

SOILS OF NORTH-CENTRAL ILLINOIS TOUR



**FRIDAY, OCTOBER 19, 2018 and
SATURDAY, OCTOBER 20, 2018**

Presented By:



Sponsored By:



Illinois Soil Classifiers Association
Northern Illinois University
Bayer Corporation
V3 Companies
Campton Township
Environmental Design Services
Illinois Environmental Health Association

Speakers:

Dr. Mike Konen, Northern Illinois University
Bruce Putman, Putman Soil Testing, Inc.
Tom Copenhaver, Lake County Health Department
Rachel Welch, Bayer Corporation
Nancy Leffler, Bayer Corporation
George Milner, V3 Companies
Ted McCannon, Environmental Design Service

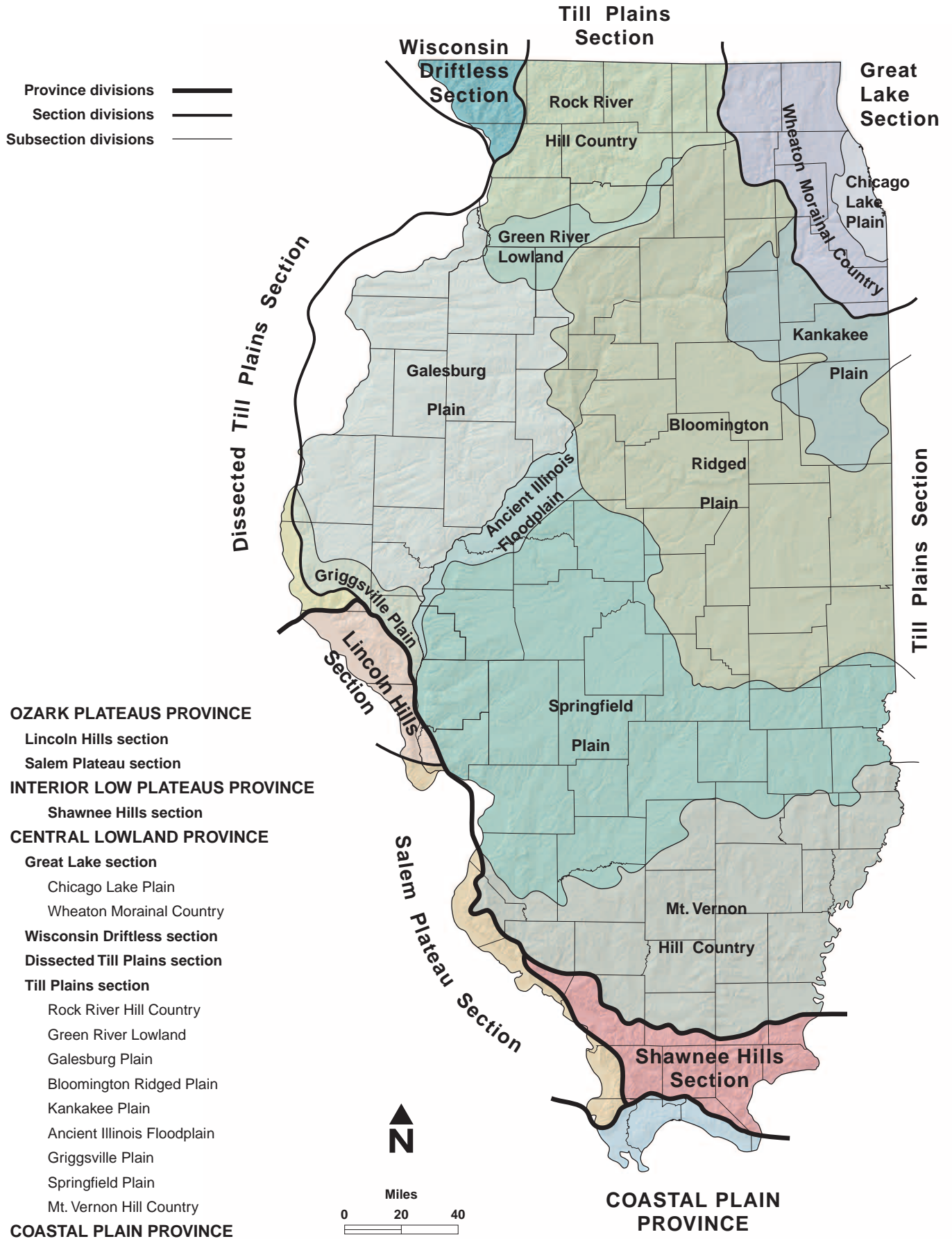
FRIDAY OCTOBER 19, 2018

Registration/Check-in	8:00 AM
DeKalb County Farm Bureau	
1350 W Prairie Drive, Sycamore, IL	
Leave DeKalb Farm Bureau	8:30 AM
Drive to Waterman Monsanto, Dr. Mike Konen	
Waterman Monsanto	9:00 AM
Rachel Welch, Nancy Leffler, Bruce Putman	
Leave Waterman Monsanto	10:30 AM
Drive to Headwaters Conservation Area, Dr. Mike Konen	
<u>Lunch (Provided)</u>	<u>11:00 AM</u>
Headwaters Conservation Area	
George Milner, Bruce Putman, Tom Copenhaver	12:00 PM
Leave Headwaters	1:30 PM
Drive to Gray Willows Farm, Dr. Mike Konen	
Gray Willows Farm	1:45 PM
George Milner, Bruce Putman, Tom Copenhaver	
Leave Gray Willows	3:15 PM
Return to DeKalb Farm Bureau	3:45 PM

SATURDAY OCTOBER 20, 2018


Meet On-Site (Transportation Not Provided)	9:20 AM
Environmental Design Services	
45W134 Raymond Road, Big Rock, IL	
Site Overview	9:30 AM
Dr. Mike Konen	
Septic Site Evaluation Demonstration	9:45 AM
Brad Cate and Bruce Putman	
<u>Lunch (Provided)</u>	<u>11:00 AM</u>
Texture Practice Exercise / Field Practicum	12:45PM
Leave Environmental Design Services	2:30 PM

Physiographic Divisions of Illinois




Quaternary Deposits


HUDSON EPISODE


 Cahokia Fm; river sand, gravel, and silt

WISCONSIN EPISODE


Mason Group

 Thickness of Peoria and Roxanna Silts; silt deposited as loess (5-ft contour interval)

 Equality Fm; silt and clay deposited in lakes


 Henry Fm; sand and gravel deposited in glacial rivers, outwash fans, beaches, and dunes


Wedron Group
(Tiskilwa, Lemont, and Wadsworth Fms) and Trafalgar Fm; diamicton deposited as till and ice-marginal sediment

 End moraine

 Till plain

ILLINOIS EPISODE

 Teneriffe Silt; silt and clay deposited in lakes

 Pearl Fm; sand and gravel deposited in glacial rivers and outwash fans, and Hagarstown Mbr; ice-contact sand and gravel deposited in ridges

