Reading the Landscape: Soils

Soils Training Workshop

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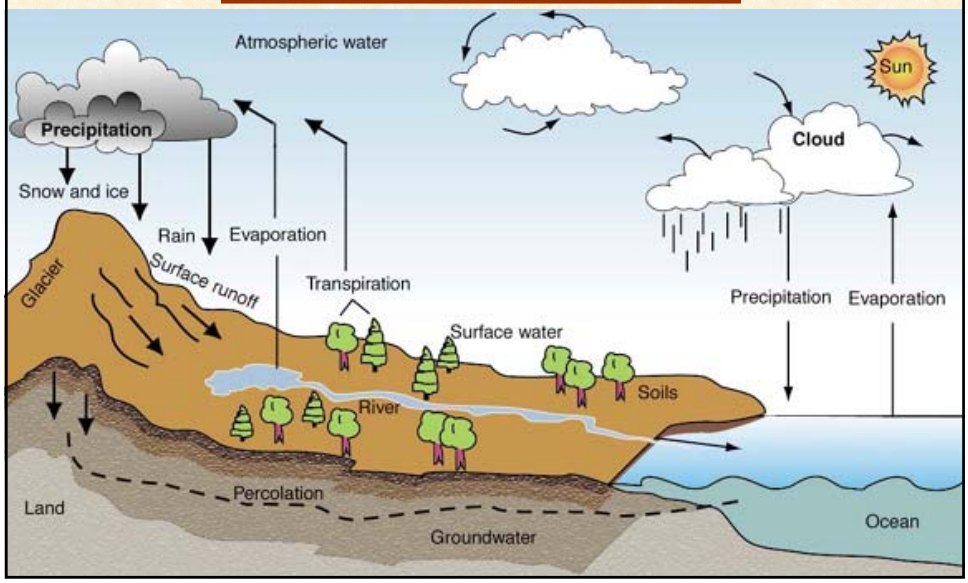
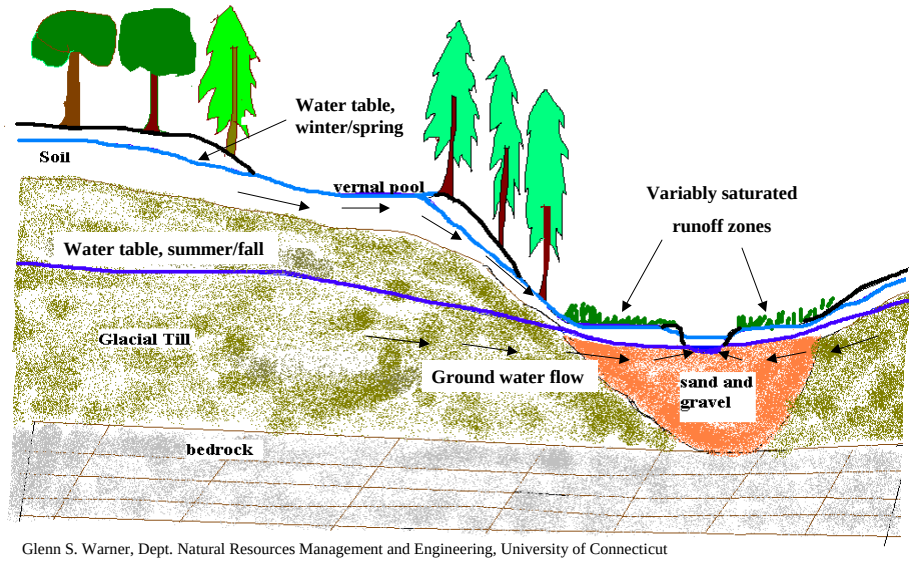
Hydrologic Cycle



Annual Amounts in Connecticut

- **Precipitation**
  - averages 44 to 48 inches
- **Evapotranspiration**
  - averages 22 to 24 inches
- **Runoff**
  - averages about 22 to 26 inches

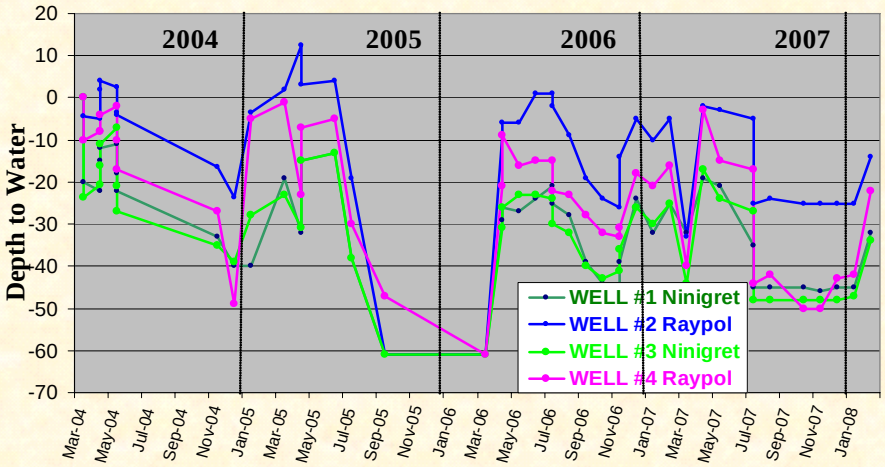
Typical Connecticut Natural Landscape



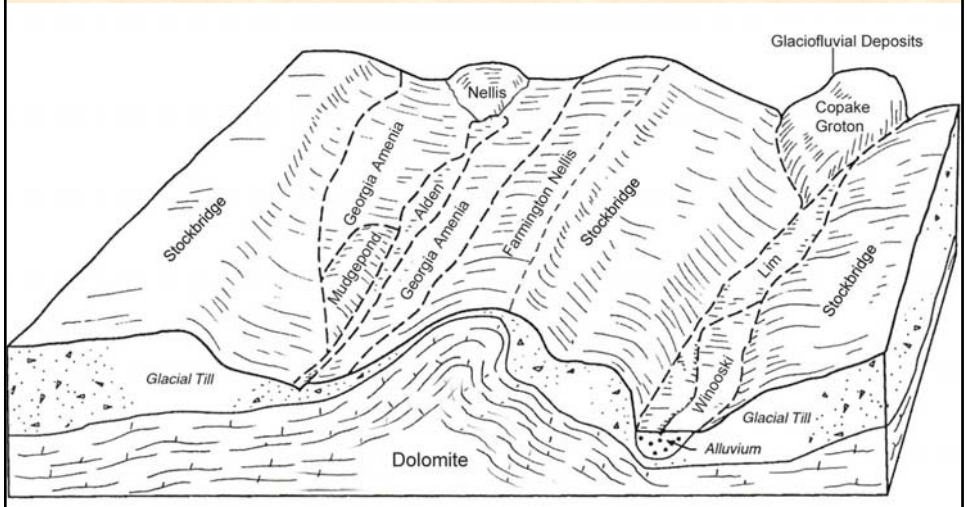
Glenn S. Warner, Dept. Natural Resources Management and Engineering, University of Connecticut

