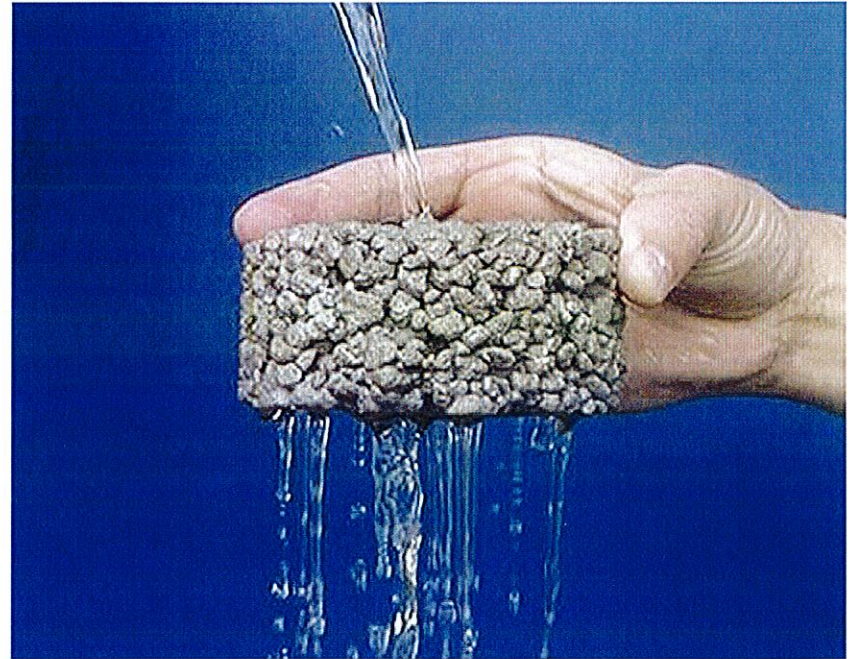


# Permeable/Porous Pavement



**Figure 1:** POROUS ASPHALT



**Figure 2:** POROUS CONCRETE

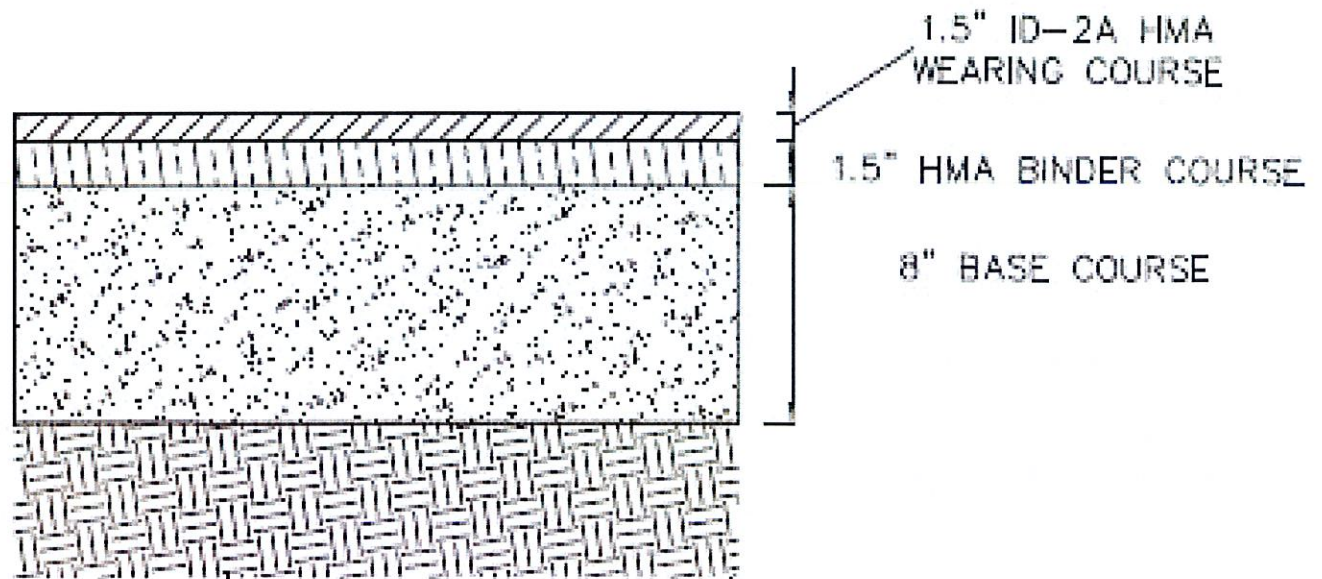
# What is Conventional Pavement?

## Conventional Pavement consists of:

- Wearing Course
- Binder Course
- Base Course
- Compacted subgrade

## Properties:

- High traffic/load capacity
- No permeability through surface
- Standard seasonal maintenance
- No vacuuming required
- Susceptible to cracking over time



**Figure 3:** CONVENTIONAL PAVEMENT CROSS-SECTION

# What is Porous Asphalt?

## Porous Asphalt consists of:

- Porous Bituminous Pavement
- AASHTO choker coarse (semi-fine aggregate)
- AASHTO clean wash aggregate with 40% void space ratio
- Non-compacted Subgrade
- Catchment area

## Properties:

- Similar appearance to conventional asphalt
- Permeable surface
- Provides filtration
- Less freeze/thaw stress
- Lower “island effect”
- Non-typical maintenance
- Vacuuming required

