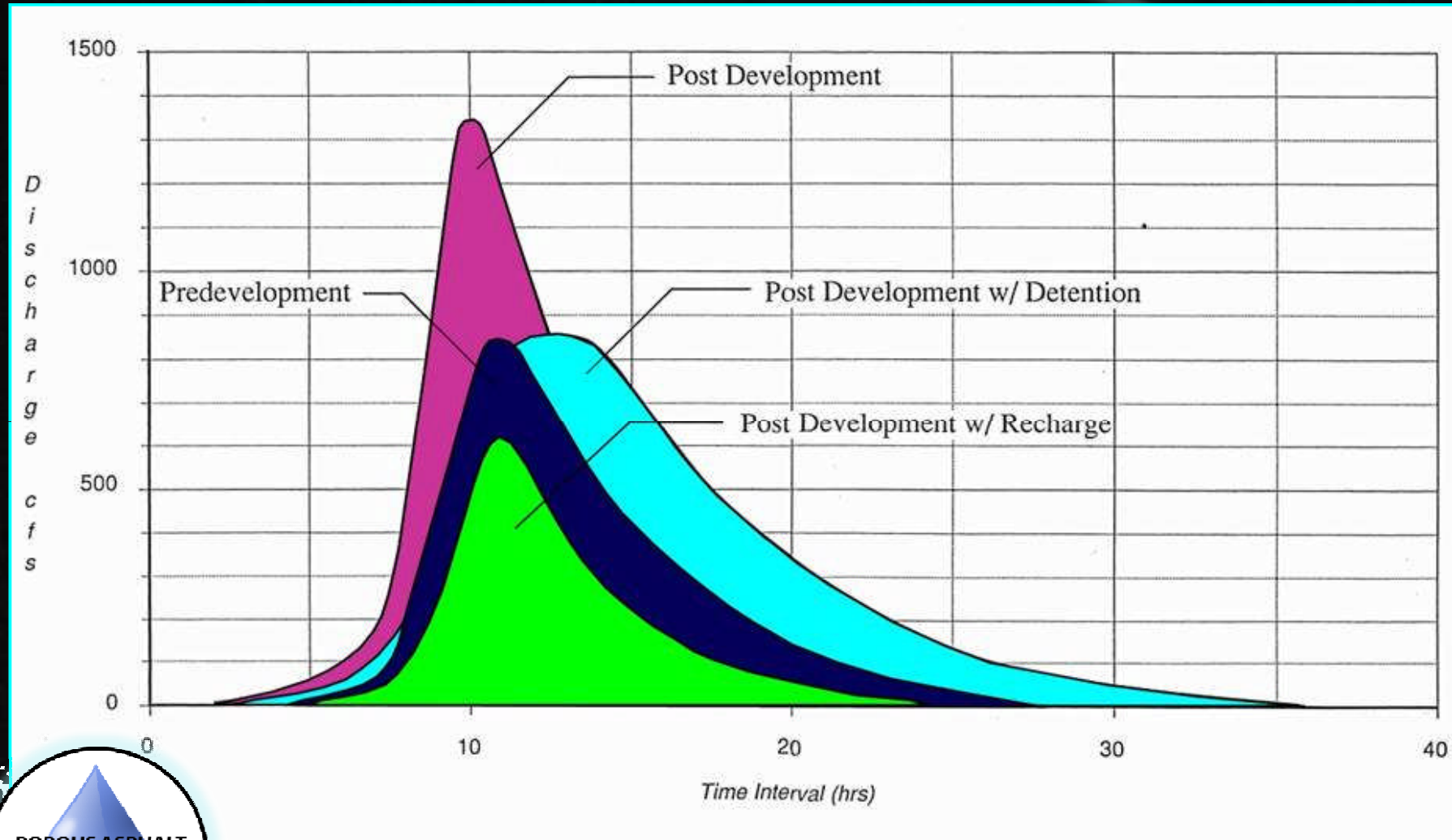
- Components of a porous pavement system
- **Performance**
- Design considerations
- Constructing a porous pavement system
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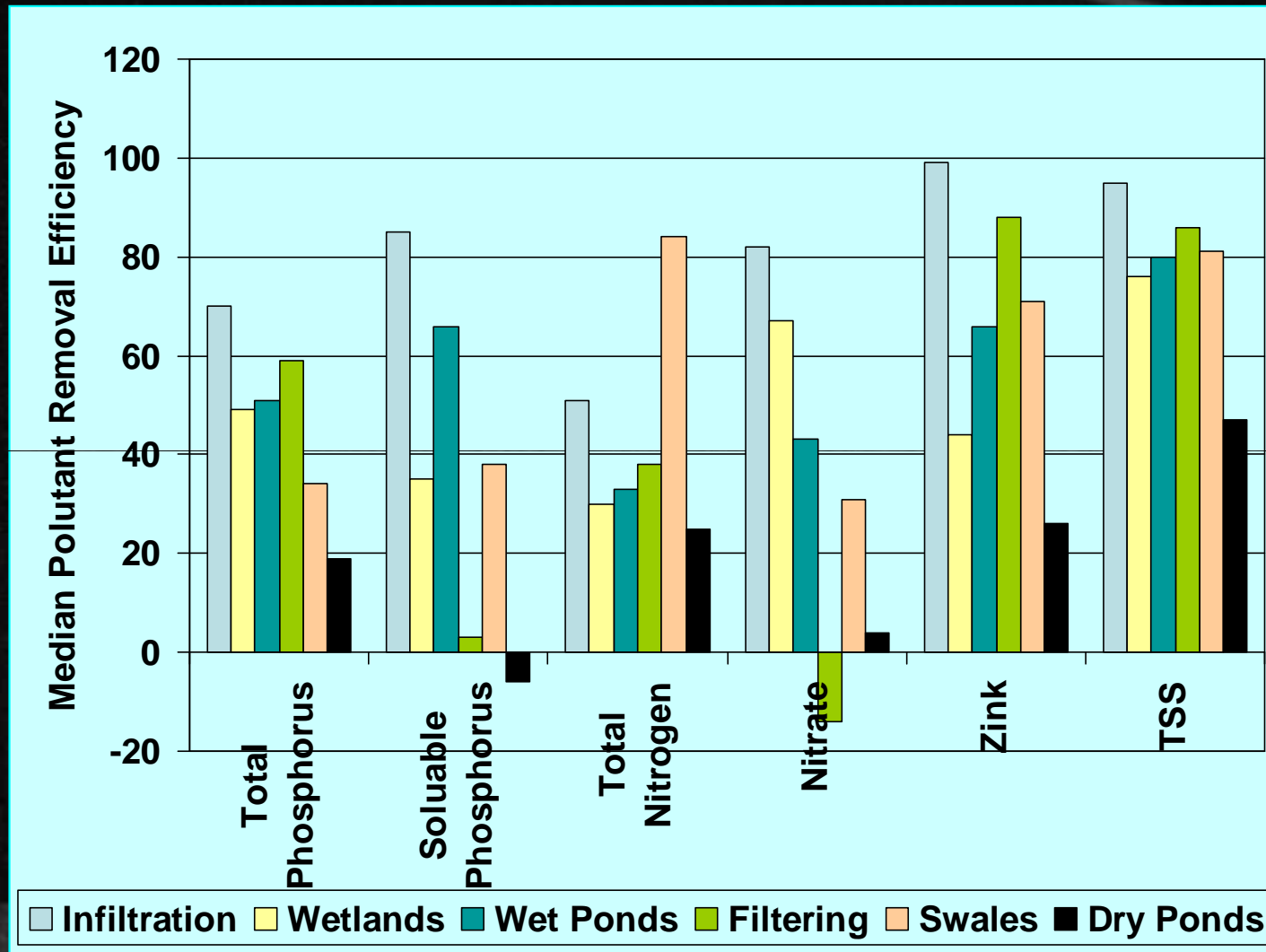
Stormwater Quantity Control