Winnebago Fm; diamicton deposited as till and ice-marginal sediment


 Till plain

Glasford Fm; diamicton deposited as till and ice-marginal sediment

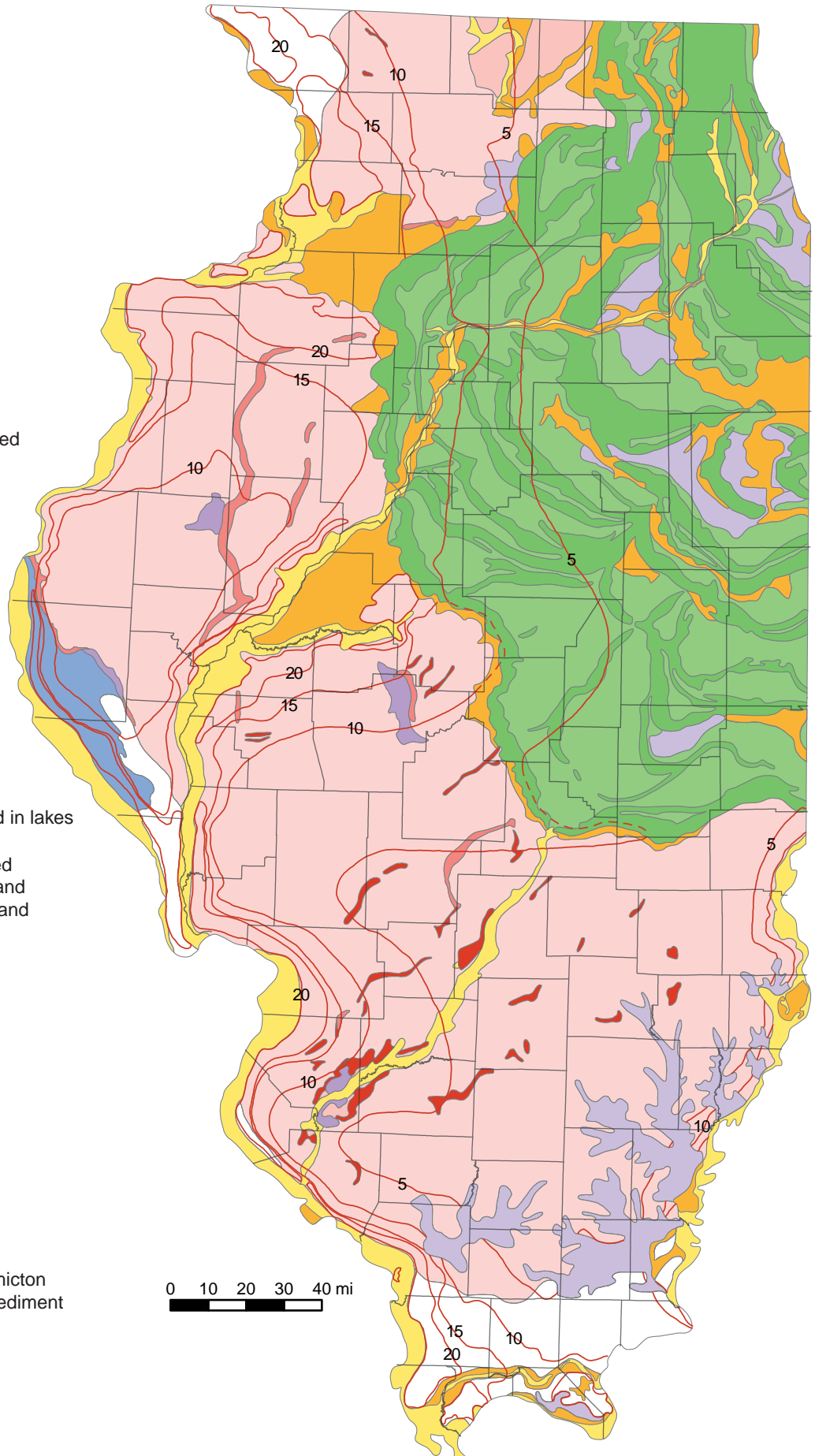
 End moraine

 Till plain

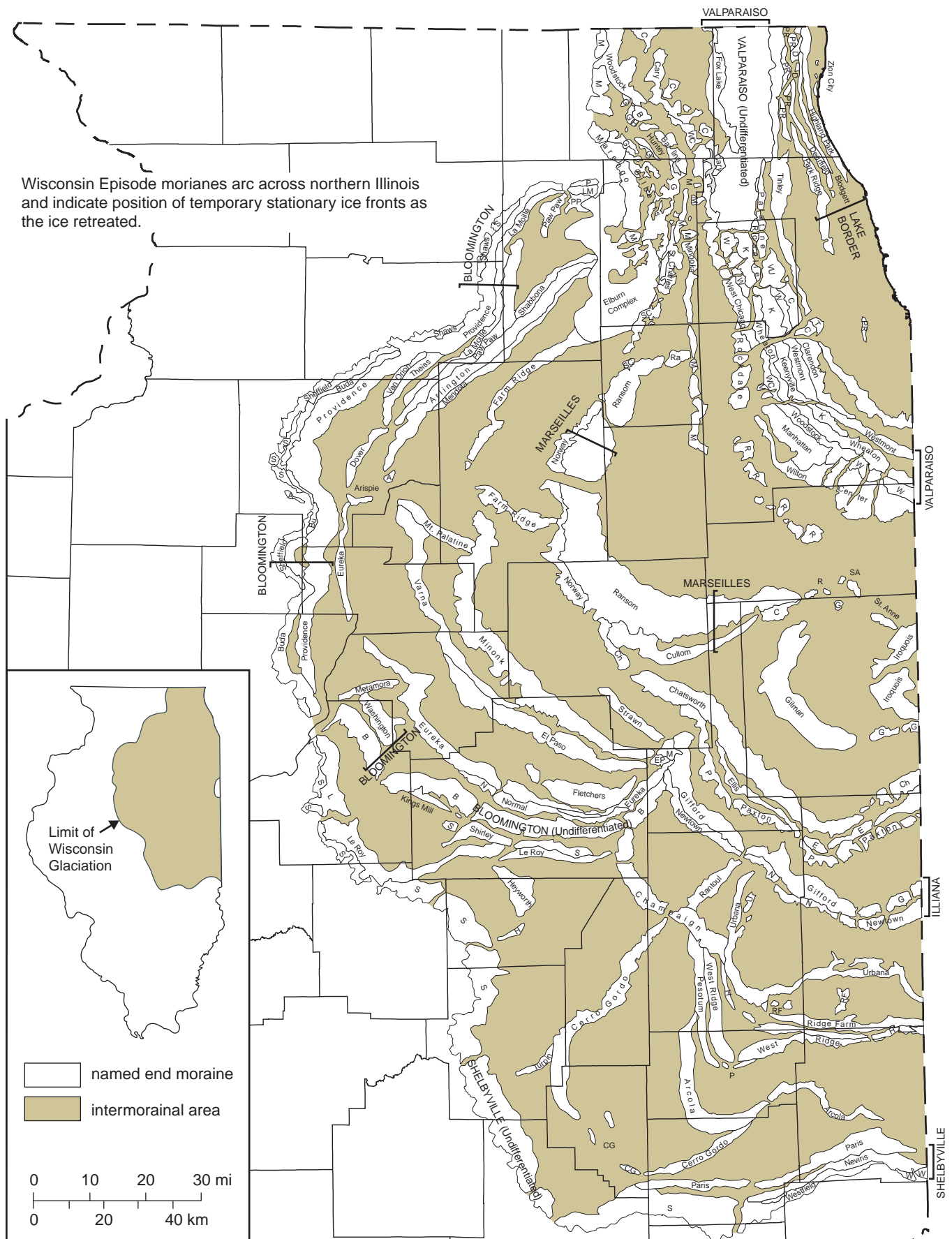
PRE-ILLINOIS EPISODE

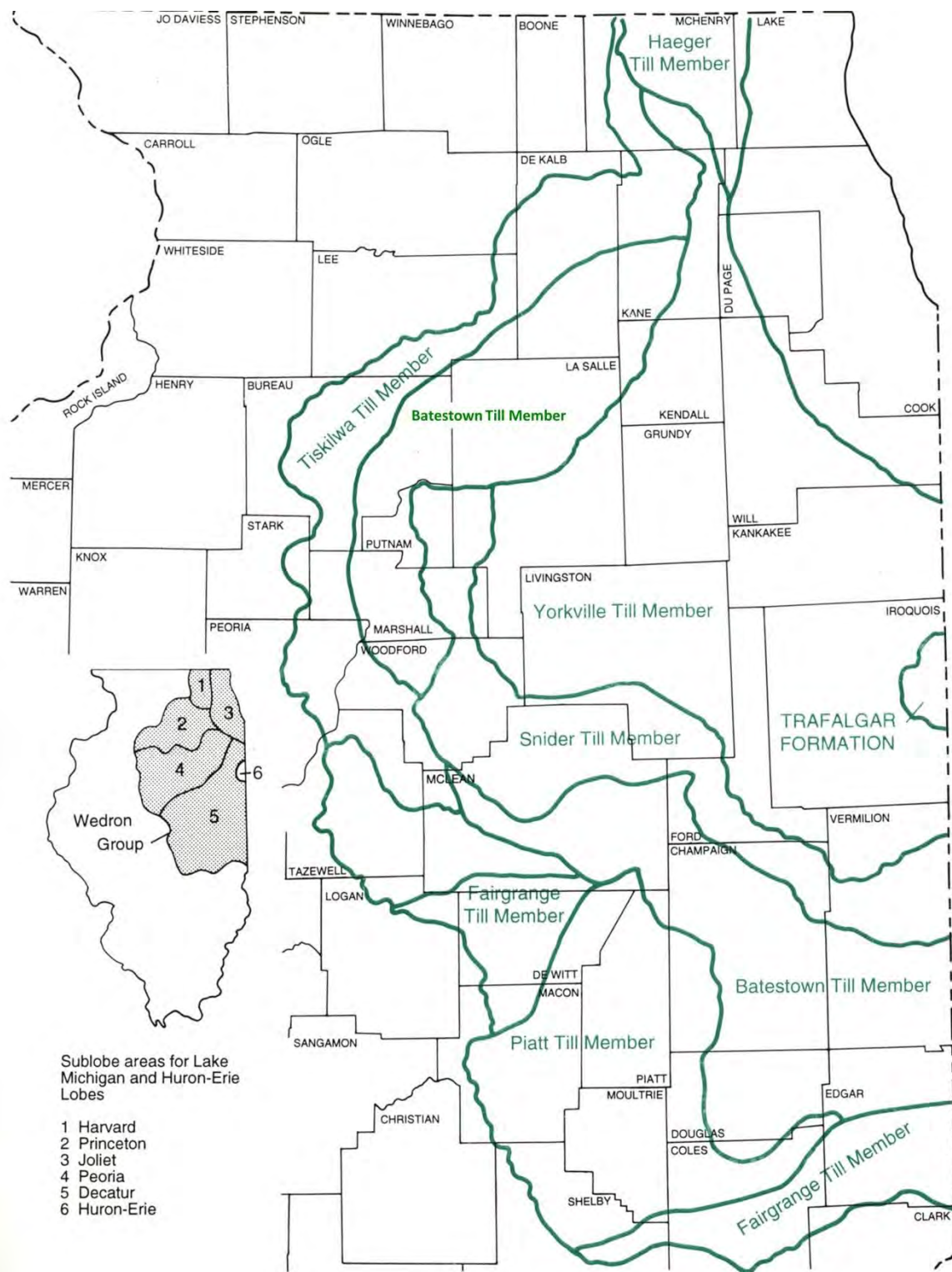
 Wolf Creek Fm; predominantly diamicton deposited as till and ice-marginal sediment

 Unglaciaded



End Moraines Of The Wisconsin Glacial Episode





Aerial Distribution of the Wedron Formation Till Members and the Trafalgar Formation (after Lineback, 1979). http://isgs.illinois.edu/ilstrat/images/a/ae/104-Figure_5.jpg

Section 905.Appendix A Illustrations and Exhibits
Illustration M Subsurface Seepage Loading Rate Key
Exhibit B (some of the numbers below have been changed)

KEY FOR DETERMINING SEWAGE SUBSURFACE LOADING RATES (g/d/sq. ft.) FOR ILLINOIS SOILS (1)

	Single Grain, weak Platy (2)	Granular, Angular and Subangular Blocky; Prismatic									Structureless or massive				
		Loess, Outwash, Alluvium, Lacustrine(8)				Till (3)					Loess, Outwash, Alluvium, Lacustrine(8)			Till (3)	
		Weak		Moderate, Strong		Weak		Moderate, Strong							
Moist Consistence	lo,vfr, fr	vfr, fr	fi	vfr, fr	fi	vfr, fr	fi	fr	fi	vfi	vfr	fr	fi	vfr, fr	fi, vfi
Texture	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1. Fragmental; Ext. or vgrs	>1.00 (4)	N/A (5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2. s, lcs, ls, grs, cs, grls	1.00	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00	N/A	N/A	N/A	N/A
3. fs, lfs, csl	.84	.91	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	.91	.84	N/A	N/A	N/A
4. sl, fsl, grsl, grl, grsil,	.75	.75	N/A	.84	N/A	.69	N/A	.75	N/A	N/A	.84	.75	.69	.62	.52
5. l, sil, vfsl, scl, si, vfs, lvfs, grcl	.62	.69	.62	.75	.52	.45 (6)	.40 (6)	.62	.52	N/A	.62	.52	.45 (6)	.27 (6)	N/R (7)
6. sicl, cl (< 35% clay)	.52	.52	.45 (6)	.62	.52	.40 (6)	.27 (6)	.52	.40 (6)	.27 (6)	.52	.45 (6)	.27 (6)	N/R	N/R
7. sicl, cl (>35% clay)	N/A	N/A	.40 (6)	.45 (6)	.40 (6)	.27 (6)	.20 (6)	.40 (6)	.27 (6)	.20 (6)	N/A	.20 (6)	N/R	N/R	N/R
8. sc,sic,clay	N/A	N/A	N/A	N/A	.20 (6) (9)	N/A	N/A	N/A	.20 (6) (9)	N/R	N/A	N/A	N/R	N/A	N/R
9. Organics, Fragic, Lithic, Paralithic	SOIL PROPERTIES HAVE VERY SEVERE LIMITATATIONS: SUBSURFACE DISPOSAL NOT RECOMMENDED														