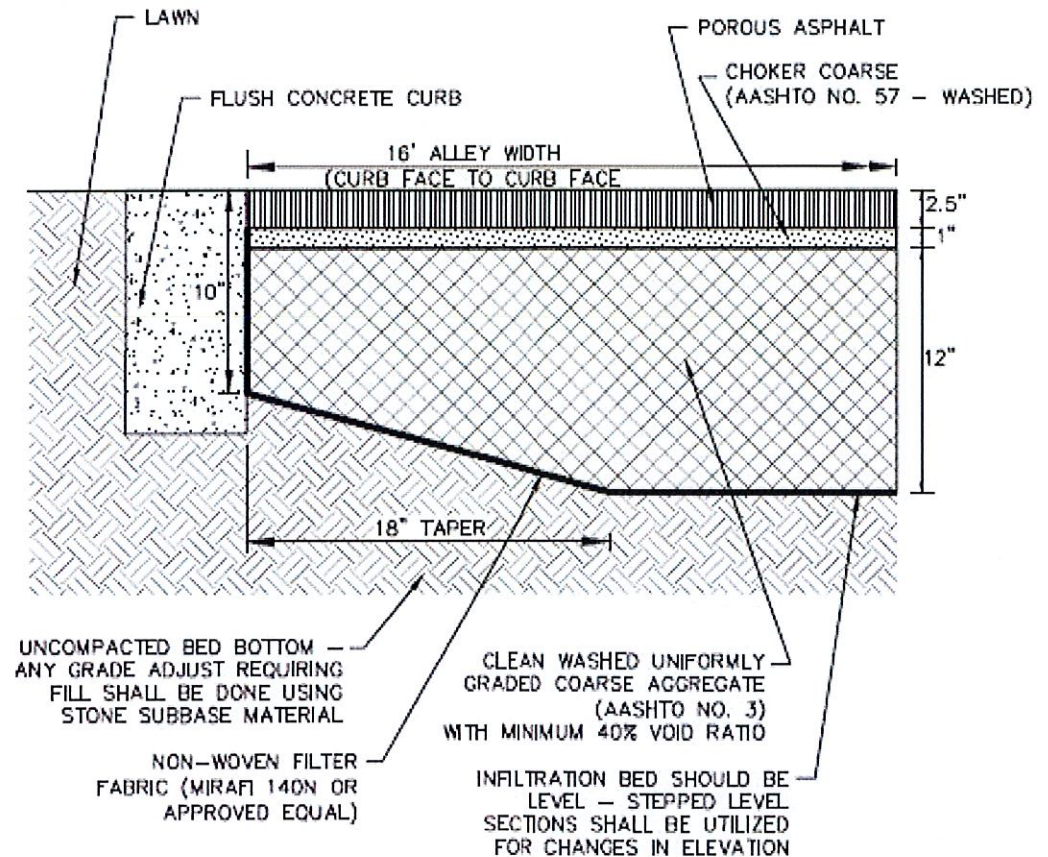


Figure 4: POROUS ASPHALT CROSS-SECTION

# Variations in Pervious Pavers offers multiple applications



← **Figure 5:**  
POROUS ASPHALT



**Figure 6:**  
PERVIOUS PAVEMENT BLOCKS

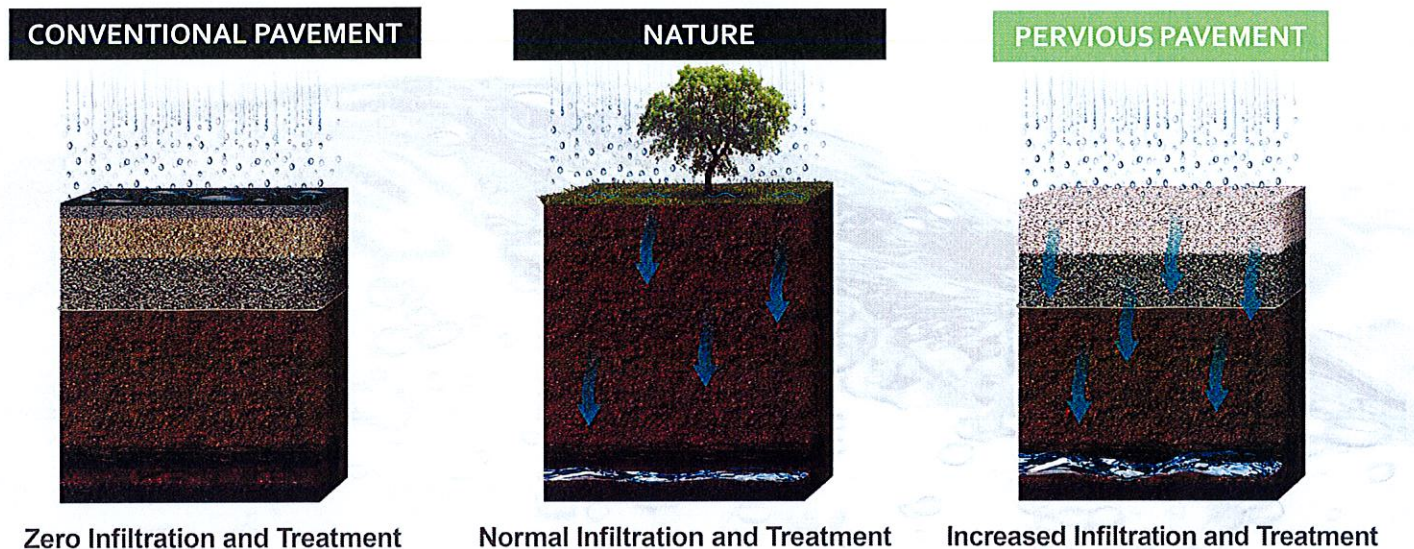


← **Figure 7:**  
POROUS CONCRETE



# Benefits of Pervious Bituminous Asphalt

- Saves money by decreasing salt use in the winter
- Helps to reestablish a more natural hydrologic balance by reducing surface runoff and recharging the groundwater table. (See figure below)
- Helps reduce “heat island effect” & pollutant infiltration (e.g. TSS, phosphorous & nitrogen, metals, oils and grease)
- Reduces stress and impact on stream/lake environments by lowering urban runoff temperature with slower infiltration rates.



