

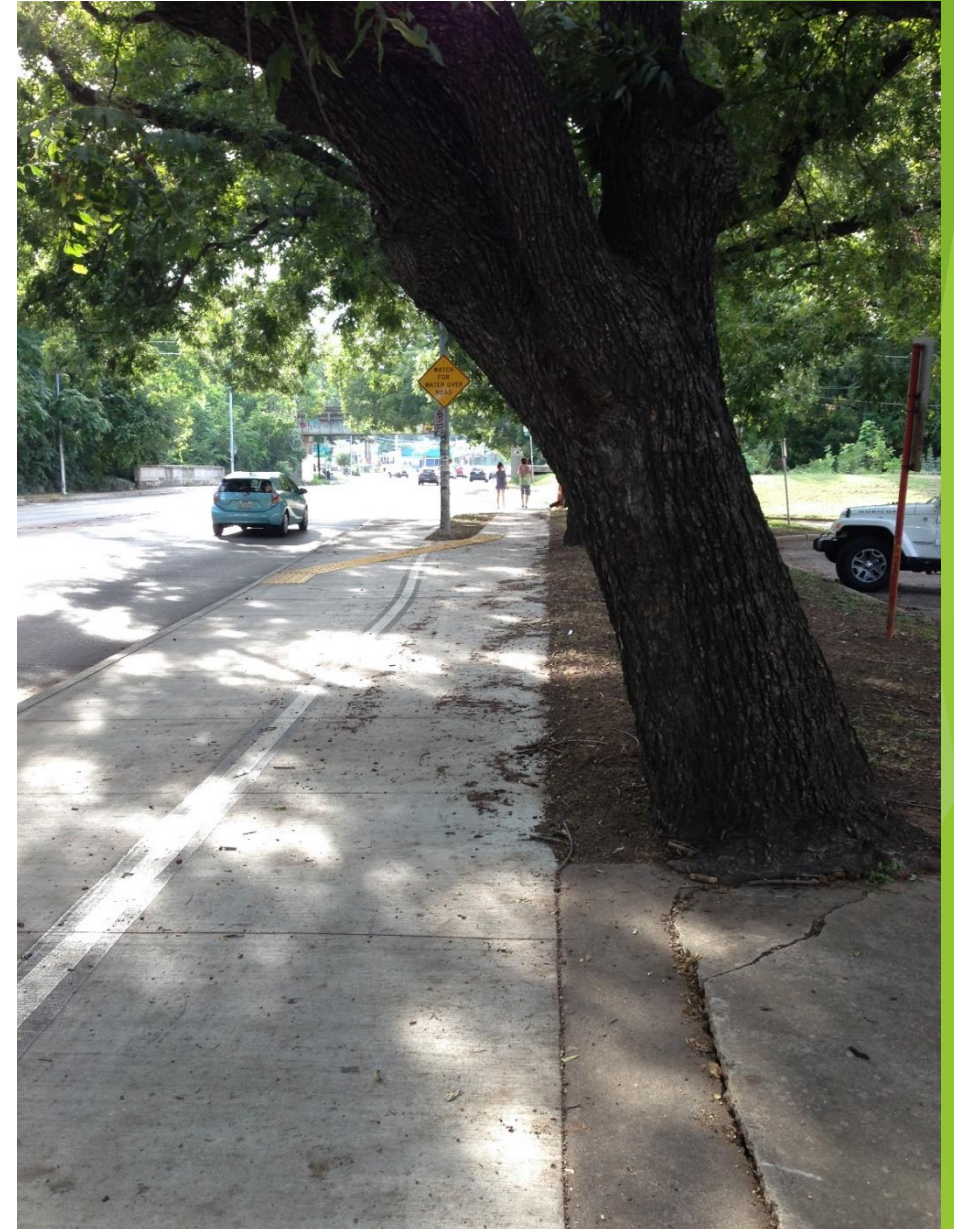
# Alternative Sidewalk Solutions

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- ▶ Issues at site:
  - ▶ Sidewalk does not meet code with regard to critical root zone of trees
    - ▶ Austin City Code Subchapter E and Environmental Criteria Manual
  - ▶ Sidewalk cracking due to tree root growth
    - ▶ Requires maintenance and repair
- ▶ Objective:
  - ▶ Propose new sidewalk design and/or materials that
    - ▶ Protect trees
    - ▶ Maintain Sidewalk
    - ▶ Aesthetically pleasing