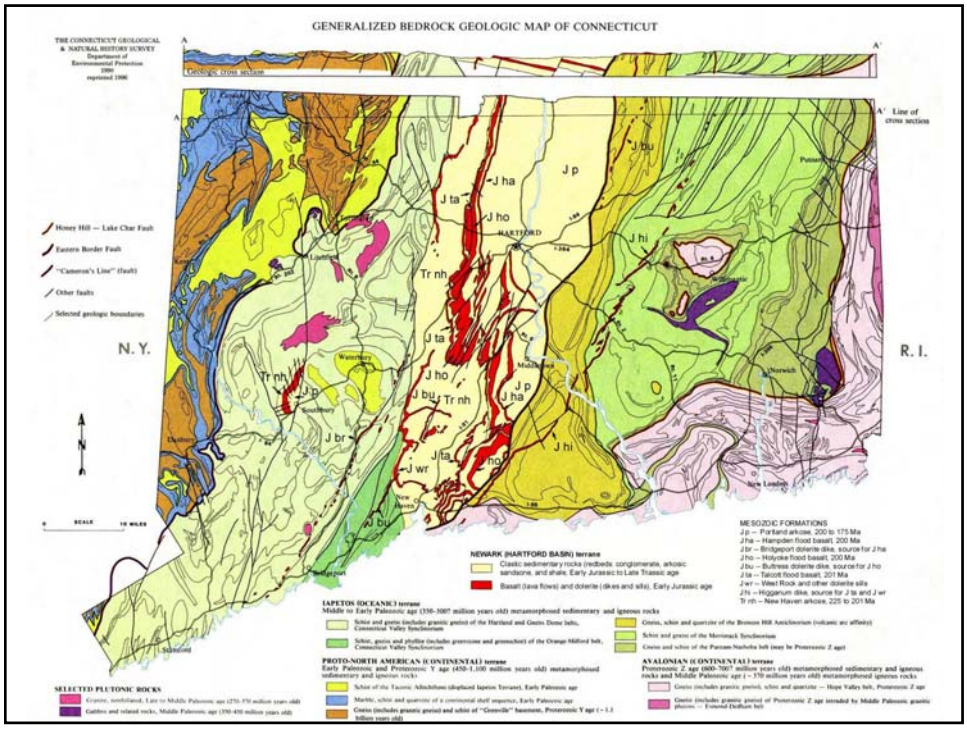
Seasonal High Water Tables

TAC Well Data

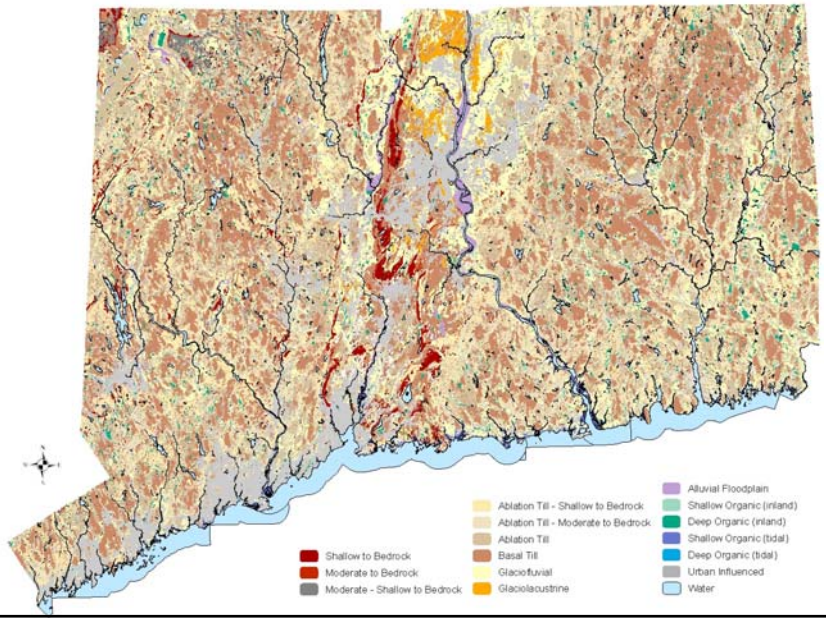


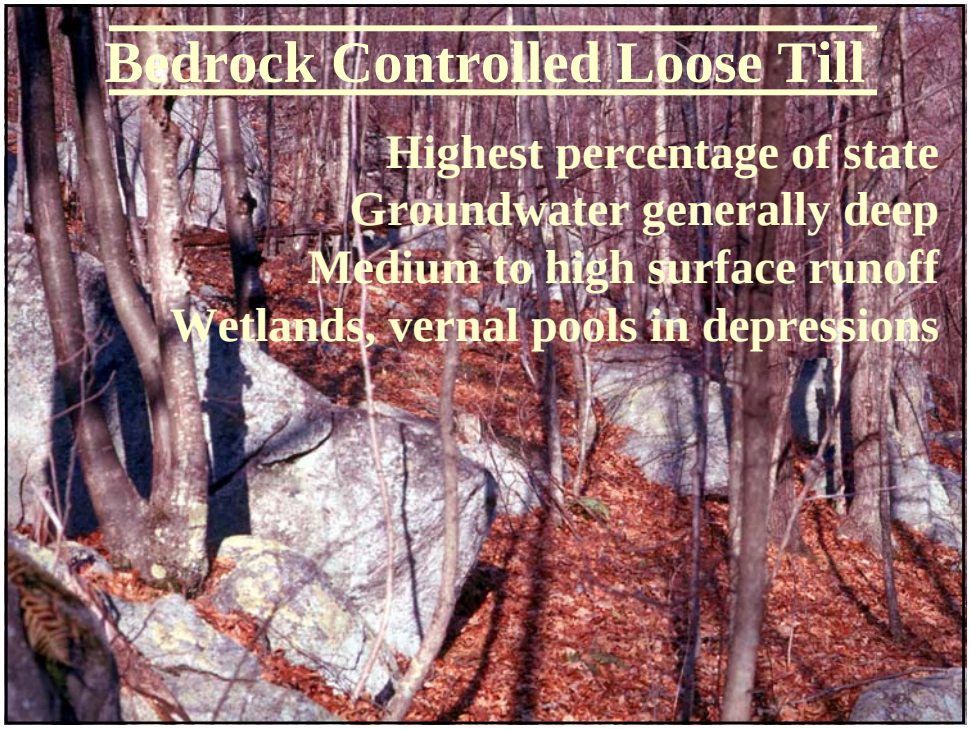
Connecticut Soil Landscapes

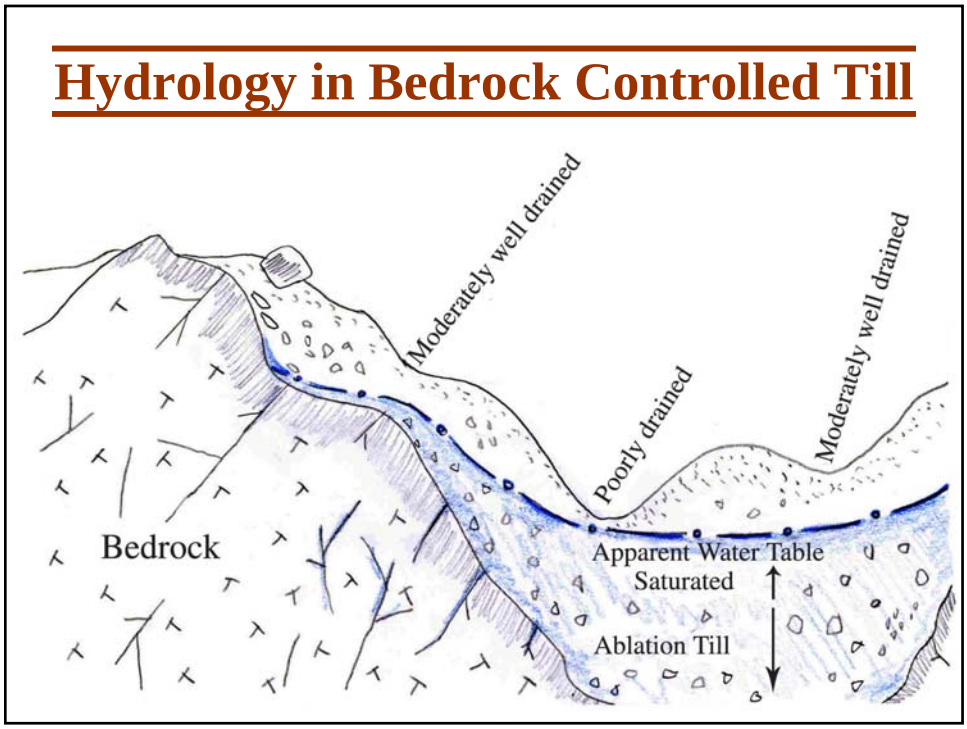


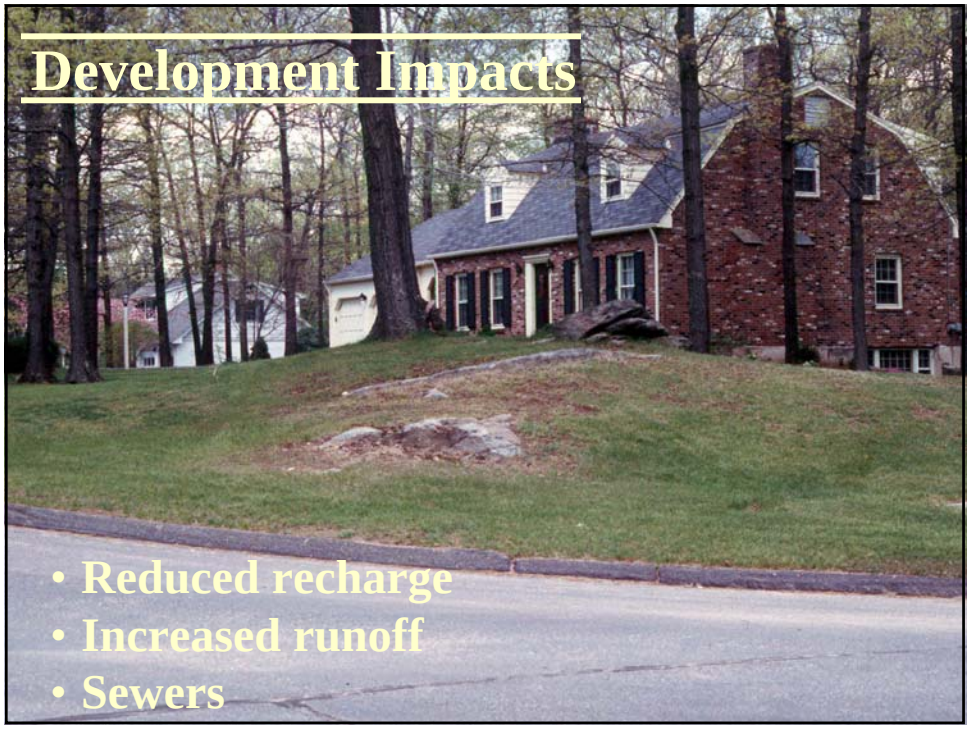


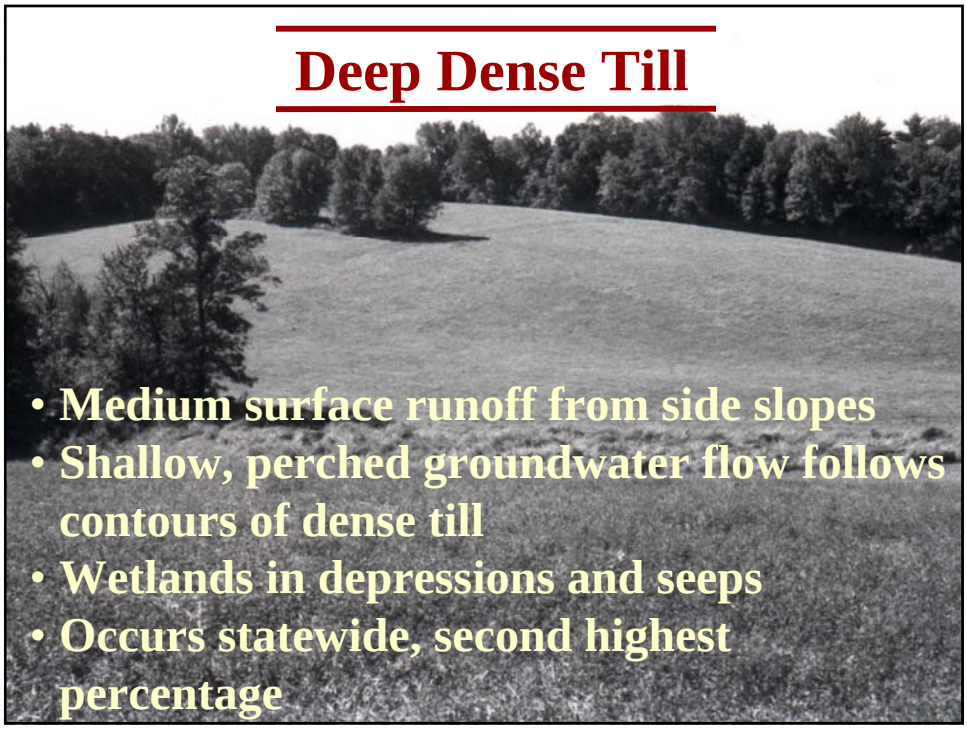
Parent Material of Connecticut Soils



