

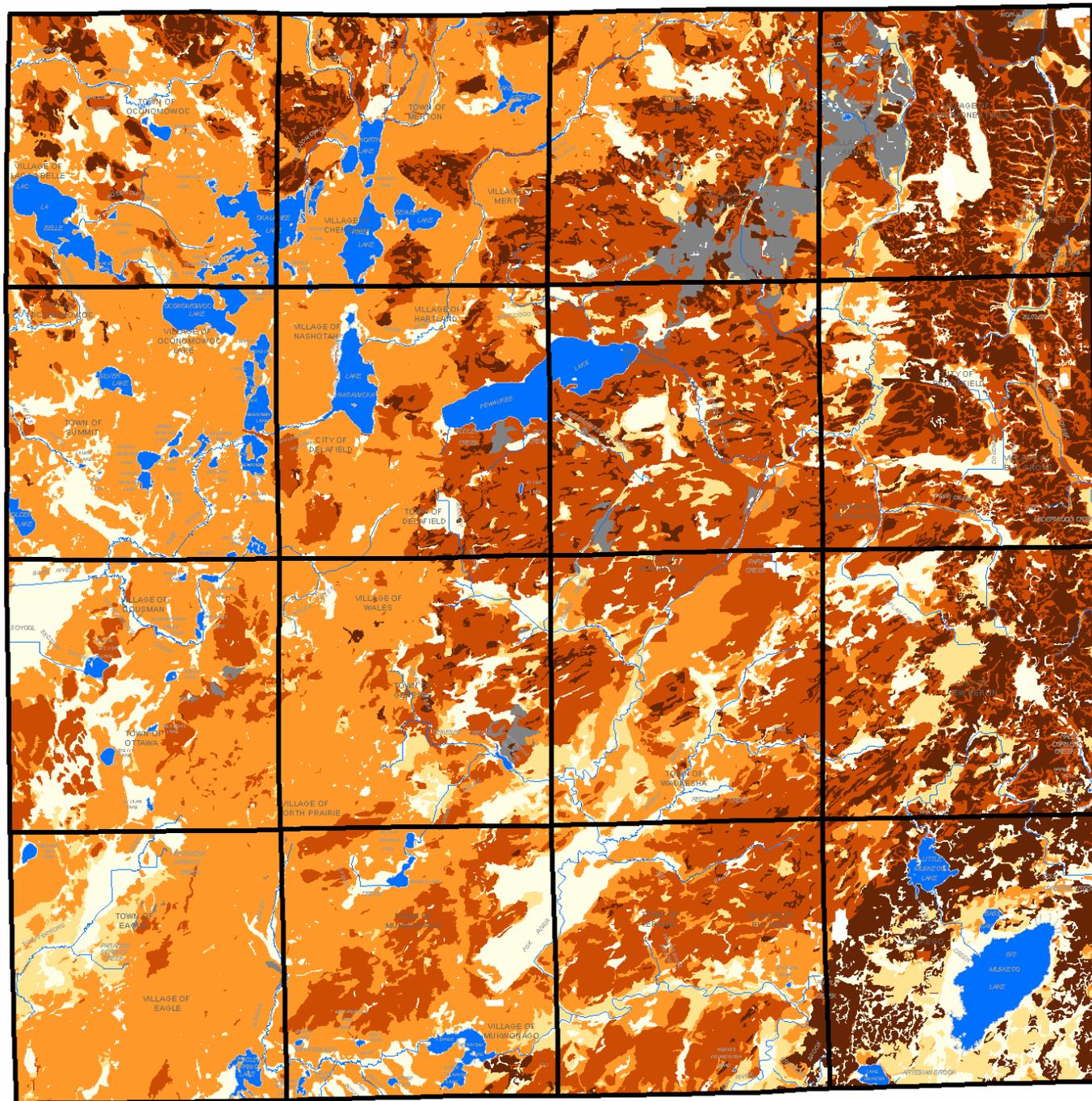
Interpreting Soils for Seasonal High Water Table & Basement Floor Separation

Steve Hoelz, Waukesha County
Environmental Health Division

Key Soil Formation Factors

- Parent material
 - Glacial, organics, wind/water deposits, etc.
- Climate
 - Precipitation, freeze/thaw, etc.
- Living organisms
 - Plants and animals (bacteria, fungi, etc.)
- Topography
 - Slope, drainage patterns, etc.
- Time
 - Last glacial period here 10,000 years ago

Generalized Soil Parent Material Groups Waukesha County



Legend

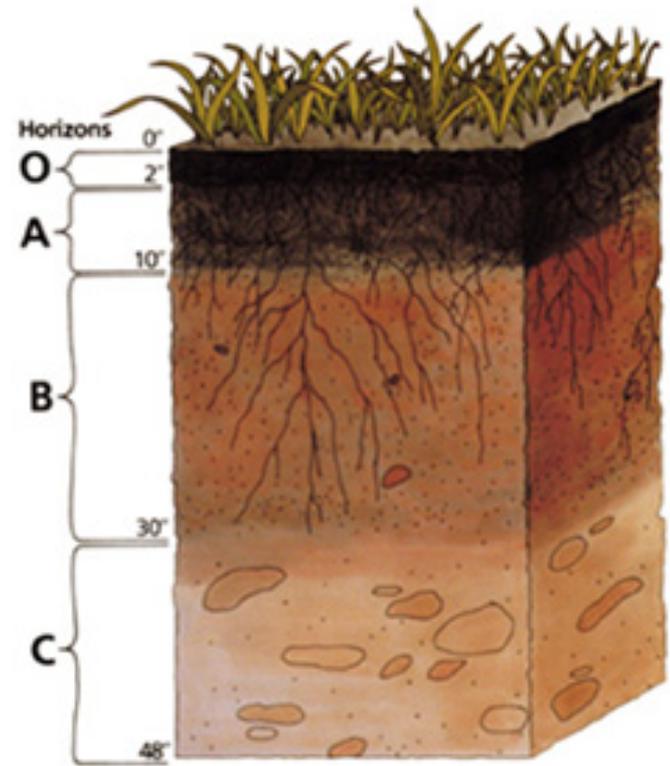
- Dense Glacial Till
- Loamy Glacial Till
- Glacial Outwash
- Lacustrine Deposits
- Alluvium / Organic
- Loess Over Dolomite

Source: Waukesha County & NRCS

USDA Soil Classification System

Key features in a soil profile description:

- Texture
- Structure
- Soil Color
- Redoximorphic features



General Soil Horizons



A = “Topsoil” - organically enriched mineral horizon

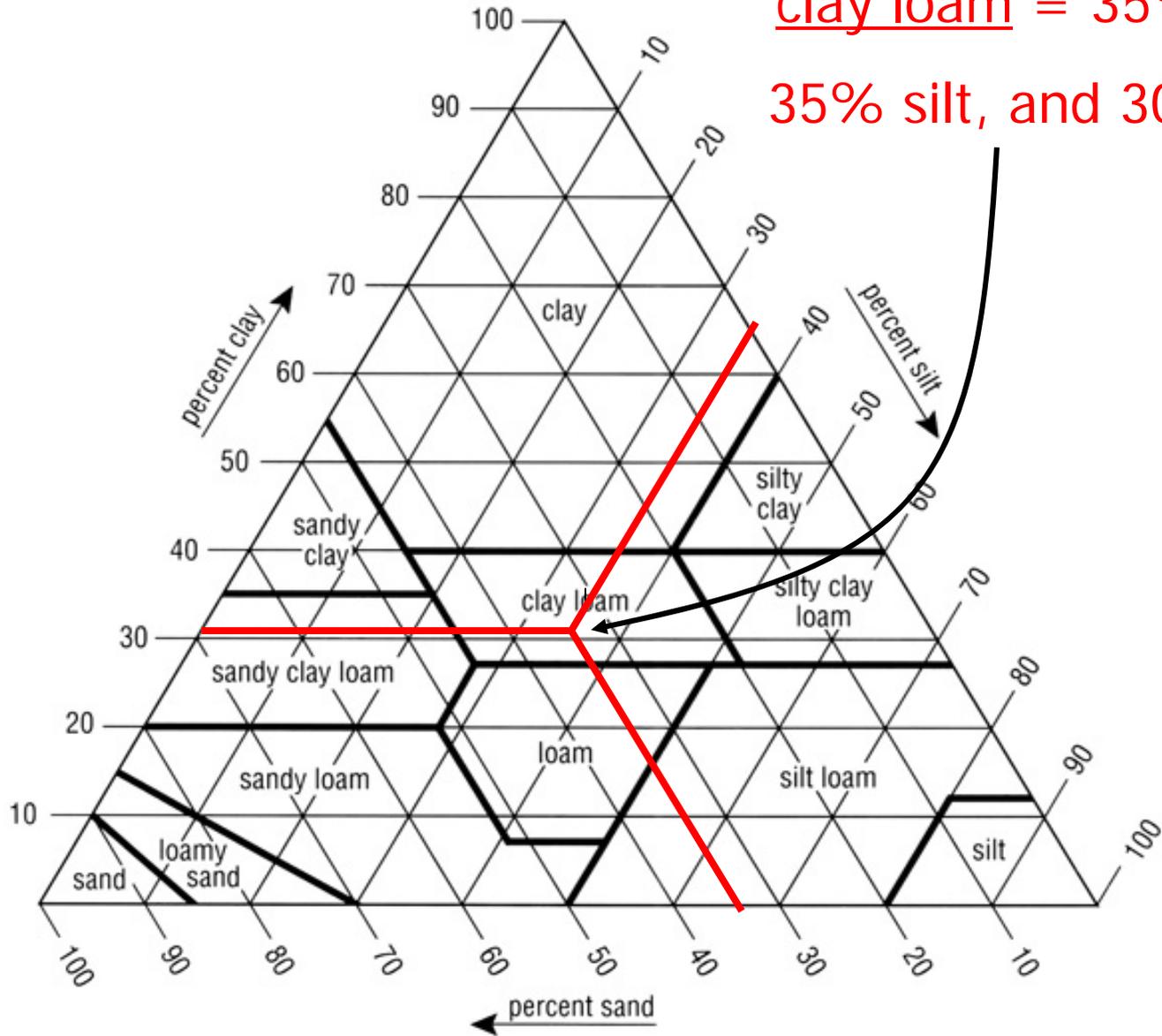
B = “Subsoil” - where minerals from A horizon accumulate from weathering

C = “Substratum” – parent material with little affect by soil formation factors

R = Hard bedrock (if present within the profile)

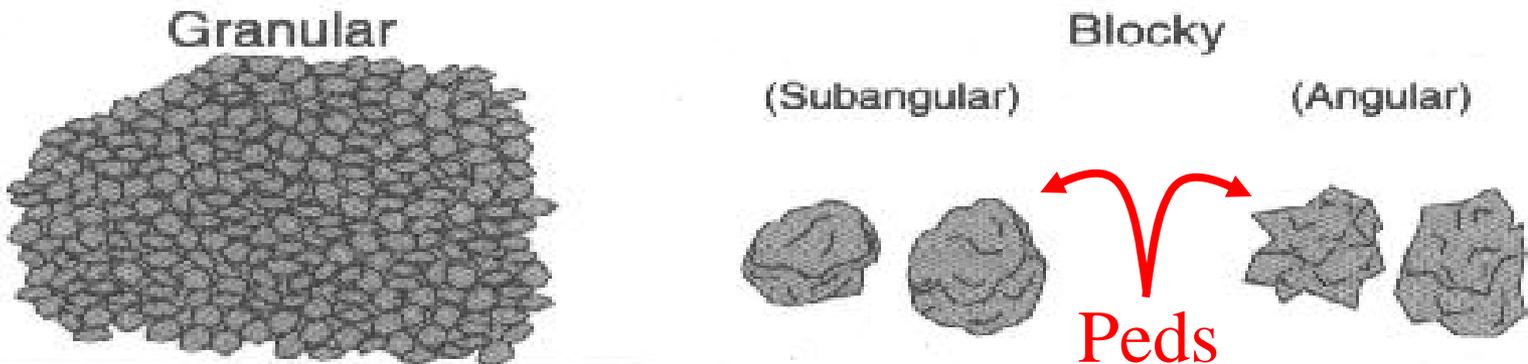
USDA Texture Triangle

clay loam = 35% sand,
35% silt, and 30% clay



Soil Structure

- The arrangement of particles of sand, silt or clay into clusters called “peds”
 - Classified by distinctiveness, size and shape
 - Affects water movement through the soil
- Example shapes found locally:

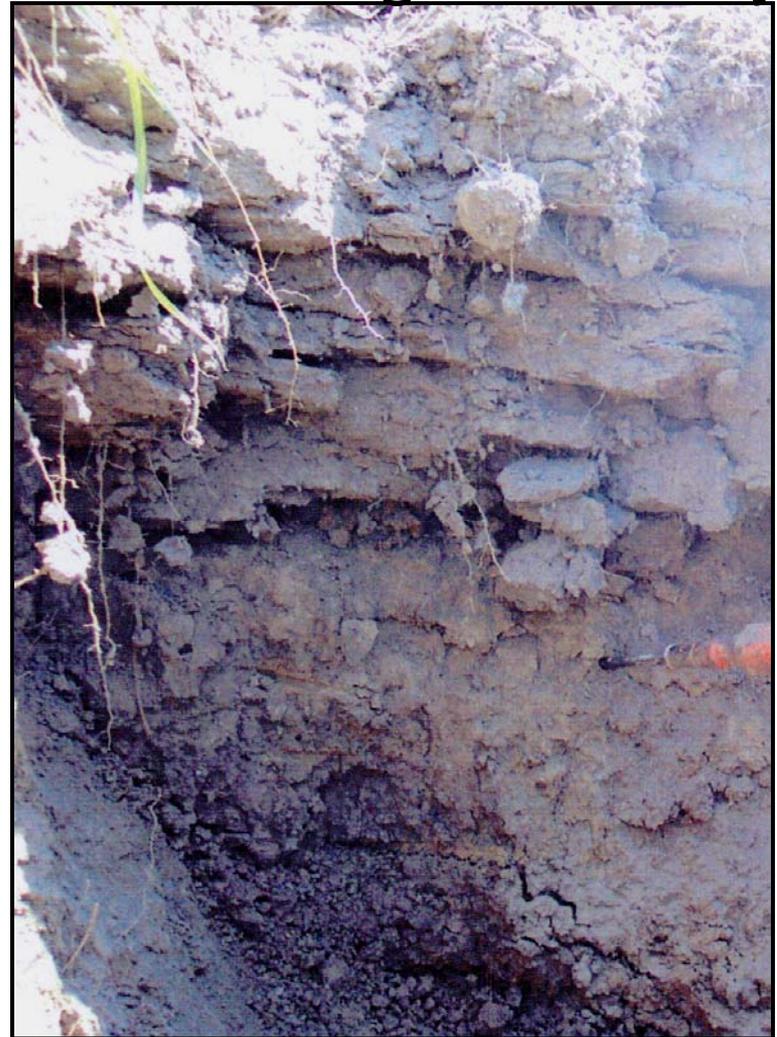


Soil Structure

Blocky

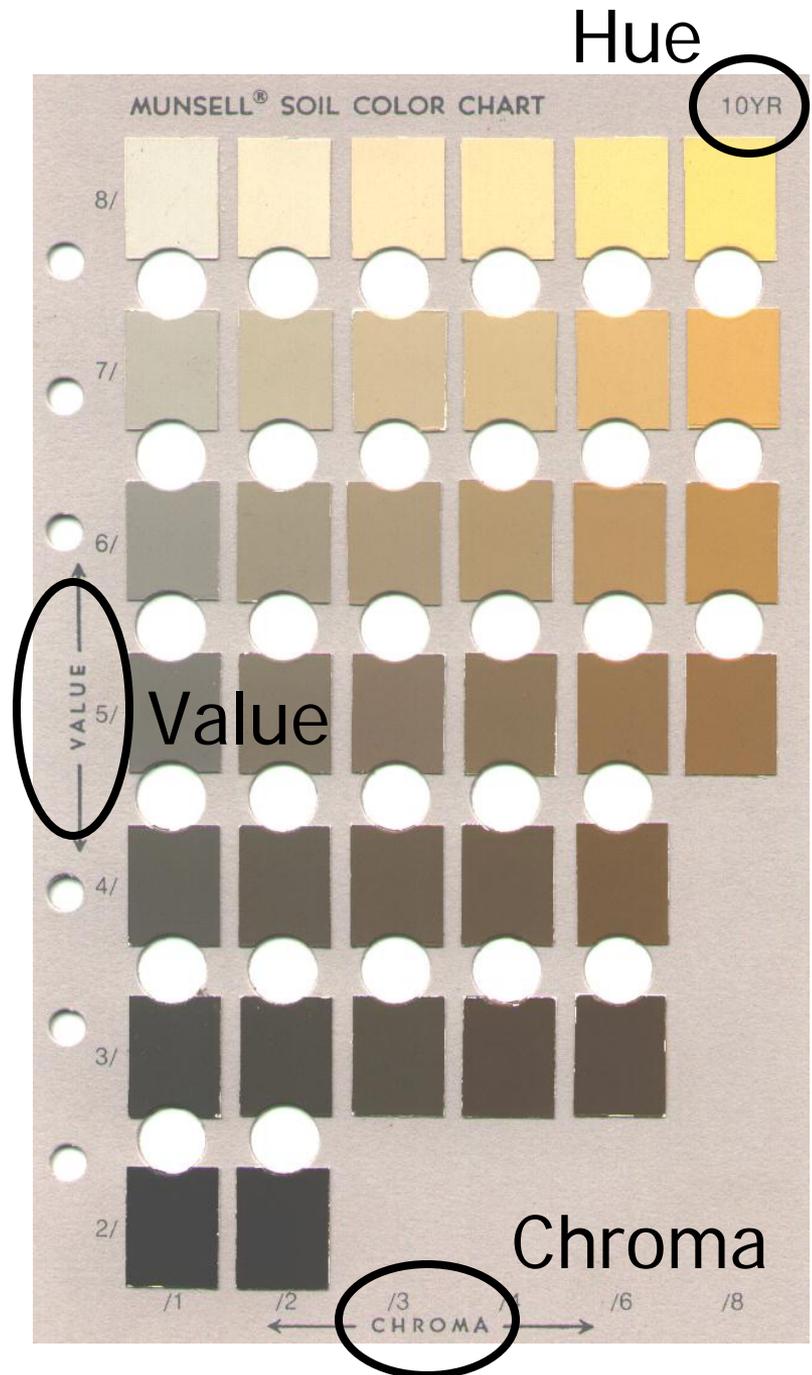


Platy over
Subangular Blocky



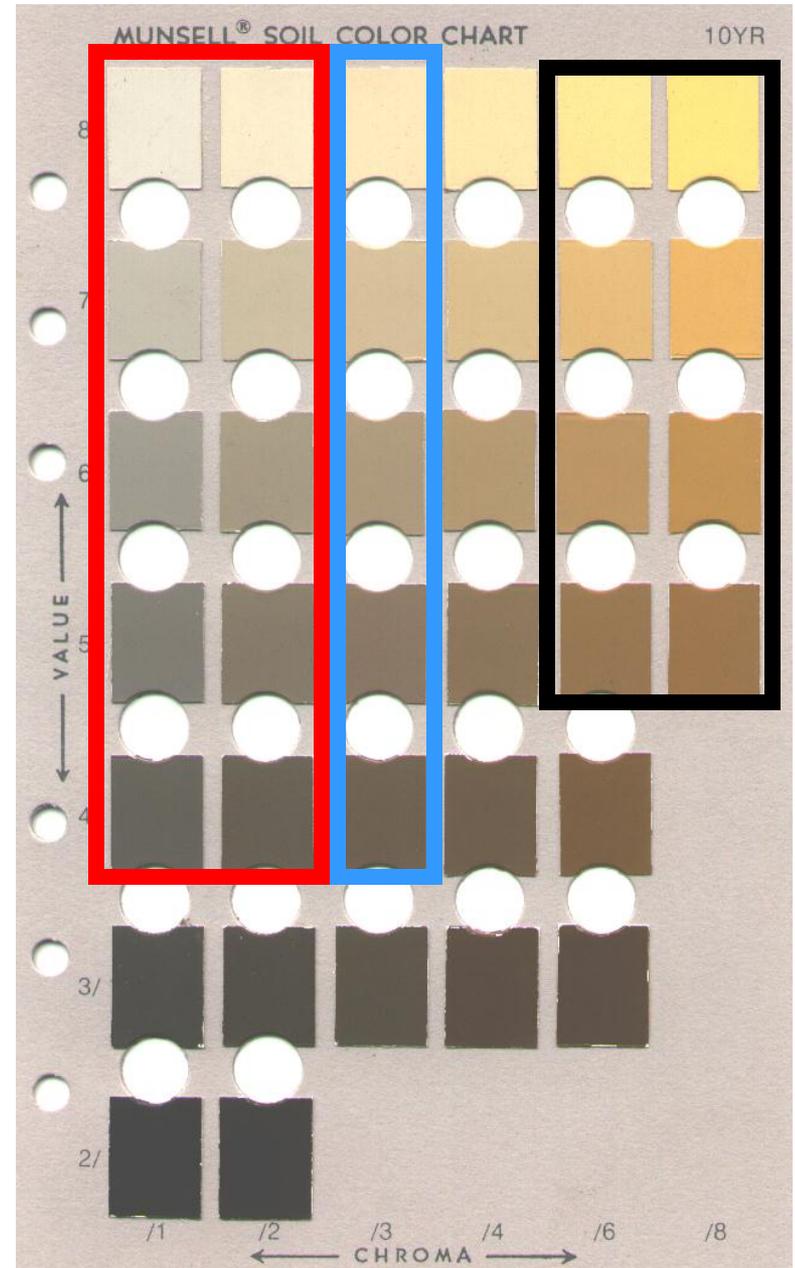
Soil Color

- **Hue** - dominate spectral color
- **Value** - relative lightness or darkness
- **Chroma** - relative purity or strength of a color

