

	Site Design
Definition	Use of planning and design techniques that prevent the generation of stormwater and non-point source pollution by reducing impervious surfaces, disconnecting flowpaths, treating storm water at its source, maximizing open space, minimizing disturbance, protecting sensitive natural features and processes, and identifying and linking greenways, parks, wilderness, and conservation land.
Potential Pollutant Removal*	Prevents generation of: sediments, nutrients, metals, and pathogens
Recharge Potential	Yes. Through preservation or restoration of recharge areas and the natural hydrologic cycle.
Application	Residential, commercial, industrial and natural areas
Installation Cost	Cost impacts or effects, not a capital costs. Lowers land clearing and grading costs, decreases infrastructure costs, lowers energy bills, lowers storm water management costs, lowers maintenance costs, may increase lot yields, marketability and property values.
Maintenance	Does not apply.
Other Benefit	Supports native species, maintains healthy ecosystems, sustains air and water quality, increases open space, protects trees, balances growth with environmental protection, fosters public/private partnerships, promotes community goodwill, preserves natural systems.
Other Limitation	Local ordinances may require variances/revision to support implementation.
More Information	http://www.epa.gov/owow/nps/lid/lidnatl.pdf
More Information	http://www.greenneighborhoods.org/site/Index.htm
More Information	http://www.stormwatercenter.net/
More Information	

* BMP pollutant removal effectiveness varies with site design and storm size. Some BMP's are most effective used in conjunction with other techniques.

Open Channels	
Definition	Concave, vegetated conveyance systems that can improve water quality by controlling water velocity, infiltration and filtering. Examples include drainage channels, grass channel ("biofilters"), dry swales and wet swales.
Potential Pollutant Removal*	Sediment, nutrients, metals, pathogens
Recharge Potential	Yes; varies with soil characteristics
Application	Residential, roads and highways, small commercial and industrial
Installation Cost	Generally lower than curb and gutter systems.
Maintenance	Mowing & dethatching, litter removal, stabilization of slopes, pesticide/fertilizer management; discing or aeration of swale bottom, sediment removal
Other Benefit	Reduces overall stormwater conveyance infrastructure; aesthetic improvement; reduction of urban heat island effect
Other Limitation	Feasibility depends on soils; wet swales potential drowning hazards; requires 6.5-20% of impervious land area; a shallow forebay is recommended as pre-treatment
More Information	http://www.cwp.org/Cold%20Climates/CHAPT7%20-%20OPEN%20CHANNELS.pdf
More Information	http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool6_Stormwater_Practices/Open%20Channel%20Practice/Grassed%20Channel.htm
More Information	
More Information	

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Permeable Paving	
Definition	A group of pervious types of pavements designed to infiltrate stormwater runoff through the surface, thereby reducing runoff from a site. Examples include pavers, lattice pavers, and porous pavement..
Potential Pollutant Removal*	sediment, nutrients, metals
Recharge Potential	Yes, if designed as exfilter
Application	Urban, residential, commercial
Installation Cost	Material cost similar to traditional pavement. Site preparation and base fill can be twice the cost of traditional paving.
Maintenance	Vacuum sweeping & pressure washing every 3 months; more maintenance in areas that receive high sediment volumes
Other Benefit	Reduces overall stormwater conveyance infrastructure; aesthetic improvement
Other Limitation	Ideal application is low traffic & low dust areas; clogging potential; works best with pre-treated runoff.
More Information	http://nemo.uconn.edu/reducing_runoff/index.htm
More Information	http://www.toolbase.org/tertiaryT.asp?TrackID=&CategoryID=1438&DocumentID=2160
More Information	
More Information	