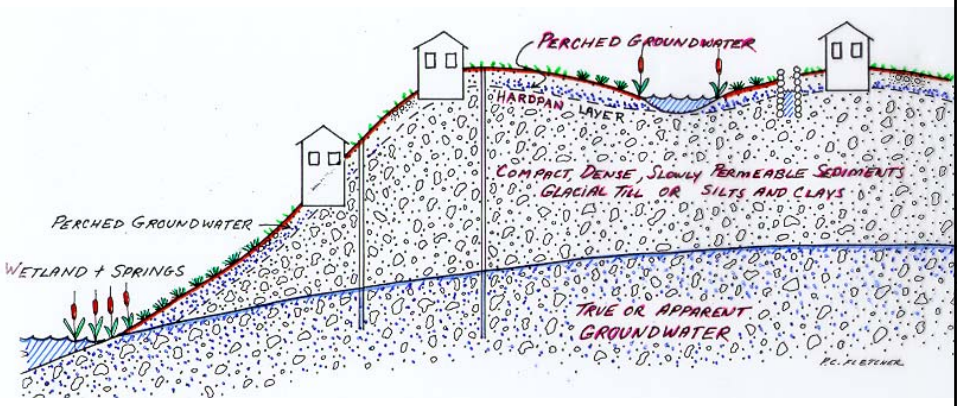

Bedrock Controlled Loose Till
Highest percentage of state
Groundwater generally deep
Medium to high surface runoff
Wetlands, vernal pools in depressions


Hydrology in Bedrock Controlled Till
Moderately well drained
Poorly drained
Moderately well drained
Bedrock
Apparent Water Table