# Overview of Code Criteria

## Austin City Code (Ch.25 Subchapter E):

- ▶ **Core Transit Corridors: Sidewalks and Building Placement**
  - ▶ no sidewalk shall be less than 15 feet in width
  - ▶ two zones: a planting zone, and a clear zone
- ▶ **Planting zone**
  - ▶ The planting zone shall have a minimum width of eight feet (from face of curb)
- ▶ **Clear Zone**
  - ▶ The clear zone shall be a minimum width of seven feet

## Environmental Criteria Manual:

- ▶ A minimum of 50 percent of the CRZ must be preserved at natural grade
- ▶ No cut or fill greater than four 4 inches will be located closer to the tree trunk than  $\frac{1}{2}$  the CRZ radius distance.
- ▶ No cut or fill within the distance from the tree which is three 3 times the trunk diameter ( $\frac{1}{4}$  CRZ)

# Alternative 1: Moving the sidewalk outside the critical root zone

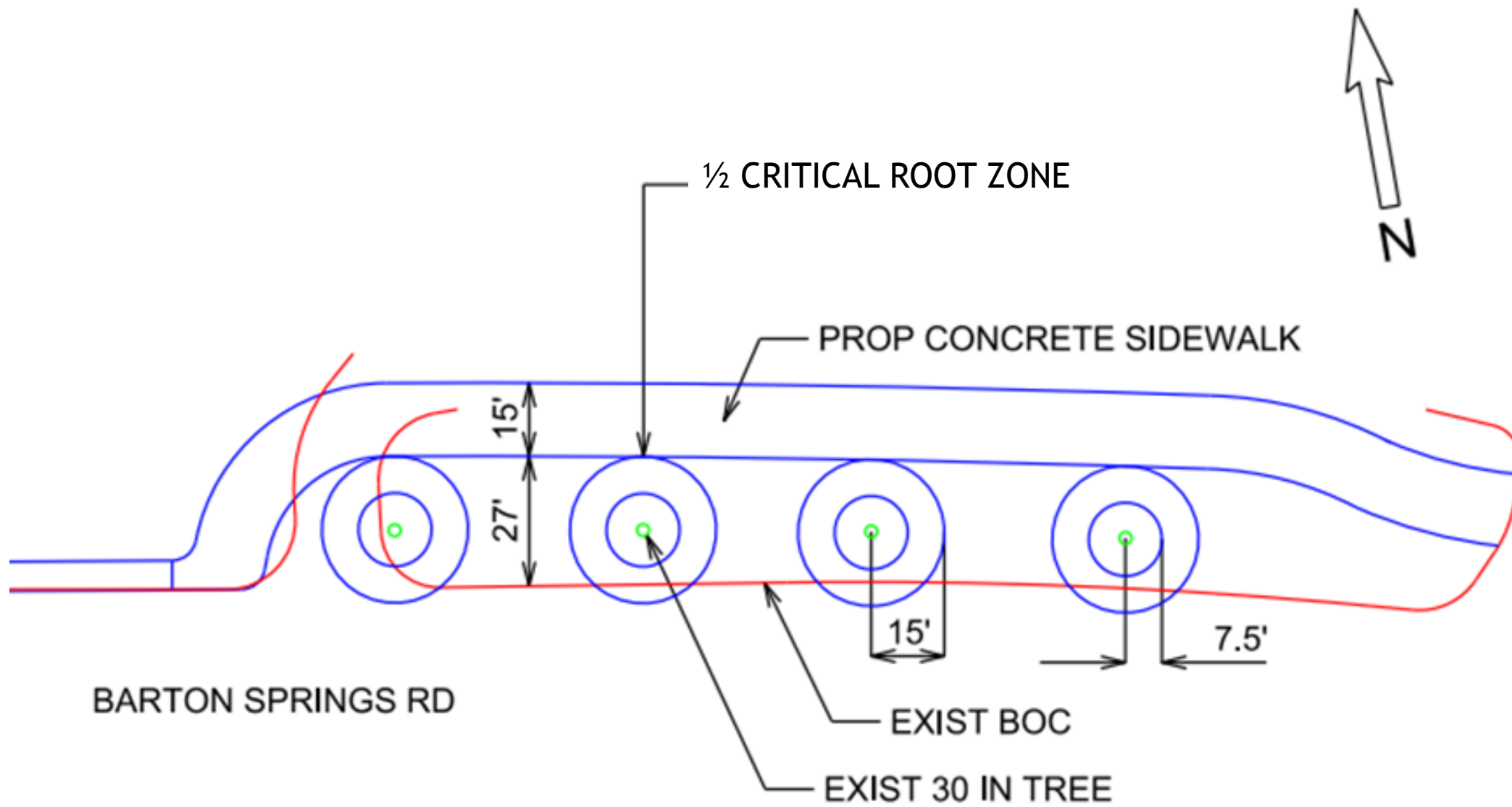
## Advantages

- ▶ Durable material
- ▶ Easy to place
  - ▶ Familiarity for the contractors
- ▶ Pedestrian friendly
- ▶ Keeps continuity of sidewalk material

## Disadvantages

- ▶ Inefficient use of space
  - ▶ Must be placed outside the  $\frac{1}{2}$  CRZ
- ▶ Impermeable
- ▶ Not flexible
- ▶ Costly repairs/frequent damage

Cost: \$5 per sq ft





# Alternative 2: Wooden Decking

(in combination with concrete sidewalk)

## Advantages

- ▶ Low to med impact on roots
  - ▶ Lifts majority of the walkway, for lower impact on roots
- ▶ Aesthetics

## Disadvantages/Considerations

- ▶ Susceptible to weather damage
  - ▶ Rotting due to rain water
    - ▶ Can be minimized with treatment of the wood
- ▶ Not continuous walkway material
- ▶ Less smooth passing for bicycles and wheel chairs
- ▶ Runners to support 15 feet of walkway will need to be deeper than 4"



Cost: \$8 per sq ft

# Alternative 3: Rubber Panels

## Advantages

- ▶ Less than 2" of cut/fill
- ▶ Flexible
- ▶ Permeable
- ▶ Relatively low cost for panel replacement

## Disadvantages

- ▶ Lower lifecycle than expected
- ▶ Discontinuity of sidewalk material
- ▶ Can be a target for vandalism

Cost: \$9 per sq ft



# Alternative 4: Porous Flexible Pavement

## Advantages

- ▶ Permeable
- ▶ Flexible
- ▶ Minimal digging/ low impact
- ▶ Slip Resistant
- ▶ Efficient strength to support pedestrian and bicycle traffic

## Disadvantages

- ▶ Pores can clog
  - ▶ Reduces permeability
  - ▶ Requires maintenance
    - ▶ washing
- ▶ New installation procedure
- ▶ Discontinuity of Sidewalk material

