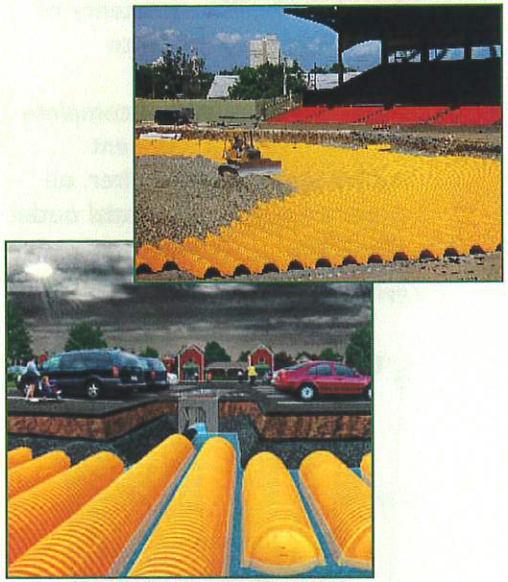
USES FOR SUBSURFACE INFILTRATION SYSTEMS

Subsurface Infiltration Systems reduce the volume of stormwater runoff leaving an area by capturing the runoff and storing it underground. Over time, this system releases the water and lets it percolate though the soil, cleaning the runoff water and recharging the groundwater supply. Because the system is installed underground, it leaves the surface open for use for other purposes such as athletic fields, additional parking, etc. This practice conserves land by making it multi-functional as the examples show below.

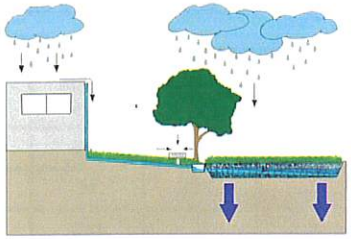


Example of a subsurface infiltration system installed beneath a stadium and a busy retail parking lot.

Financial and other support for this project is provided by the Pennsylvania Association of Conservation Districts through a grant from the Pennsylvania Department of Environmental Protection under Section 319 of the Clean Water Act, administered by the U.S. Environmental Protection Agency.

INFILTRATION 101

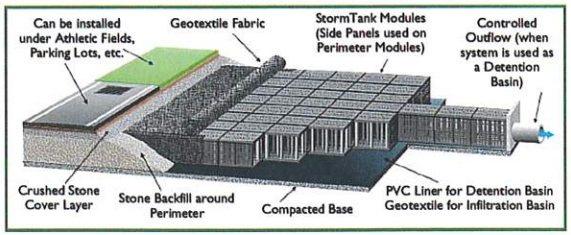
Before humans settled on the land, rain was filtered through soil, roots, and plants in our native forests, wetlands, and meadows. The majority of the water that entered our surface waters was cool, clean groundwater.



As we built homes, roads and infrastructure, the natural water-cleaning systems were gradually removed. Our streams and rivers became increasingly degraded as water ran off the land instead of being taken up by plants, soaking into the soil, and being filtered by soils and wetlands.

Today engineers have a difficult task designing innovative practices that will work around our alterations and mimic the earth's natural ability to clean water for human consumption. Stormwater runoff has become a focus of much debate. As open land is replaced with impervious surfaces, less land is available to properly filter and replenish the groundwater aquifer. Subsurface infiltration systems are one way to help recharge our water sources.

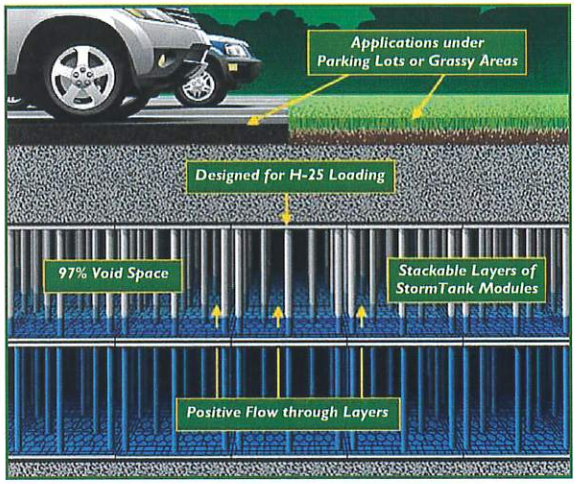
Subsurface infiltration systems are designed to save space and recharge groundwater aquifers. These systems are often built as alternatives to basins by storing and treating stormwater runoff.