Saturated
Ablation Till


Development Impacts
• Reduced recharge
• Increased runoff
• Sewers

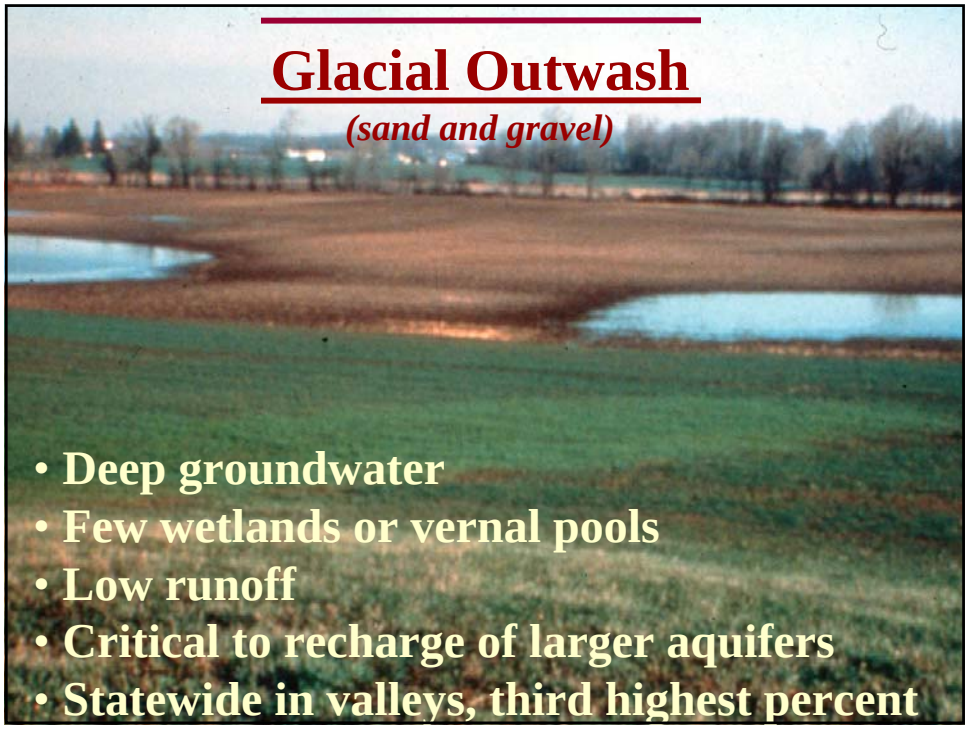

Deep Dense Till
• Medium surface runoff from side slopes
• Shallow, perched groundwater flow follows contours of dense till
• Wetlands in depressions and seeps
• Occurs statewide, second highest percentage