FOOTNOTES:

- 1) Disturbed soils are highly variable and require special on-site investigations.
- 2) Moderate or strong platy structures for the soil textures in Groups 4, 5 and 6 have a loading rate of 0.40 g/d/sq. ft. Platy structure having firm or very firm consistence and/or caused by mechanical compaction has a loading rate of 0.0 g/d/sq. ft.
- 3) Basal glacial tills structured by geogenic processes have the same loading rates as structureless glacial till.
- 4) This soil group is estimated to have very rapid permeability and exceeds the maximum established rate in Section 905. Illustration H, Exhibit A of this part.
- 5) N/A means not applicable.
- 6) These soil groups are estimated to have moderately slow to very slow permeability and is less than the minimum established rate in Section 905. Illustration H, Exhibit A of this part.
- 7) N/R means not recommended. These soils have loading rates considered too low for conventional subsurface disposal.
- 8) In some areas, lacustrine material may have physical properties similar to glacial till and should be placed in the glacial till columns.
- 9) Non-swelling (1:1 lattice clays) formed in bedrock residuum have a loading rate of .27 g/d/sq. ft. Swelling (2:1 lattice) clays are not recommended for subsurface disposal.

Joint Committee on Administrative Rules
ADMINISTRATIVE CODE

TITLE 77: PUBLIC HEALTH
CHAPTER I: DEPARTMENT OF PUBLIC HEALTH
SUBCHAPTER 1: WATER AND SEWAGE
PART 905 PRIVATE SEWAGE DISPOSAL CODE
SECTION 905.APPENDIX A ILLUSTRATIONS AND EXHIBITS

Section 905.APPENDIX A Illustrations and Exhibits

Section 905.ILLUSTRATION M Soil Suitability for On-Site Sewage Design

Section 905.EXHIBIT A Loading Rates in Square Feet Per Bedroom and Gallons/Square Feet/Day

Design Group	Soil Group (Most Limiting Layer)	Minimum Separation To Limiting Layer ¹	Permeability Range	Size of System	
				Residential Reg. Absorption (ft ² /bedroom)	Institutional/Commercial Allowable Application Rate (GPD/ft ²)
I	1A	NR ³	Very Rapid	NR ³	NR ³
II	2A; 2B; 2K	3 feet	Rapid	200	1.0
III	3B; 3K	3 feet	High Moderately Rapid	220	0.91
IV	3A; 3L; 4D; 4K	3 feet	Low Moderately Rapid	240	0.84
V	4A;; 4B; 4H; 4L; 5D	3 feet	Very High Moderate	265	0.75
VI	4F; 4M; 5B	3 feet	High Moderate	290	0.69
VII	4N; 5A; 5C; 5H; 5K; 6D	2 feet	Moderate	325	0.62
VIII	4O; 5E; 5I; 5L; 6A; 6B; 6E; 6H; 6K	2 feet	Low Moderate	385	0.52
IX ²	5F; 5M; 6C; 6L; 7D; 7F	2 feet	High Moderately Slow	445	0.45
X ²	5G; 6F; 6I; 7E; 7C; 7H	2 feet	Low Moderately Slow	500	0.40
XI ²	5N; 6G; 6J; 6M; 7F; 7I	2 feet	Slow	740	0.27
XII ²	7G; 7J; 7L; 8E; 8I	2 feet	Very Slow	1000	0.20
XII ²	5O; 6N; 6O; 7M; 7N; 7O; 8J; 8M; 8O	NR ³	NR ³	NR ³	0.00
XIII	9	SUBSURFACE DISPOSAL NOT RECOMMENDED			

NOTES:

- ¹ Limiting layers include fragipans; bedrock; compact glacial tills; seasonal high water table or other soil profile features that will materially affect the absorption of liquid from the disposal field.
- ² Soils in this group are less than the minimum percolation rate established in Appendix A, Illustration H as suitable for subsurface seepage systems.
- ³ NR = Subsurface disposal system not recommended.

(Source: Amended at 37 Ill. Reg. 14994, effective August 28, 2013)

Site 1:

Bayer Crop Science Research Center
8350 Minnegan Road,
Waterman, IL

Site Background:

The 300-acre Bayer Crop Science Research Center has been in operation since the 1930's and consists of four departments:

- NA Field Testing and Operations
- Plant Health
- Entomology
- Parent Testing

Currently, the Center employs 25 full-time employees and 50-100 part-time employees.

In 2012, the first butterfly garden was started and two habitat areas were added in 2015. The three pollinator habitats are certified through the Wildlife Habitat Council.



Speakers:

Ms. Rachel Welch, Bayer Corporation

Ms. Nancy Leffer, Bayer Corporation

Dr. Mike Konen, Northern Illinois University

Bruce Putman, Putman Soil Testing, Inc.

LEGAL DESCRIPTION: Bayer-Waterman,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 1 SOIL SERIES: 330 (Peotone)
MOTTLE DEPTH (in.): <24 (*)
RESTRICTIVE PERMEABILITY (in.): >45
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Dekalb
CLASSIFICATION: fine silty, Cumulic Endoaquoll
PARENT MATERIAL: colluvium
SAMPLE METHOD: Backhoe
SLOPE: 4 percent to the west

HORIZON	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
Ap	0-6	10YR 2/1	Sicl		3-f-gr & 3-m-gr	Fr		6D	.62
A1	6-15	2.5Y 2.5/1	Sicl		3-m-abk	Fr		6D	.62
A2	15-24	2.5Y 2.5/1	Sicl, Sic	c 1 10YR 5/6	1-m-sbk & 1-f-sbk	Fr		6B	.52
BAtg	24-29	2.5Y 4/1	Sic	c 2 2.5Y 5/6	1-m-sbk & 1-f-sbk	Fr	M 10YR 3/1	6B	.52
Btg	29-38	2.5Y 4/1	Sic	m 2 2.5Y 5/6	1-m-sbk & 1-f-sbk	Fr	M 2.5Y 3/1	6B	.52
Bg	38-45	5 Y 5/1	Sic	m 2 2.5Y 6/6, c 2 5Y 6/2	1-c-sbk	Fr		6B	.52

REMARKS: Estimated seasonal high groundwater table for 330 soils is typically less than 12 inches; 330 (Peotone) soils may be subject to ponding of surface waters.

LEGAL DESCRIPTION: Bayer-Waterman,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 2 SOIL SERIES: 193 (Mayville)
MOTTLE DEPTH (in.): 21
RESTRICTIVE PERMEABILITY (in.): >45
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Dekalb
CLASSIFICATION: fine silty, Oxyaquic Hapludalf
PARENT MATERIAL: loess over loamy diamicton (till)
SAMPLE METHOD: Backhoe
SLOPE: 4 percent to the west

HORIZON	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
Ap	0-7	10YR 2/1	Sil		1-f-sbk P 2-f-gr	Fr		5D	.75
Bt1	7-14	10YR 4/3	Sil		2-m-sbk	Fr	C 10YR 4/2, 10YR 2/1	5D	.75
Bt2	14-21	10YR 5/3	Sicl	c 1 10YR 5/6	2-m-sbk	Fr	C 10YR 4/2, 10YR 2/1	6D	.62
Bt3	21-27	10YR 5/3	Sicl	c 2 10YR 5/6, c 1 2.5Y 6/2	1-vf-pr P 3-f-sbk	Fr	C 10YR 5/2	6D	.62
Bt4	21-33	2.5Y 5/3	Sicl	c 3 10YR 5/8, c 3 10YR 5/4, c 2 2.5Y 6/2	1-f-pr P 2-f-sbk & 2-m-sbk	Fr	C 10YR 3/3, C 10YR 5/2	6D	.62
2BCtg	33-45	2.5Y 6/2	Sicl	m 3 10YR 5/8, m 3 2.5Y 5/6, c 2 10YR 8/1	1-m-sbk	Fr	C 10YR 3/2	5F	.45

REMARKS:

Site 2:

Headwaters Conservation Area

Beith Road, Campton Hills

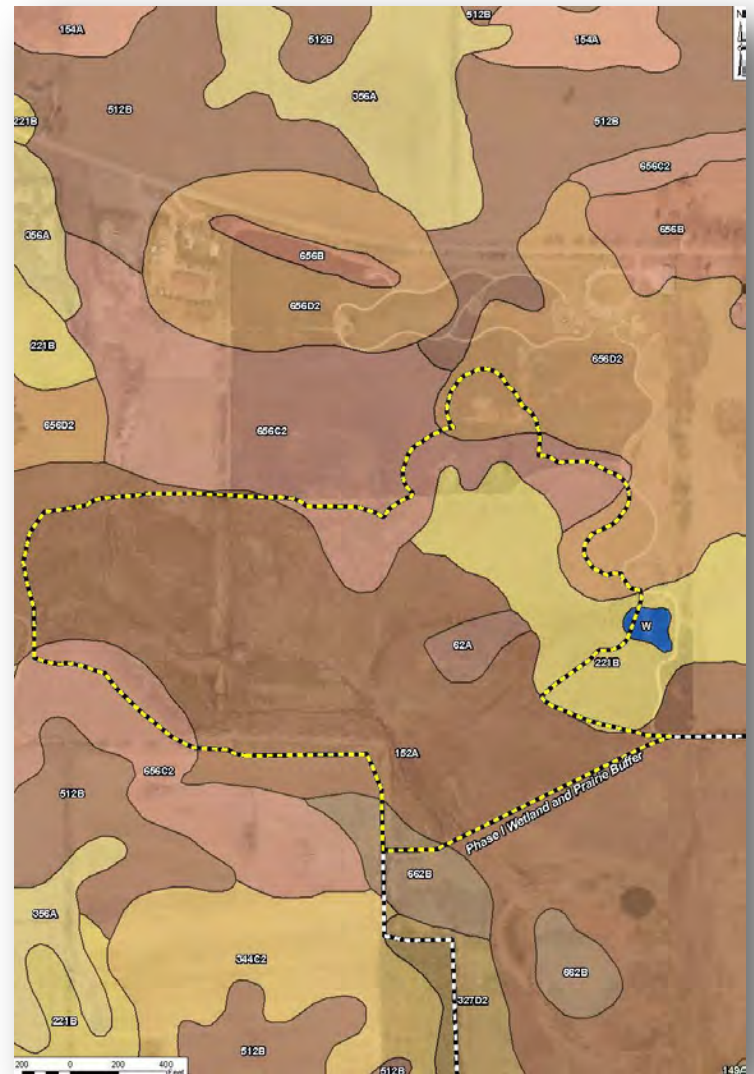
Site Background:

A former agricultural field, the property was donated to Campton Township in the early 2000's. V3 Companies was hired in 2002 to delineate wetlands and develop a wetland mitigation bank restoration plan on the 220-acre property.

After removal of the drain tile system, V3 restored over 90 acres of wetland throughout the property.

Phase I, located on the south end of the property, resulted in the successful restoration of 69 acres of high-quality wetland and prairie habitat resulting in 48.9 acres of wetland credit. Phase I received sign-off in 2013 and is now managed by Campton Township.

Phase II, located in the north and western portions of the property, are currently undergoing restoration and will restore 30-acres of wetland and 31-acres of prairie habitat, resulting in 38.8 acres of wetland credit. Upon successful restoration, management and monitoring of Phase II, V3 hopes to achieve sign-off in 2021.

**Speakers:**

Dr. Mike Konen, Northern Illinois University

Mr. George Milner, V3 Companies

Bruce Putman, Putman Soil Testing, Inc.

Tom Copenhaver, Lake County Health
Department

LEGAL DESCRIPTION: Headwaters Conservation Area,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 1 SOIL SERIES: 679 (Blackberry)
MOTTLE DEPTH (in.): 36
RESTRICTIVE PERMEABILITY (in.): >45
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Kane
CLASSIFICATION: fine silty, Oxyaquic Argiudoll
PARENT MATERIAL: silty and loamy sediments
SAMPLE METHOD: Backhoe
SLOPE: 4 percent to the west

HORIZON	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
Ap	0-10	10YR 3/3	Sil		2-m-gr	Fr			.75
Bt1	10-16	10YR 4/4	Sicl		2-m-sbk	Fr	C 10YR 3/3		.62
Bt2	16-27	10YR 4/4	Sicl		2-m-sbk	Fr	C 10YR 4/3		.62
Bt3	27-36	10YR 4/4	Sicl		2-f-pr, 2-m-sbk	Fr	C 10YR 4/3		.62
BCt	36-45	10YR 5/4	Sicl	c-2-d 10YR 6/2, c-1-d 10YR 5/6	1-m-pr	Fr	C 10YR 4/3		.62

REMARKS:

LEGAL DESCRIPTION: Headwaters Conservation Area,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 2 SOIL SERIES: 221 (Parr)
MOTTLE DEPTH (in.): 38
RESTRICTIVE PERMEABILITY (in.): >48
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Kane
CLASSIFICATION: fine loamy, Oxyaquic Argiudoll
PARENT MATERIAL: loess/till
SAMPLE METHOD: Backhoe
SLOPE: 4 percent to the west

HORIZON	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
Ap	0-7	10YR 2/1	Sil		2-f-gr	Fr		5D	.75
A	7-16	10YR 2/1	Sil		2-f-sbk	Fr		5D	.75
ABt	16-20	10YR 3/2 10YR3/4	Sicl	f-1p 10YR 5/6	2-f-sbk	Fr		6D	.62
2Bt1	20-29	10YR3/4	Cl	f-1p 10YR 5/6	2-f-sbk	Fr	C 10YR 3/2	6H	.52
2Bt2	29-38	10YR 4/4	L, Cl	f-1-p 10YR 5/6	2-m-sbk & 2-f-sbk	Fr	C 10YR 4/3	6H	.52
2BCt	38-48	7.5YR 4/4	Grsl	c-1-p 10YR 6/2, c-1-d 7.5YR 5/6	1-c-sbk	Fr	C 10YR 4/3	5F	.45

REMARKS:

LEGAL DESCRIPTION: Headwaters Conservation Area,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 3 SOIL SERIES: 198 (Elburn)
MOTTLE DEPTH (in.): 32 (*)
RESTRICTIVE PERMEABILITY (in.): >55
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Kane
CLASSIFICATION: fine silty, Pachic Aquic Argiudoll
PARENT MATERIAL: loess-silty sediments
SAMPLE METHOD: 2-inch core
SLOPE: 4 percent to the west

HORIZON	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
Ap	0-14	10YR 2/2	Sil		2-m-gr	Fr		5D	.75
A	14-23	10YR 2/1	Sil		2-f-gr	Fr		5D	.75
ABt	23-26	10YR 3/2	Sicl		2-f-sbk	Fr		6D	.62
Bt1	26-32	10YR 4/3	Sicl	c-1-d 10YR 5/6, f -1-d 10YR 5/2	2-f-sbk & 2-m-sbk	Fr	C 10YR 3/2	6D	.62
Bt2	32-42	2.5Y 4/4, 10YR 5/4	Sicl	c-2-d 10YR 5/2, c-2-d 7.5YR 5/6	2-m-sbk	Fr	C 10YR 4/3	6D	.62
BCtg	42-50	2.5Y 5/2, 2.5Y 6/2	Sicl	c-2-p 7.5YR 5/6	1-m-sbk	Fr		6B	.52
Cg	50-55	2.5Y 6/2	Sicl	c-2-p 7.5YR 5/6	M	Fr		5L	.52

REMARKS: Common gray chroma at 32 inches; few at 26 inches.

Site 3:

Gray Willows Farm

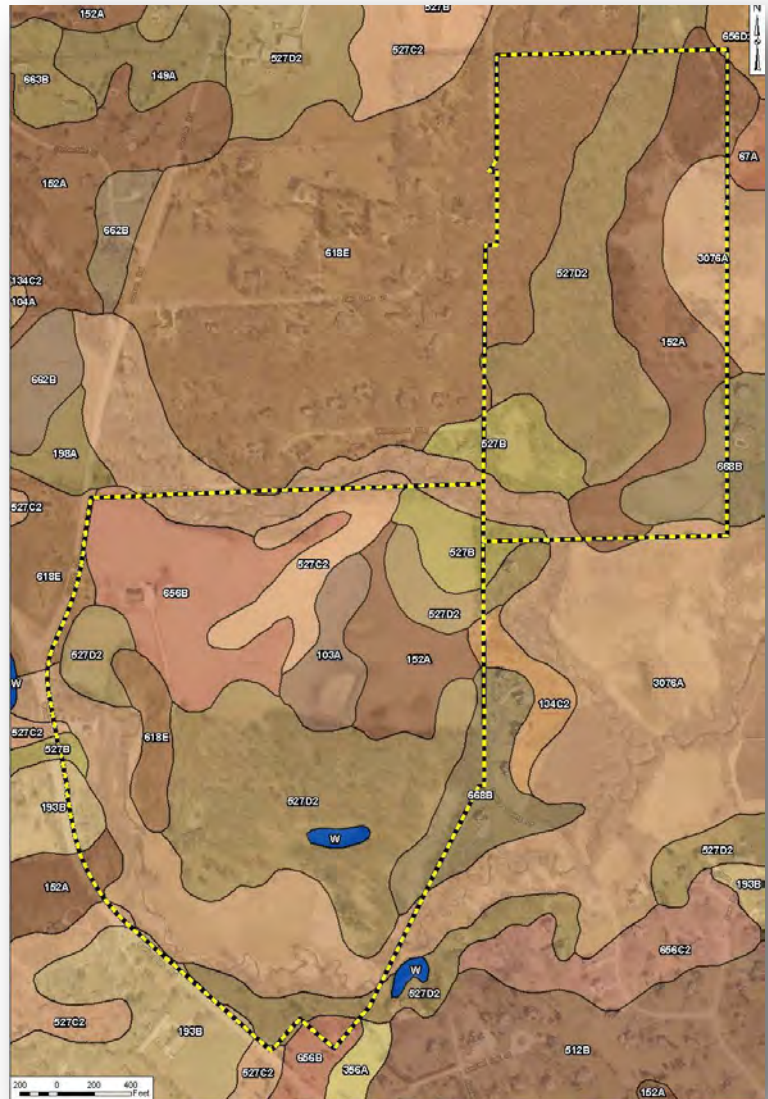
Corron Road, Campton Hills

Site Background:

The Site was donated to Campton Township Open Spaces Program in 2012. V3 Companies was hired to conduct wetland delineation and develop site plans for a wetland mitigation bank.

The wetland mitigation bank design includes 29 acres of wetland reestablishment, 16 acres of wetland restoration, 11 acres of stream and ravine restoration, 51 acres of prairie habitat and 44 acres of enhanced woodland. The design was approved by the US Army Corps of Engineers and Interagency Review Team, which includes the US Fish and Wildlife Service, in fall 2017 and construction began shortly after.

Site restoration activities will include pre-seeding weed control, removal of invasive species, drain tile disablement and removal, installation of native seed and plugs, erosion control along the stream, and native shoreline plantings. The site will be managed by V3 Companies for five years, beginning in Fall 2018, until site review and sign-off are requested.



Speakers:

Dr. Mike Konen, Northern Illinois University

Mr. George Milner, V3 Companies

Bruce Putman, Putman Soil Testing, Inc.