**Figure 8:** POROUS PAVEMENT INFILTRATION VS. CONVENTIONAL PAVEMENT INFILTRATION  
(Pervious Concrete, The Basics)

# Drawbacks of Pervious Bituminous Asphalt

- Susceptible to damage under heavy loads or high traffic volumes
- A site-specific soil investigation needs to be performed to establish the hydraulic properties and characteristics within the purposed footprint
- Not ideal for clay or other impervious soils
- Prone to clogging if not installed or cleaned properly
- Maintenance required on Pervious Pavement varies from conventional non-porous pavement



**Figure 9:** NO HEAVY TRAFFIC

# Maintenance for Pervious Bituminous Asphalt

## Fall/Spring/Summer:

- Blow or vacuum surface clean at least two times per year
- Clean inlets draining to the subsurface bed twice a year.
- No construction staging allowed (e.g. soil, mulch storage, etc.)

## Winter:

- Abrasives such as sand or cinders shall not be applied on or adjacent to the porous pavement
- Snow plowing is acceptable provided blade is set about 1” higher than usual
- Salt is an acceptable deicer however non-organic deicers are preferred.



**Figure 10:** EXAMPLE OF PERVIOUS PAVEMENT VACUUM  
(Surface Hog)

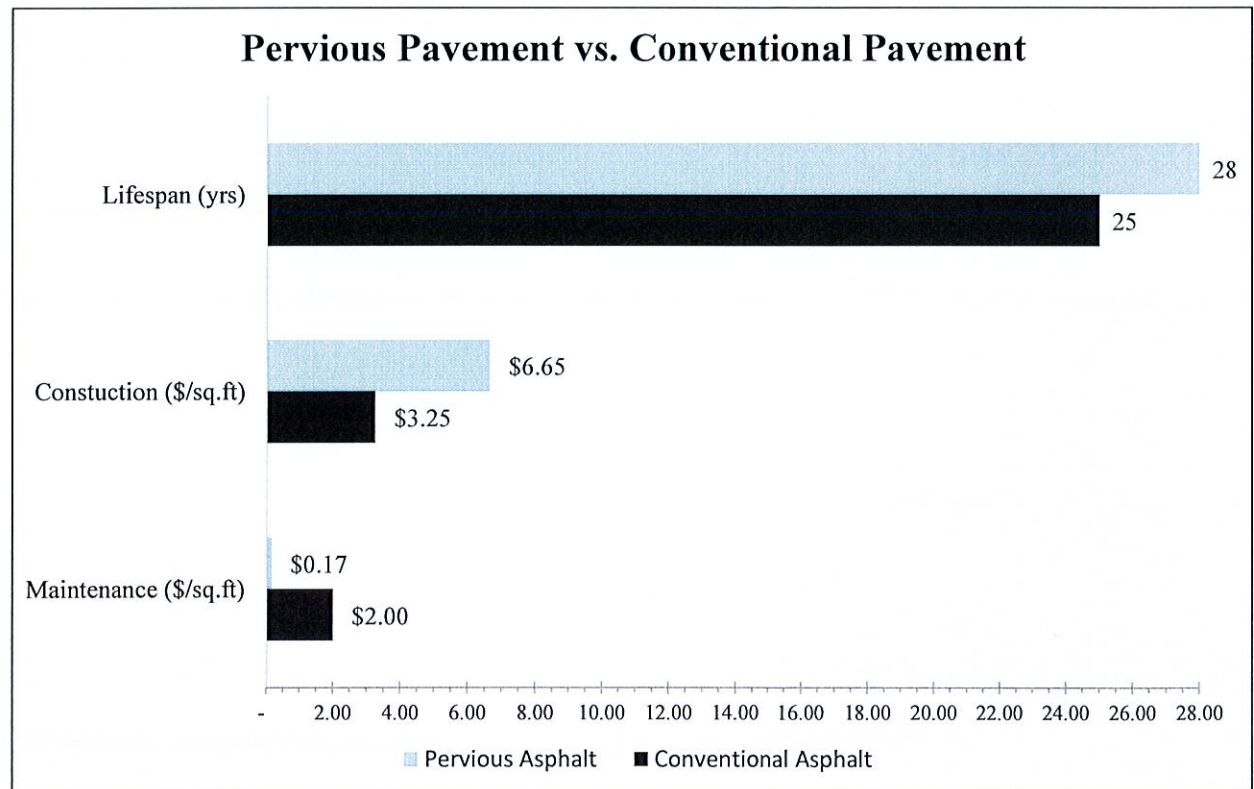
# Cost & Life Span Comparison Between Pervious Bituminous Asphalt & Conventional Non-porous Pavement

## Factors Affecting Cost:

- Runoff Volume
- Pavement area
- Maintenance/Repairs

## Other Factors to consider:

- Correct installation significantly affects lifespan
- Pervious Pavement experiences fewer freeze/thaw cycles increasing lifespan
- Favorable subsurface conditions (e.g. high infiltration rates)





# Current Example of Pervious Bituminous Asphalt Application



**Figure 11:** WESTTOWN SCHOOL  
975 WESTTOWN RD, WEST CHESTER, PA 19382

# Pervious Bituminous Asphalt Parking Lot at Westtown School



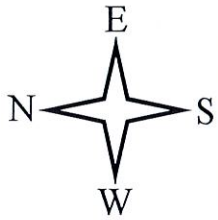
**Figure 12:** WESTTOWN SCHOOL  
975 WESTTOWN RD, WEST CHESTER, PA 19382