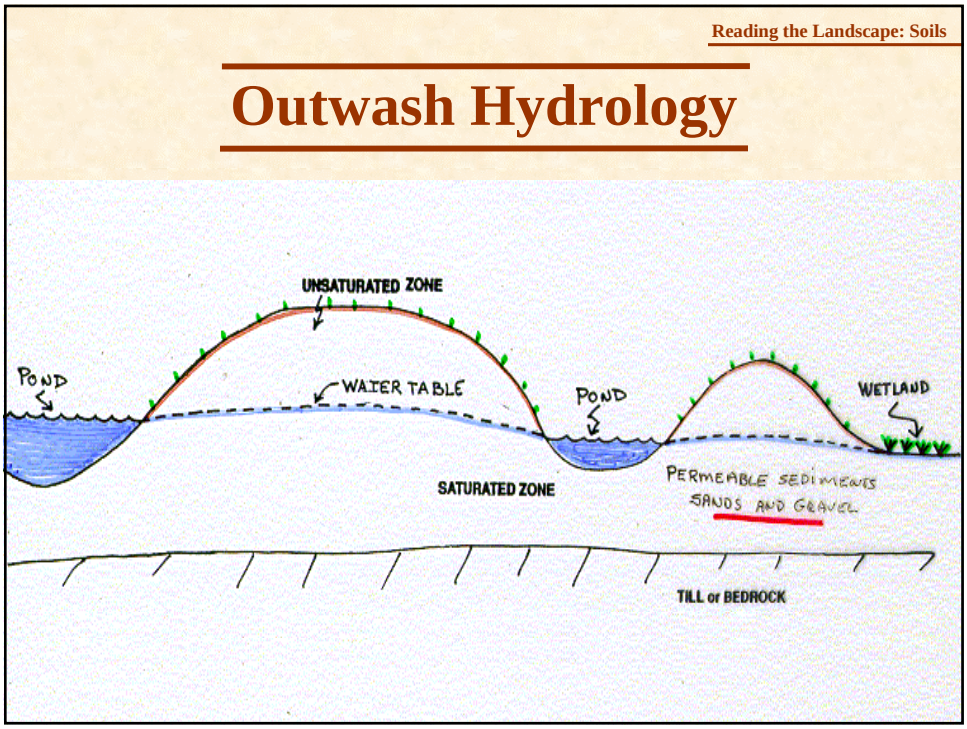
Hydrology in Tills



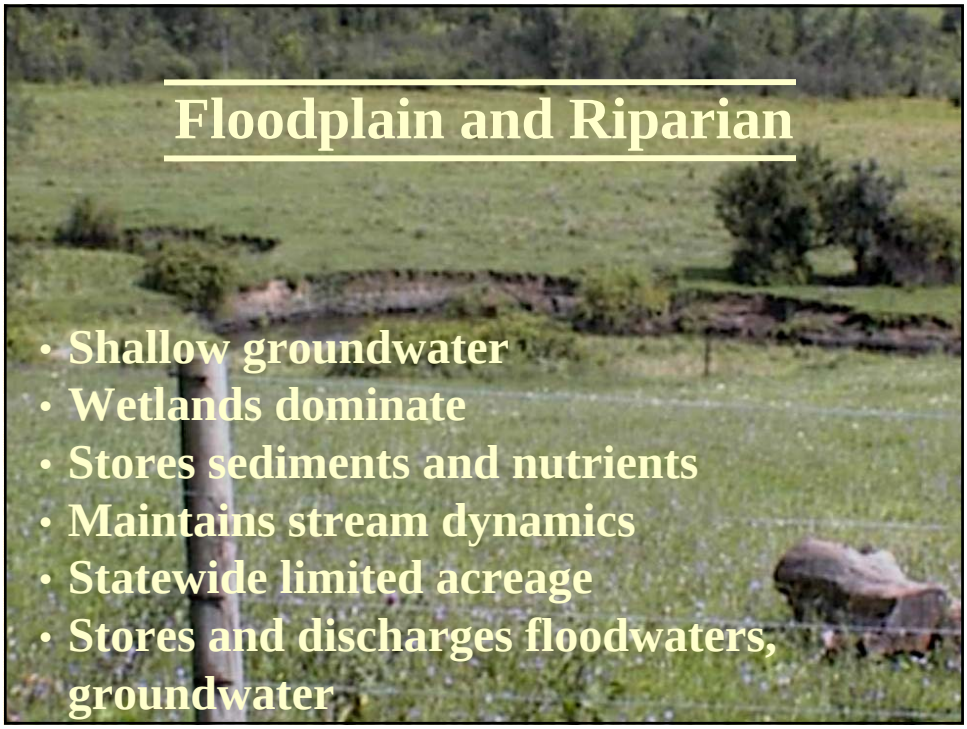
Development Impacts

- Subsurface drainage
- Increased runoff
- Sewers
- Erosion

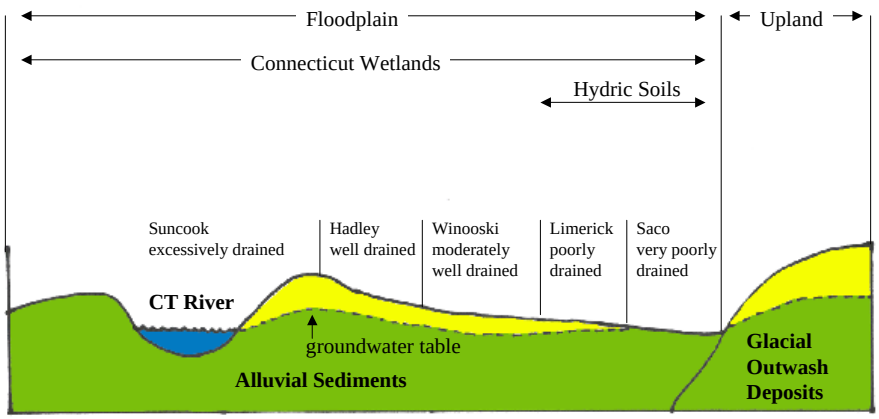

Glacial Outwash
(sand and gravel)
• Deep groundwater
• Few wetlands or vernal pools
• Low runoff
• Critical to recharge of larger aquifers
• Statewide in valleys, third highest percent

