



CITY *of* CALABASAS

**Amended Definitions of Pervious Surface  
and Permeable Paving**



# Background

- Planning Commission – September 17, 2020
  - Discussion regarding the role and application of requirements for permeable paving, as one specific type of pervious surfaces.
  - Pervious surface requirements achieve the broader goal of collecting, detaining, and managing storm water runoff. (No definitive aquifer exists in or near the City for which aquifer recharge is necessary; furthermore, presence of liquefaction zones throughout the City actually underpin a need to not overly accelerate and increase water penetration.)
- Staff Directive
  - Amend the current definition of **permeable paving** to clarify that interlocking pavers or paving systems, with no void spaces to allow water penetration, cannot be considered pervious surface.



# Developing a Definition -

1. What constitutes a pervious surface, and permeable pavers or paving systems? (NOTE: As staff reviewed the definition of “permeable pavers”, it became obvious that the definition of the term “pervious surface” also had to be revised.)
2. How can the definitions help the City regulate permeable paving systems to ensure they meet the pervious surface requirements?
3. How best to define these terms to ensure water infiltration requirements of pervious surfaces and permeable paving systems can realistically be accomplished?



1

# What constitutes a pervious surface?



Photo Courtesy of ASCE *Design of Permeable Pavement*



# 2

## How can the definitions help the City regulate permeable paving systems to ensure they meet the pervious surface requirements?



# Definitions which are clear and specific help the City regulate development and particular aspects of development, such as permeable pavement.

- The existing definitions lack sufficient clarity and specificity, thereby hampering effective application of the standards and requirements, as well as compliance enforcement.
- By incorporating specificity with clarity, the revised definitions will correct this problem.





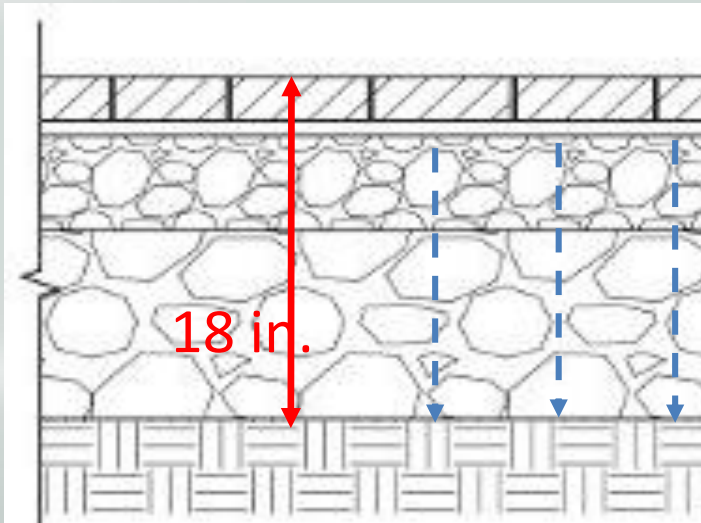
# Current Definition

- Pervious Surface (CMC 17.90.020)– Means portions of a site that are only paved with *permeable paving* materials and are not covered with structures after development. Includes landscaped and natural areas.



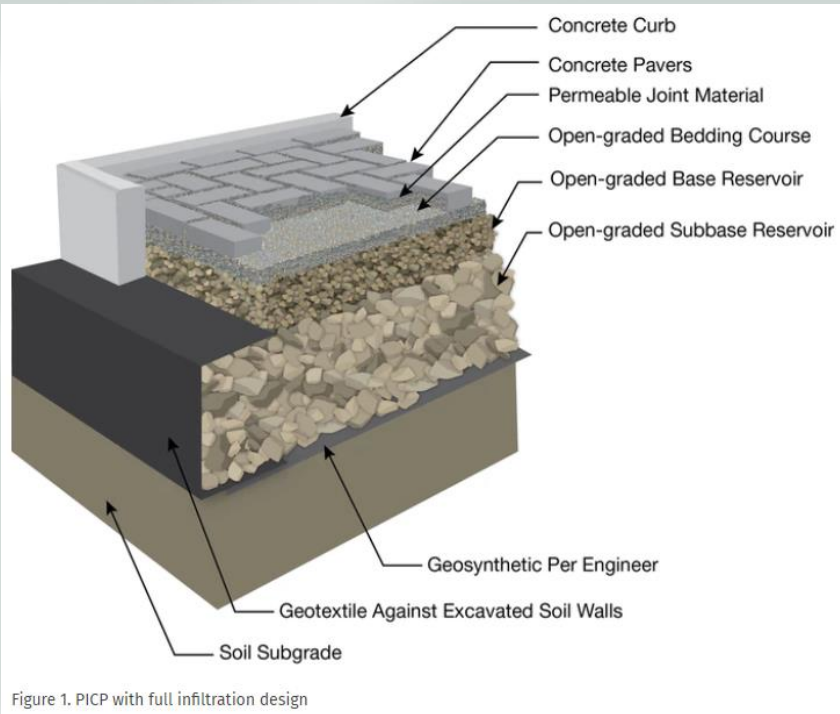
# Current Definition

- Permeable Paving (CMC 17.90.020)– Means any paving material that permits water penetration to a soil depth of 18 inches or more. Includes nonporous surface material poured or laid in sections not exceeding one square foot in area and less than 2/3rds of the total surface area of a lot that permits water penetration to a soil depth of 18 inches or more. Examples include crushed stone or gravel.





# Issues / Problems



- Not all “permeable paving material” systems actually accomplish water penetration and infiltration.
- Permeable paving systems are dependent on system design in order to achieve specified infiltration rates.
- If permeable paver systems are not designed to allow water infiltration, then storm water runoff quantity and velocity can actually increase. Therefore, the goal and intent of the pervious surface requirements for development projects is not necessarily achieved.