# Current Example of Pervious Bituminous Asphalt Application



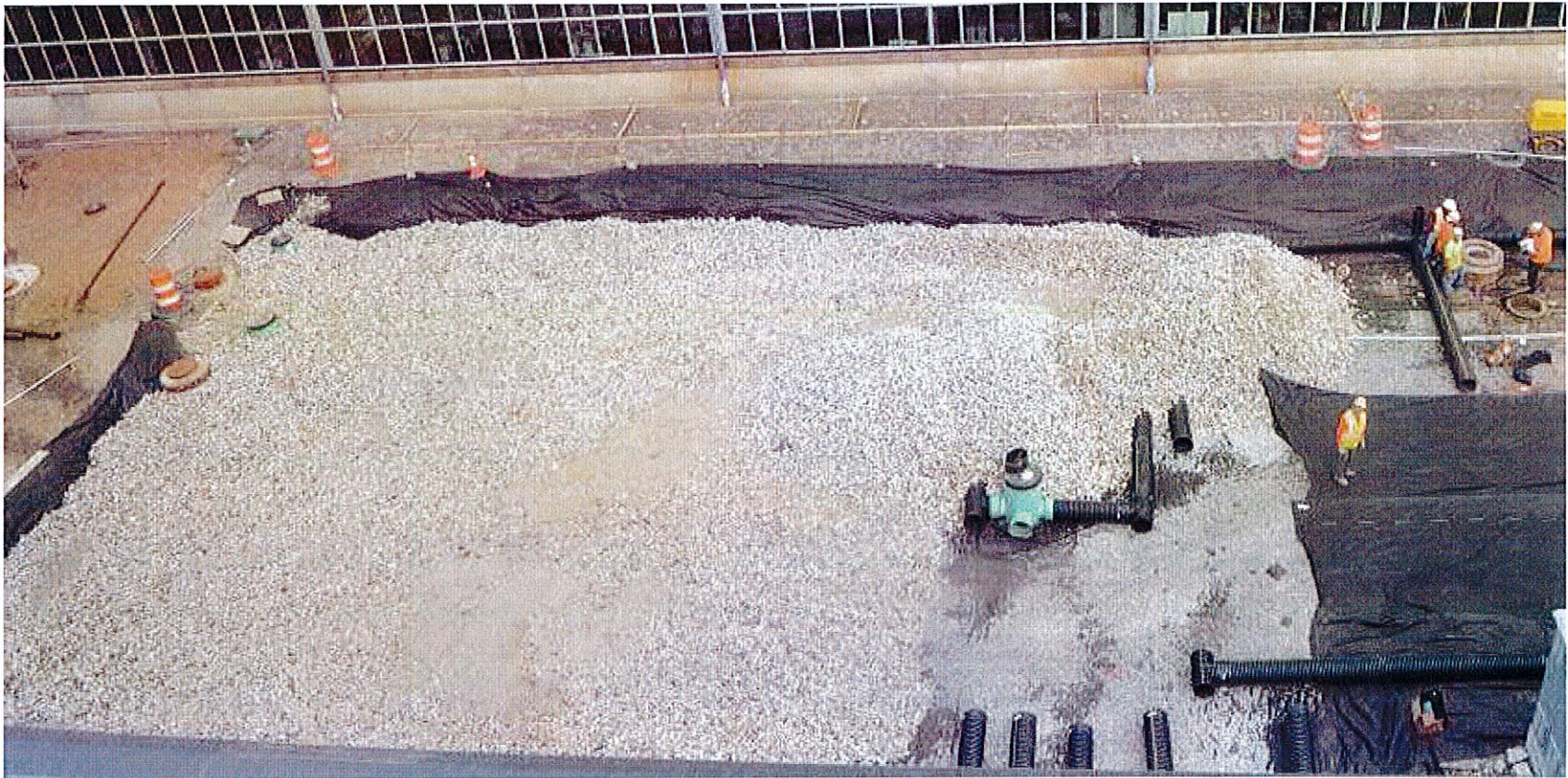
**Figure 13:** URBAN OUTFITTERS (NAVAL YARD BLDG 18)  
18 KITTY HAWK AVE, PHILADELPHIA PA 19112

