City of Austin
WATERSHED PROTECTION

Watershed Protection Ordinance (WPO) Phase 2 Stakeholder Meeting:

Porous Pavement & Artificial Turf

March 7, 2014

Symphony Square, Downtown Austin. Site of an early installation of porous pavement.

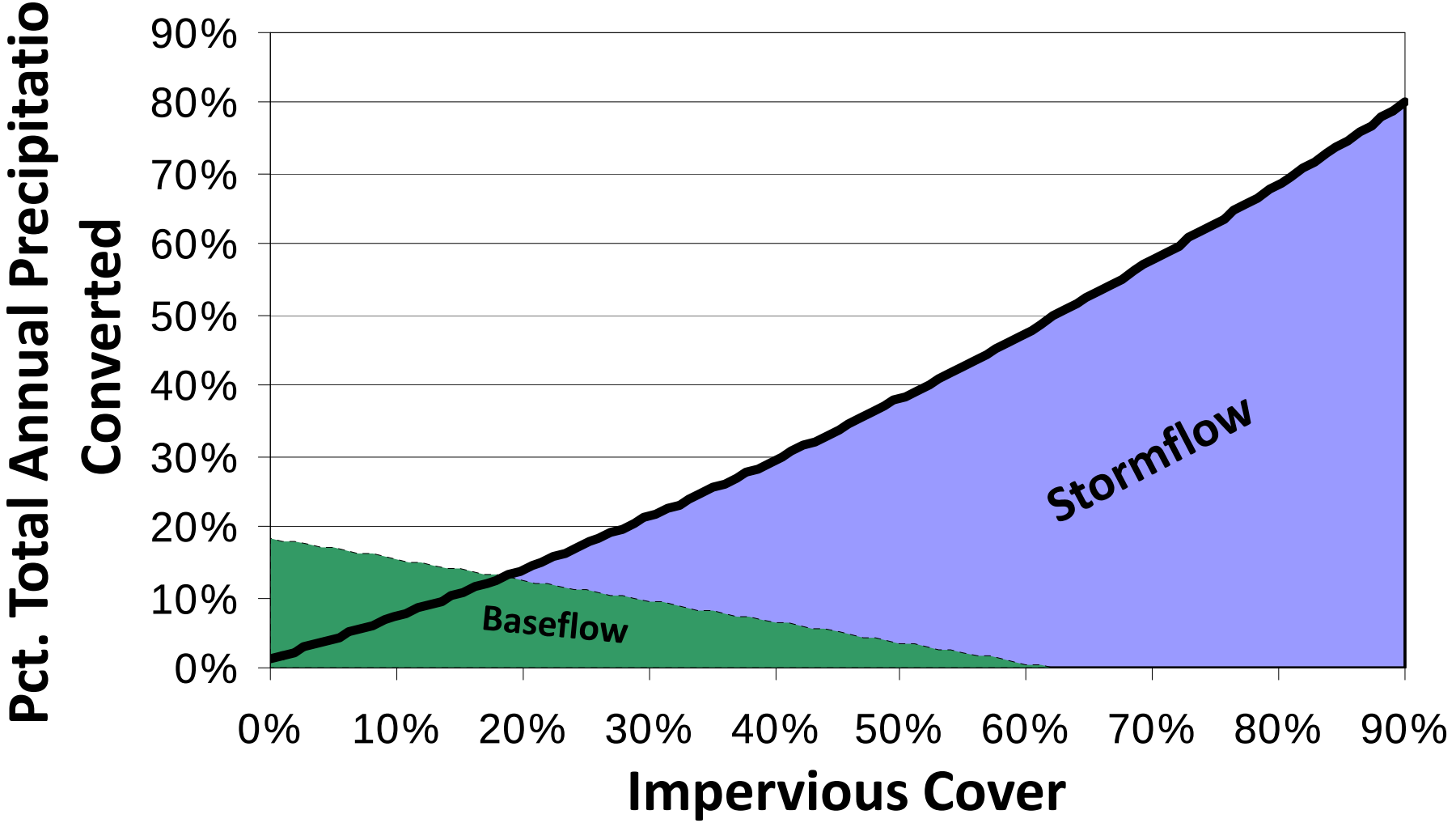
Agenda

- Introduction
  - Brief recap of benefits of pervious surfaces
  - Brief recap of previous meeting's technical discussion
  - Summarize and review stakeholder feedback
- Discuss porous pavement
  - How is similar/differs from pervious surfaces
  - City staff proposal
- Discuss artificial turf
  - How is similar/differs from pervious surfaces
  - City staff proposal
- Preview next meetings