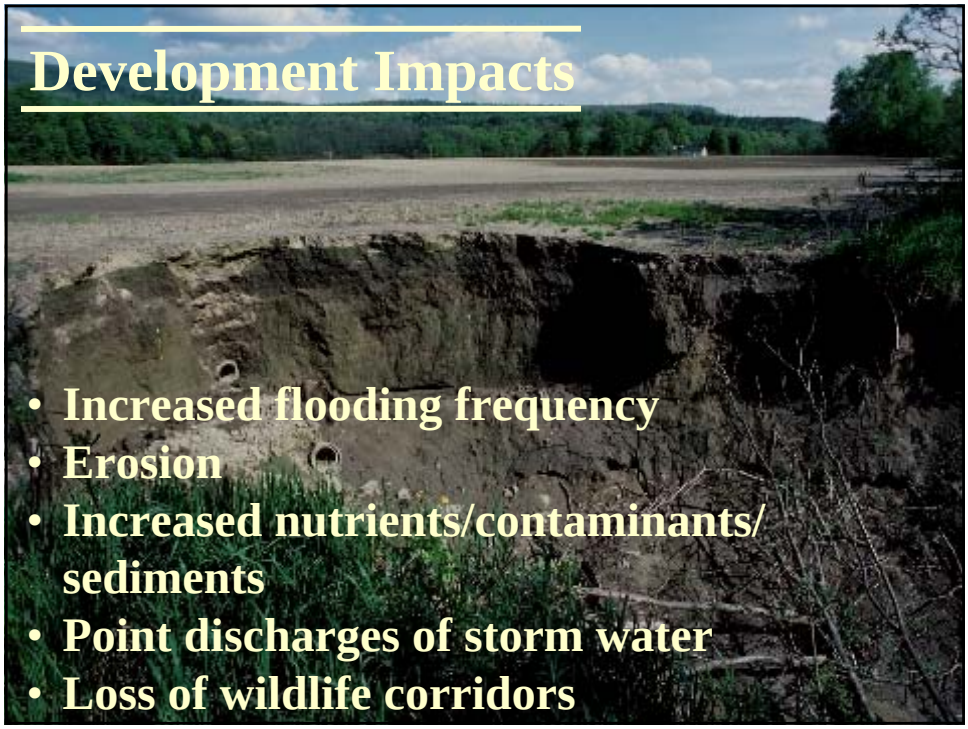

Reading the Landscape: Soils
Outwash Hydrology
UNSATURATED ZONE
POND
WATER TABLE
POND
WETLAND
SATURATED ZONE
PERMEABLE SEDIMENTS
SANDS AND GRAVEL
TILL or BEDROCK

Development Impacts
• Highest increase in runoff
• Loss of groundwater recharge
• Loss of prime farmland
• Possible groundwater contamination


Floodplain and Riparian
• Shallow groundwater
• Wetlands dominate
• Stores sediments and nutrients
• Maintains stream dynamics
• Statewide limited acreage
• Stores and discharges floodwaters, groundwater

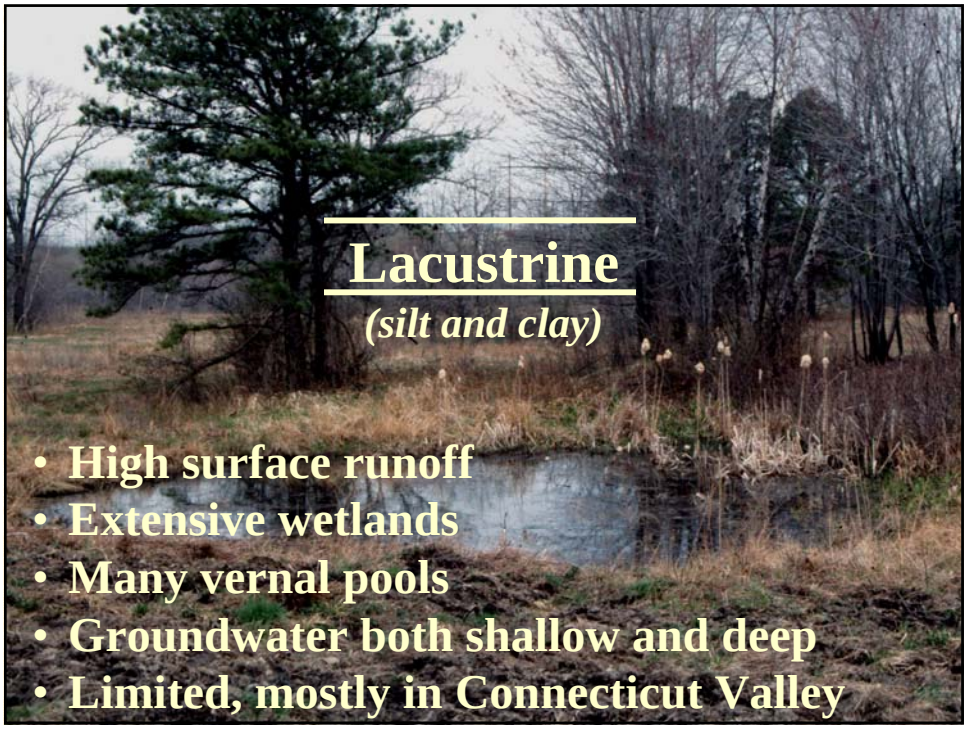
A Topodrainage Sequence on the Connecticut River Floodplain