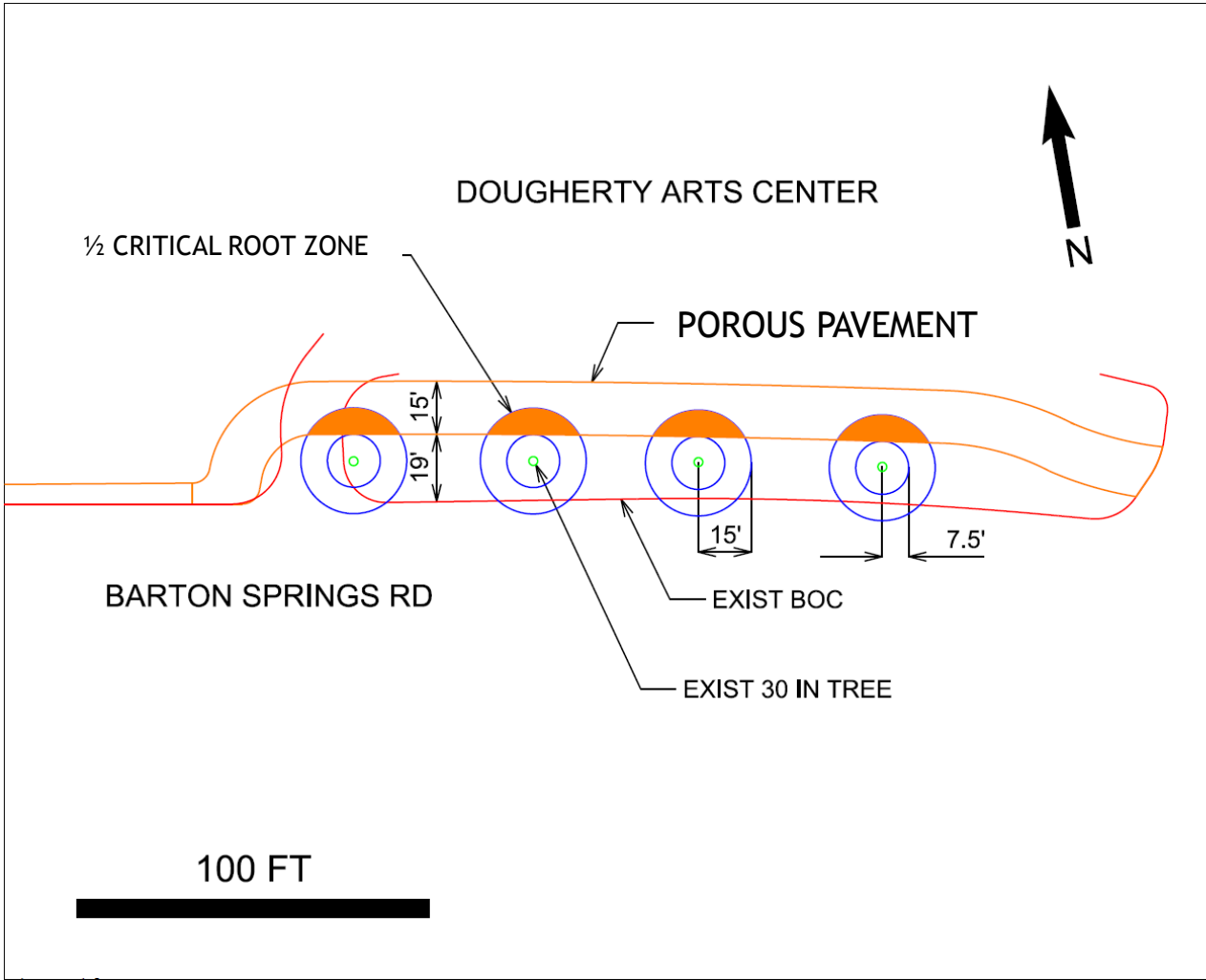