Why Perviousness Matters

- Degree of imperviousness (and thus perviousness by extension) is the driver for health and safety issues relating to flood, erosion & water quality
- Increased imperviousness/urbanization drives:
  - Increased runoff volume
  - Increased peak discharge
  - Diminished baseflow
  - Stream channel enlargement
  - Decline in stream habitat quality
  - Increased stream temperature
  - And the list goes on (see Schueler, 2003, and many other sources)
- Other/Non-Watershed: Space for trees/vegetation, habitat, urban design, heat island mitigation, aesthetics, etc.

Impervious Cover vs. Percent of Precipitation Converted to Stormflow and Baseflow



Source: City of Austin monitoring data derived per Barrett, Quenzer, and Maidment, 1998

Impervious Cover and Runoff:
Avg. Annual Conversion of Total Rainfall to Runoff

Imperv. Cover Pct.	Avg. Annual Runoff	Ratio to Undeveloped (5% IC)	Typical Land Use
5%	4%	1.0	Open/Preserve
20%	14%	3.3	Low-Density SFR
40%	29%	7.1	Single-Family Res.
60%	48%	11.4	Multifamily Res.
80%	69%	16.4	Commercial/Office

Source: Derived from Barrett et al., CRWR, 1998. | SFR = Single-Family Residential

Stakeholder Feedback on Pervious Cover Determination

- Keep policies clear, simple & practical, not Ph.D level
- Need a system that accounts for geographic variations
- Want partial credit rather than “all or nothing”
- Need space-efficient options for redevelopment (e.g., turf)
- Focus on goals of perviousness, rather than imperviousness;
  don’t exclude green roofs and other creative solutions
- Include considerations of climate change (e.g., more intense storms, more need for pervious benefits)
- Want to know details of the technical process of determination

