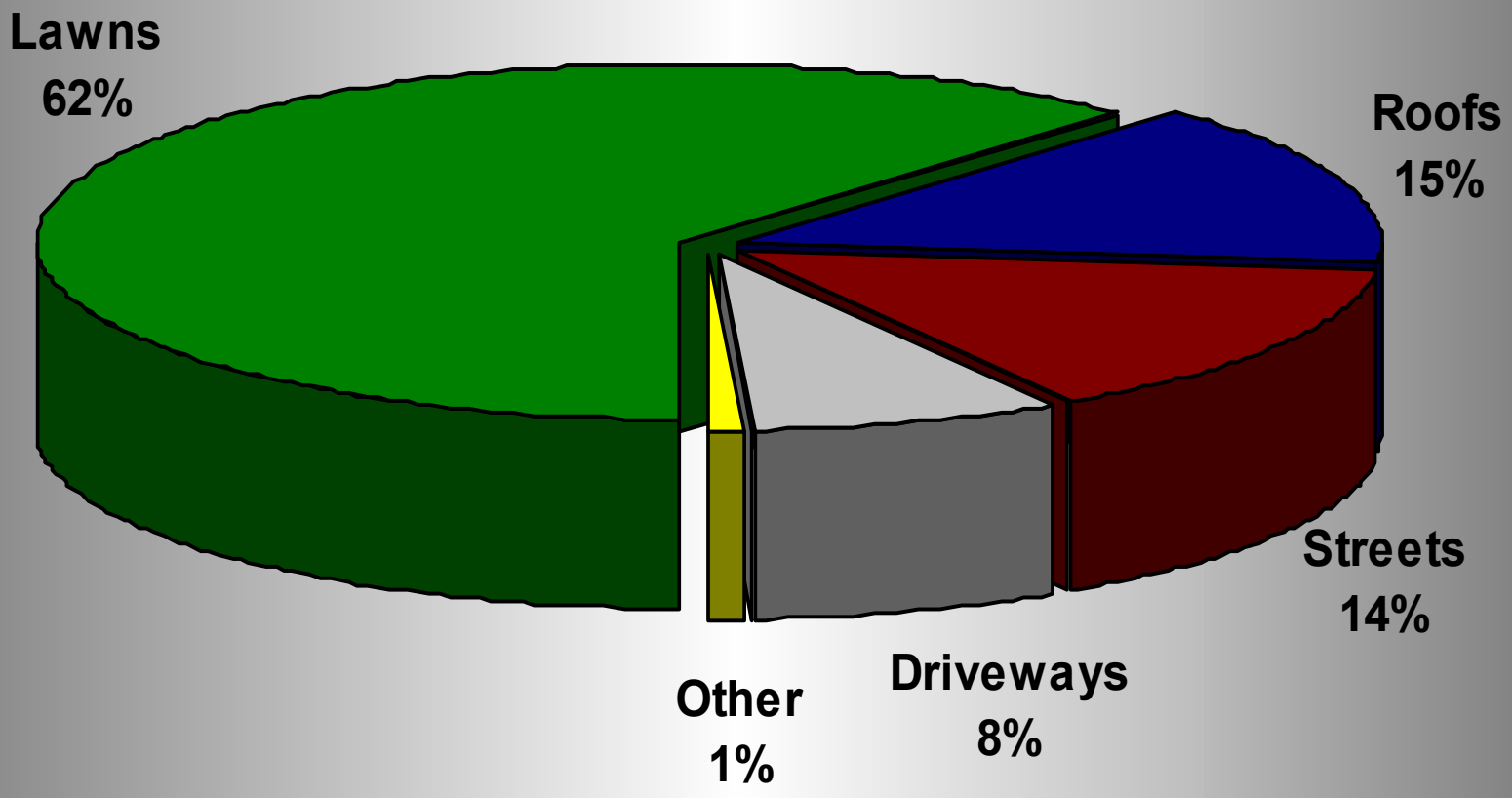
Alternative Landscape Management to Protect Water Resources

Residential Land Surfaces



Soil Compaction during site grading is main problem

Insufficient topsoil cover after grading exacerbates compaction and affects turf growth