# Pervious Bituminous Asphalt Parking lots at Urban Outfitters (Naval Yard Bldg. 18)



**Figure 14:** URBAN OUTFITTERS (NAVAL YARD BLDG 18)  
18 KITTY HAWK AVE, PHILIDELPHIA PA 19112

# Porous Paving System Installation at South Parking Lot



**Figure 15:** URBAN OUTFITTERS (NAVAL YARD BLDG 18)  
SOUTH PARKING LOT BASIN CONSTRUCTION

## Porous Paving prep at Northeast Parking Lot



**Figure 16:** URBAN OUTFITTERS (NAVAL YARD BLDG 18)  
NORTHEAST PARKING LOT BASIN CONSTRUCTION

# Completed Northeast Porous Pavement Parking Lot



**Figure 17:** URBAN OUTFITTERS (NAVAL YARD BLDG 18)  
NORTHEAST POROUS PAVEMENT FINAL

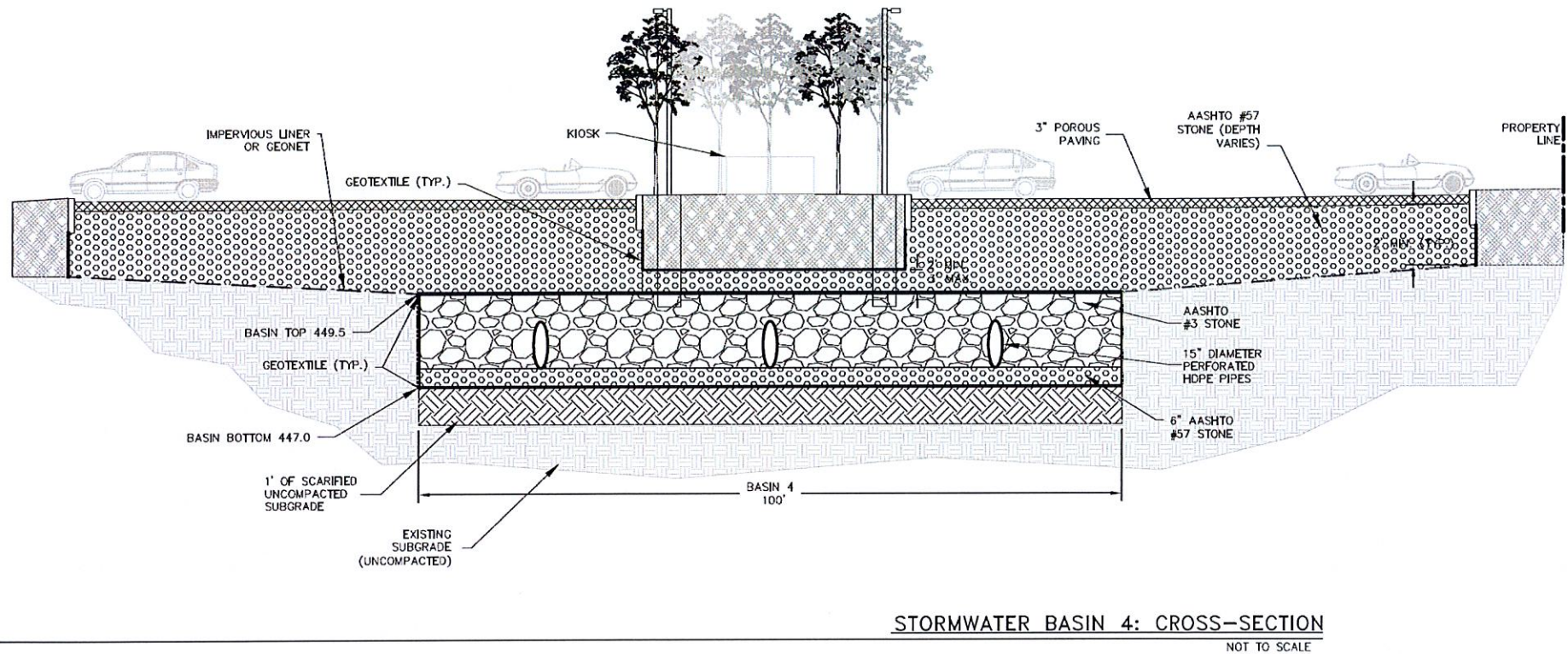
# Current Example of Pervious Bituminous Asphalt Application