Porous Pavement

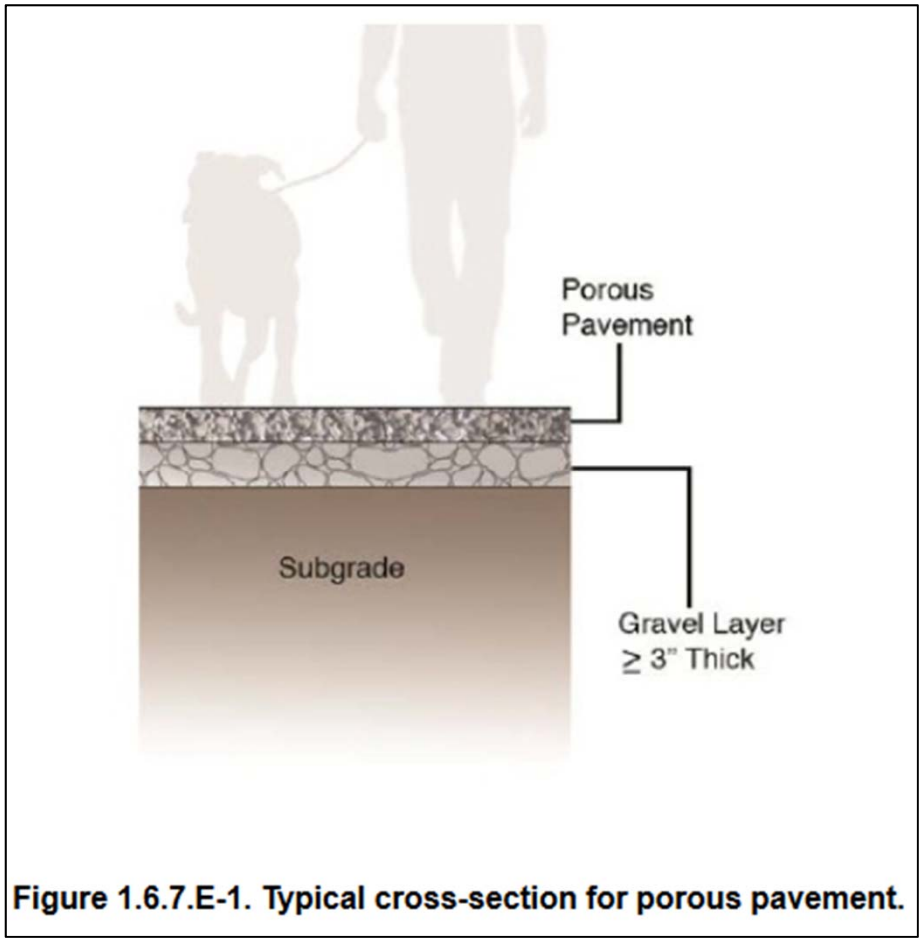


Figure 1.6.7.E-1. Typical cross-section for porous pavement.

Environmental Criteria Manual detail

Porous concrete in Austin:
Town and Country Optimist Club


Porous Asphalt (close-up)
Porous Asphalt
Conventional Asphalt
www.phillydesignblog.com
www.mychamplain.net


macaulay.cuny.edu


www.3riverswetweather.org


water.epa.gov


socwisconsin.org

Why Porous Pavement Delivers Stormwater Benefits

➢ *Porous pavement differs from conventional, impervious pavement in fundamental ways, such as:*

- Permits rainfall to pass through and into substrate and/or native soil below
  - Reduces runoff & augments baseflow and recharge
  - Removes pollutants (assuming proper soils, etc.)
  - Benefits adjacent trees and vegetation

→Thus rationale for giving water quality credit

Other non-stormwater benefits:

- Reduces surface temperature/heat island effect
- Reduces hydroplaning during storm events
- Is quieter/has less tire friction and noise

Why Porous Pavement Does Not Address All Pervious Cover Functions

➢ *Porous pavement does not perform well as actual pervious cover for other functions:*

- Displaces vegetation and related benefits & functions
- Higher surface temperature than vegetation (heat island impacts)
- Does not address urban design, aesthetics, etc.
- Does not fully mitigate hydrologic impacts of impervious cover (i.e., volume and peak flows)

→Thus rationale for not giving impervious cover credit

Porous Pavement Proposal

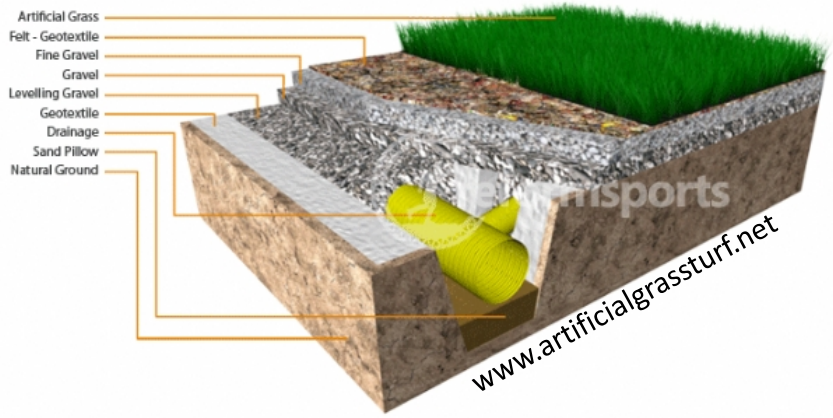
- *Water quality credits now given for sidewalks and other pedestrian surfaces, but not for vehicular use areas.*