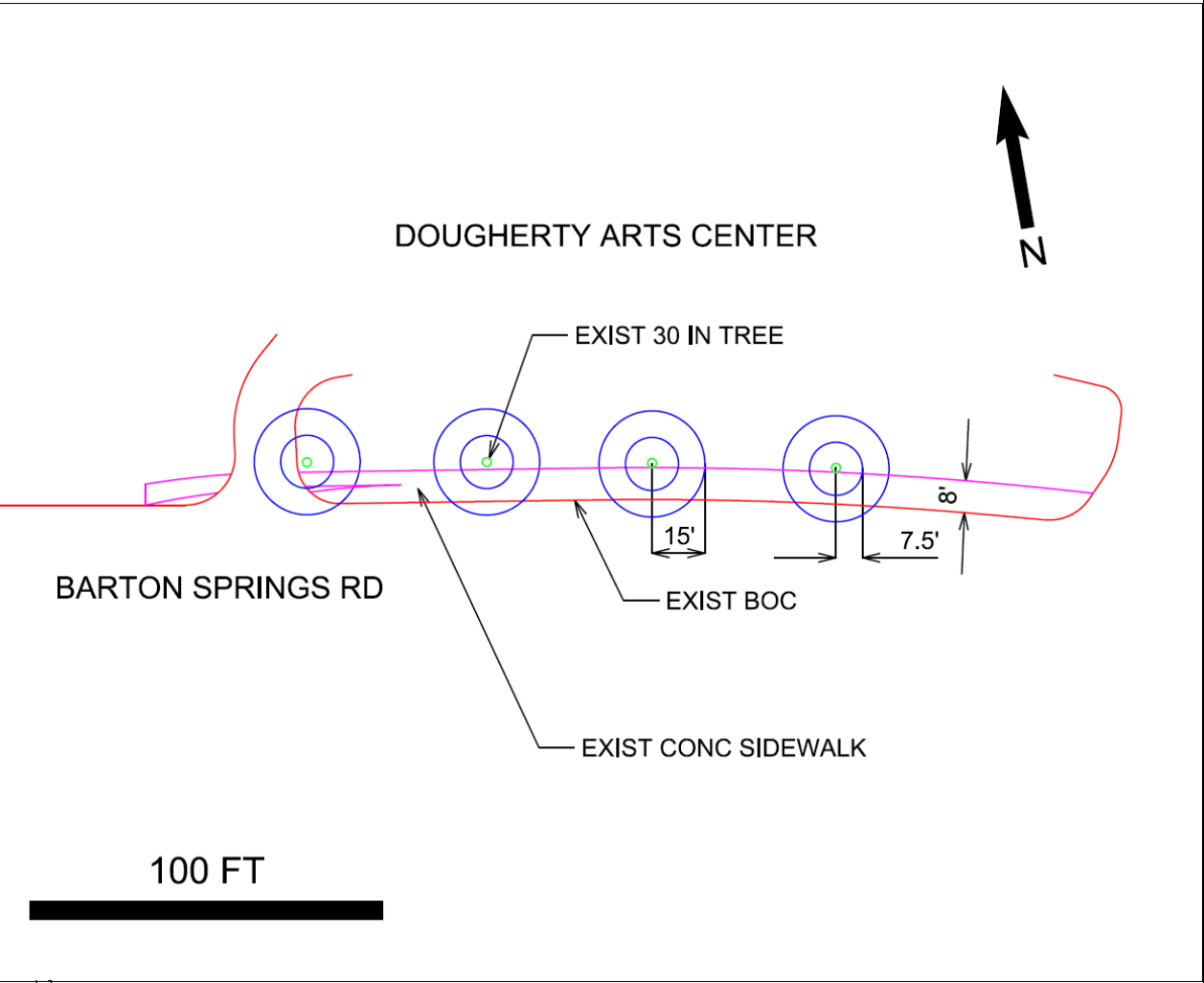
Cost: \$9 per sq ft