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Pollutant Removal

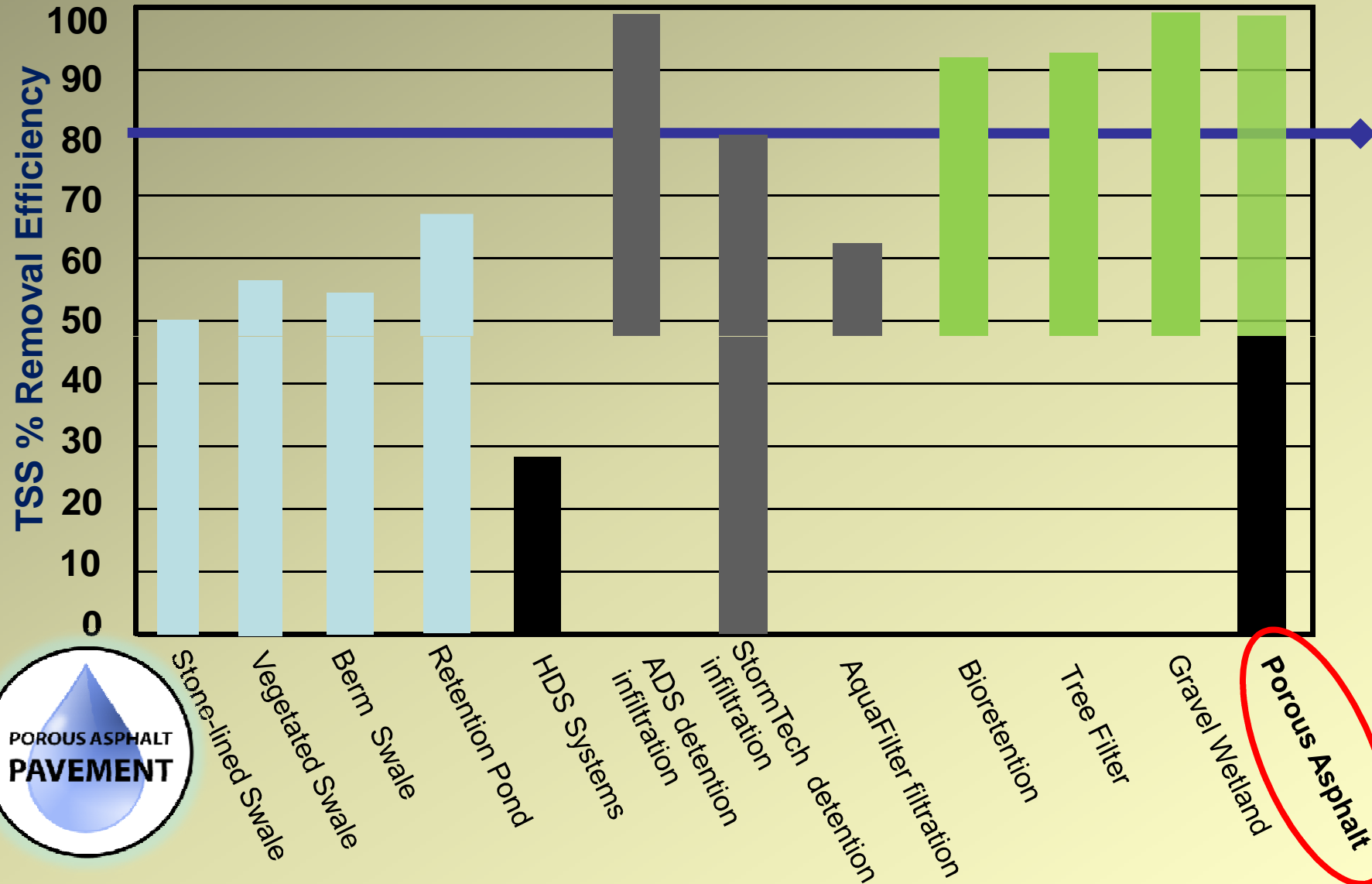


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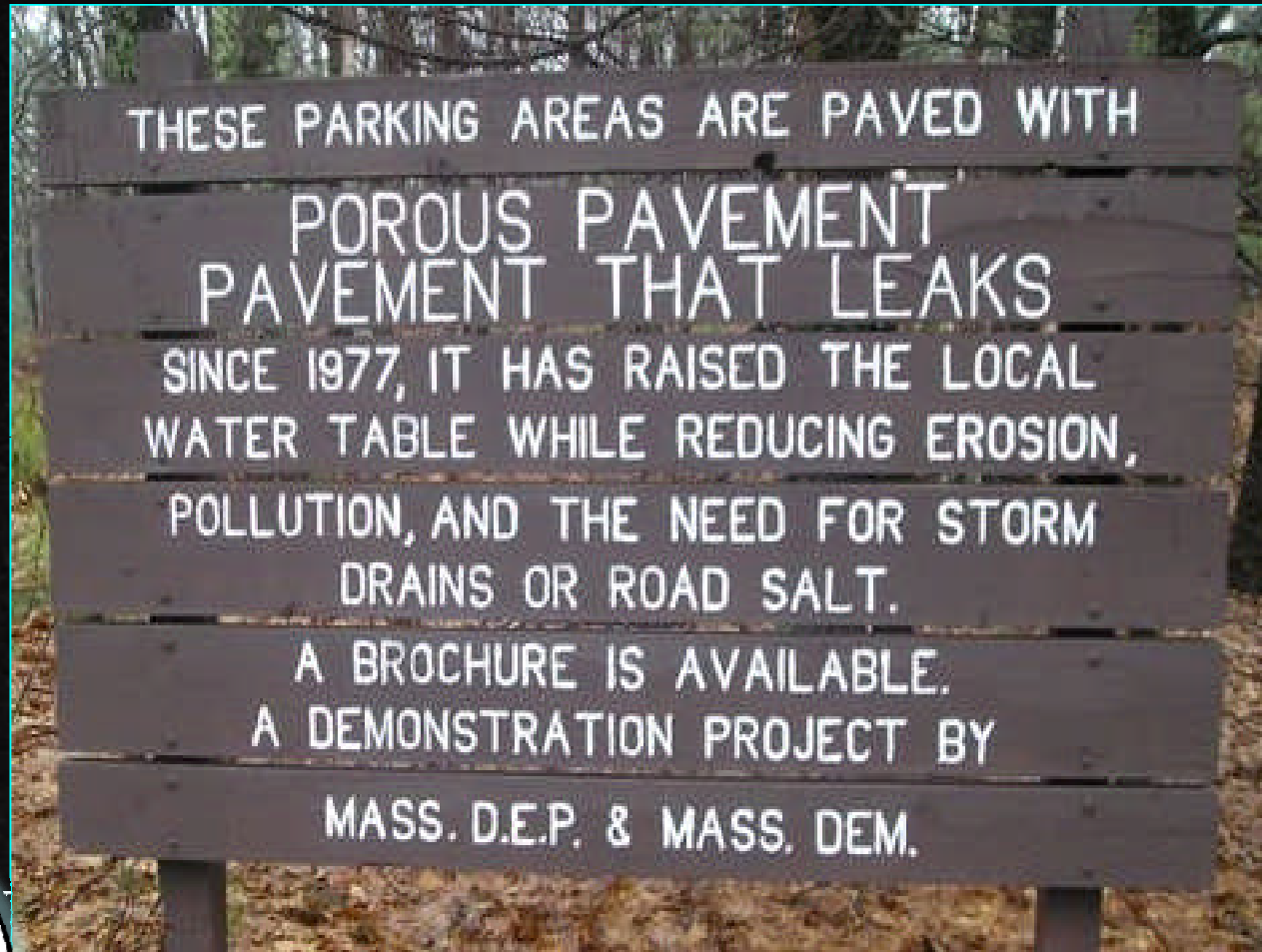
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TSS Removal Efficiencies

Source: University of New Hampshire Storm Water Center



Pavement Longevity



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Dense-graded Pavement –
Two maintenance treatments