**Figure 18:** TERRAIN CAFÉ (DEVON YARD)  
138 LANCASTER AVE, DEVON, PA 19333

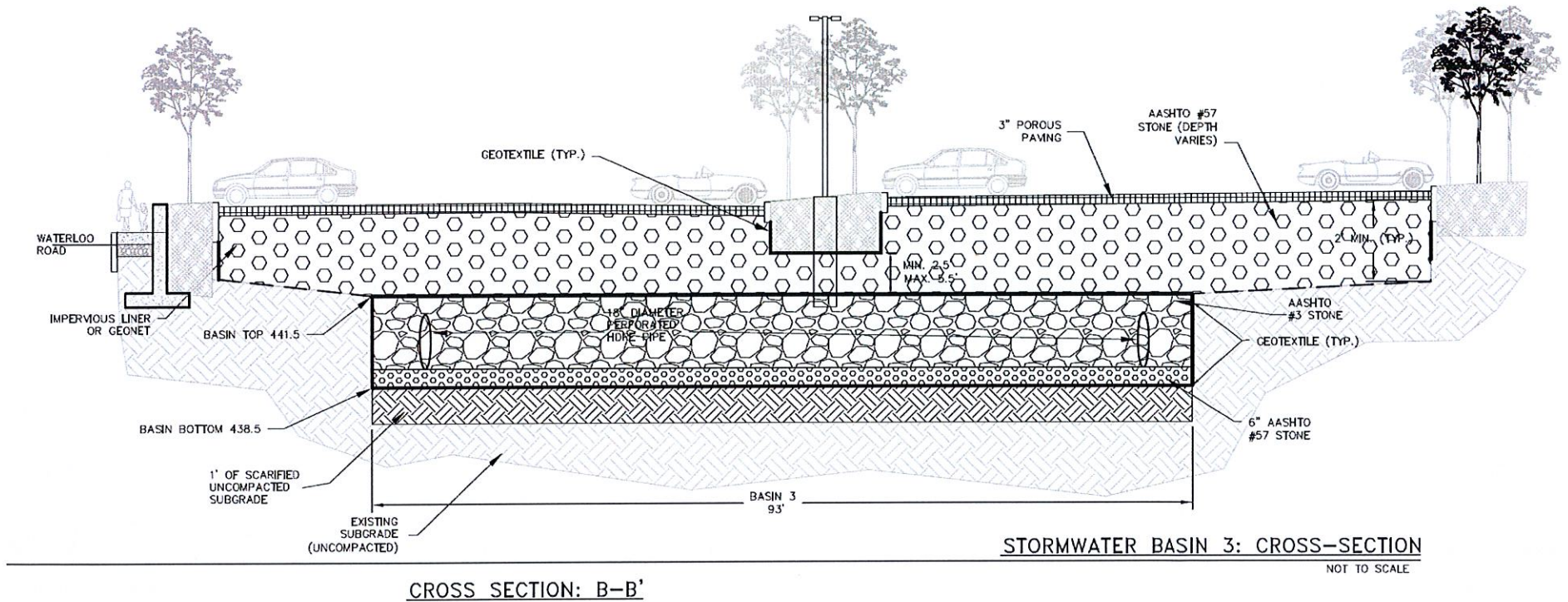


# Porous Pavement cross-section Detail for Northeast Parking Lot at Devon Yard



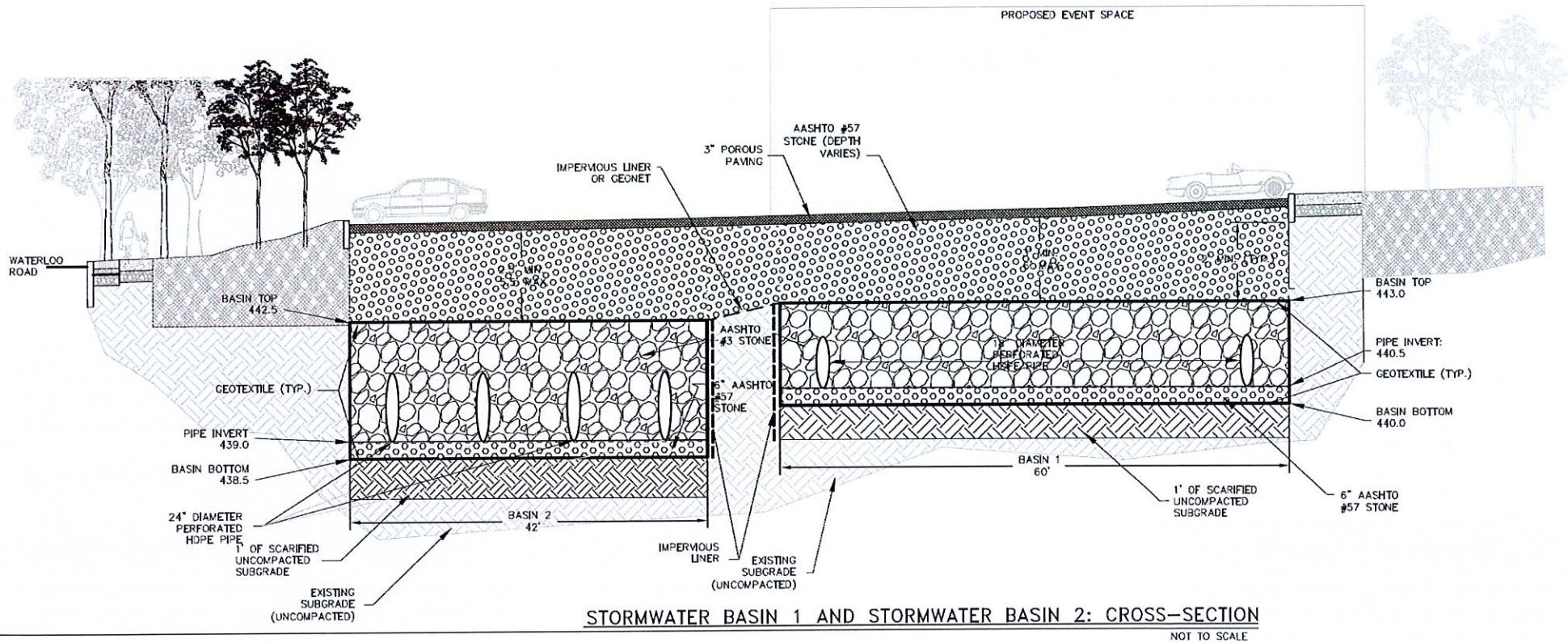
**Figure 20:** DEVON YARD POROUS PAVEMENT DETAIL FOR NORTHEAST PARKING LOT