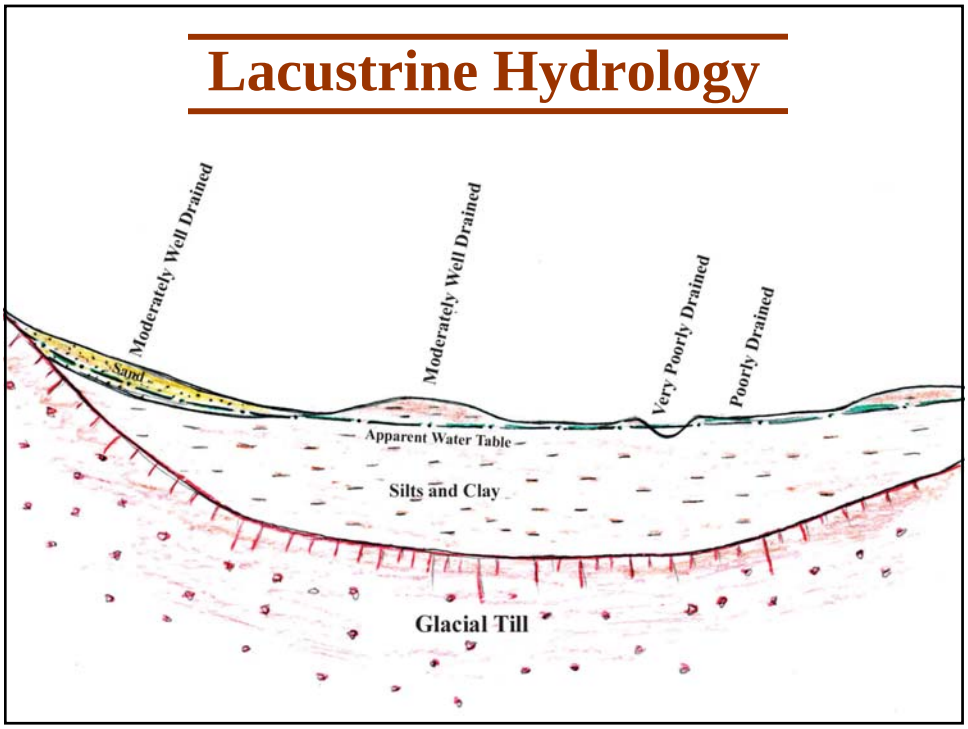




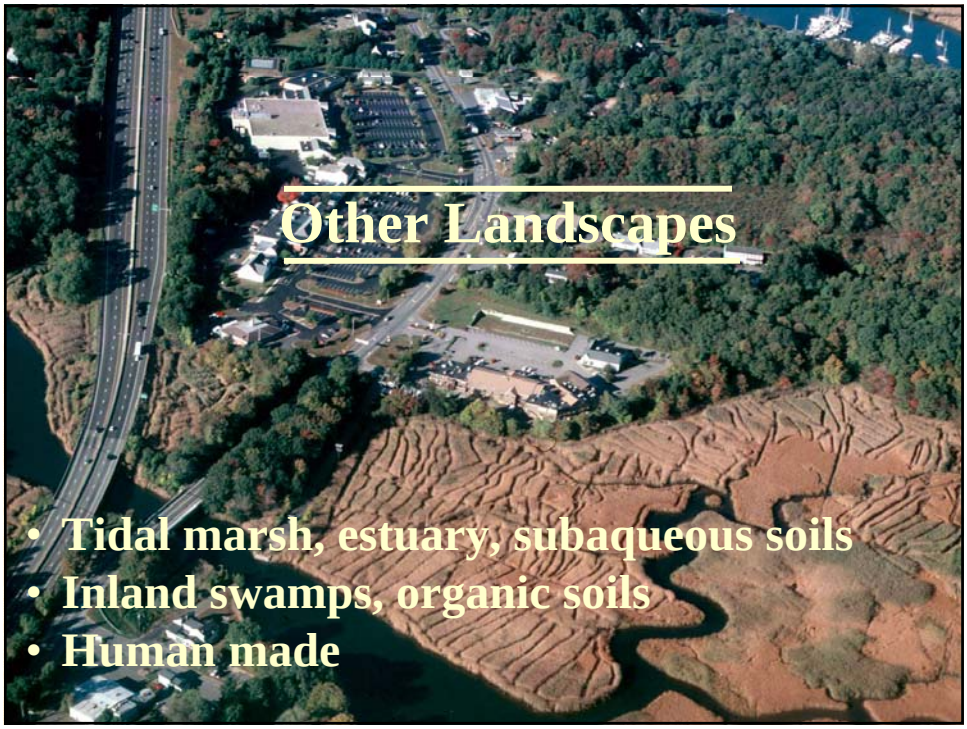
Development Impacts

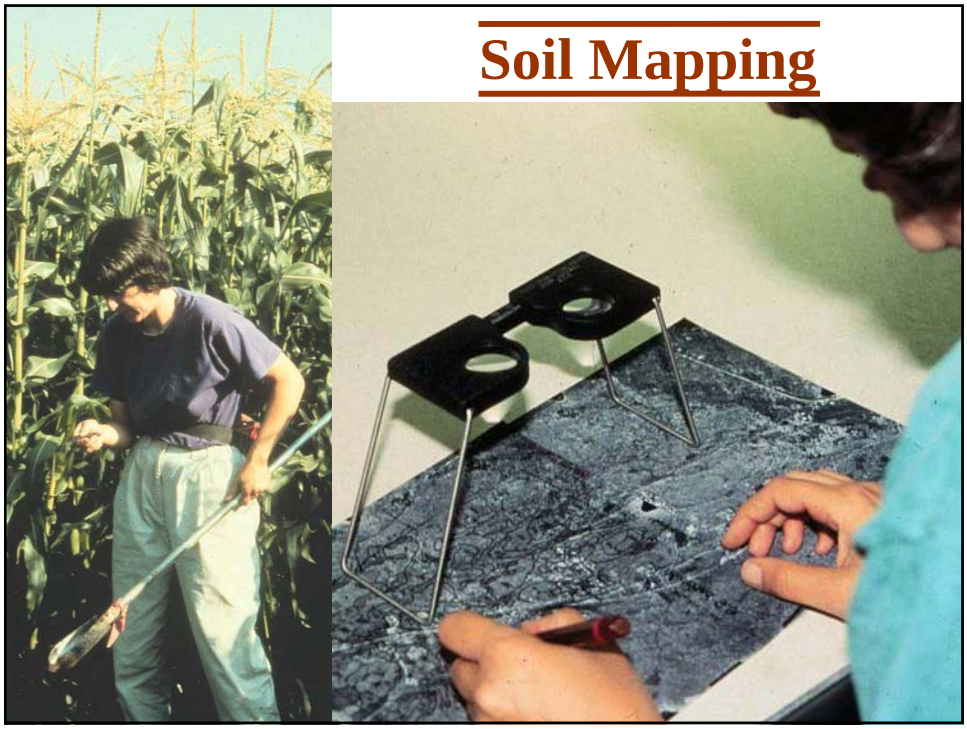
- Increased flooding frequency
- Erosion
- Increased nutrients/contaminants/ sediments
- Point discharges of storm water
- Loss of wildlife corridors