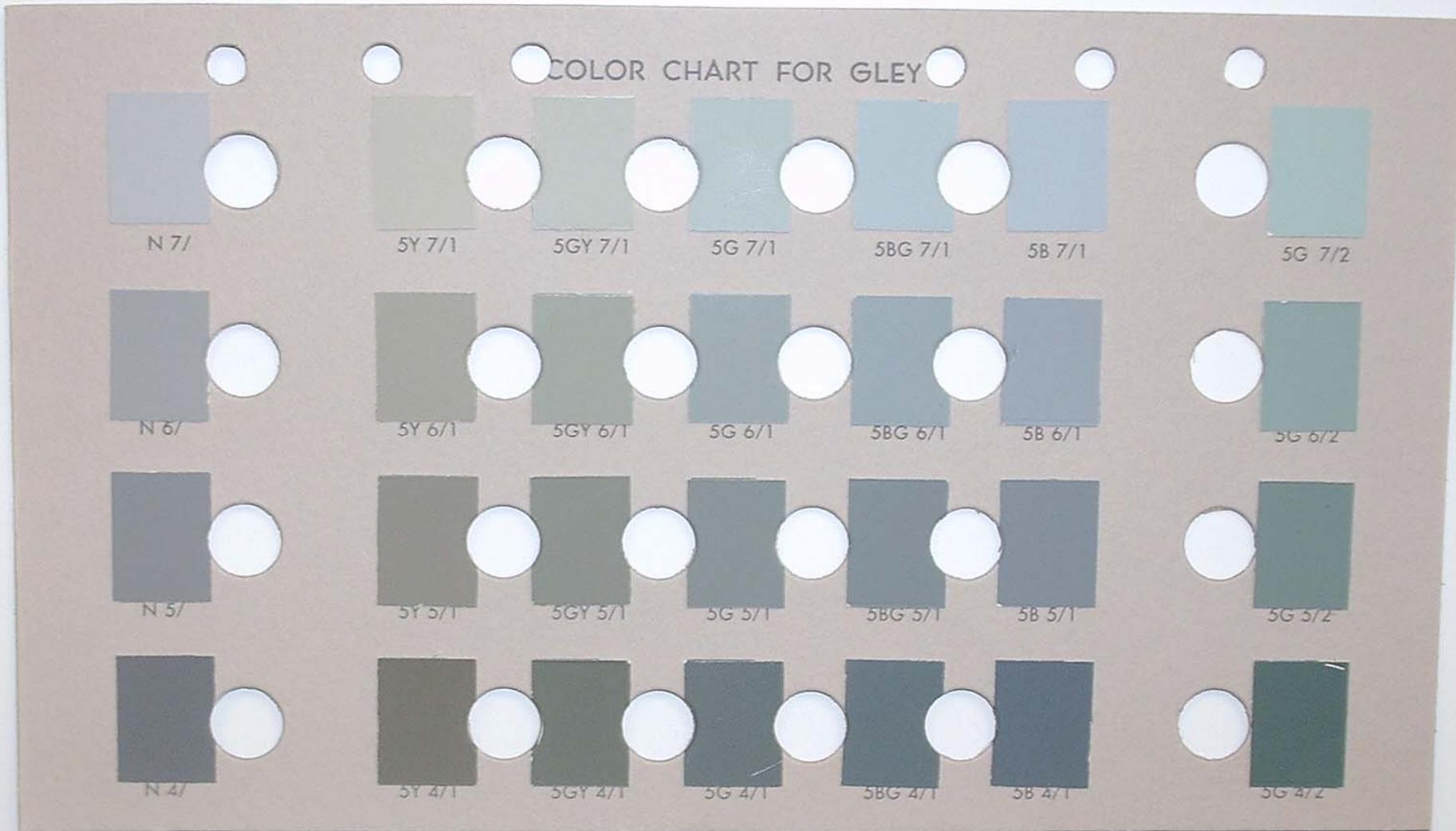


Low Chroma Colors

- Value of 4 or more and a chroma of 2 or less.
 - Redox depletions
 - Reducing conditions
- Suspicious conditions with chromas of 3 or less.
- Relocation of iron oxides (oxidation)