# Porous Pavement cross-section Detail for Southwest Parking lot at Devon Yard



**Figure 21:** DEVON YARD POROUS PAVEMENT DETAIL FOR SOUTHWEST PARKING LOT

# Porous Pavement cross-section Detail for Northwest Parking Lot at Devon Yard



**Figure 22:** DEVON YARD POROUS PAVEMENT DETAIL FOR NORTHWEST PARKING LOT

# Construction Sequences for Porous Pavement Parking Lots at Devon Yard



**Figure 23:** DEVON YARD POROUS PAVEMENT CORRIGATED PIPE PLACEMENT

# Construction Sequences for Porous Pavement Parking Lots at Devon Yard



**Figure 24:** POROUS PAVEMENT LARGE AGGREGATE LAYER COVERING CORRIGATED PIPE PLACEMENT

# Construction Sequences for Porous Pavement Parking Lots at Devon Yard



**Figure 25:** DEVON YARD POROUS PAVEMENT SEMI-FINE AGGREGATE LAYER

# Construction Sequences for Porous Pavement Parking Lots at Devon Yard



**Figure 26:** DEVON YARD POROUS PAVEMENT CHOKER COURSE

# Construction of Basin 3 for Southwest Parking Lot at Devon Yard



**Figure 27:** DEVON YARD POROUS PAVEMENT BASIN 3 CONSTRUCTION

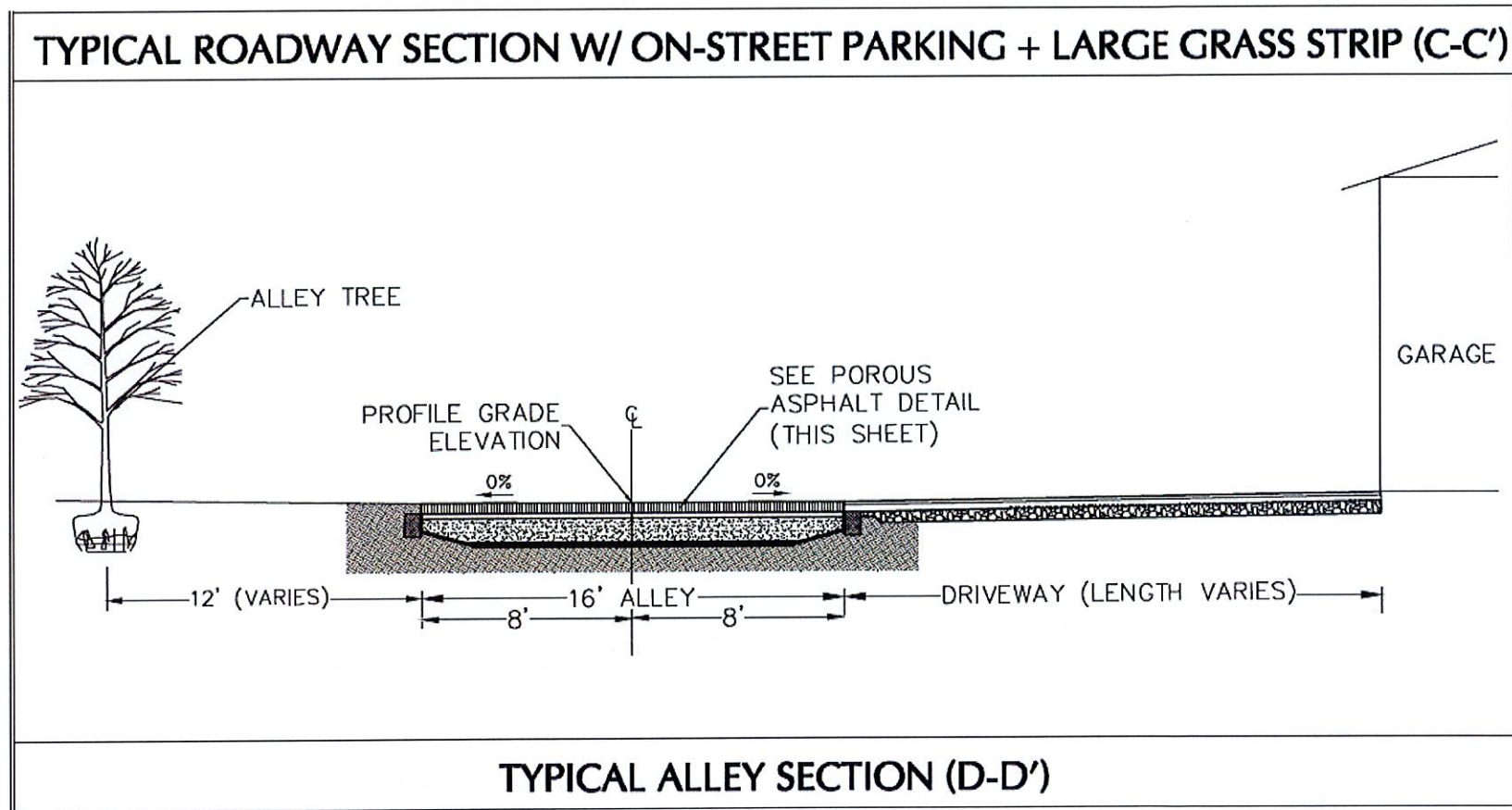


# Current Example of Pervious Bituminous Asphalt in Charlestown Township



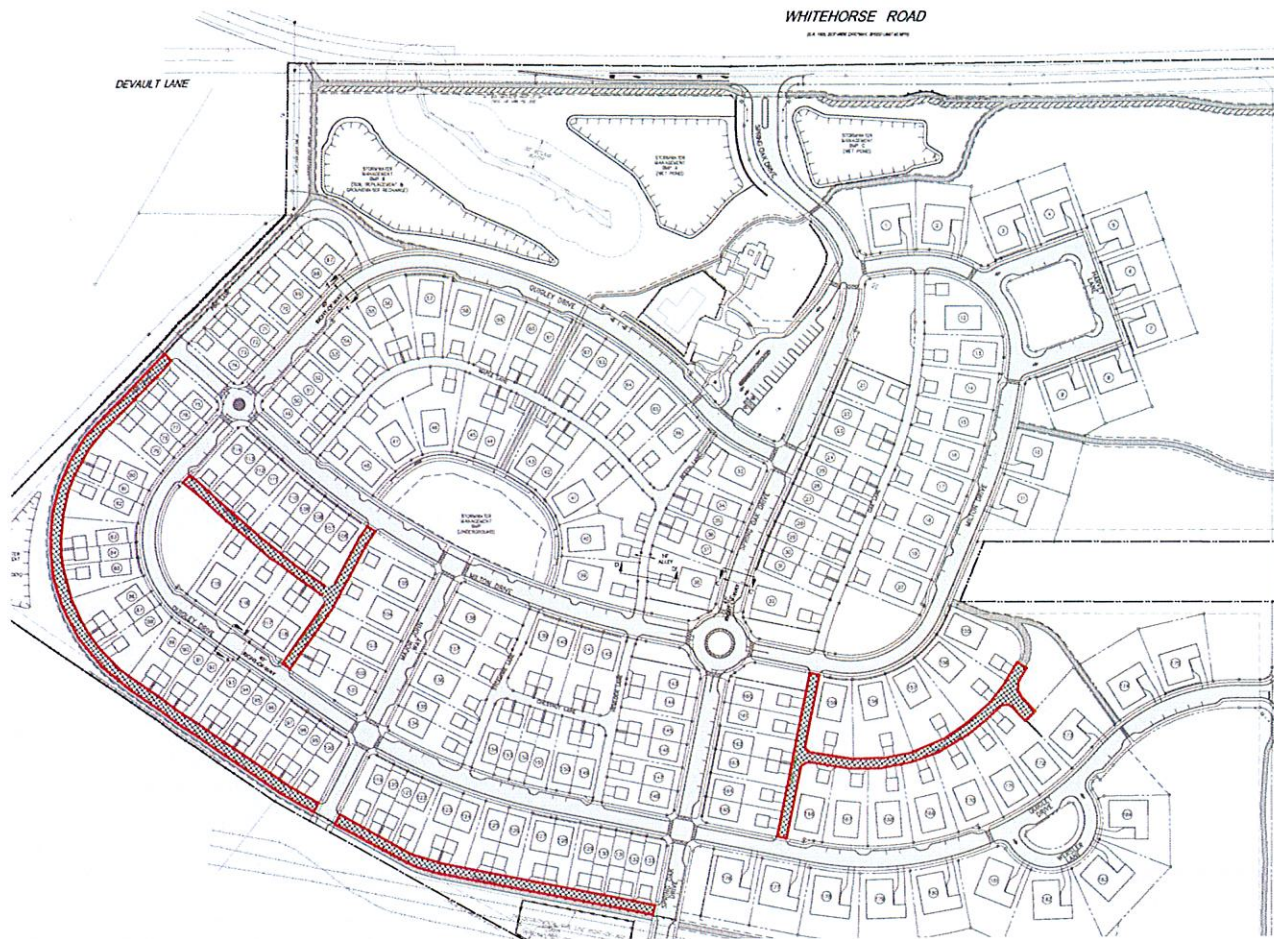
**Figure 28:** SPRING OAK COMMUNITY  
CHARLESTOWN TOWNSHIP, PA 19355