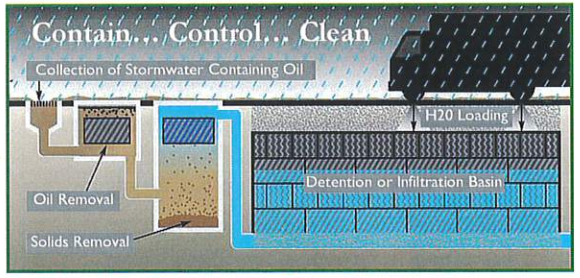


Stormwater
Best Management Practices Interpretive Trail

Nonpoint Source Pollution Reduction Strategy:

SUBSURFACE INFILTRATION SYSTEMS





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ABOUT THIS TRAIL

The Berks Conservation District Stormwater Best Management Practices Interpretive Trail was developed to educate visitors about stormwater management; nonpoint source pollution and its impacts; and, strategies for reducing water pollution that can be implemented at home, at work, or in the community.

What is nonpoint source pollution (NPS)? NPS pollution occurs when precipitation flows over lawns, parking lots, farm fields, city streets and forests picking up pollutants and carrying them into our streams, rivers and oceans.

Activities such as littering, oil leaks, lawn over-fertilization, and improper disposal of chemicals contribute to the contamination of our local waters. If left unchecked, these activities eventually increase the level of pollution content in our streams & waterways.

What can we each do? Strategies for managing stormwater and reducing nonpoint source pollution can be accomplished in many ways. Some of those ways are demonstrated on this trail and include Installation of Pervious Surfaces, Water Quality Units, Rain Gardens or Bioretention Areas, and Subsurface Infiltration Systems.

Was this information helpful? Log on to **www.co.berks.pa.us/conservation** to take our Trail Survey and enter to win a prize!

QUALITIES & BENEFITS OF SUBSURFACE INFILTRATION SYSTEMS

Environmental Benefits:

- Gather and store runoff until it can infiltrate into the soils. Infiltration is important to restore groundwater recharge and maintain stream base flows.
- Reduce peak flows, as well as volume, and play an important role in reducing damage when floods occur.

POLLUTANT PARAMETER (% Removal)	INFILTRATION	*Wetland*	*Water Quality Pond*	*Filtering System*	*Water Quality Swale*
Total Phosphorus	65	51	45.5	45	14.5
Total Nitrogen	82.5	20.9	30	32	10.5
Lead	98	63	66.5	71	50
Zinc	99	53.5	50.5	69	49
Suspended	88.5	78	70	81	66
Organic Carbon	82	28	35	57	23

Maintenance:

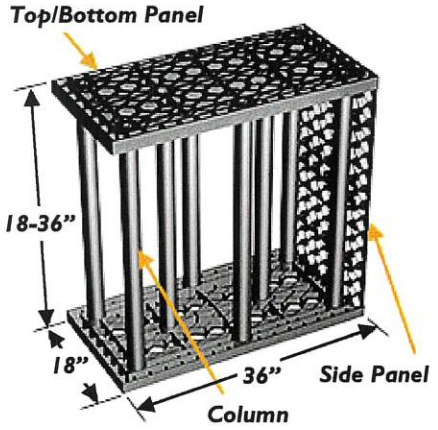
- Maintain a 2 ft. buffer between bed bottom and seasonal high groundwater table and bedrock.
- Keep loading ratios low by providing a distributed infiltration area (5:1 impervious area to infiltration area - maximum) .
- Site practice on natural, uncompacted soils with acceptable infiltration capacity (as determined in pre-construction testing of infiltration rates).
- Beds filled with stone (open-graded, clean stone with minimum 40% void space) or alternative as needed to increase void space.
- Wrapped in nonwoven geotextile.
- Level or nearly level bed bottoms.
- Do not place bed bottom on compacted fill.
- Provide positive stormwater overflow from beds.
- Protect from sedimentation buildup during construction.
- Provide perforated pipe network along bed bottom for distribution as necessary.

Application:

- This system is applicable to all types of sites (commercial, industrial and residential). Small units can be easily adaptable to existing individual home sites by incorporating items such as rain leaders as shown above.

Take Note:

- It is very important to consider installing pre-treatment measures to clean the stormwater before it reaches the infiltration system. This will lengthen the life expectancy of the system and minimize maintenance.
- Optional features of a complete system include a sediment collection facility and filter, oil separation, and a potential outlet structure.



A close-up of a ***Storm Tank*** module as seen on the interpretative trail. This model provides 97% void space for increased storage when compared to stone beds (40% voids).