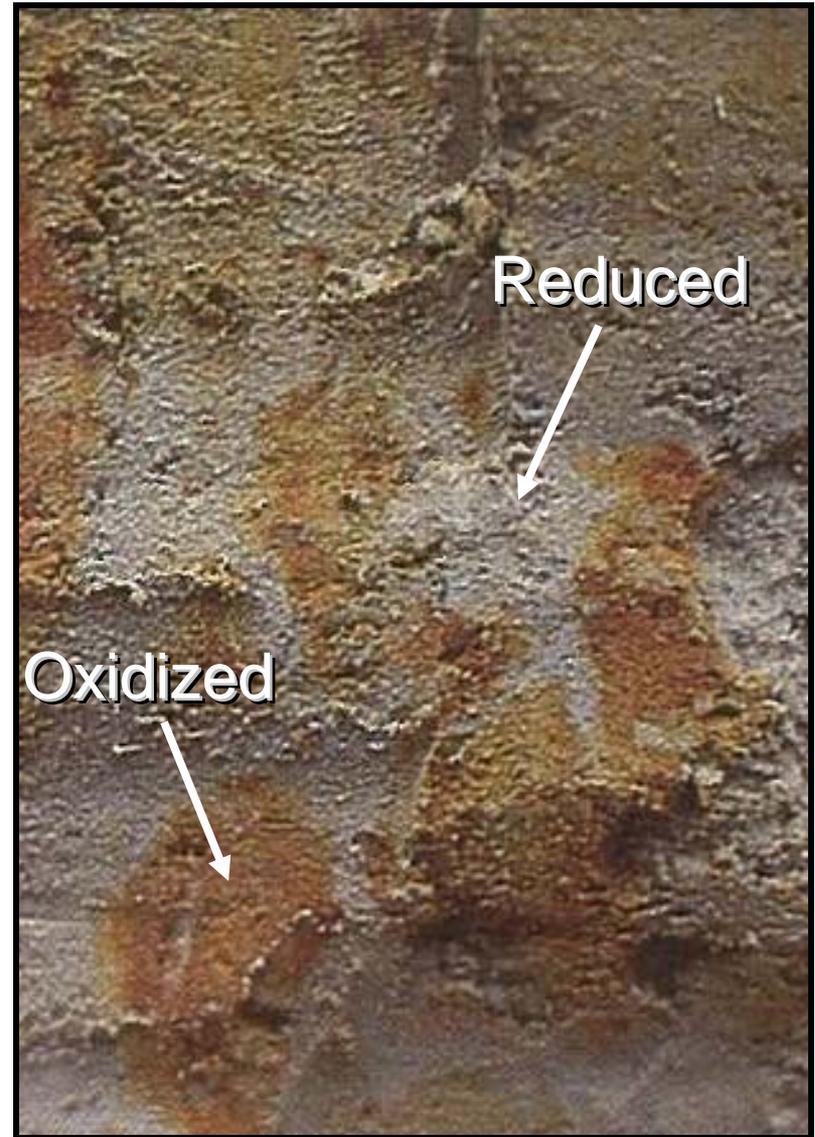


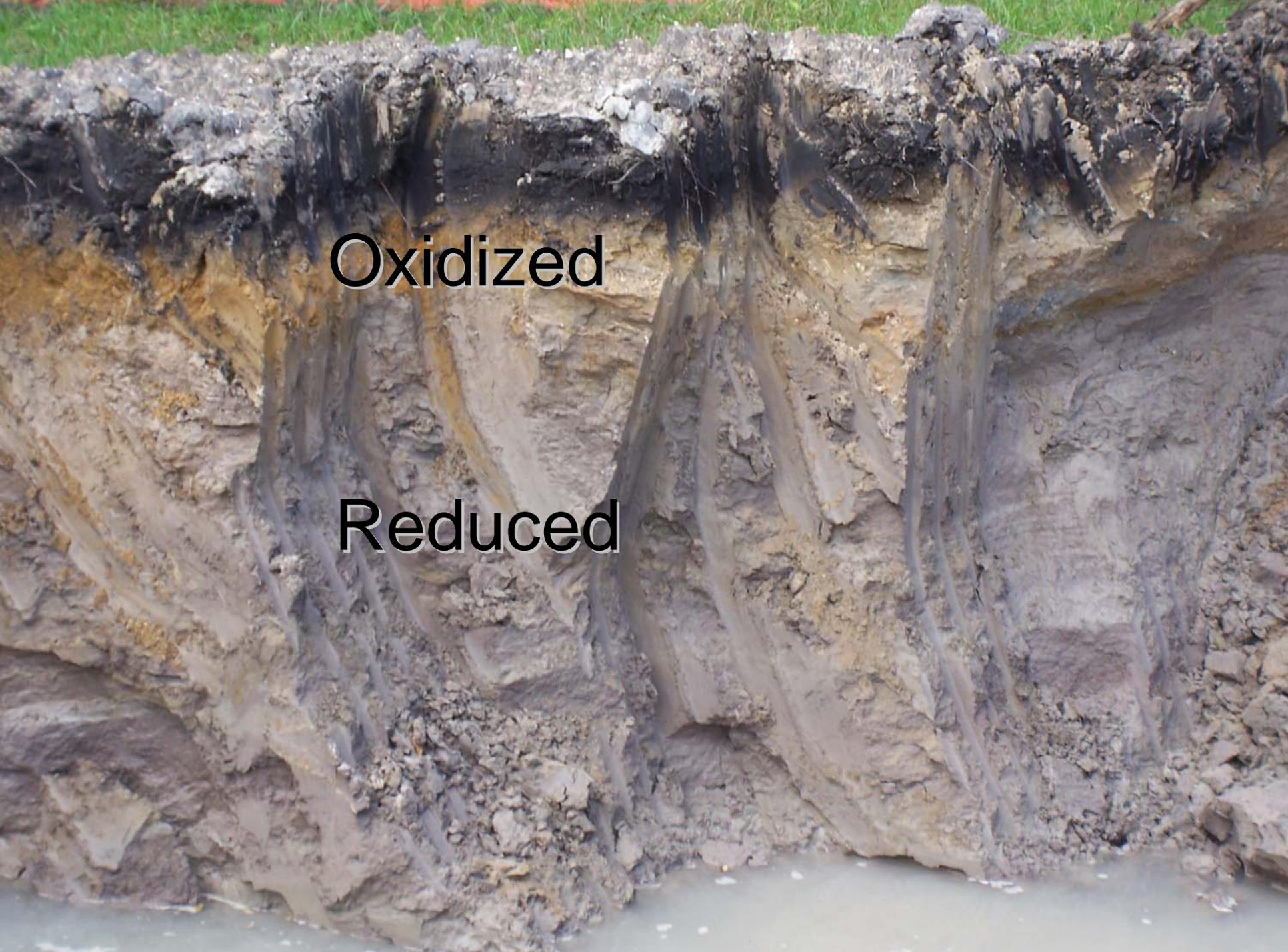
Gley Colors – Very Wet



Redoximorphic Features

- **Quantity**
 - Few, common, many
- **Size**
 - Fine, medium, coarse & very coarse
- **Contrast (relative to matrix color)**
 - Faint - barely observable