Most organic matter lost during grading process

100% of 181 monitored lawns had low or medium organic matter levels

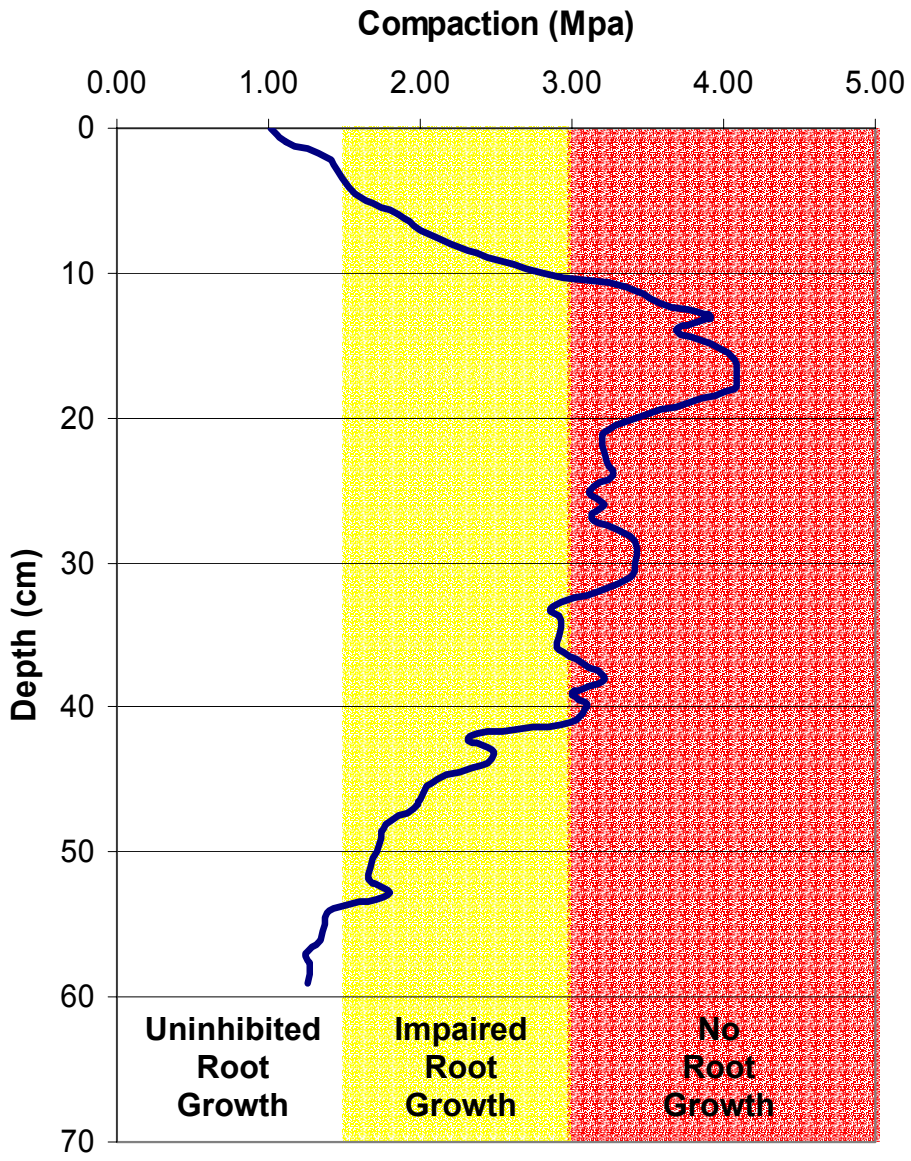
Soil Compaction is increased during building construction

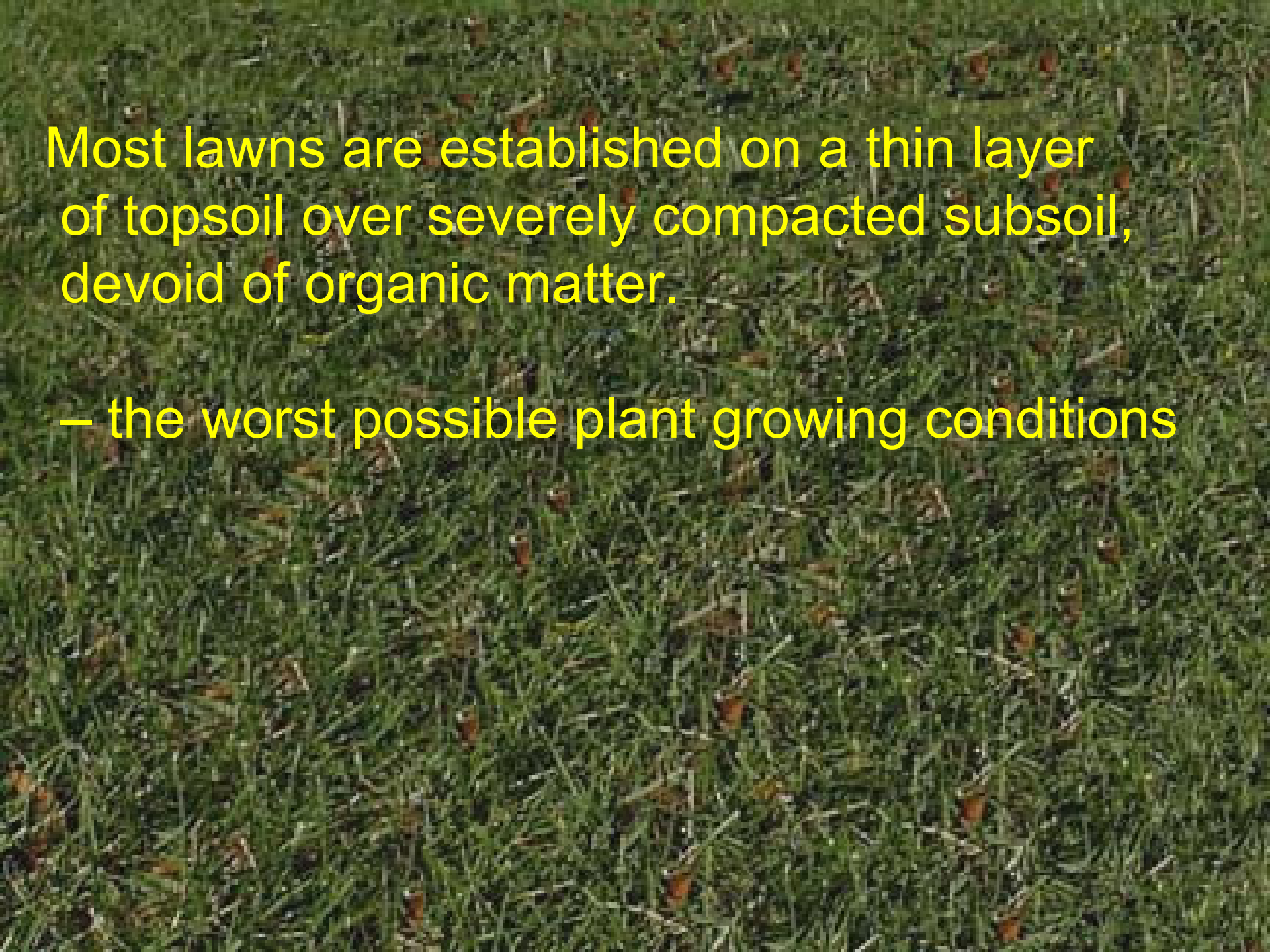
- Spoil from basements placed on adjacent soils
- Building crews and material suppliers drive on soils