# Detail cross-section of Porous Pavement Alley ways at Spring Oak



**Figure 29: SPRING OAK ALLEY WAY DETAIL**

# Spring Oak Porous Pavement Plan



**Figure 30:** POROUS PAVEMENT AREA IN SPRING OAK

# Total cost Comparison for Porous Pavement vs Conventional Pavement in Spring Oak

Assuming equal pavement quantity of 3,860 (SY)

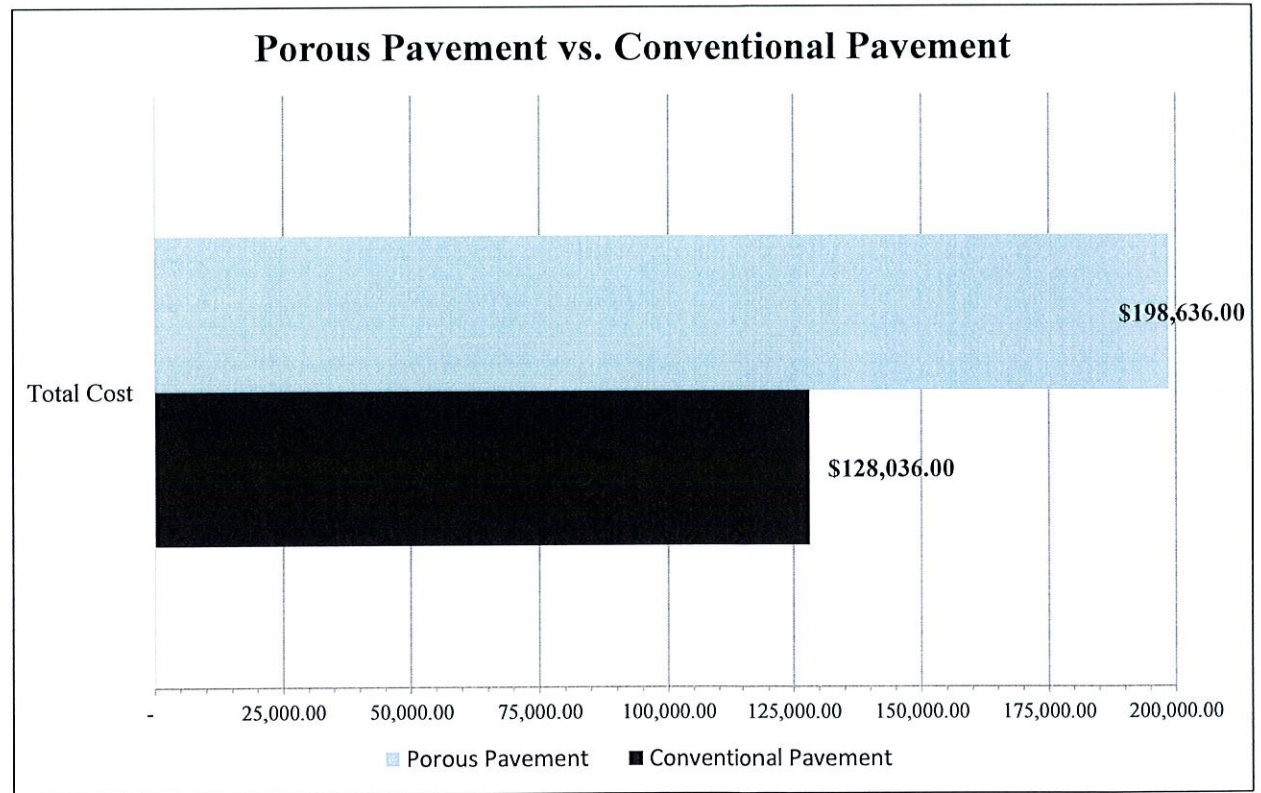
## Factors Considered:

### Conventional Pavement

- 1.5" Wearing Pavement – \$8.01 (SY)
- 4" Binder - \$17.32 (SY)
- 6" Stone - \$7.84 per (SY)

### Porous Pavement

- 2.5" Porous Pavement – 21.06 (SY)
- 12" Stone – \$30.40 (SY)



# REFERENCES

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