Is a Bioretention Garden System Right for Your Site?

• Drainage
  – Connected or disconnected
  – Slope

• Space
  – Is there enough available space?

• Sustainability
  – Will it be maintained
  – Is it affordable

• Is there a better or more appropriate system?
Other BMP system options to consider

- Level spreaders
- Wet ponds
- Bioswales
- Porous/pervious paving
- Rain barrels, above-ground cisterns
- Below-ground cisterns, dry wells and modular storage
Critical Consideration: Potential Design Objectives

• Enhance water quality through filtration and plant uptake
• Reduce peak runoff quantities
• Storage to meet regulatory requirements (address WQv and/or additional volumes associated with significant storm events)
Understanding the Landscape

To be successful, the bioretention garden designer must have a full understanding of the particular landscape in which they are working.
Nebraska’s Environment

- Prairie Heritage
- Spring and early summer storms
- Warm/hot summers – often dry
- Deep loess soils
- Native vegetation – deep roots
- Impact of urbanization
Nebraska’s Environment

- Rolling landscapes
- Established urban/expanding urban areas
- Incised streams, degraded water quality
Effective stormwater management requires integrated management of water, vegetation, and soil.
The Wisdom of Native Plants

- Adapted to this region
- Water and nutrient stingy
- Deep roots
- Beautiful leaves and flowers
Soil: How it “Works”

Soil Chemistry

• Soil particles have negative charges on surface – attract cations (metals and salts)
• Adsorption – cation exchange (CEC)
• Finer soils have more surface area and higher CEC
• Organic soils have highest CEC, also attract organic compounds

Sand
CEC 2-6 meq/100g

Silt
CEC 10-25 meq/100g

Clay
CEC 20-75 meq/100g
Drainage of Water into Soil
Soil: How it “Works”

1. **Organic Matter – Carbon**
2. **Soil Microflora – Bacteria and Fungi**
3. **Hydrology**
   - storage / evaporation / recharge / detention
4. **Storing Cycling Nutrients (bacteria / fungi)**
   - phosphorous / nitrogen / carbon
5. **Soil Structure**
6. **Water Quality**

“Most diverse ecosystem in the world”