 - Distinct - readily seen
 - Prominent - obvious
- **Color** - Munsell colors
- **Type** - concentrations, depletions, concretions, nodules

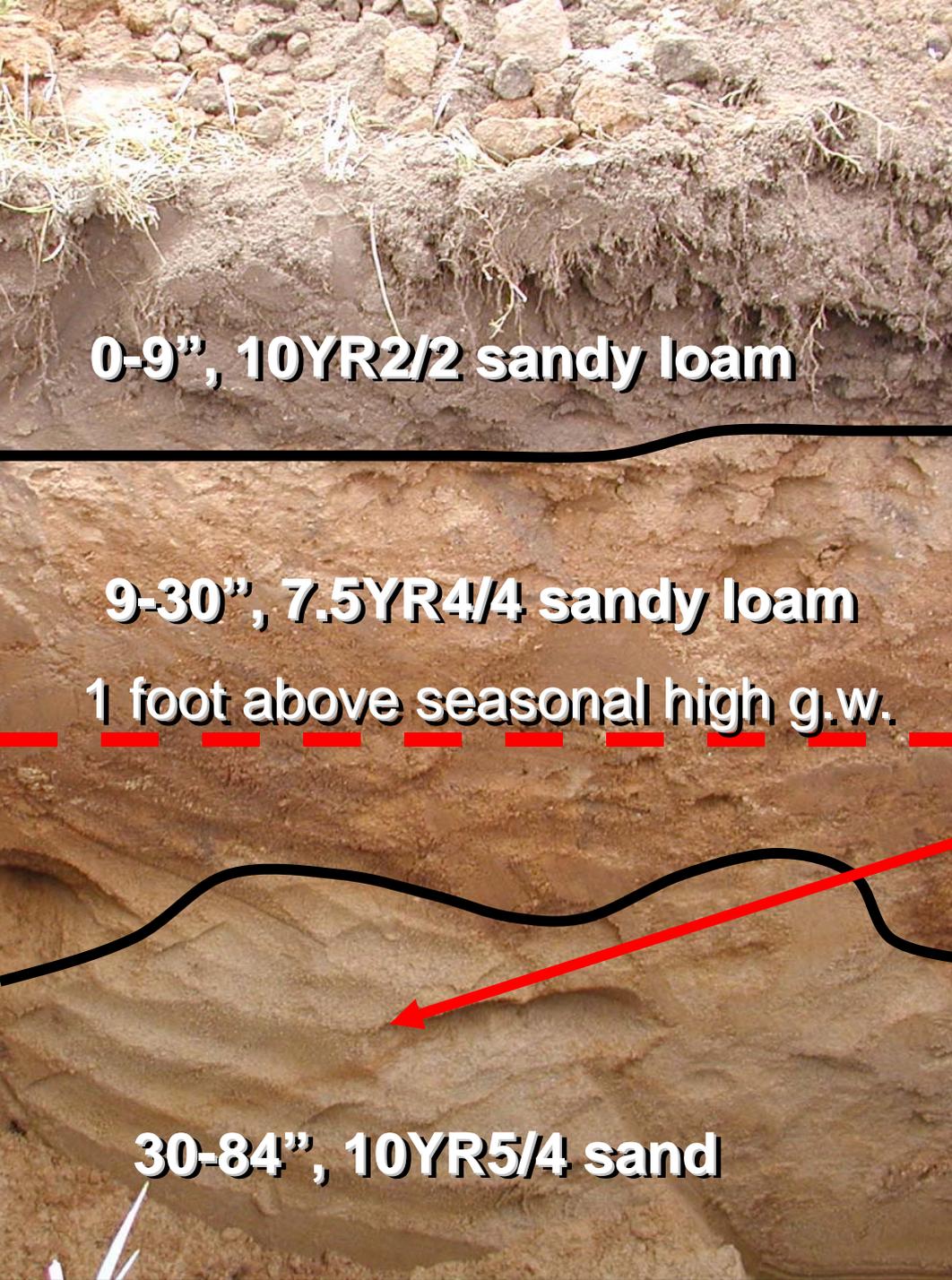




Oxidized

Reduced

Boyer sandy loam



0-9", 10YR2/2 sandy loam

9-30", 7.5YR4/4 sandy loam
1 foot above seasonal high g.w.

