Low Impact Development
What it is and what it does

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Topics

- How conventional urban drainage design affects watersheds
- How Low Impact Development can mitigate effects of urban drainage
- Meeting NPDES Permit requirements for SUSMPs
- Myths and reality about LID

Conventional Urban Drainage

- Features
  - Impervious surfaces: roofs and pavement
  - Catch basins and piped drainage
  - "Collect and convey" design objective

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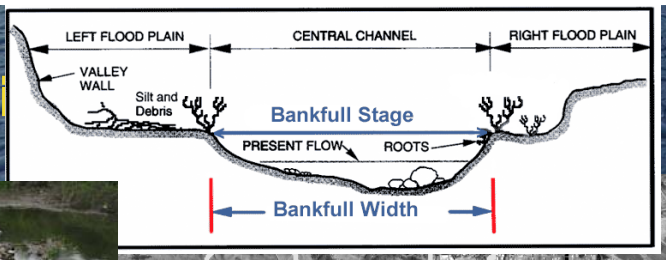


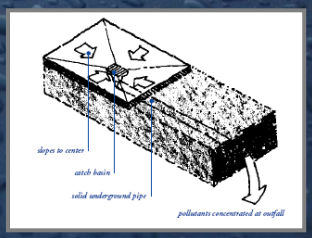
	Watershed and Stream Scale
	Flooding and scouring of stream beds
entration	Flash flows
torms	Discharge when runoff did not
rations	Stream erosion at moderate s
mes	Higher pollutant loading
Greater runoff energy	Conveys trash and gross pollu
Decreased infiltration	Lower and less frequent strea
Dry weather discharges	High pollutant concentrations

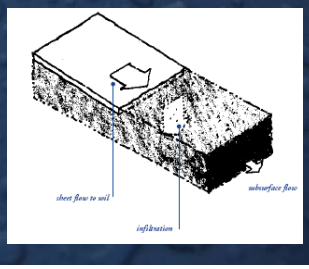
LID Design Objectives

Watershed and Stream Scale	Site scale
Reduce peak flows	Detain runoff on site
Increase time of concentration	Slow runoff from leaving site
No runoff from small storms	Infiltrate and evapotranspirate
Reduce duration of moderate flows	Let runoff seep away very slowly
Reduce runoff volume	Infiltrate where possible
Reduce runoff energy	Detain and slow flows
Increase groundwater storage and stream base flows	Facilitate infiltration
Reduce pollutants in runoff	Detain and filter runoff
Protect against spills and dumping	Disconnect drainage and filter runoff

LID Drainage Principles

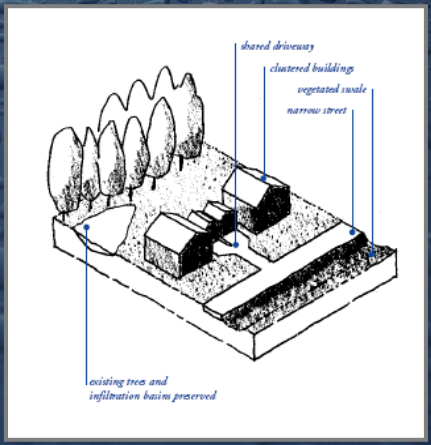
- Instead of "collect and convey," disperse and retain
  - Avoid concentrating flows
    - Keep drainage areas small
  - Promote infiltration
  - Detain
  - Treat
- Route high flows so they flood safely





LID Design Steps

- Optimize the site layout



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- Use pervious surfaces and green roofs where possible

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- Disperse runoff to landscaping
- Direct drainage from impervious surfaces to bioretention facilities, flow-through planters, or dry wells

LID Myths and Reality

Myth	Reality
LID reduces downstream flooding.	If implemented watershed-wide, LID can reduce peak discharges and the frequency of small floods. But it will have little impact during very large floods.
Bioretention soils will accumulate hazardous concentrations of pollutants.	Soils are very effective “sponges” for heavy metals and can filter low concentrations from runoff for many years without a noticeable increase in soil levels.
LID can’t be used on clay soils or steep slopes	Planter boxes and bioretention facilities with underdrains can be used on most sites, regardless of soils or topography
Other techniques can meet “maximum extent practicable.”	LID provides the most robust and effective treatment and seems to be required except in specific circumstances.