# 3

## How should we define permeable paving systems to help ensure water infiltration can occur?



Definition of Pervious Surface & Permeable Paving

September 2, 2021



# Defining Permeable Surface

Establish a realistic design minimum that aids in the intent to reduce storm water runoff.



## The American Society of Testing and Materials (ASTM).

- Creates a method for testing products in order to quantify permeability.



## The American Society of Civil Engineers (ASCE)

- Creates design minimums for products and systems utilizing the above testing method.



# Specific Design Reference Standards

- **ASTM C1781** – Standard Test Method for surface infiltration rate of Permeable Unit Pavement Systems
- **ASCE 68-18** – Universally understood standards and specifications for Permeable Interlocking Concrete Pavement and similar systems



# ASTM – Surface Infiltration Testing Method

This standard test method is utilized for acceptance of surface infiltration for new permeable unit pavement systems. This method covers surface infiltration rate of in-place permeable unit pavement systems surfaced with solid interlocking concrete paving units.





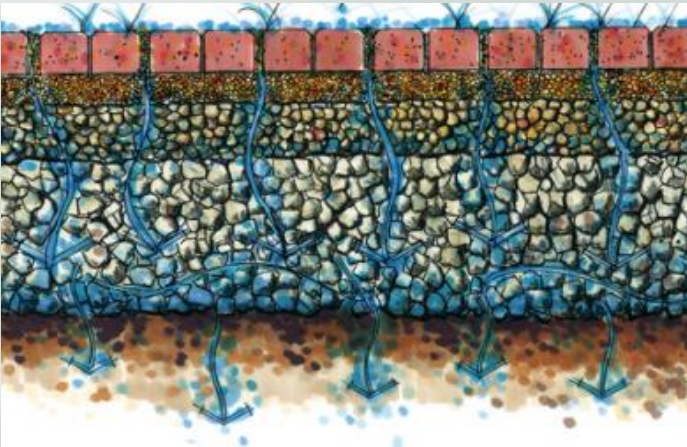
# ASCE – Design of Permeable Pavements



## Design minimums:

- Open area void space: 5% minimum
- In-service infiltration rate: 10in/hr.

*Note: The average annual rainfall for Calabasas is 17 inches.*





# Proposed Definition for Pervious Surface

“Pervious Surface” means **those** portions of a **property or** site that ~~are only paved with permeable paving materials and are not covered with structures after development.~~ **allow for water penetration into the soil, to a depth of 18 inches or more, such as landscaped areas, natural areas, and developed hardscape areas where permeable paving has been used or which otherwise includes storm water runoff features consistent with Calabasas Municipal Code Chapter 17.26. Pervious surfaces may not be covered with structures that prevent water penetration into soil, to a depth of at least 18 inches. Includes landscaped and natural areas.**



# Proposed Definition for Permeable Paving

"Permeable paving" means any paving material **or paving system** that permits water penetration to a soil depth of eighteen (18) inches or more. **Paving systems may include combinations of nonporous surface material poured or laid in distinct and separate sections ~~not exceeding one square foot in area and~~ installed in combination with permeable materials** (examples include crushed stone, gravel or equivalent) **such that at least** two-thirds of the total surface area of a lot ~~that~~ **the system** permits water penetration to a soil depth of eighteen (18) inches or more.

**Permeable paving systems that require drainage to the curb or direct connection to the storm drain system do not qualify as permeable paving. Engineered paving systems under this definition include interlocking concrete pavers installed to comply with the standard from the American Society of Civil Engineers (ASCE) – Standard 68-18 for Permeable Interlocking Concrete Pavement, or an equivalent standard for interlocking concrete pavers may be adopted by Resolution by the City Council.**

**Individual paving units must have a minimum surface open area void space of 5% and a minimum in-service infiltration rate of not less than 10in/hr and complying with ASTM Standard C1781 – Standard Test Method for Surface Infiltration Rate of Permeable Unit Pavement Systems, or an equivalent standard as may be adopted by Resolution by the City Council. Alternative designs, which meet infiltration testing in accordance with ASTM Standard C1781, or an equivalent standard as may be adopted by Resolution by the City Council, may be considered subject to review and approval by the Director. Any permeable paving system must be certified by a licensed civil engineer, landscape architect, or other qualified, licensed professional, as meeting the requirements of this definition.**



- City of Calabasas. (1995). City of Calabasas Municode Library. City of Calabasas Municipal Code.

[https://library.municode.com/ca/city\\_of\\_calabasas/codes/code\\_of\\_ordinances?nodeId=TIT17LA\\_USDE\\_ARTIIISIPRDEST\\_CH17.90DE\\_17.90.020DESPTEPH](https://library.municode.com/ca/city_of_calabasas/codes/code_of_ordinances?nodeId=TIT17LA_USDE_ARTIIISIPRDEST_CH17.90DE_17.90.020DESPTEPH)

- Committee, P. P. T., Eisenberg, L. B. A. P., Lindow, K. C., & Smith, D. A. R. (2015). *Permeable Pavements*. American Society of Civil Engineers.
- American Society of Civil Engineers. (2018). *Permeable Interlocking Concrete Pavement (Standard ASCE/T&DI/ICPI 68-18)*. American Society of Civil Engineers.



# Recommendation

Staff recommends that the Planning Commission adopt **Resolution No. 2021-718** recommending to the City Council adoption of **Ordinance 2021-393**, amending the City of Calabasas Land Use and Development Code (Chapter 17.90) by strengthening the definitions of permeable paving and pervious surface.