30-84", 10YR5/4 sand

- Outwash parent material
- Good infiltration
- This one found near Fox River
- Groundwater indicators (redox)



**Contrasting
colors –
mottling?**

Hochheim loam

- Loamy till soil
- Located at bottom of hill next to wetland
- Observed water table & redox above

Hochheim

0-13", 7.5YR 3/2 sandy loam

13-16", 10YR 5/3 sandy loam

1 foot above seasonal high g.w.

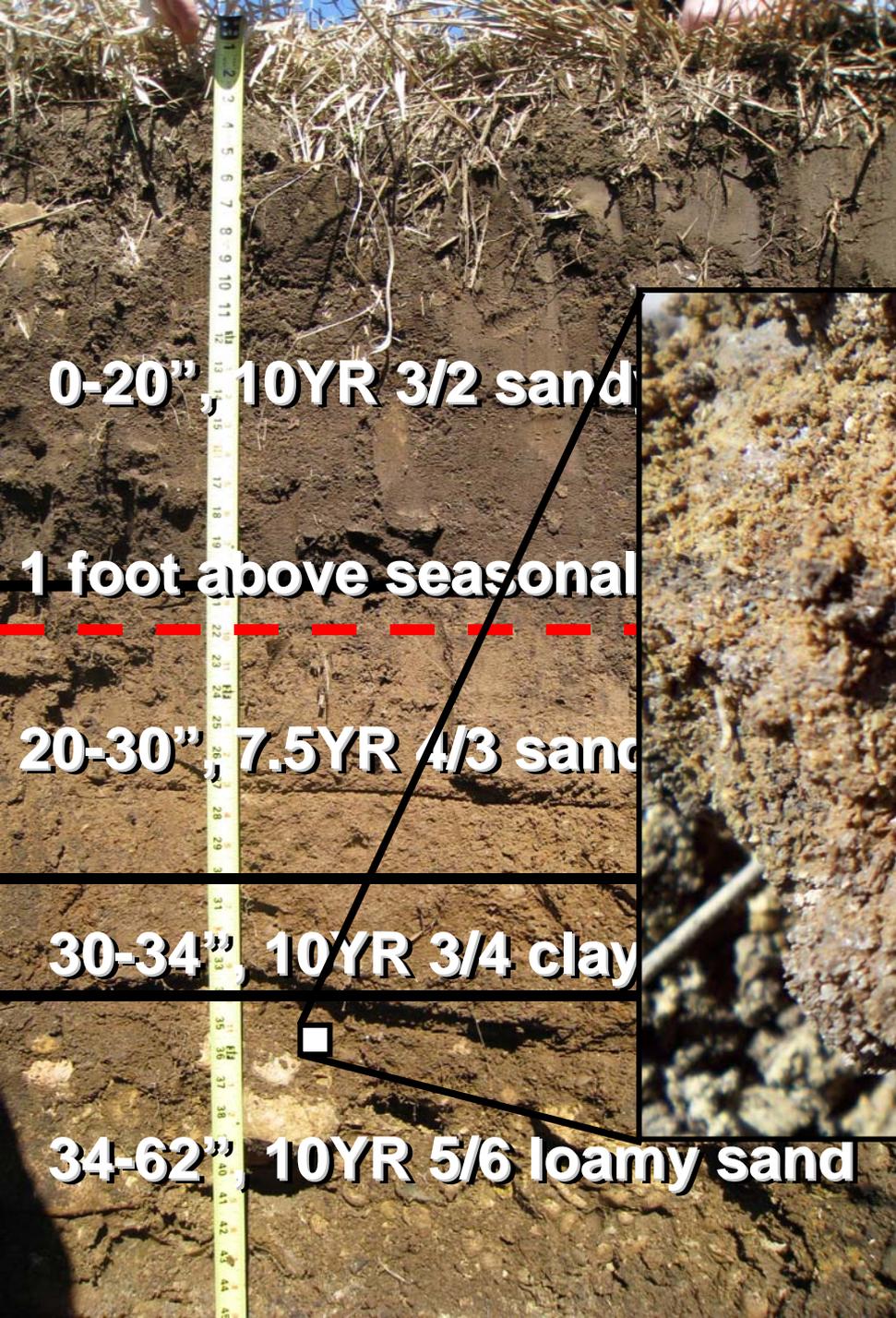
16-30", 7.5YR 4/4 clay loam

30-55", 7.5YR 4/4 gr. clay loam



Virgil loam

(St. Charles/Drummer group)