Porous Pavement –
No maintenance treatments



Cahill Associates
ENVIRONMENTAL CONSULTANTS

POROUS PAVEMENT

Design, Construction, Maintenance

- Components of a porous pavement system
- Performance
- **Design considerations**
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Design Considerations

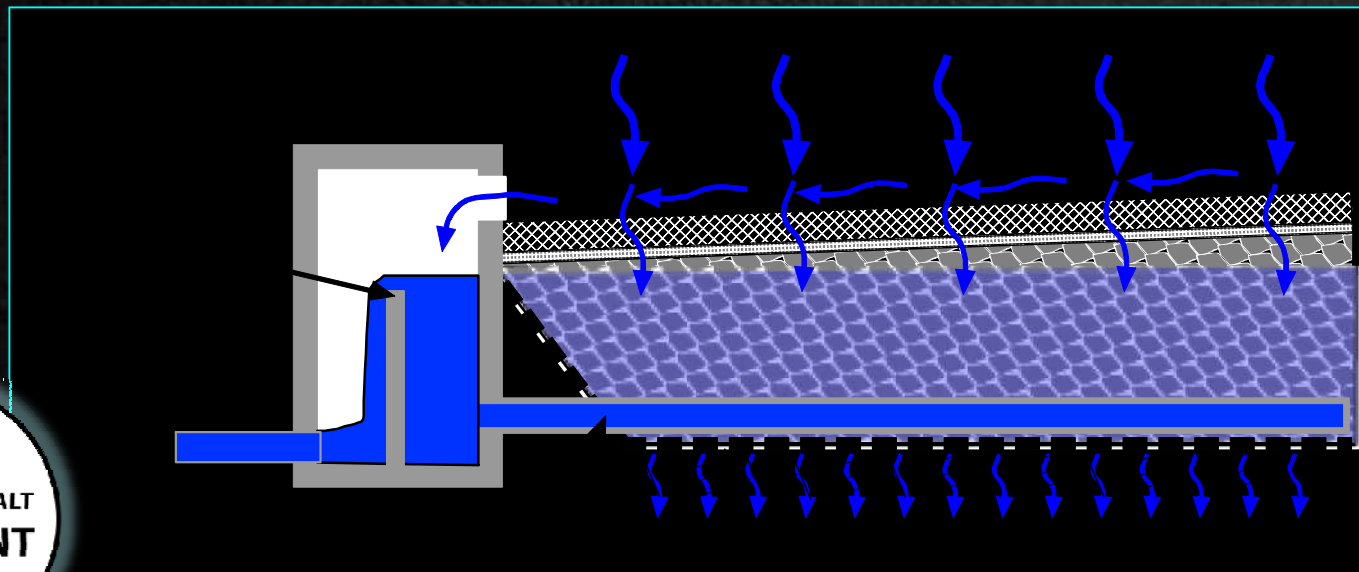
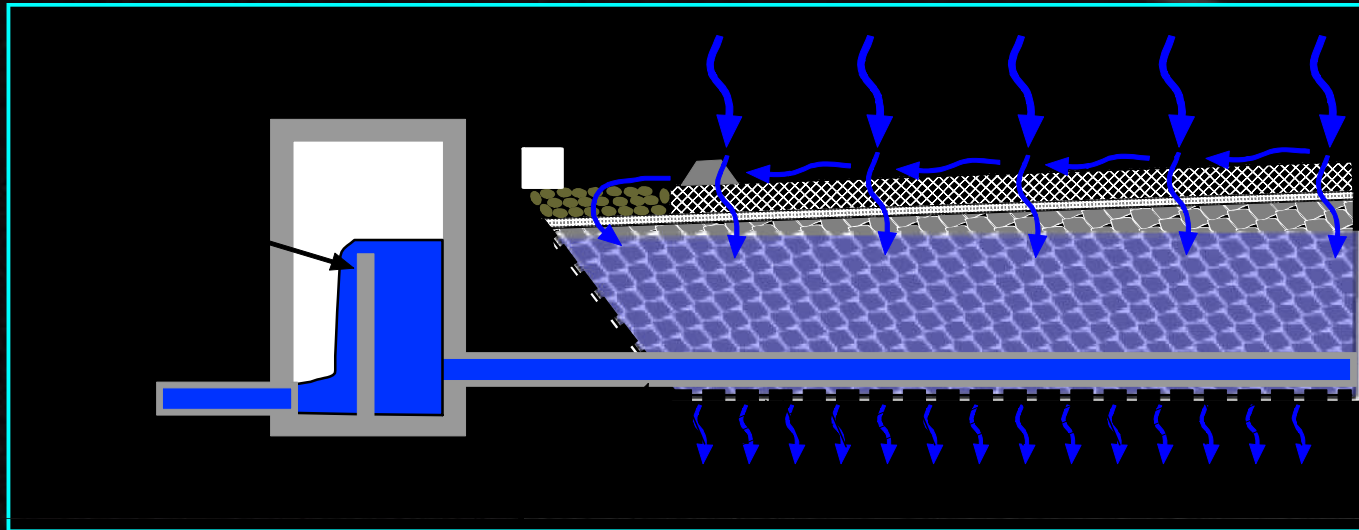
- Porous pavements can be designed as infiltration OR detention systems
- UNHSC research indicates some infiltration will occur even in low-permeability, clay-like soils.
 - TANK project confirms infiltration occurs in poor draining soil
 - Build in failsafe (e.g. underdrains, catchbasins, etc)



