



Chester County Stormwater BMP Tour Guide

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BMP: Porous Pavement Parking Lot with Subsurface Seepage Beds

Site Name: Siemens Medical Systems Corporate Campus
See Tour Guidelines below. A tour must be scheduled in advance with owner.

Location: East Whiteland Township, ADC Map Coordinates: 23 D-6
Directions: 51 Valley Stream Parkway, Parking lot bays located at back of the property accessed via on-site perimeter road.

Watershed: Valley Creek

Land Use: Commercial Corporate Campus

Description: Porous pavement is a permeable surface paving material comprised of porous bituminous concrete mixtures that permits stormwater to infiltrate down through the pavement's tiny interstitial spaces. Below the porous pavement are subsurface seepage beds, commonly called recharge beds, which temporarily store stormwater prior to its infiltration into the ground and water table below. These recharge beds store stormwater underground in a network of perforated PVC pipe and in the bed of crushed stone surrounding the pipes. (The stone bed has 40 percent void space.) The recharge beds are lined with geotextile filter fabric to prevent the void spaces from clogging. Any overflow from the recharge beds discharge into an on-site stormwater basin. The parking bays are edged with large river stone creating infiltration trenches that provide additional opportunities for infiltration of stormwater. Porous pavement requires moderately permeable soil with depth to permit the penetration of stormwater into the subsurface.

Porous pavement can be used for patios, walkways, driveways, and parking areas. Porous pavement lots should have limited heavy vehicle traffic to prevent compaction, which would limit infiltration. The porous pavement parking lot at Siemens Headquarters in Malvern covers approximately 3 acres and includes ten employee-parking bays. Siemens does not have a policy prohibiting truck traffic on its porous pavement parking bays; however, by design, large trucks cannot easily access these parking bays. The subsurface recharge beds provide 110,000 cubic feet of stormwater storage. Constructed in 1984, the site owner constructed this porous pavement parking lot and subsurface recharge beds instead of a surface retention basin of the same capacity, which otherwise would have been required. This infiltration structure was preferred for aesthetic reasons.

Function: Porous pavement and subsurface recharge beds promote on-site infiltration of stormwater. Porous pavement helps recharge local groundwater supplies and maintain base flow in nearby streams, two important functions in this highly developed watershed. Porous pavement reduces peak surface runoff rates and can limit erosion in downslope areas. Porous pavement with its excellent drainage capacity should minimize puddling problems and ice formation in cold weather. Properly installed and maintained pavement can be expected to function effectively for 20 years or more.

SITE 7

Porous pavement has limited pollutant-removal capacity, and, as such should not be used independently in areas with significant sources of pollution (i.e. industrial areas and hotspots). To prevent contamination of drinking water supplies, this infiltration structure should not be installed in highly permeable sand and gravel seams that are directly connected to aquifers. Functioning as designed, the system of porous pavement and subsurface infiltration beds can have the following pollutant removal efficiencies:

- Total Suspended Solids (TSS): 95 %
- Total Phosphorus: 42 %
- Total Nitrogen: 51 %
- Metals (copper and zinc): 99 %
- Bacteria: No Data

Operation and Maintenance: The Chester County Conservation District considers the operation and of porous pavement and subsurface infiltration beds to be moderate to high. Maintaining porous pavement requires special attention to ensure it continues to function over the long term. The lot should be routinely cleaned of debris, leaves and brush, which could impede infiltration. The Pennsylvania Handbook (Reference 3) recommends at least semiannual vacuum sweeping to preserve surface infiltration capacity. Accumulated mud or sediment should be swept or washed away as soon as possible. Routine asphalt surface coatings cannot be used on the porous surface since they would clog its pores. Cold weather maintenance considerations: limit sanding road surface since particles can prematurely clog pores; limit the extent to which snow is piled on porous pavement areas since it could hinder infiltration due to potential for ice formation and ice-damming on the infiltrating surface. This surface coating with its excellent drainage should, however, minimize icing problems.

Siemens conducted frequent inspections when the lot was first installed to ensure the bays could handle the volume and were functioning properly. Siemens currently conducts visual inspections seasonally and after major storm events. Sinkhole formation has occurred, but has not been a significant maintenance issue; sinkholes have been filled in and resurfaced after inspection by a geologist.

Cost Factors. The cost of this BMP is initially higher compared to the cost of conventional pavement; however, it becomes cost comparable considering that it provides an opportunity to eliminate the need for a traditional basin and associated storm piping. It can be more cost effective depending upon how and where it is installed on a site, especially with consideration to the value of the land that would otherwise be required for a traditional basin. This structure may have higher up-front costs; however, the long-term value of recharging groundwater can offset short-term monetary costs. Site management reports that maintenance costs for the pavement have not been significant.

Tour Guidelines: For security purposes, tour participants must contact site owner prior to a site visit.

For more information

Owner: Siemens Medical Systems, (610) 219-3538 (Kevin Matthews, Facilities Manager)

Designers: Cahill Associates Environmental Consultants
Marathon Environmental, (856) 241-9705 (Dan Martin)

References

1. Cahill Associates Environmental Consultants. Report: *Porous Pavement Parking Lot With Infiltration*.
2. Center for Watershed Protection. *A Review of Stormwater Treatment Practices* (published presentation).
3. *Pennsylvania Handbook of Best Management Practices for Developing Areas*. Spring 1998. CH2MHILL.

Site 7 - Siemens Medical Systems – Porous Pavement Parking Lot



Along the edges of porous pavement parking bays are stone infiltration trenches that capture any runoff and enhance infiltration opportunities. (Parking bumpers allow runoff to be captured in stone infiltration trenches along parking lot edge.)



To limit compaction, porous pavement lot used for passenger vehicle parking only.