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Rain Barrels & Cisterns	
Definition	Automatic water collection systems that store runoff from stormwater to be used later for activities such as lawn and garden watering. Rain barrels range in size from 35 - 100 gallons and cisterns range in size from 100 - 10,000 gallons or more.
Potential Pollutant Removal*	Rainwater is prevented from contacting surface pollutants
Recharge Potential	No, but can reduce stormwater runoff volumes
Application	Residential, commercial, industrial, urban
Installation Cost	Rain barrels less than \$100 per 50 - 100 gallon barrel. \$2,500 for a typical 2,000 gallon in ground cistern.
Maintenance	Biannual inspection
Other Benefit	Reduce irrigation cost; reduce demand on domestic water supply system
Other Limitation	Size - overflow is untreated
More Information	http://www.lid-stormwater.net/intro/sitemap.htm
More Information	
More Information	
More Information	

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Green Rooftop Systems	
Definition	Green space created by adding a layer of growing medium and plants on top of a traditional roof system. Differs from a "roof garden", which consists of freestanding containers and planters on a terrace or deck.
Potential Pollutant Removal*	Rainwater is prevented from contacting surface pollutants
Recharge Potential	No, but can reduce stormwater runoff volumes
Application	Urban, commercial
Installation Cost	Special structural design needs increase the cost over traditional roofs up to twice as much.
Maintenance	Plant maintenance & waterproof membrane maintenance 2-3 times per year
Other Benefit	Energy savings; extended life of roof; sound insulation; fire resistance; reduction in urban heat island effect
Other Limitation	Structural load limitations, best for new buildings;
More Information	http://www.greenroofs.com/
More Information	http://peck.ca/grhcc/
More Information	
More Information	

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Bioretention	
Definition	Manages and treats stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression. Examples include rain gardens and biofilters.
Potential Pollutant Removal*	Sediment, metals, nutrients
Recharge Potential	Yes, if designed as exfilter
Application	Urban, residential, commercial, industrial
Installation Cost	About \$10 per square foot.
Maintenance	Routine landscape maintenance; roto-till surface if system becomes clogged
Other Benefit	Aesthetic improvement
Other Limitation	Require 5 - 7% of drainage land area.
More Information	http://www.raingardens.org/Index.php
More Information	http://www.ence.umd.edu/~apdavis/Bioret.htm
More Information	http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool6_Stormwater_Practices/Filtering%20Practice/Bioretention.htm
More Information	http://www.lid-stormwater.net/intro/sitemap.htm

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Stormwater Planters	
Definition	Small-scale stormwater treatment systems comprised of organic soil media and plants in a confined planter box.
Potential Pollutant Removal*	Sediment, metals, nutrients
Recharge Potential	Yes, if designed as infiltration system with exfilter
Application	Urban
Installation Cost	About \$10 per square foot plus the cost of the planter itself.
Maintenance	Routine landscape maintenance
Other Benefit	Aesthetic improvement
Other Limitation	Not applicable on steep slopes; often does not meet channel protection/flood control objectives alone; designed to accept only surface sheetflow; requires approx. 5% of impervious land area
More Information	

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Vegetated Buffers	
Definition	An area of grass, shrubs, and/or close growing vegetation which impedes the sheet flow of stormwater, encourages infiltration, and prevents runoff into adjacent surface waters.
Potential Pollutant Removal*	Sediment, metals, nutrients, pathogens
Recharge Potential	Yes. Adds depth and complexity to root systems, which improves the recharge capacity of the soil.
Application	Residential, commercial, industrial, urban
Installation Cost	Zero to average landscaping costs
Maintenance	None to minor landscape maintenance and removal of exotic invasive species.
Other Benefit	Improved water quality and quantity, increase biodiversity, provides habitat, food, cover, and travel corridors, increases property values, provides flood mitigation, stream bank stabilization, erosion control, privacy, and aesthetic improvement, and acts as a goose barrier.
Other Limitation	Subject to Wetlands Protection Act needs Conservation Commission review. Most effective for targeting sheet flow storm water runoff. Avoid areas of concentrated flow and channelization.
More Information	http://berkshireplanning.org/4/1/index.php3
More Information	http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool3_Buffers/BufferZones.htm
More Information	
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