Tyvek
HomeWrap
F150

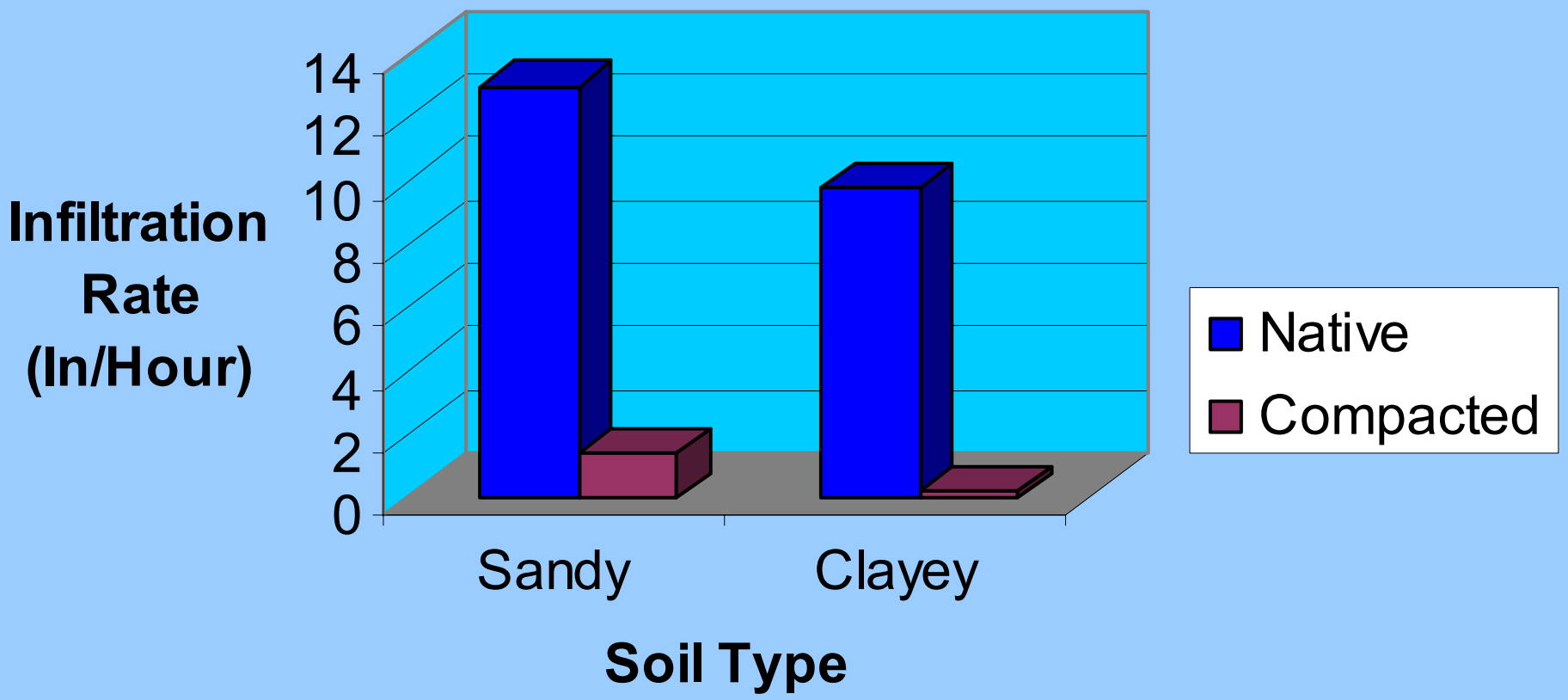

Note lack of A, B, and C soil horizons

Lawn Soil Compaction

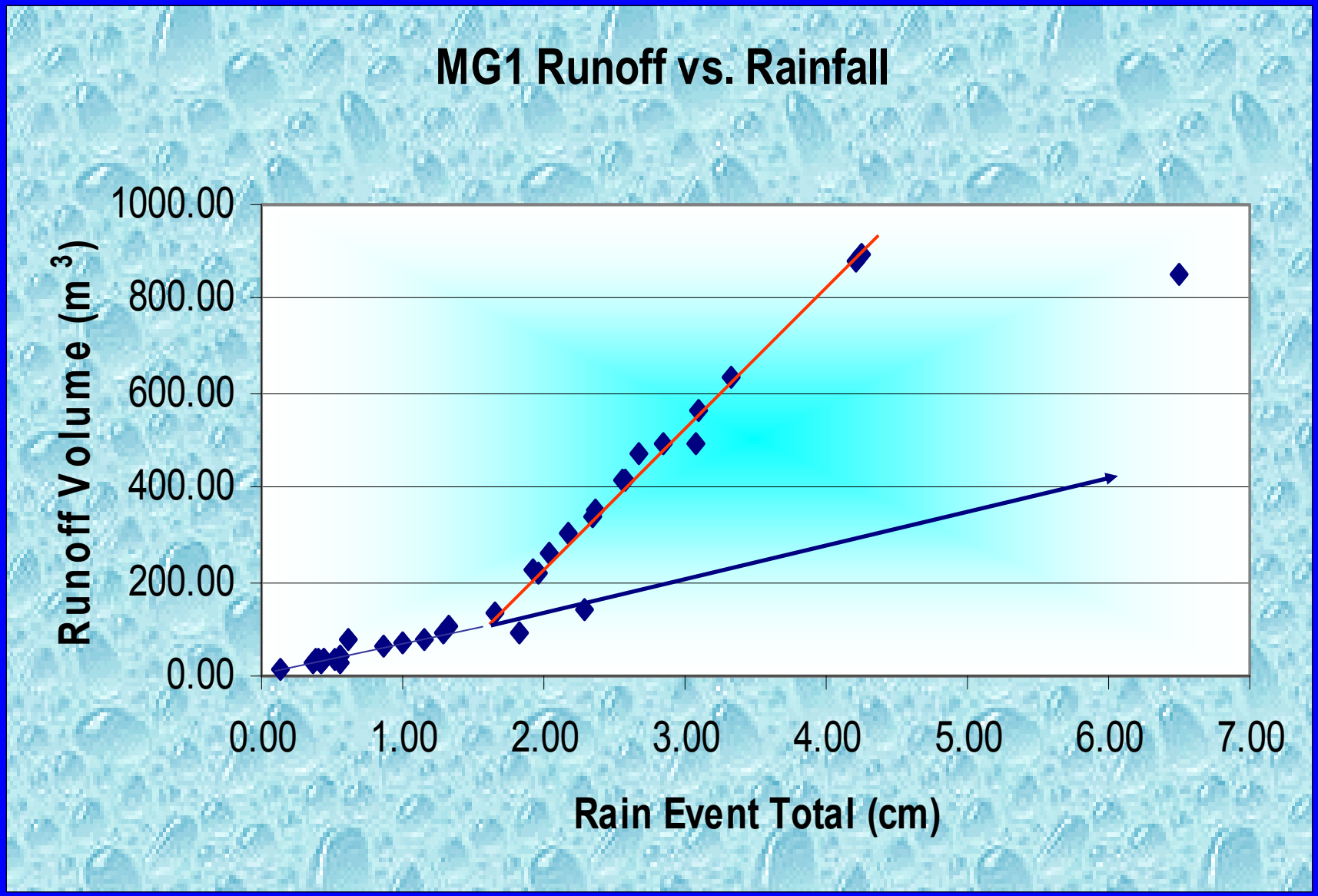


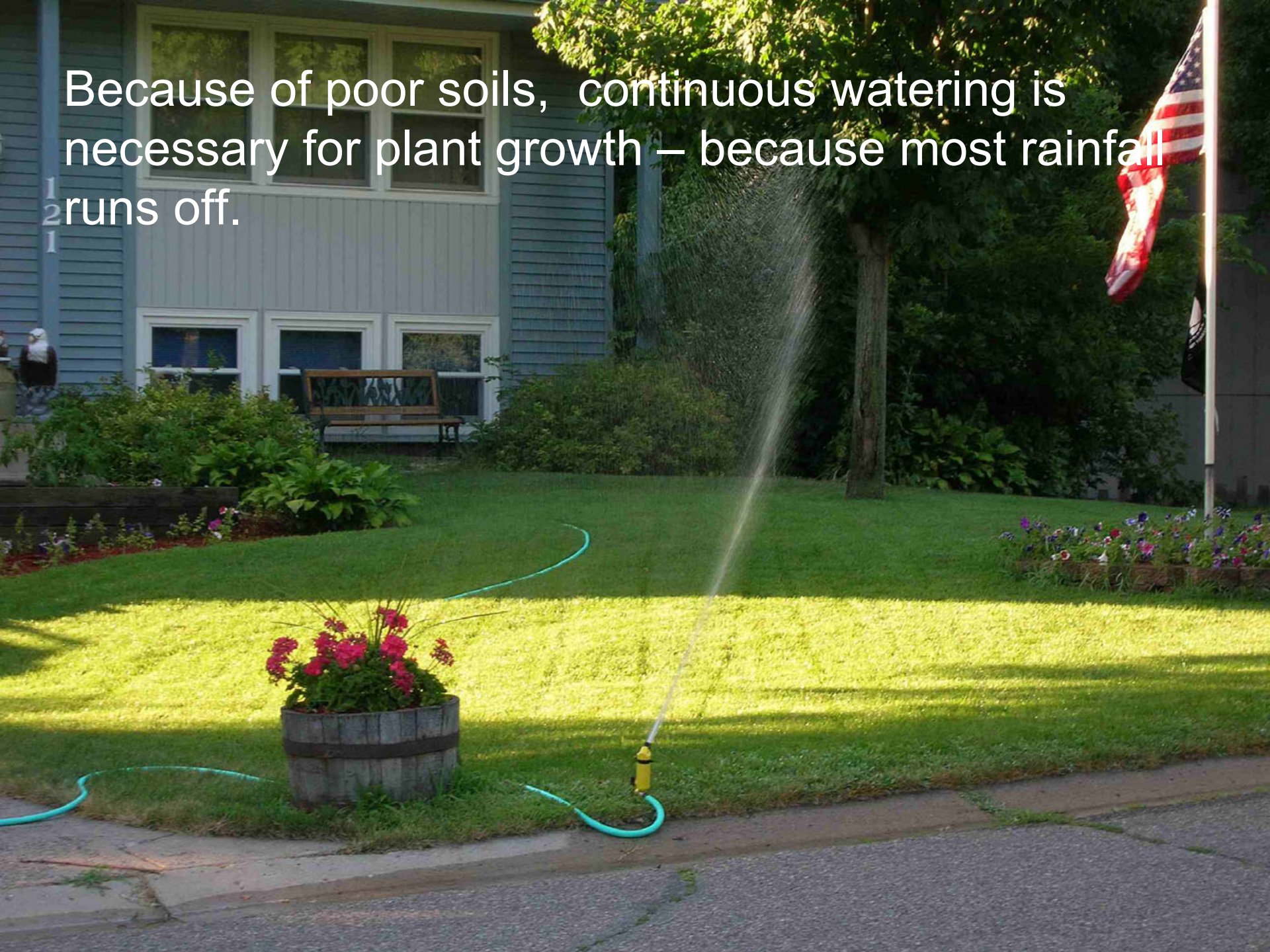

Most lawns are established on a thin layer
of topsoil over severely compacted subsoil,
devoid of organic matter.
– the worst possible plant growing conditions

Effect of Compaction on Infiltration Rate



Pitt, et. al., 1999


MG1 Runoff vs. Rainfall
Runoff Volume (m 3)
1000.00
800.00
600.00
400.00
200.00
0.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
Rain Event Total (cm)


Because of poor soils, continuous watering is necessary for plant growth – because most rainfall runs off.