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Failsafe



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Failsafe

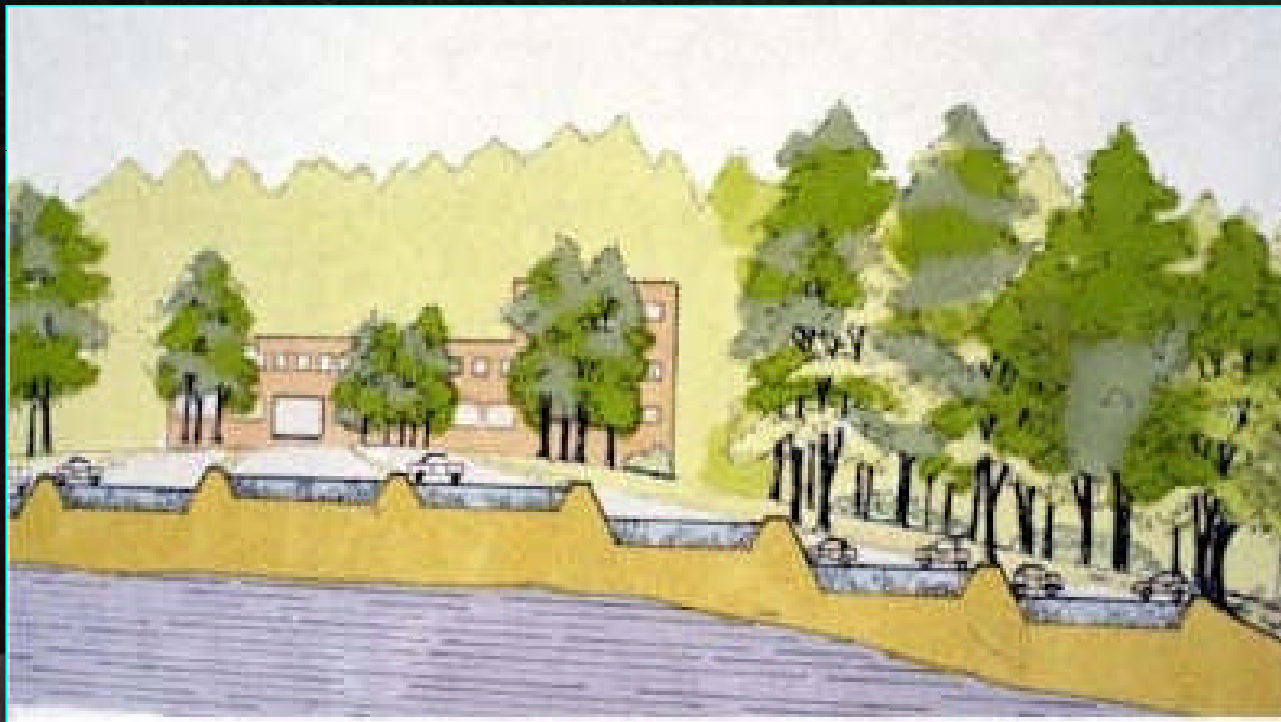


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Design Considerations

- Soil bed must be designed to be flat to maximize infiltration area. Step pavement to assure flat surface.



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Design Considerations

- Provide a pavement structure that will carry paving equipment without distorting.
 - Avoid thick courses (> 3 inches) of single size aggregate such as no. 57



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POROUS PAVEMENT

Design, Construction, Maintenance

- Components of a porous pavement system
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Constructing a Porous Pavement System

- Build porous pavement last
 - Protect from construction debris
 - Protect from debris laden runoff
- Protect site from heavy equipment
 - Avoid compaction of subgrade by construction equipment
- Excavate to subgrade using soft footprint



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Constructing a Porous Pavement System

- Place filter fabric, ensuring fabric extends above excavation to protect pavement until vegetation is established



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Constructing a Porous Pavement System

- Compaction of asphalt mixes is crucial to performance
- Asphalt binder content is 6.0 min.



Source:
University of
New
Hampshire
Storm Water
Center



halt.

POROUS PAVEMENT

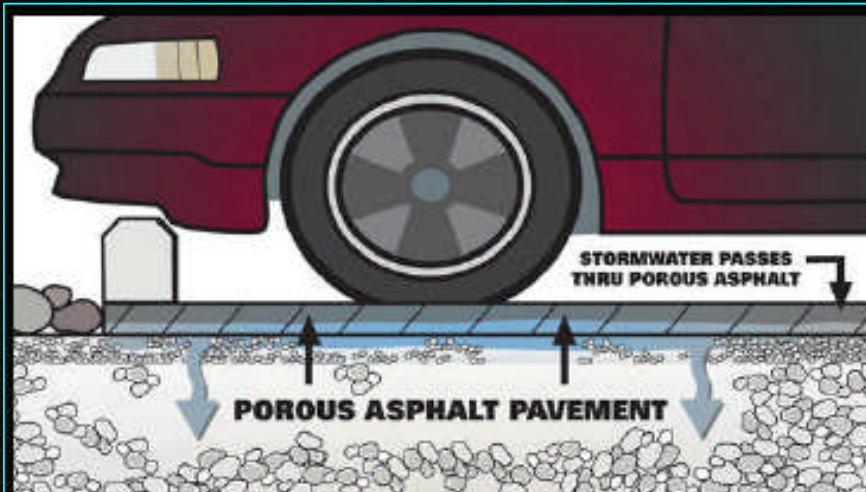
Design, Construction, Maintenance

- Components of a porous pavement system
- Performance
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- **Ensuring long life through proper maintenance**



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LET IT FLOW !



