

Figure 8.8 and Table 8.1 from ...de la Crétaz, Avril L., and Paul K. Barten. 2007. *Land Use Effects on Streamflow and Water Quality in the Northeastern United States*. Taylor & Francis Group, CRC Press, Boca Raton, FL, 319 pages, www.crcpress.com

Forest (reference condition)

1. Deep-rooted woody vegetation maximizes interception and evapotranspiration (available soil water storage) and soil permeability
2. The litter layer and organic horizon protect and enhance mineral soil permeability
3. Rainfall and snowmelt rates rarely exceed infiltration capacity and generate overland flow
4. Stormwater flows laterally through the root zone and shallow groundwater to streams
5. Detention storage of stormwater in the soil helps to maintain dry weather (base) flow
6. Riparian vegetation and large woody debris help to maintain stream channel stability
7. Water quality is favorably affected by the forest "biofilter"

Conventional Development

1. Little deep-rooted woody vegetation to intercept rainfall and promote soil permeability
2. Extensive excavation, grading, and soil compaction reduces infiltration capacity
3. Rainfall and snowmelt rates often exceed infiltration capacity and generate overland flow
4. Stormwater from rooftops, driveways, and lawns is hydraulically connected to roads then streams (EIA, effective impervious area \approx TIA, total impervious area)
5. Stormwater is collected and transmitted directly to streams, short circuiting the soil
6. Stream channels are destabilized by the erratic flow regime and the lack of riparian vegetation
7. Water quality is adversely affected by limited infiltration, residence time, and natural filtration through the soil and shallow groundwater

Low Impact Development (with buried utilities)

1. More deep-rooted woody vegetation to intercept rainfall and promote soil permeability
2. Soil disturbance is minimized in order to maintain infiltration capacity
3. Rainfall and snowmelt rates occasionally exceed infiltration capacity and generate overland flow
4. Stormwater from rooftops and driveways is dispersed on to permeable areas—grassed swales and shallow depressions (EIA, effective impervious area \ll TIA, total impervious area)
5. Stormwater from roads is dispersed laterally – curbs and storm drains are omitted
6. Riparian vegetation is protected or restored to help maintain stream channel stability
7. Maximizing infiltration capacity, residence time, and natural filtration through the soil and shallow groundwater minimizes water quality degradation

"With the disappearance of the forest all is changed." George Perkins Marsh, 1864