Golf courses provide a model for turf management to increase infiltration and improve plant growth

SITE	TOTAL RUNOFF (Ac-Ft)	RUNOFF (%) RAINFALL	TOTAL PHOSPHORUS (LBS)	PHOSPHORUS EXPORT (LBS/ACRE)	TOTAL NITROGEN (LBS)	NITROGEN EXPORT (LBS/ACRE)
BAKER	5.4	0.058	4.1	0.09	22.5	0.48
MEADOWBROOK	16.4	0.078	44.5	0.33	74.4	0.79
WOODHILL	3.3	0.05	3	0.1	18.5	0.6
MINIKAHDA	16.6	0.052	19.4	0.014	587.1	4.28
MEAN		0.060		0.13		1.54
MINIKAHDA IN	548.4	0.208	315.3	0.27	1667.5	1.42
RESIDENTIAL*				0.94		4.8
OPEN*				0.16		0.92

* VALUES FROM BRACH, 1992

Till soils around building sites prior to adding topsoil

Spading machine allows organic matter to be tilled in

Soil Preparation Specification

Loosen subsoil to less than 1400 kPa (200 psi)

- The Park District will verify with cone penetrometer

Remove all material exceeding 3”

Cover subsoil with minimum of 6” of Topsoil

- Subsoil must be loose and friable before placing topsoil

Turf needs to be aerated annually

- Core aeration
  - Aero-vator


TURFMAN


WARNING
WARNING

Reducing Soil Compaction

- Avoid during construction - compaction is forever
- Till compacted areas around buildings
- Apply adequate topsoil prior to seeding
- Add organic matter - minimum of 5%
- Aerate turf areas annually

Advantages of Reducing soil compaction

- Improved turf growth
- Improved tree growth
- Reduced storm water volume
- Reduced nutrient transport
- Reduced watering needs – fewer wells, smaller reservoirs, pipe sizes
- Improved water quality