DO NOT USE SAND OR OTHER
ABRASIVES FOR SNOW AND ICE
CONTROL

DO NOT PLACE SOIL, MULCH OR
OTHER MATERIAL THAT CAN CLOG



REGULARLY SWEEP, VACUUM OR
BLOW PAVEMENT TO REMOVE
LEAVES, NEEDLES OR OTHER
DEBRIS THAT CAN CLOG



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Regularly sweep, vacuum or blow pavement to remove leaves, needles or other debris that can clog.



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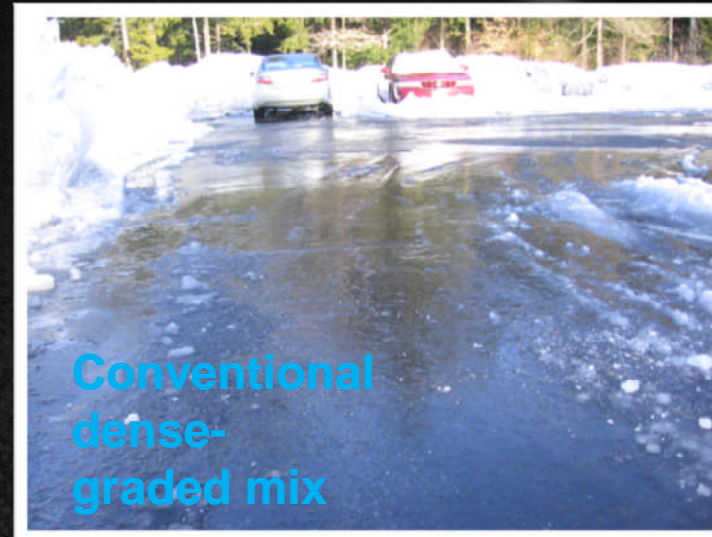
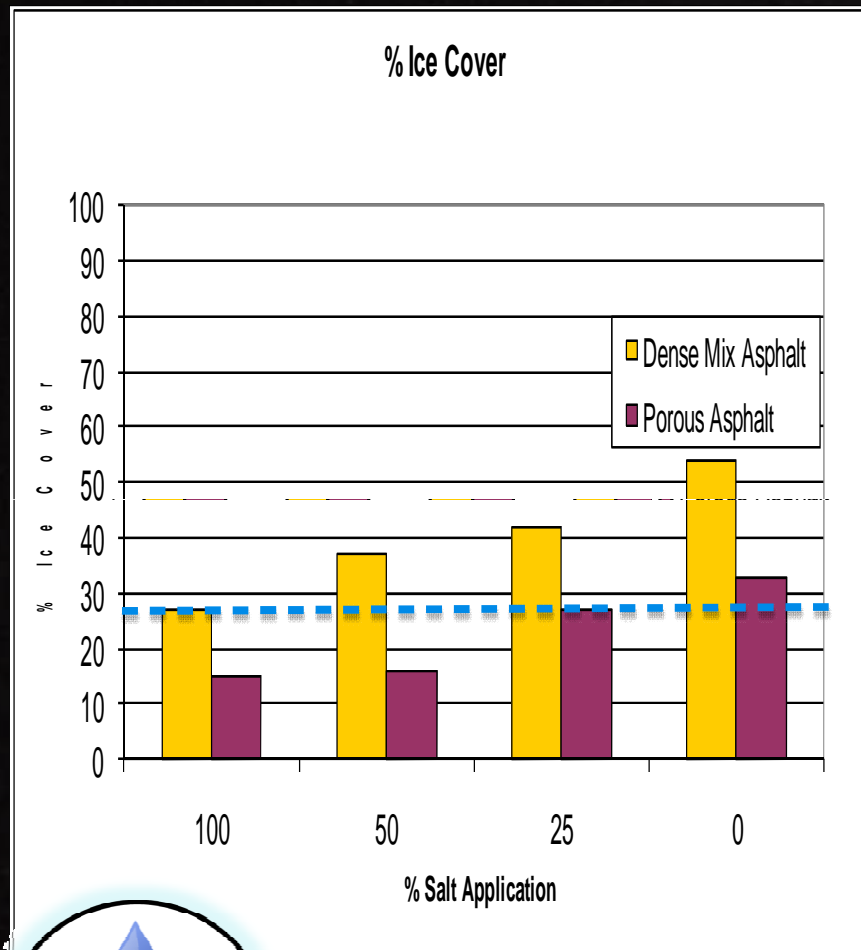
Regularly sweep, vacuum or blow pavement to remove leaves, needles or other debris that can clog.