<http://greatergreaterwashington.org/post/19401/new-sidewalk-uses-porous-flexible-pavement/>



# Geometric Sketches



# Recommendation:

## Test Phase of Porous Flexible Pavement

- ▶ Flexible for accommodating tree root growth
- ▶ Low impact
- ▶ Can be used in conjunction with concrete
- ▶ Durable
- ▶ Comparable cost to concrete

<http://www.easypaveinc.com/wp-content/uploads/Porous-Pave-Brochure.pdf>



- ▶ [http://www.homewyse.com/services/cost\\_to\\_install\\_wood\\_decking.html](http://www.homewyse.com/services/cost_to_install_wood_decking.html)
- ▶ <http://www.citylab.com/tech/2014/05/the-sidewalk-of-the-future-is-not-so-concrete/371377/>
- ▶ <http://greatergreaterwashington.org/post/19401/new-sidewalk-uses-porous-flexible-pavement/>
- ▶ <http://www.txdot.gov/business/letting-bids/average-low-bid-unit-prices.html>
- ▶ [https://www.municode.com/library/tx/austin/codes/land\\_development\\_code?nodeId=TIT25LADE\\_CH25-2ZO\\_SUBCHAPTER\\_EDESTMIUS](https://www.municode.com/library/tx/austin/codes/land_development_code?nodeId=TIT25LADE_CH25-2ZO_SUBCHAPTER_EDESTMIUS)
- ▶ [http://www.ehow.com/how\\_7995782\\_build-wood-sidewalk.html](http://www.ehow.com/how_7995782_build-wood-sidewalk.html)
- ▶ <http://nepis.epa.gov/Exe/ZyNET.exe/91018M1N.txt?ZyActionD=ZyDocument&Client=EPA&Index=1995%20Thru%201999&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C95THRU99%5C TXT%5C00000032%5C91018M1N.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=3>
- ▶ <http://clermontstorm.net/porouspavement.pdf>
- ▶ [http://www.greendesignetc.net/GreenProducts\\_06\\_\(pdf\)/Syed\\_Asma-Sidewalks\(paper\).pdf](http://www.greendesignetc.net/GreenProducts_06_(pdf)/Syed_Asma-Sidewalks(paper).pdf)
- ▶ [http://www.lowes.com/pd\\_489134-152-540616SEC\\_4294610197\\_\\_?productId=50151670&Ns=p\\_product\\_qty\\_sales\\_dollar|1&pl=1&currentURL=%3FNs%3Dp\\_product\\_qty\\_sales\\_dollar%7C1&facetInfo=](http://www.lowes.com/pd_489134-152-540616SEC_4294610197__?productId=50151670&Ns=p_product_qty_sales_dollar|1&pl=1&currentURL=%3FNs%3Dp_product_qty_sales_dollar%7C1&facetInfo=)