Tom Copenhaver, Lake County Health
Department

LEGAL DESCRIPTION: Gray Willows Farm,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 1 SOIL SERIES: 527 (Kidami)
MOTTLE DEPTH (in.): >60
RESTRICTIVE PERMEABILITY (in.): >48
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Kane
CLASSIFICATION: fine loamy, Typic Hapludalf
PARENT MATERIAL: loess/loam till
SAMPLE METHOD: Backhoe
SLOPE: 4 percent to the west

HORIZON	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
A	0-6	10YR 3/2	Sil		2-f-gr & 2-m-gr	Fr		5D	.75
EB	6-12	10YR 5/3	Sil		2-f-sbk	Fr		5D	.75
Bt1	12-18	10YR 4/4	Sicl		2-f-sbk & 2-m-sbk	Fr		6D	.62
2Bt2	18-27	7.5YR 4/4	Cl		2-m-sbk	Fr	C 10YR 4/4	6H	.52
2BCt	27-34	10YR 5/4	L		1-m-sbk	Fr	C 10YR 4/2, C 10YR 4/3	5F	.45
2C	34-48	10YR 5/4	L		M	Fr		5N	.27

REMARKS:

LEGAL DESCRIPTION: Gray Willows Farm,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 2 SOIL SERIES: 219 (Millbrook)
MOTTLE DEPTH (in.): 18
RESTRICTIVE PERMEABILITY (in.): >48
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Kane
CLASSIFICATION: fine silty, Aquic Hapludalf
PARENT MATERIAL: loess/loamy sediments
SAMPLE METHOD: 3-inch core
SLOPE: 4 percent to the west

HORIZON	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
A	0-9	10YR 4/3	Sil		2-f-gr	Fr		5D	.75
AE	9-14	10YR 4/2	Sil		2-f-pl	Fr		5A	.62
Bt1	14-18	10YR 5/3	Sicl		2-f-sbk	Fr		6D	.62
Bt2	18-24	2.5Y 5/3	Sicl	c-1-d 10YR 5/6, c-1-d 10YR 6/2	2-m-sbk	Fr	C 10YR 5/2	6D	.62
Btg3	24-38	2.5Y 5/2	Sicl	c-2-p 7.5YR 5/6, c-2-p 10YR 6/2	2-f-pr	Fr		6D	.62
2Btg4	38-44	2.5Y 5/2, 10YR 6/2	Cl	c-2-p 7.5YR 5/6	2-m-sbk	Fr		6D	.62
2BCt	44-48	10YR 5/3	L	c-2-p 7.5YR 4/6, c-2-d 10YR 6/2	1-c-sbk	Fr		5B	.69

REMARKS:

BIOGRAPHIES

Dr. Mike Konen, Northern Illinois University

Dr. Konen is currently an associate professor in the Department of Geographic and Atmospheric Sciences at Northern Illinois University. He holds a Ph.D. in Soil Science from Iowa State University, a M.S. in Soil Science from The Ohio State University, and a B.S. in Agronomy from Iowa State University. Dr. Konen is a certified professional soil scientist (SSSA) and a certified professional soil classifier (SSSA & ISCA). He has served as chair of the Soil Science Society of America's Council of Soil Science Examiners which authors the national certification and several state licensing exams and has served as a director with the DeKalb Co. SWCD and on the ISCA and ARCPACS certification boards.

Konen teaches courses in Soil Science, Soils and Land Use Planning, Field Methods, Physical Geography, and Pedology. In 2011 he was honored with the Excellence in Undergraduate Teaching Award by Northern Illinois University. His research focuses on: human impacts on soils and landscapes; soil carbon sequestration; soil-landscape relationships in glaciated landscapes; glacial and periglacial geomorphology; Quaternary sediment mapping in northern Illinois; and post-glacial landscape changes in Midwestern U.S.

Bruce Putman, Putman Soil Testing, Inc.

Bruce Putman has owned and operated Putman Soil Testing, Inc. since 1988. He does on-site soil testing and soils related consulting in 12 counties in Northern Illinois. He has a B.S. and M.S. degree in Agronomy/Soil Science from the University of Illinois and was previously employed as a soil scientist for USDA, NRCS prior to starting his business. He is a Certified Professional Classifier with SSSA and ISCA. He is actively involved in his state professional organization and has served on numerous committees related to soils and on-site waste disposal. He has given numerous presentations at prior state and regional conferences and workshops.

Tom Copenhaver, Lake County Health Department

Tom is currently employed by the Lake County Health Department as an Environmental Health Program Manager. He began working for Lake County in August 1990 in the Individual Sewage Disposal (ISD) System Program as a registered sanitarian and then as a soil scientist. In 2004, he became a regional office supervisor and in June 2005, Tom became the ISD Program Coordinator. Tom is currently responsible for coordinating the onsite wastewater treatment system and water well programs. Tom is a Licensed Environmental Health Practitioner and a Certified Professional Soil Scientist with SSSA. He works in the Lake County Central Permit Facility in Libertyville, Illinois.

Rachel Welch, Bayer Corporation

Rachel graduated with a Bachelor's in Natural Resources and Environmental Science from the University of Illinois Urbana-Champaign (UIUC) in 2013. She continued at UIUC and received a Master's in Crop Science with a thesis focused on cover crops in 2015. After completing school, she started as a Soil Conservationist with the USDA-NRCS in the State Office in Champaign, IL and later moved to the Field Office in Normal, IL. In June 2017, she started as an Agronomic Research Specialist with Monsanto, now Bayer Crop Sciences, on the North America Field Testing and Operations team at the Waterman Research Site.

Nancy Leffler, Bayer Corporation

Nancy received her degree in Microbiology from the University of Illinois, Urbana. Upon moving to DeKalb, Nancy became a DeKalb County Master Gardener. After raising three children, she returned to work at NIU in the Plant Molecular Biology Department, then to DeKalb Genetics in the Genetic Purity Lab. Nancy took the opportunity to switch to Pathology with the Soybean Pathology group and when that moved to St. Louis, she joined the Corn Pathology group. Having always been environmentally conscious, she encouraged using the unfarmable portions of the site to plant native plants for pollinators and other wildlife.

George Milner, V3 Companies

George Milner received a B.S. in Biology from Illinois State University and worked for the U.S. Navy for a few years prior to entering the private sector as a consultant. George has been at V3 for 21 years and is the lead wetland mitigation and natural area expert. He is the lead ecologist and designer for V3's Wetland Mitigation Banks as well as many other restoration projects at V3. George also conducts prescribed burns, tree surveys, and wetland delineations.

Ted McCannon, Environmental Design Service

Ted is Principle and Founder of Environmental Design Service, designers of On-Site Waste systems for residential to commercial systems that treat 30,000 gallons per day.

After college Ted returned home to manage and expand the family farming operation of grain and livestock, later moving into the role of a hedging specialist with a major firm in Chicago and then creating an offshoot hedging business of his own which he sold in 1985 to found Environmental Design Service.

HANDOUTS

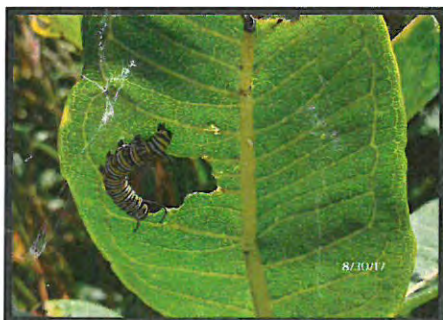
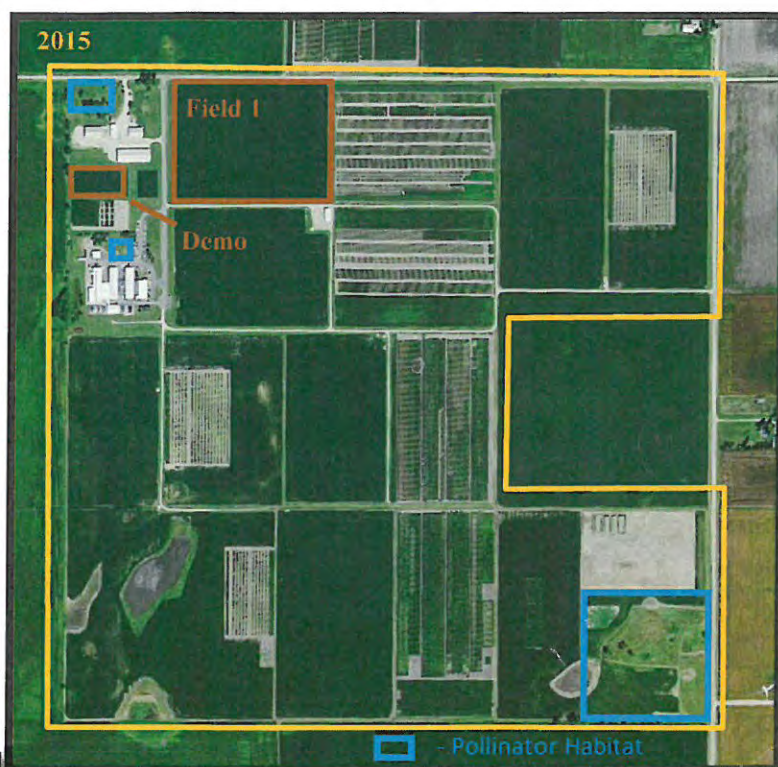
Bayer Crop Science Research Center

Overview of the Site

- Opened since the 1930s
- ~300 acres on-site
- 4 Departments
 - NA Field Testing and Operations
 - Plant Health
 - Entomology
 - Parent Testing
- ~25 Full-Time Employees
- 50—100 Part-Time Employees

Pollinator Habitat

- First butterfly garden started in 2012
- In 2015, two habitat areas added
- 3 locations total on-site, which are certified through the Wildlife Habitat Council
- The 2 larger locations are burned each spring



On-site we also have 2 honey bee hives and a butterfly tent where we raise and release monarch butterflies.