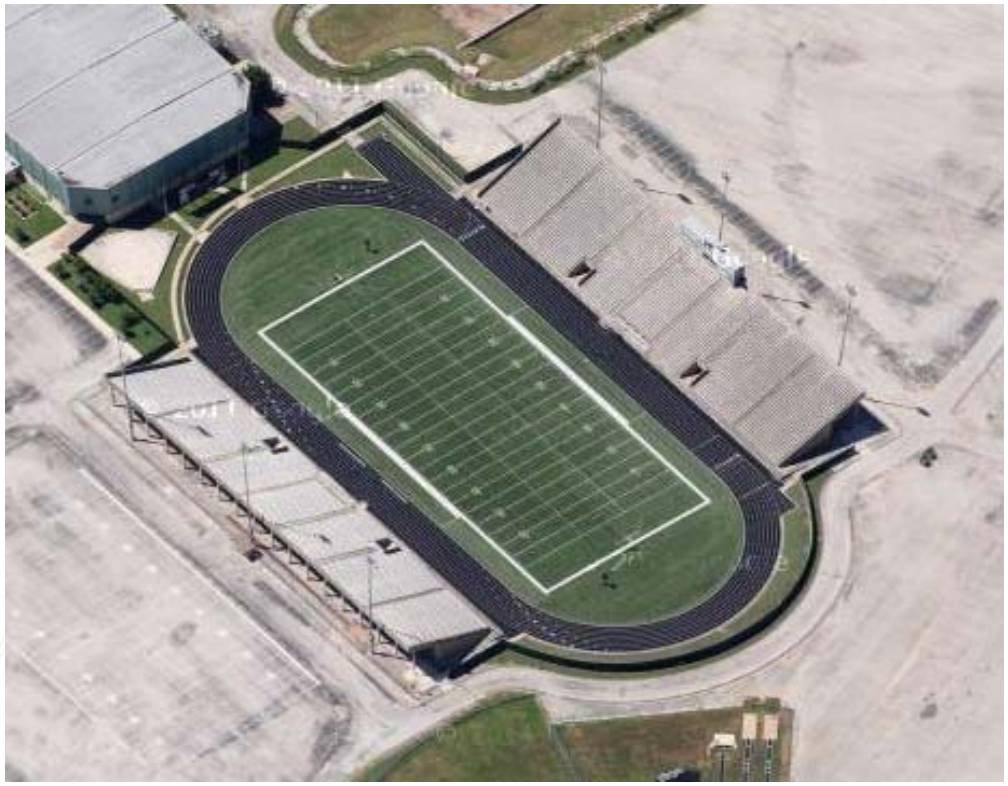
Staff proposal:

- Expand ECM criteria to allow water quality credit for porous pavement for non-pedestrian surfaces
- Expected date: Fall 2014
- Limited to privately maintained facilities (e.g., private parking lots, driveways, streets and alleys; but not public roads)
- Cannot propose over karst/recharge zone or certain "hot spot" land uses (e.g., gas stations, etc.)
- Acceptable systems: interlocking concrete pavement and porous asphalt; porous concrete for pedestrian surfaces only

Artificial Turf

Example cross sections





Tony Burger Center, Austin, Texas
(from Google Maps)

Artificial Turf Benefits

➢ *Artificial turf differs from a conventional, pervious athletic field in fundamental ways, such as:*

- Permits rainfall to pass through into substrate
- Offers temporary storage for detention

→**Thus rationale for potentially giving stormwater credit**

Other non-stormwater benefits:

- Water conservation
- Higher durability/allows more frequent use
- No fertilizers, pesticides, herbicides needed (but runoff can still contain pollutants from components)

Why Artificial Turf Does Not Address Many Pervious Cover Functions

➢ *Artificial turf does not perform well as actual pervious cover for other functions:*

- Displaces vegetation and related benefits & functions
- Higher surface temperature than vegetation (heat island impacts)
- Does not address urban design, aesthetics, etc.
- Does not fully mitigate hydrologic impacts of impervious cover (i.e., water quality and groundwater connectivity due to liners)

→Thus rationale for not giving impervious cover credit

Artificial Turf Proposal

- *Can artificial turf systems be counted as pervious cover? If so, under what conditions?*

Current code: Artificial turf = impervious

Staff proposal:

- In considering artificial turf to count as pervious cover, the applicant has to show that pervious functions are retained.

WPO Phase 2 Schedule, 2014

Phase 2 Kickoff	**Jan. 22**
Perviousness: Introduction	**Feb. 21**
Perviousness: Porous Pavement & Artificial Turf	**Mar. 7**
Beneficial Use of Stormwater: Proposed New Tools*	**Mar. 21**
• Rain gardens for single-family residential • Rainwater harvesting options (conservation storage, green roofs, etc.)	
Beneficial Use of Stormwater: Potential Policy Approaches	**Apr. 4**
Wrap-Up	**TBD**

* May need second meeting to discuss. If so, will adjust schedule accordingly.

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http://austintexas.gov/department/watershed-protection-ordinance