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Snow & Ice

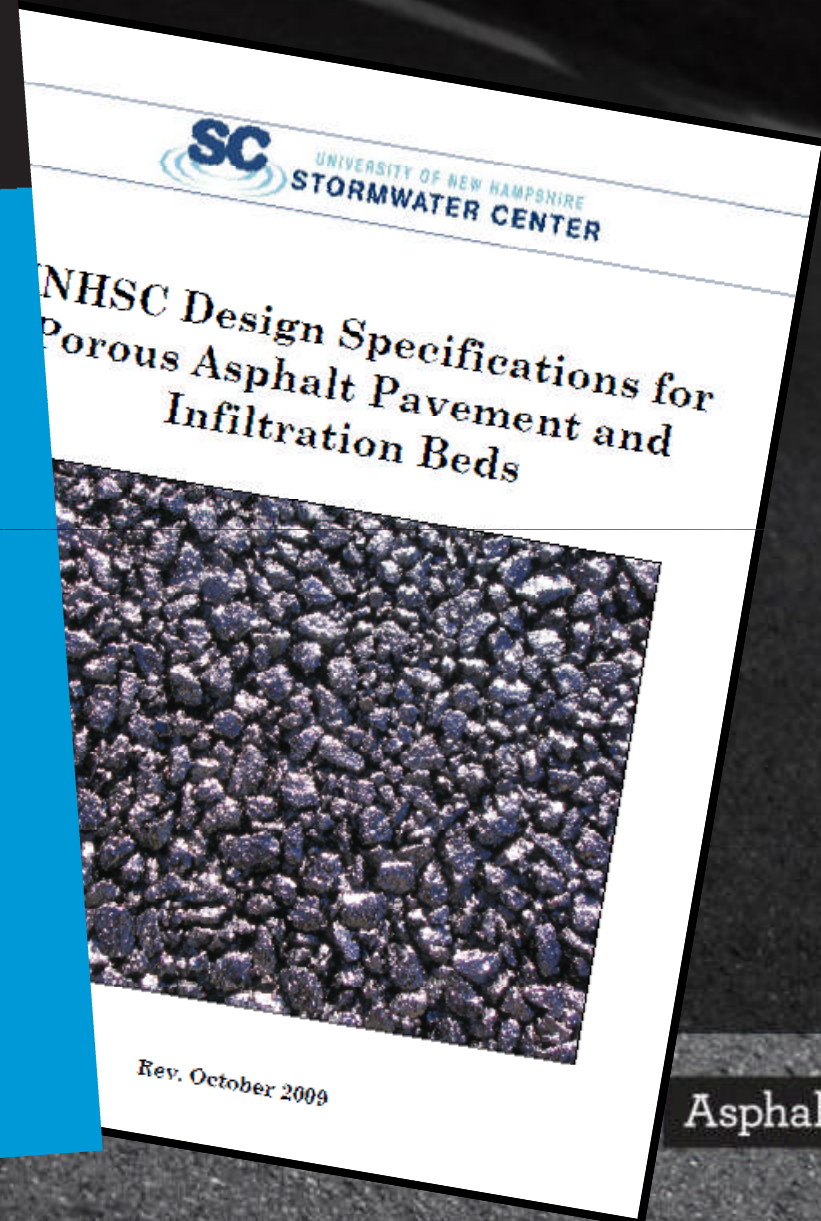
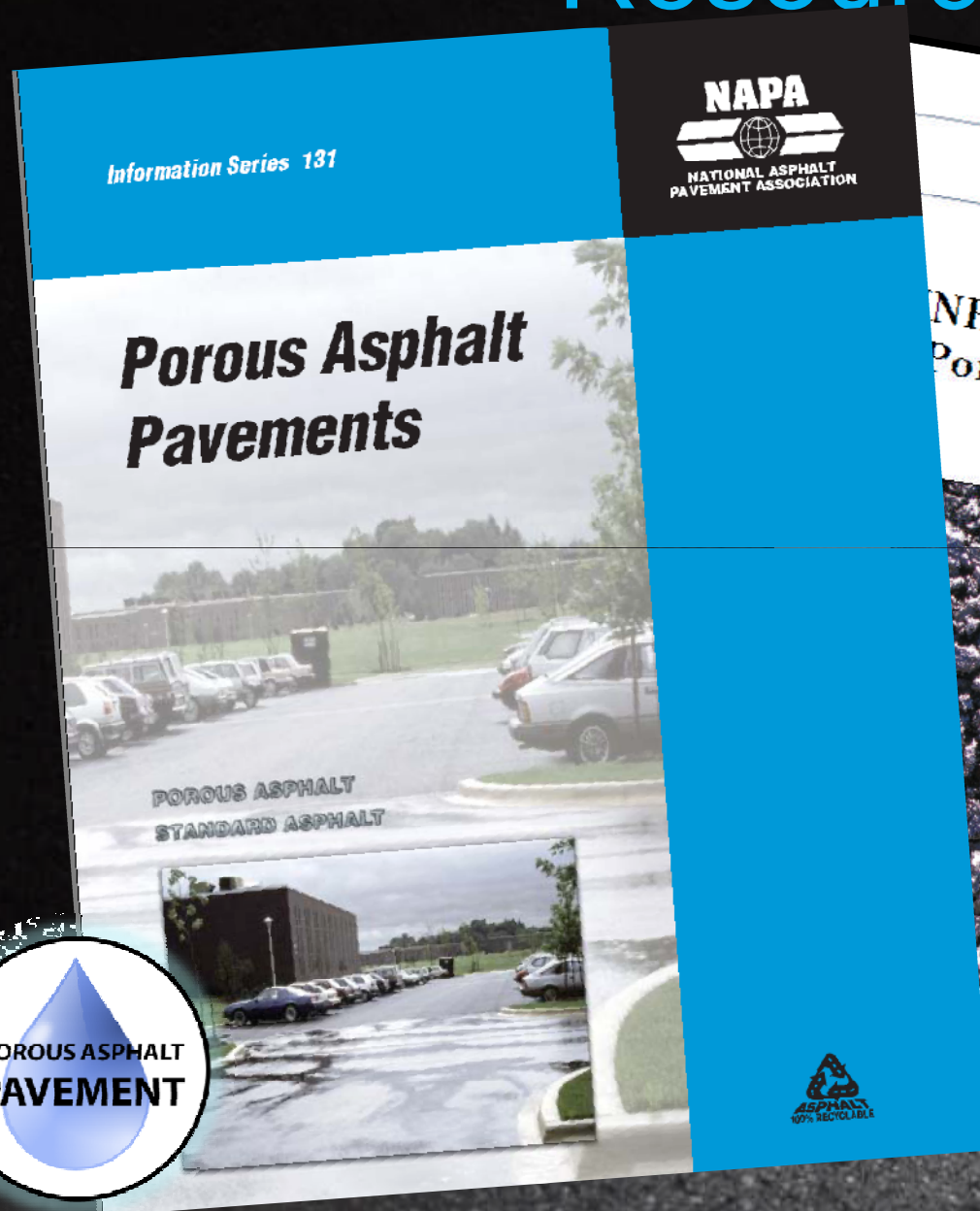