Cover Crops

Cover Crop Demonstration Plots

Planted on September 18th, 2018 with hand-seeder and drag

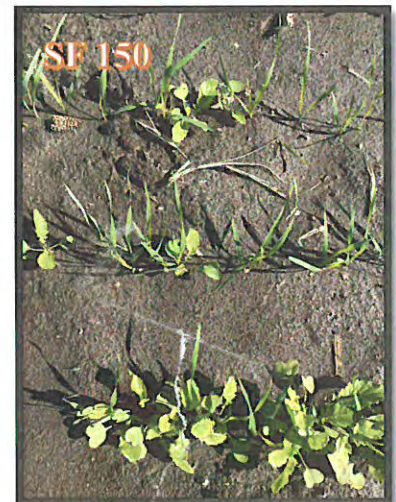
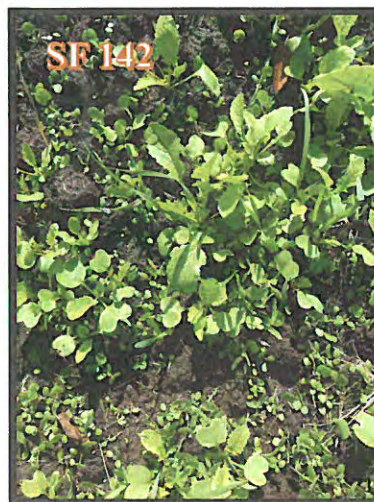
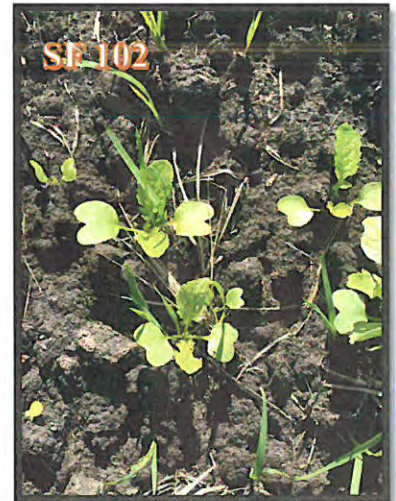
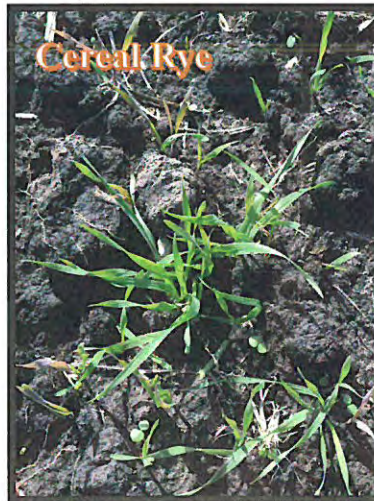
Corn						Soy								
Cover Crop		Termination	Hybrid			Cover Crop		Termination	Hybrid					
		Cereal Rye	SF 102					Cereal Rye	SF 102					
No Cover Crop / Conventional Tillage		Spray 2 Weeks Prior to Plant	Spray Day of Plant	Other	EDC	No Cover Crop / Conventional Tillage		Spray 2 Weeks Prior to Plant	Spray Day of Plant	TDB	TDB			
	SF 150													
	SF 142													
	SF 102													

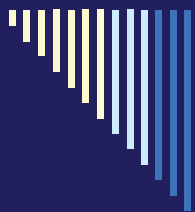
Cover Crop Mixes

- ♦ Cereal Rye (50 lb/ac)
- ♦ SF 102 Cover Starter + (35 lb/ac)
 - Radish
 - Fall Rye
 - Crimson Clover
- ♦ SF 142 Classic (15 lb/ac)
 - Crimson Clover
 - Radish
- ♦ SF 150 Field Fit (35 lb/ac)
 - Spring Oats
 - Radish

Other Cover Crops On-Site

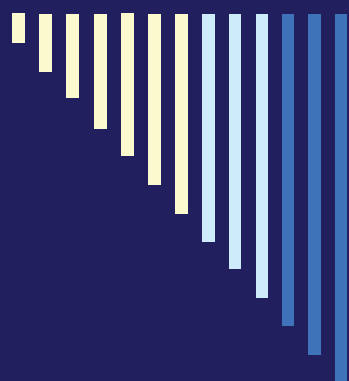
- ♦ Field 1 (15 ac) - Corn going into soy in 2019, planted with SF 150
- ♦ Irrigation Fallow (~10 ac) - Modified mix of crimson clover, peas, balansa clover, oats and cereal rye





North Central Soils of Illinois Workshop Sponsored by ISCA and IEHA

October 19, 2018



Wisconsin Mounds and At-grade Systems in Lake County

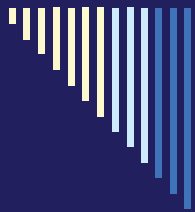
Presenter:

Tom Copenhaver, LEHP, CPSS
OWTS and Water Well Coordinator



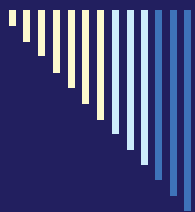
LakeCounty

Health Department and
Community Health Center



Some Basic Information

- Developed in 70's and 80's
- Design manuals from SSWMP at U. of Wis. Madison
- Soil based system with unsaturated treatment zone
- The site's soil must be "suitable"
 - Permeable (Infiltration) and Unsaturated (Treatment)
- Site contour considerations



When Should You Use???

- Primarily determined by depth to **limiting layer.**
- Other Possible Considerations:
 - Surface horizon permeability
 - Available area
 - Slope

Comparison

Mound

- Shallower Limiting Layer
- Imported sand for treatment
- Probably better for clayey surface soil
- Generally longer and narrower

At-Grade

- Deeper Limiting Layer
- Treatment occurs in soil
- Less total area

-2-

Fig. 2 shows a cross section of 4 soil absorption systems; the in-ground trench or bed, the shallow in-ground trench or bed, the at-grade, and the mound. System selection is based on the soil site criteria established by local or state codes for soil absorption systems.

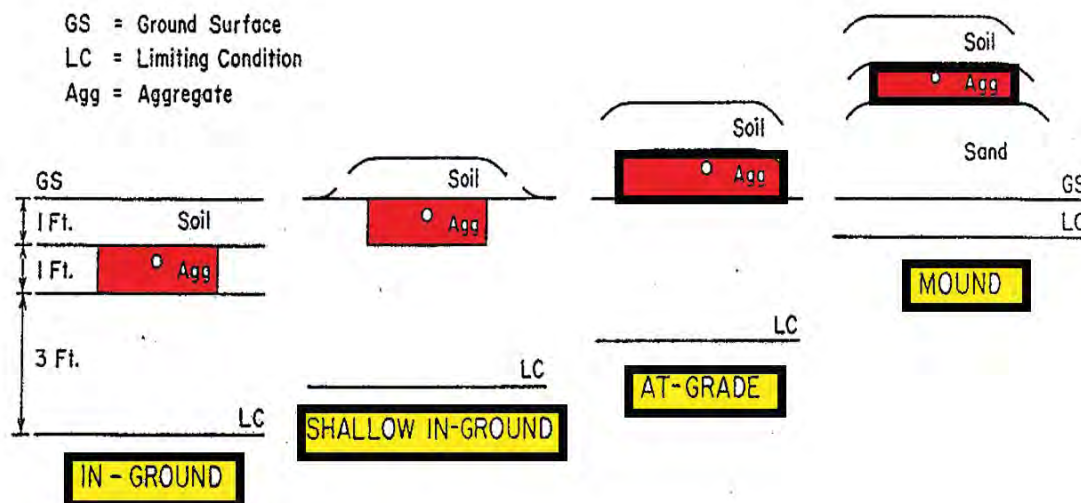
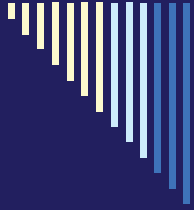
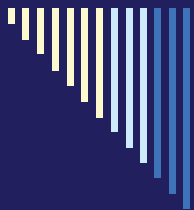


Fig. 2 Cross Section of 4 Soil Absorptions Units in Relation to Ground Surface and Limiting Conditions



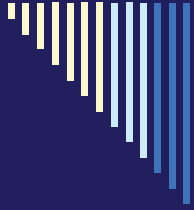
Site Conditions

- Soil
- Slope/Topography
- Landscape position



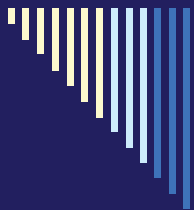
Site Condition #1 - Soil

- Permeability
 - Top 12" to 24"
- Depth to Limiting Layer. Lake County uses:
 - 12" for mound (6" to 12"???)
 - 16" to 24" for at-grades



Site Condition #2 – Slope/Topography

- Slope - 25% is a limit
- Positioned on contour



Site Condition #3 – Landscape Position

- Avoid concave positions to prevent downslope overloading

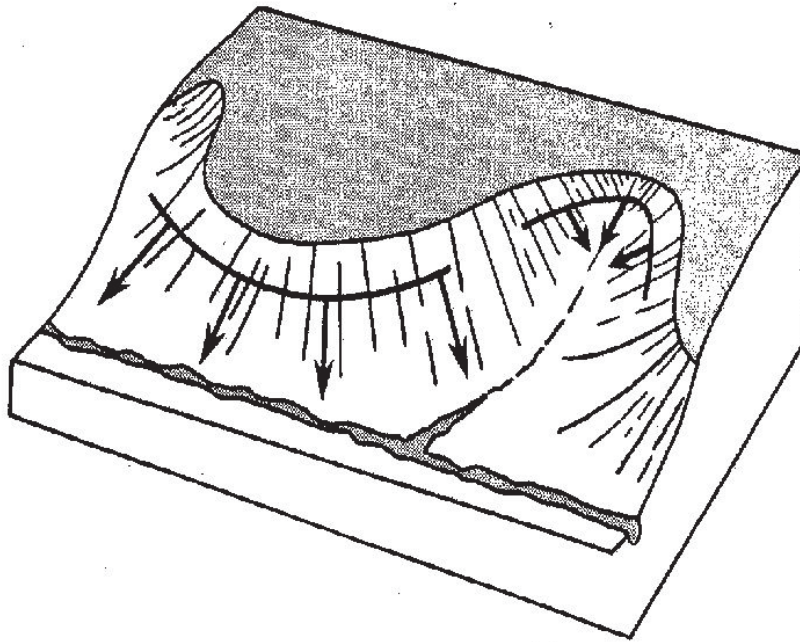


Figure 5. Block diagram of divergent and convergent from wastewater applications in convex and concave landscape positions.