Leaving clippings on lawn increases organic matter

"Thatch" Layer

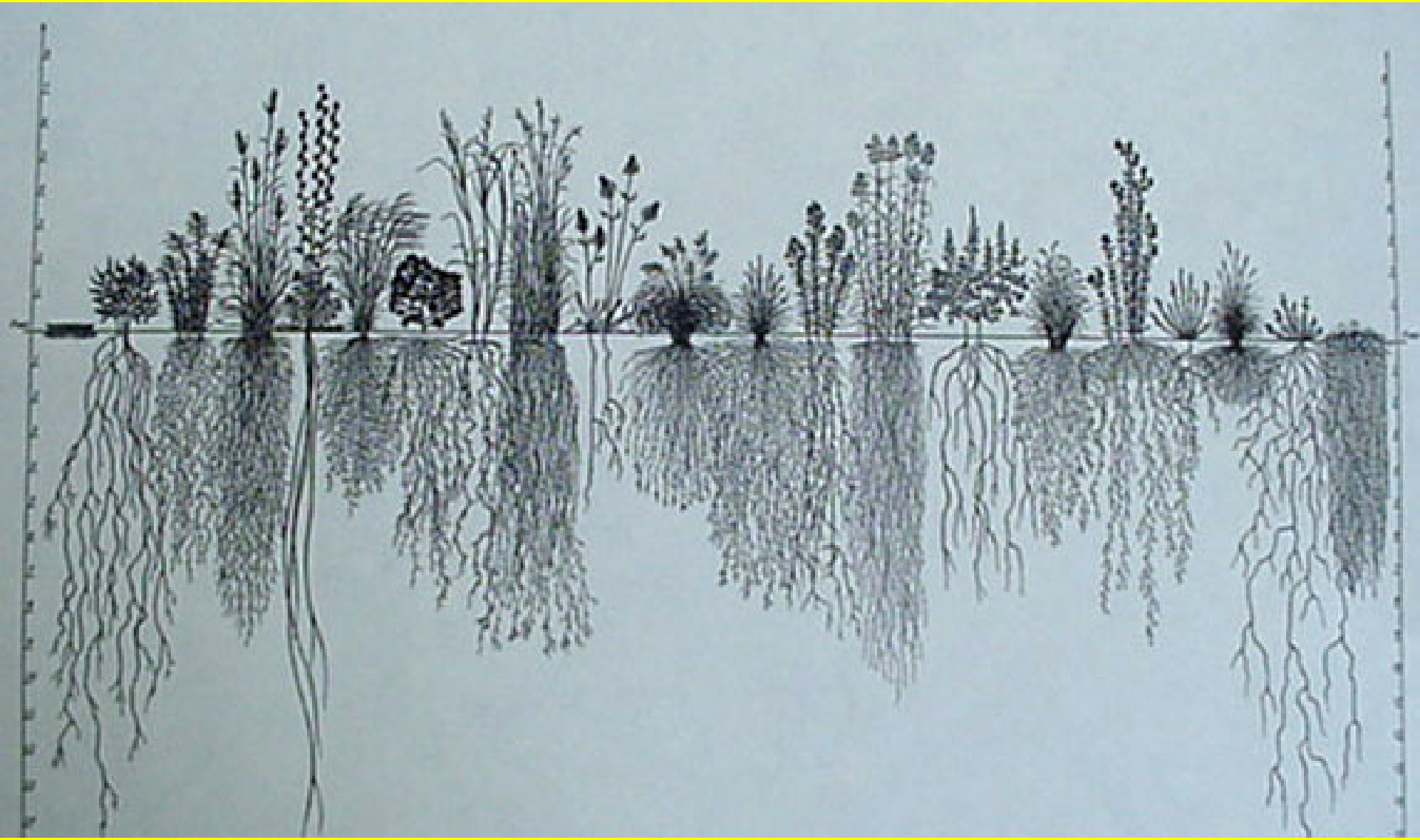
High in soluble P

High Phosphorus

Med Phosphorus

Low Phosphorus

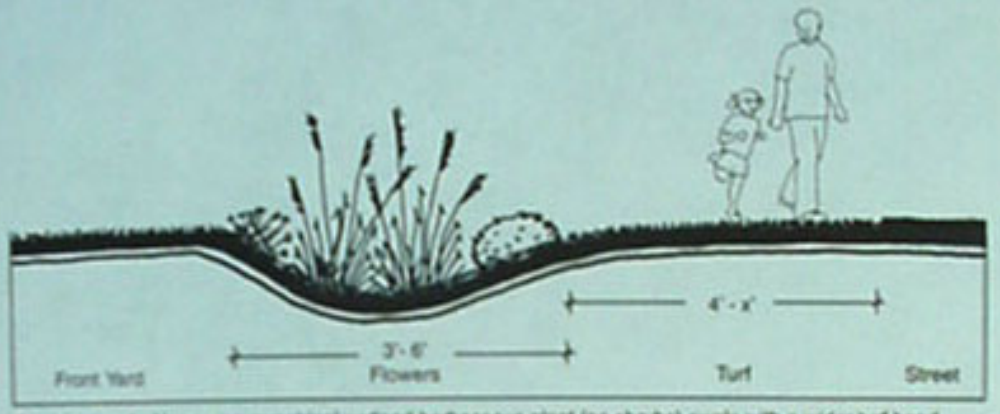
Increase mower cut height to 3.0" minimum