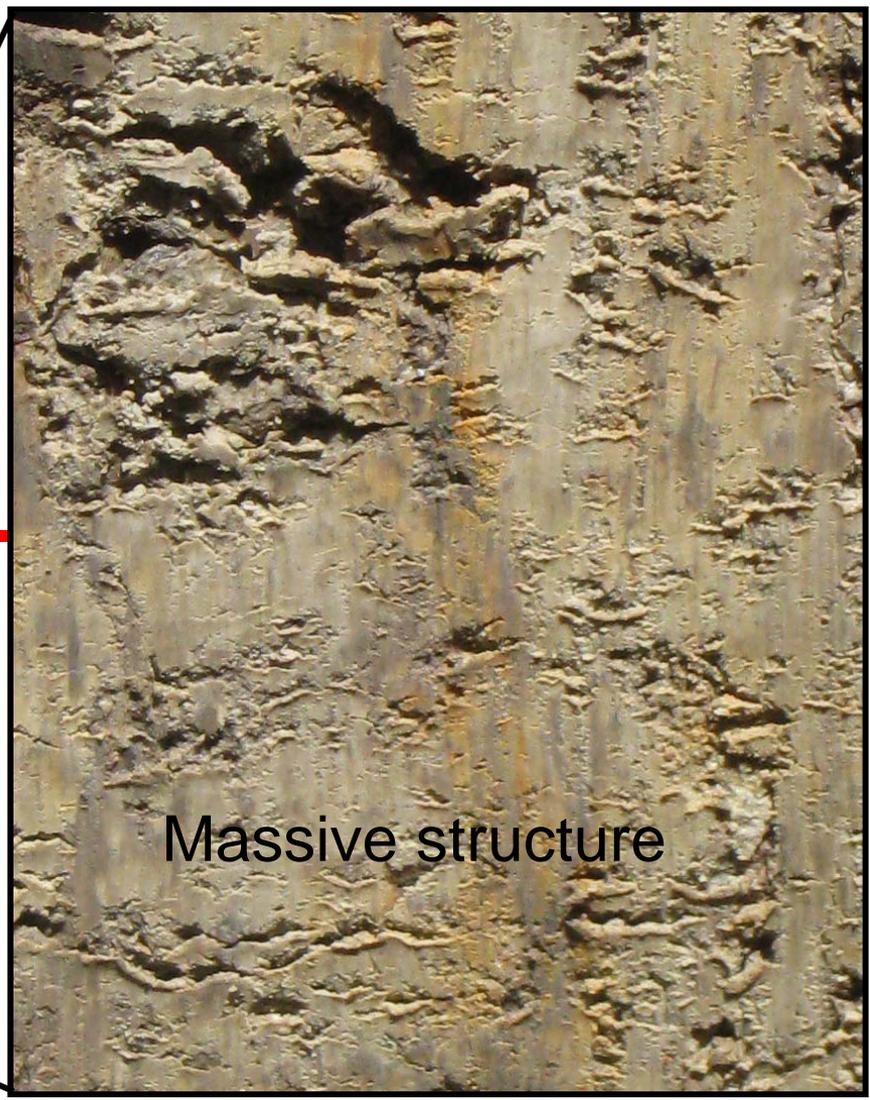




Virgil loam

- 1 hour later
- Water at 42"

Juneau



Hochheim loam

0-11", 7.5YR 3/2 sandy loam

11-23", 7.5YR 4/4 clay loam

23-30", 7.5YR 4/4 sandy loam

30-51", 10YR 5/4 sandy loam

- Loamy till soil
- Clayey subsoil
- Located top of hill in Town of Genesee
- No groundwater indicators or basement limitations
- Redox may occur in silt loam or finer soils over substratum of loamy sand or coarser
 - Tension zone
 - Requires "Seasonal High Groundwater Determination Report" (Form A)

Example Profile with Tension Zone

Remarks: _____

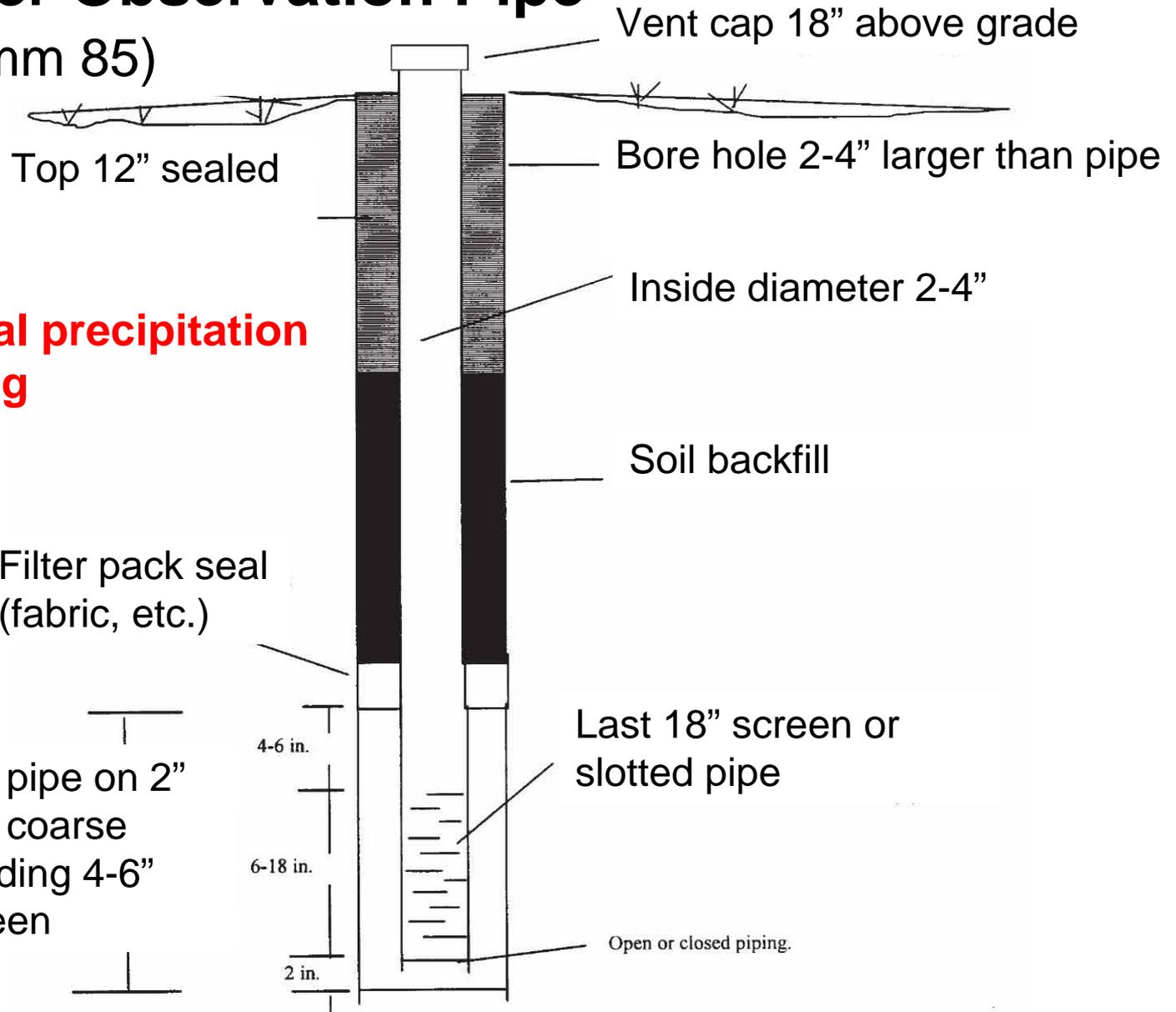
Boring #	1	0-9	10YR3/3	None	sil	1fsbk	mfr	cs	2f	0.2	0.3
	2	9-36	10YR4/4	None	cl	2msbk	mfr	cs	1f	0.4	0.5
	3	36-80	10YR5/4	m3p-10YR5/8 10YR6/1	sil	0vfsg	mfi	cs	--	N.A.	N.A.
Ground elev.	4	80-134	10YR5/4	None	ms&gr	0msg	ml	--	--	0.7	0.8
181.5 ft.											
Depth to limiting factor											
36"											

Remarks: _____

Groundwater Observation Pipe

(per Comm 85)

Must have normal precipitation from fall to spring



Filter pack. Set pipe on 2" of pea gravel or coarse sand soil, extending 4-6" above slots/screen

Questions?