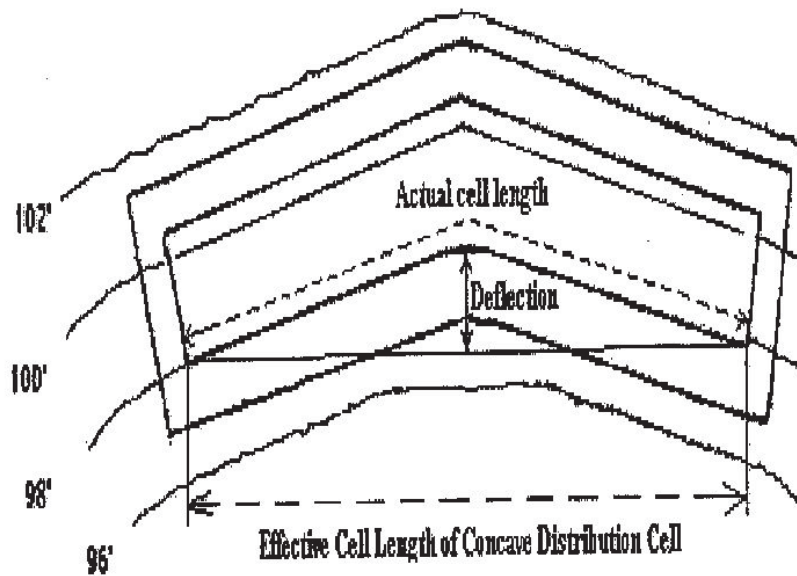
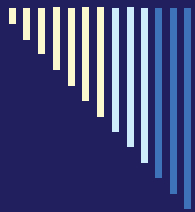
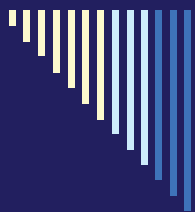


Figure 4 - Concave at-grade and Distribution Cell



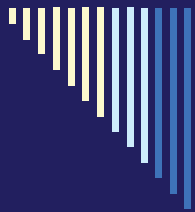
System Design

- Loading rate – gal./sq.ft/day
 - Sand (mound only)
 - Soil basal (treatment area)
- Linear loading rate – gal./ft.
- Piping distribution network



System Design – Sand Loading Rate

- Mound Only
- Determines area of gravel/application bed

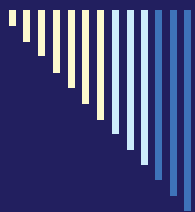


Calculation # 1

Example: Design flow = 600gpd

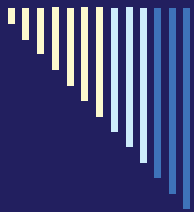
$$600\text{gpd} \div 1.0 \text{ gal./ft}^2/\text{day} = \mathbf{600 \text{ ft}^2}$$

area of gravel bed



System Design – Soil/Basal Loading Rate

- Soil loading rate (gal/ft²/day)
- Published Charts – soil texture, structure, consistence
- Determines soil treatment (basal) area



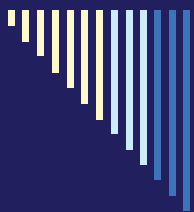
Calculation #2

Example: Design Flow = 600 gpd

$$600 \text{ gpd} \div 0.4 \text{ gal./ft}^2/\text{day} = \mathbf{1500 \text{ ft}^2}$$

(area of soil treatment/basal area)

- * At- grade – area of gravel bed
- * Mound – area of gravel bed + sand downslope

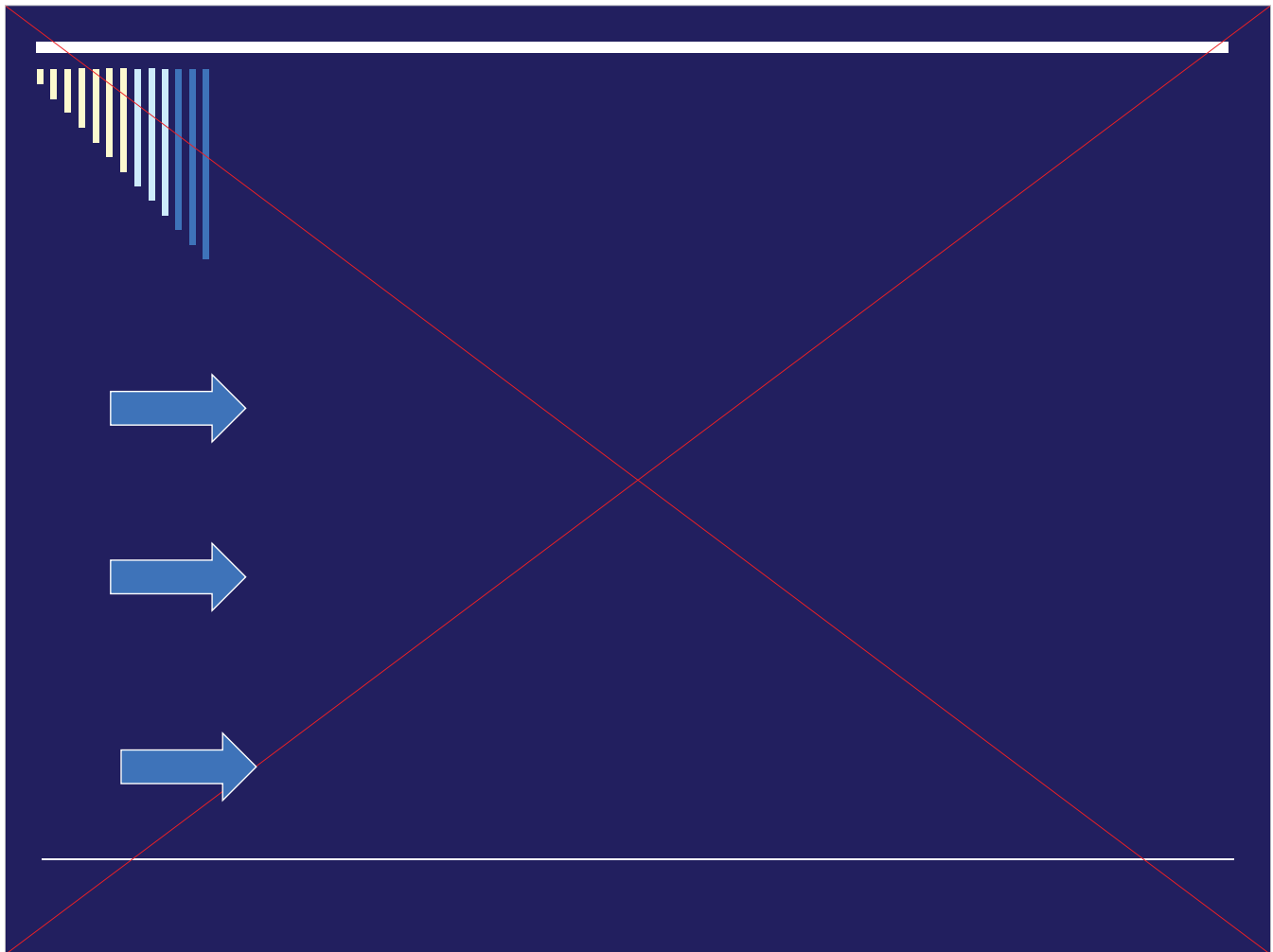


System Design – Linear Loading Rate

- Same area but different geometry
- Gallons per lineal foot of system – 3 to 10?



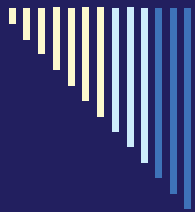
- Depends on how water is moving
 - Vertical, Horizontal, Combination



Calculation #3 (Absorption Area Length)

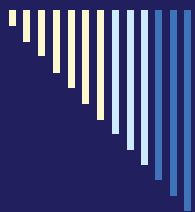
Example: Design Flow = 600 gpd

$$600 \text{ gpd} \div 4 \text{ ft (linear loading rate)} = 150 \text{ ft.}$$



Calculation #4 (Absorption Area Width)

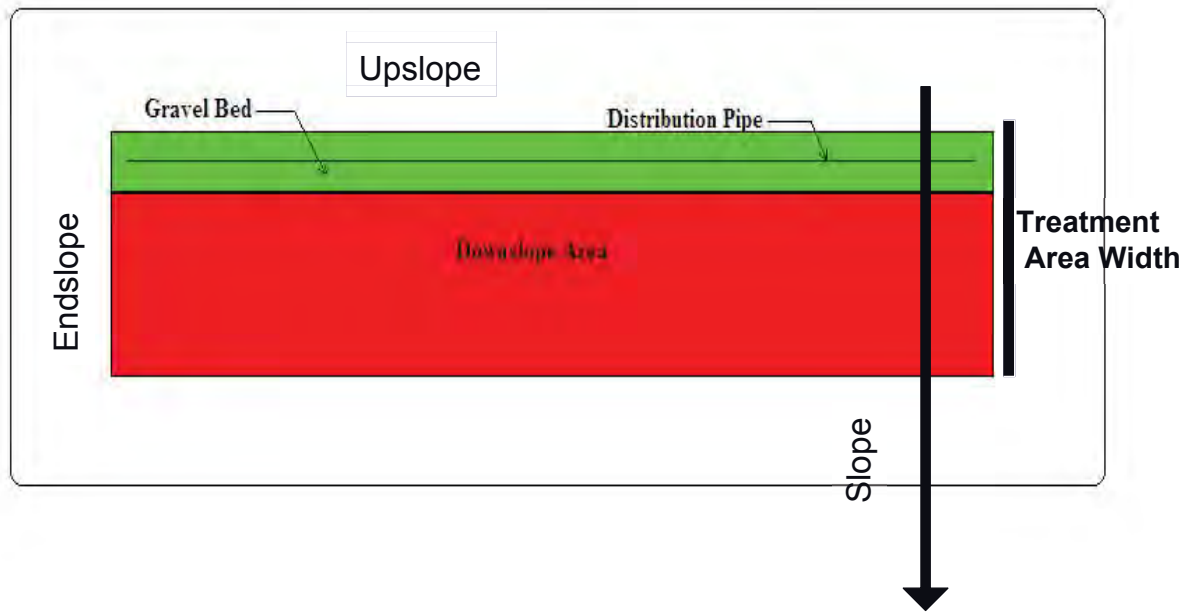
$$4 \text{ gal/ft. (linear loading rate)} \div 0.40 \text{ gal/sq.ft./day (soil loading rate)} = 10'$$