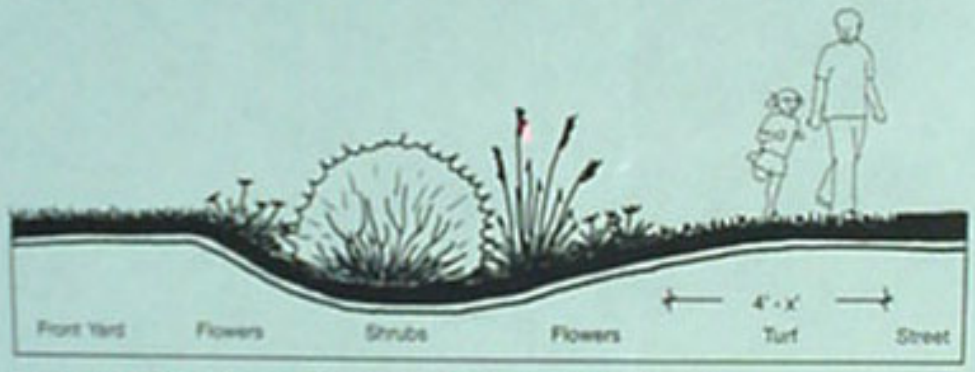

Reduce turf area


STOP

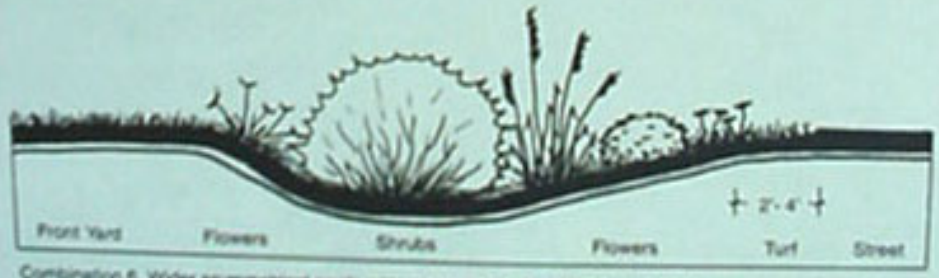

6 14 06



Combination 4. Narrow asymmetrical wetland herbaceous plant (no shrubs) swale with a wider turf band facing the street.



Combination 5. Narrow asymmetrical swale with a wider turf band facing the street.