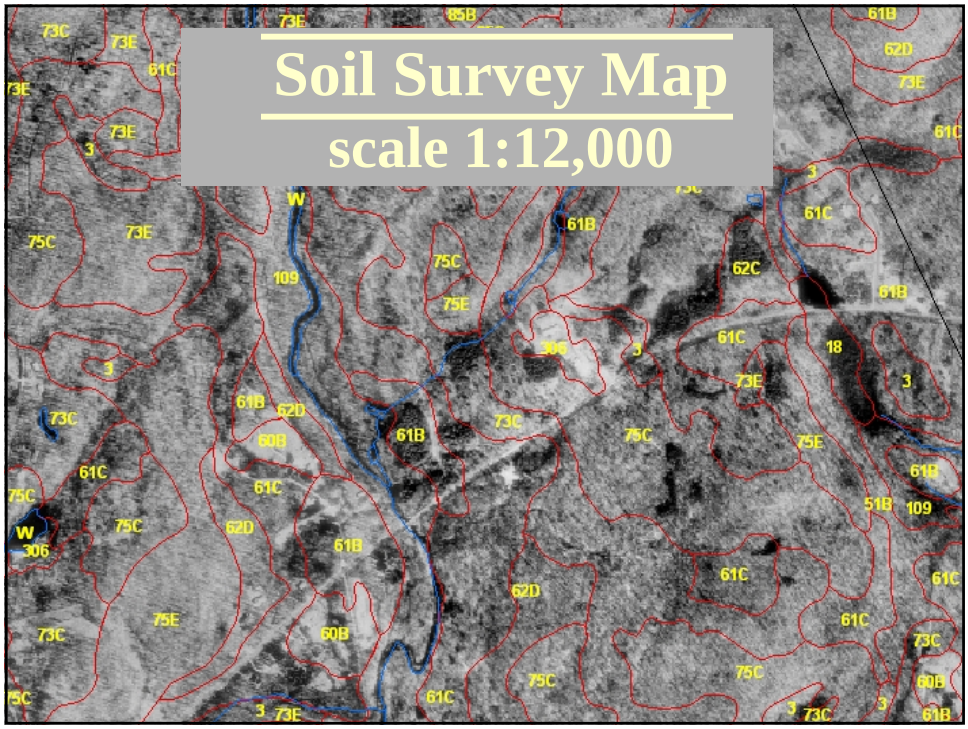

Lacustrine
(silt and clay)
• High surface runoff
• Extensive wetlands
• Many vernal pools
• Groundwater both shallow and deep
• Limited, mostly in Connecticut Valley


Lacustrine Hydrology
Moderately Well Drained
Sand
Moderately Well Drained
Very Poorly Drained
Poorly Drained
Apparent Water Table
Silts and Clay
Glacial Till

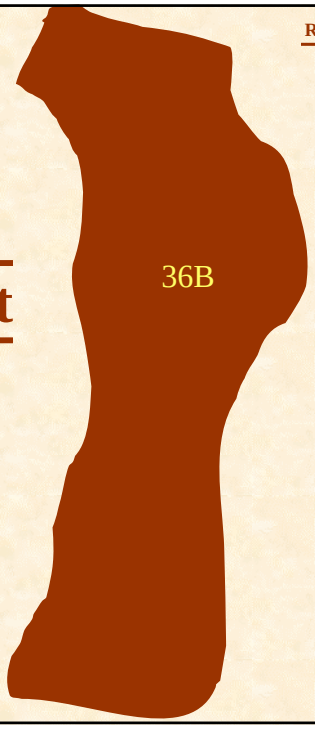
Development Impacts
• Increased runoff
• Subsurface drainage for homes and roads
Surface runoff captured
• Sewers
• Erosion


Other Landscapes
• Tidal marsh, estuary, subaqueous soils
• Inland swamps, organic soils
• Human made


Soil Mapping


Soil Survey Map
scale 1:12,000

Soil Map Unit



Definition of Terms

36B – Windsor loamy sand, 3 to 8 percent slopes

- Soil series – Windsor
- Texture of surface layer – loamy sand
- Phase – 3 to 8 percent slopes

Kinds of Soil Map Units

1. **Consociations**
   – single kind of soil or miscellaneous area
   - Agawam fine sandy loam, 0 to 3 percent slopes
   - Mudgepond silt loam
   - Udorthents, smoothed

Kinds of Soil Map Units *(continued)*

2. **Complexes**
   – two or more kinds of soils or miscellaneous areas
   – occur in regular pattern
   - Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky
   - Manchester-Urban land complex, 0 to 3 percent slopes

Kinds of Soil Map Units *(continued)*

3. **Undifferentiated Groups**
   - two or more kinds of soils or miscellaneous areas
   - soils occur in an irregular pattern
     - Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony

Kinds of Map Units

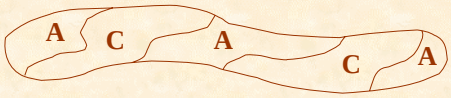
Consociation

Dominantly Soil A

29A Agawam fine sandy loam, 0 to 3 percent slopes

Complex

Always Soil A with Soil C



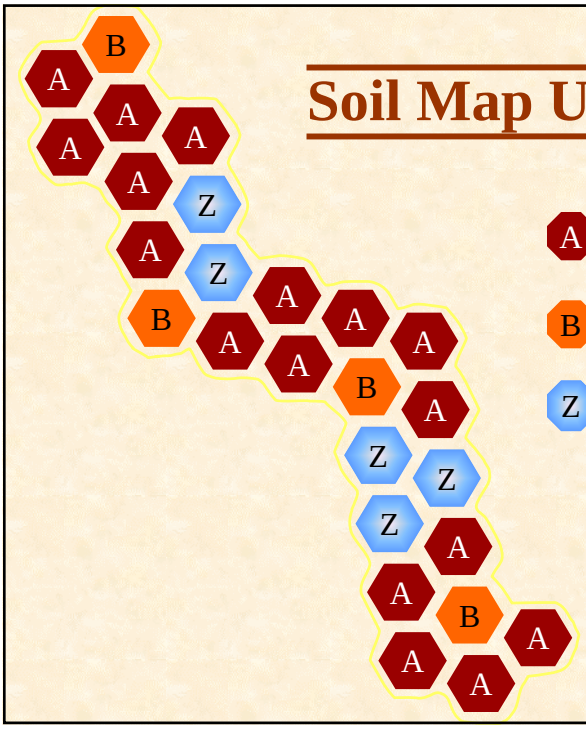
237A Manchester-Urban land complex, 0 to 3 percent slopes

Undifferentiated

Soil A and B or All A or All B

86D Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony

Soil Map Unit



A Named soil

B Similar soils

Z Dissimilar soils

Other Resources

- Topographic Maps
- Air Photos
- Surficial Geology Maps
- Consultant's Maps
- FEMA Maps

Nothing
Beats
the On-Site
Investigation!