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**POROUS ASPHALT
PAVEMENT**

Source: University of New
Hampshire Storm Water
Center

Resources





An association for the development, improvement and advancement of quality asphalt pavement construction.



- CALENDAR
- BID RESULTS
- NEWS ROOM
- GOVERNMENT
- FAQS
- CONTACT FPO
- EDUCATION / TRAINING
- MEMBERSHIP
- MAGAZINES / ARTICLES
- SCHOLARSHIPS
- TECHNICAL RESOURCES

Quality Asphalt Paving Awards



Ohio Casulty Parking, Fairfield, OH 2010 - [more](#)

PERPETUAL PAVEMENT >

SMOOTHSEAL >

SUSTAINABLE PAVEMENT >

POROUS ASPHALT
PAVEMENT

FEATURED LINKS

- [New! Winter/Spring issue Ohio Asphalt Magazine](#)
- [ODOT ProVal training](#)
- [ODOT, Asphalt level 2 Training](#)



Resources

http://www.flexiblepavements.org/sustainable_pav.cfm

Flexible Pavements of Ohio

Flexible Pavements OF OHIO An association for the development, improvement and advancement of quality asphalt pavement construction.

CALENDAR BID RESULTS NEWS ROOM GOVERNMENT FAQS CONTACT FPO
EDUCATION / TRAINING MEMBERSHIP MAGAZINES / ARTICLES SCHOLARSHIPS TECHNICAL RESOURCES
FEATURED LINKS PERPETUAL PAVEMENT SMOOTHSEAL SUSTAINABLE PAVEMENT HOME SEARCH

Sustainable Construction Using Asphalt Pavement.

A growing concern in the development community is for construction that exhibits good environmental stewardship. That is, practices that conserve resources in a manner that allow growth and development to be sustained for the long-term without degrading the environment. Asphalt pavements are economical, efficient and contribute to sustainability in many different ways. For more information on the sustainability of asphalt pavement visit www.pavegreen.com and www.beyondroads.com

Some specific environmentally friendly applications of asphalt pavement are discussed in detail below:

[Porous asphalt pavement used for storm water management](#)

[Asphalt Pavements and LEED® Certification](#)

[What Is America's most recycled product?](#)

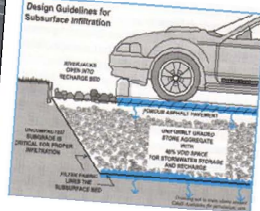

[What are the advantages, other than cost, of using hot mix asphalt \(HMA\) pavement?](#)

[What impact does the production and use of HMA have on the environment?](#)

[How can asphalt help reduce noise pollution?](#)

[What is Warm Mix Asphalt?](#)

Porous asphalt pavement used for storm water management



Porous asphalt pavements are being used to reduce or eliminate storm water runoff from parking lots and other facilities. A porous asphalt pavement is constructed over a stone filled reservoir to collect and store storm water and to allow it to infiltrate into the soil between rainfalls. These designs can reduce pollution and replace expensive detention and treatment facilities. Porous pavements are readily applied to low-impact development. As regulators as an economical approach to storm water management for sustainable or low-impact development. As the NPDES permit requirements have become more widely applicable, it has become necessary that developers

http://www.flexiblepavements.org/sustainable_pav.cfm (1 of 5) 8/17/2007 12:03:08 PM



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Porous Asphalt Use – Light Duty Parking Facility



Asphalt.

Porous Asphalt Use – Light Duty Parking Facility



Anna Dean Medical Complex –
VASCO Asphalt Co.

Asphalt.

Quality Award for Asphalt Paving

Porous Asphalt Parking Facility at
Munroe Falls Metro Park 10/14/2010 11:14
Contractor: Perrin Asphalt



Porous Asphalt Use – Light Duty Parking Facility



**Munroe Falls Metro Park
– Perrin Asphalt**

10/20/2010 10:37

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Questions ?

Asphalt ... Defining Value !
Safe, Smooth and Sustainable

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