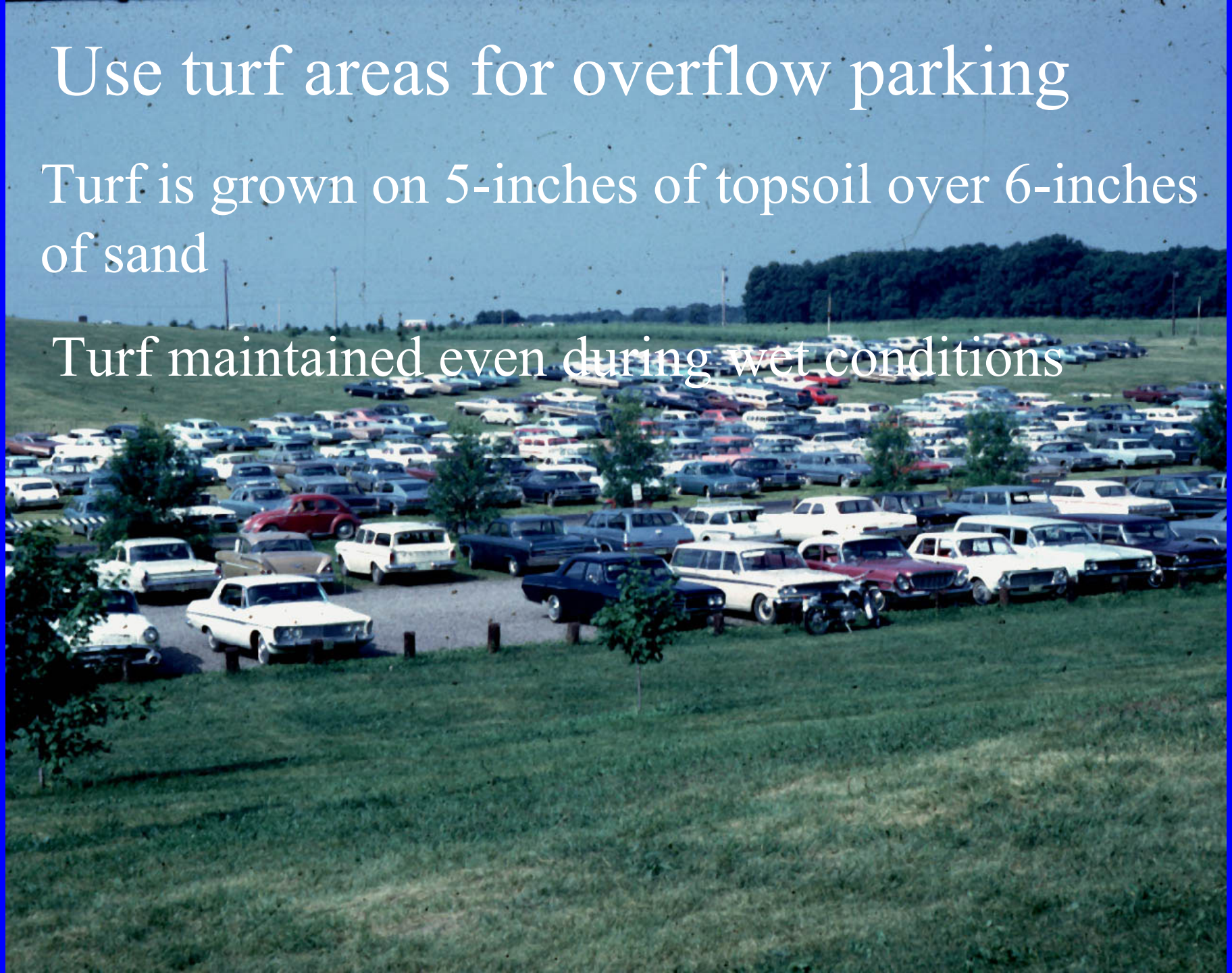


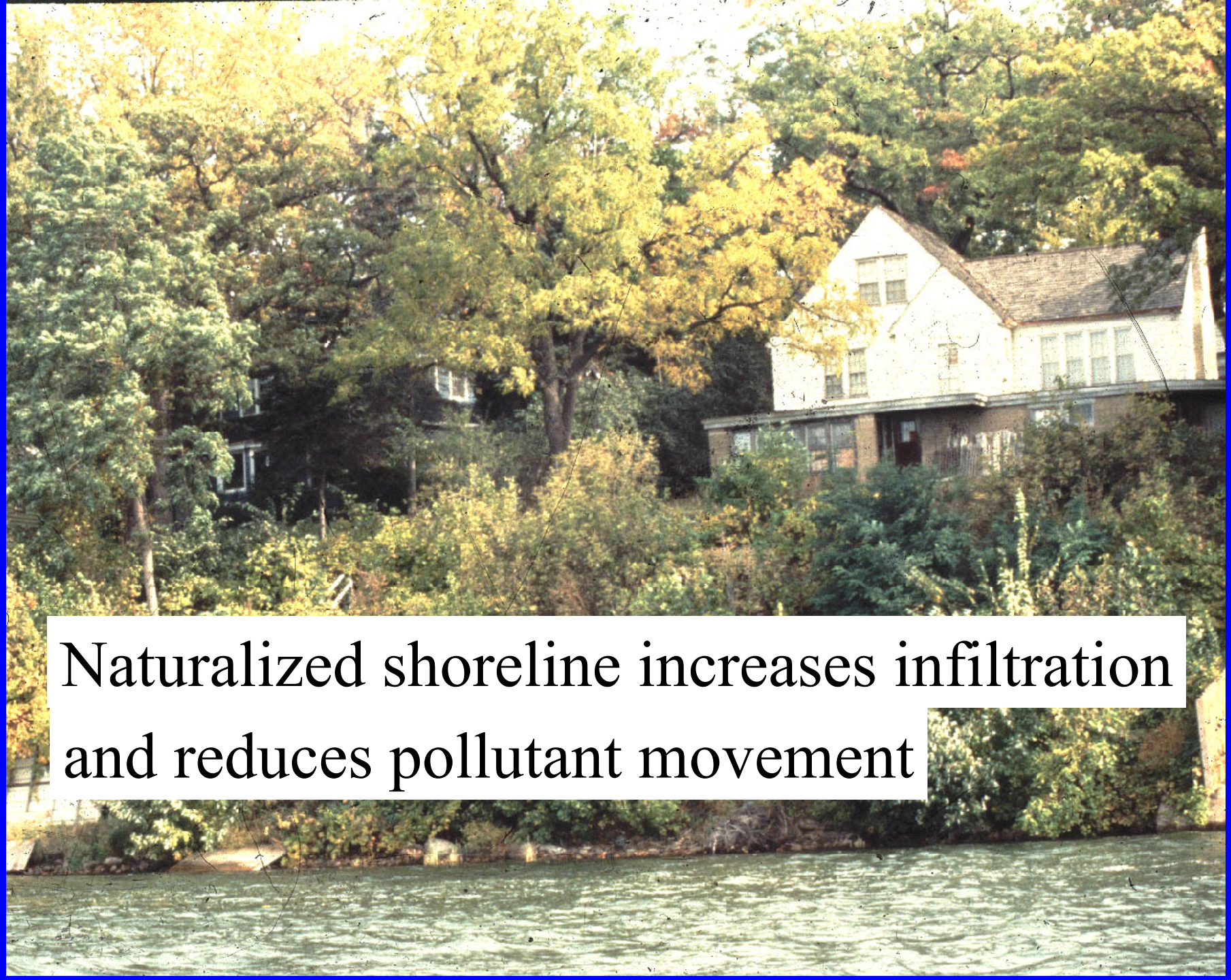
Combination 6. Wider asymmetrical swale with a narrow turf band facing the street.

Use turf areas for overflow parking

Turf is grown on 5-inches of topsoil over 6-inches of sand

Turf maintained even during wet conditions




Naturalized shoreline increases infiltration
and reduces pollutant movement

Municipal wetland buffer ordinances

Required by most watershed management organizations
Range from 15 to 50 feet in width
Width depends on size or “value” of wetland
Permanent monuments required along buffer edge