Paving the Way for Green Infrastructure
Boston’s Green/Porous Alley Demonstration Projects

25th Annual NPS Pollution Conference
April 29th 2014
Boston Groundwater Conservation Overlay District
BAC Green Alley Project
Project Goals and Design

361,400 gallons
annual amount of rainfall conveyed to groundwater recharge from greenroof and green alley

83% reduction
annual rainfall runoff conveyed to storm drain

GREEN ALLEY

Permeable paving allows rain to penetrate down to better recharging areas, multi-level green roofs, and rainwater harvesting to reduce storm water runoff.
Project Construction Phase

April 2013

May 2013

May 2013

June 2013
Project Completion

October 2013

Source: http://the-bac.edu/experience-the-bac/green-alley
Boston Porous Alley Project

- **Partnership** – Charles River Watershed Association (CRWA), Boston Public Works Department and Boston Groundwater Trust (BGwT) partnering to implement and monitor pilot project
- **Funding** - Grant from Mass DEP to CRWA + match provided by City of Boston and BGwT
- **Design/ Engineering** - Vanasse Hangen Brustlin Inc.
Project Goals

- Part of Boston’s goal to be a “greener” city
- Help to protect Boston’s water resources from stormwater runoff
- Help replenish groundwater
- Develop maintenance protocol to ensure effectiveness of the system
- Replicate system in other locations in the City
- Assess the effectiveness of porous alleys in comparison to cities like Philadelphia, New York, Chicago, Baltimore
Project Benefits

- **Flood Reduction** or elimination
- **Groundwater recharge** – protects building foundations
- **Aesthetics & accessibility** improvement in the Public Alley
- **Stormwater runoff pollution control** - reduction of polluted discharge into ground or harbor
- **Design Standards** - Porous Pavement design, installation, maintenance, benefits data collection
BGwT Wells

Boston Groundwater Trust Well Readings

Well Name: 22J-2351
Last Measured: 4/7/2014
Elevation (ft.): 5.74
View All Readings: Table Export (xls)

a). * indicates that well was inaccessible.
b). D indicates that the well was dry at the time of the reading.
c). X indicates that the well has been decommissioned.
Site Selection

BOSTON POROUS ALLEY
When it rains, it recharges

Project funded by Massachusetts DEP and designed by Vanasse Hangen Brustlin

Public Alley # 543
Charles River Watershed Association
Boston Public Works Department
Boston Groundwater Trust
Public Alley 543
Alley Design

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Porous Pavement

Scale: N.T.S.  Date: Dec 2013

Notes:
1. Subgrade shall be set at a uniform elevation. The choker course depth may vary slightly for surface grade changes as per plan.
2. Contractor to keep crushed stone free of debris and/or sediment during adjacent construction activities.
3. Porous asphalt may be purchased from qualified manufacturer or manufactured to follow specific requirements.
4. Sidewalks may be tapered. 6” minimum width to be maintained at 8.39’ elevation.
5. Contractor to ensure no tack coat is applied to the porous pavement surface.

Existing Manhole Underdrain Connection

Scale: N.T.S.  Date: Jan 2014
Design for Water Quality Monitoring

(S9)
STA:1+09.49 OFF:-0.59L
R=12.30
I=3.10 (in (S7))
I=3.10 (out)

(STATION=1+09.5
ELEV = 12.30)

POROUS ASPHALT

FULL DEPTH PAVEMENT

PROP 6" PERFORATED PVC OBSERVATION WELL
STA 1+43.0; 2.0' LT
35 LF - 6" UNDERDRAIN
S=0.008'
INVERT = 10.3'

CHOKER COURSE
RESERVOIR COURSE
27.5 LF - 6" UNDERDRAIN
INVERT = 10.2'
S=0.008'

115 LF - 24" PIPE - S=0.003'

128 LF - 24" PIPE - S=0.032'
Construction Monitoring
Public Outreach- Residents Concerns

- Project limits
- Parking Disruption
- Dumpster Relocation
Public Outreach- Residents Concerns

- Safety
- Emergency access
- Snow Removal
- Dust Control
- Noise
- Rodents

Frequently Asked Questions

1. Construction operations
   a) Access and egress: Prior to the start of construction, a plan and procedure for building access during construction will be provided to everyone that lives in buildings that connect to the alley. A construction schedule will be provided to the abutters of Public Alley 543 and Alley 544.
   b) Trash: During construction, the Methunian Manor dumpster will be moved to one end of the alley. No other building occupants will experience any changes in handling the disposal of trash.
   c) Rodent control: A rodent control plan will be implemented as part of the project. Maintenance and upkeep of rodent control will continue during the project.
   d) Parking: We are working with Boston Transportation Department (BTD) to arrange alternate parking spaces for those affected during construction.
   e) Emergency access will be maintained at all times during construction.

2. Post construction operations and maintenance
   a) Snow plowing and salting: There will be no change to City’s plowing and salting procedures for the alley.
   b) Vacuuming, sweeping and ongoing maintenance: Regularly scheduled sweeping and vacuuming of the porous surface will maintain its functionality.
   c) Ice buildup: Given the drainage capacity of the porous asphalt, surface water is less likely to accumulate or puddle on its surface.
   d) Pavement durability and replacement: Porous pavement is durable. Since porous pavement drains rapidly, it reduces the risk of frost heaves and potholes that are common in regular asphalt.
   e) Pavement damage: Any pavement on private property that is damaged will be repaired.
   f) Flooding: The Public alley has overflow drainage directly connected to the stormwater sewer system to prevent surface flooding.

3. Construction period
   a) Location of project: Construction will occur in the Public Alley only. Minor work may be necessary to allow a slight overlapping strip to provide a smooth transition from the newly paved section to existing pavement.
   b) Duration: Estimated 3-4 Months
   c) Damage to private alley surface: If the surface of the private portion of the alley is damaged as a result of construction, the contractor will repair.
Groundwater & Water Quality Monitoring Program

- Boston Groundwater Trust monitoring groundwater levels at two new observation wells installed in July 2013
- Monthly data logging prior to, during and after construction
- Expected increase in groundwater levels
- CRWA to monitor post construction water quality and recharge
Goals

- Monitor impacts on water quality, runoff reduction, groundwater recharge and water table elevations.

- Track maintenance operations, and performance of permeable pavement in Boston’s climatic conditions, especially freeze-thaw.
Next Steps

- Bid award and start of project construction in June 2014
- Construction supervision and documentation (June-Aug)
- Continued monitoring of groundwater levels through project construction and beyond
- Post construction water quality monitoring starting August 2014 and continuing through fall of 2015
- Development of Operations and Maintenance Plan
- Ongoing public outreach and education
- Project updates shared on [http://www.crwa.org/bluecities/porous-alley](http://www.crwa.org/bluecities/porous-alley)