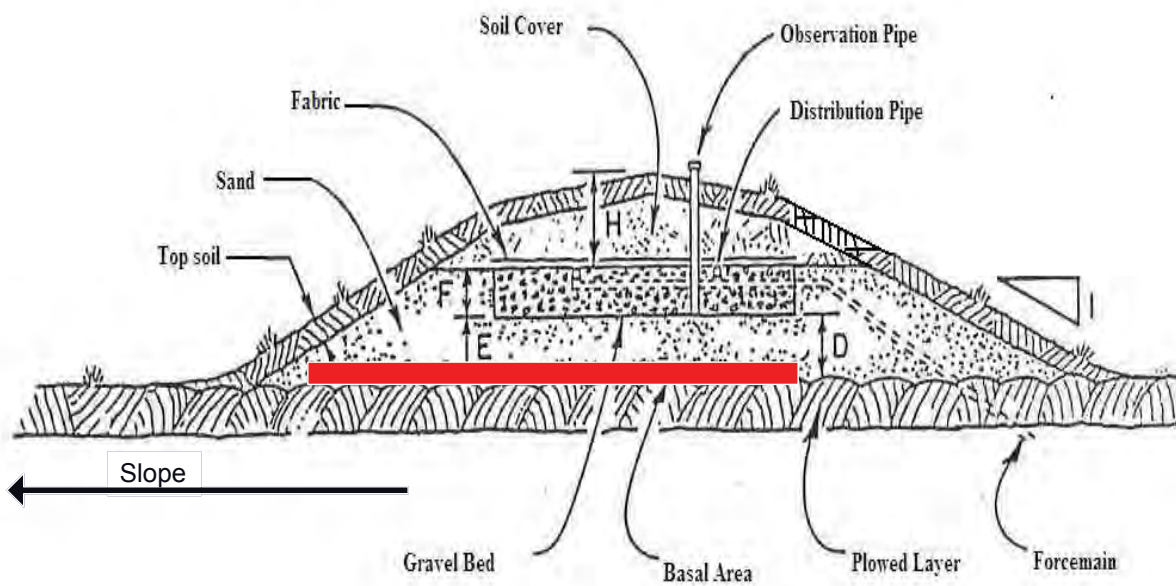
Review – Mound System Treatment Area

- Design Flow = 600gpd
- Sand Loading Rate = 1.0 gal/ft²/day
- Soil Basal Loading rate = 0.40gal/sqft/day
- Linear loading rate = 4 gals/ft

- ✓ $600\text{gpd} \div 4 \text{ gal/ft} = \mathbf{150 \text{ ft}}$ (length gravel bed and therefore treatment area)
- ✓ $600\text{gpd} \div 1.0 = \mathbf{600 \text{ ft}^2}$ gravel bed (150 x 4)
- ✓ $600\text{gpd} \div 0.40 = \mathbf{1500 \text{ ft}^2}$ treatment area
- ✓ Treatment area Width = $1500 \text{ ft}^2 \div 150' = \mathbf{10 \text{ ft}}$



Mound Treatment Area



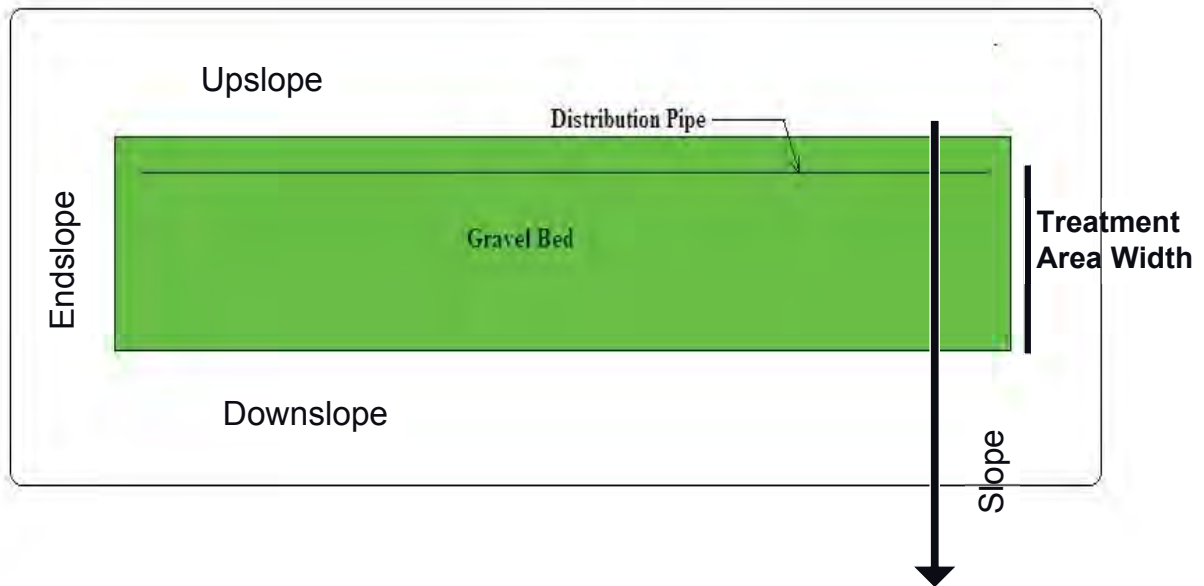






Review – At Grade System Treatment Area

- Design Flow = 600gpd
- Soil Basal Loading rate = 0.40gal/sqft/day
- Linear loading rate = 6 gals/ft
- ✓ $600\text{gpd} \div 6 \text{ gal/ft} = \mathbf{100 \text{ ft}}$ (length gravel bed and therefore treatment area)
- ✓ $600\text{gpd} \div 0.40 = \mathbf{1500 \text{ ft}^2}$ treatment area
- ✓ Treatment area Width = $1500 \text{ ft}^2 \div 100' = \mathbf{10 \text{ ft}}$



At- Grade Treatment Area

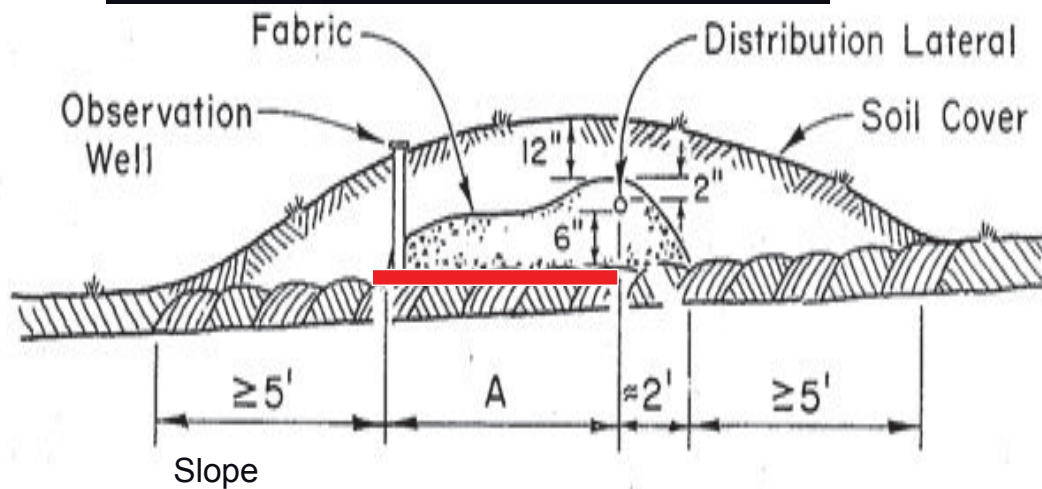


Fig. 8a. Plan View and Cross Section of Wisconsin At-grade Unit with a Single Absorption Area on a Sloping Site



At- Grade 2 Beds

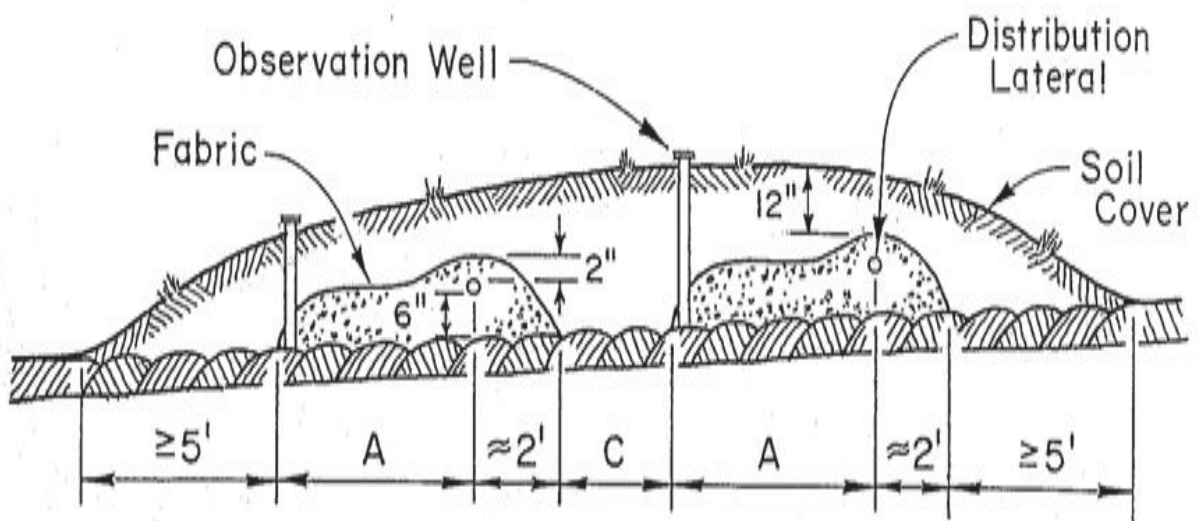


Fig. 8c. Plan View and Cross Section of a Wisconsin At-grade Unit with Two Absorption Areas Within a Single Unit on a Sloping Site

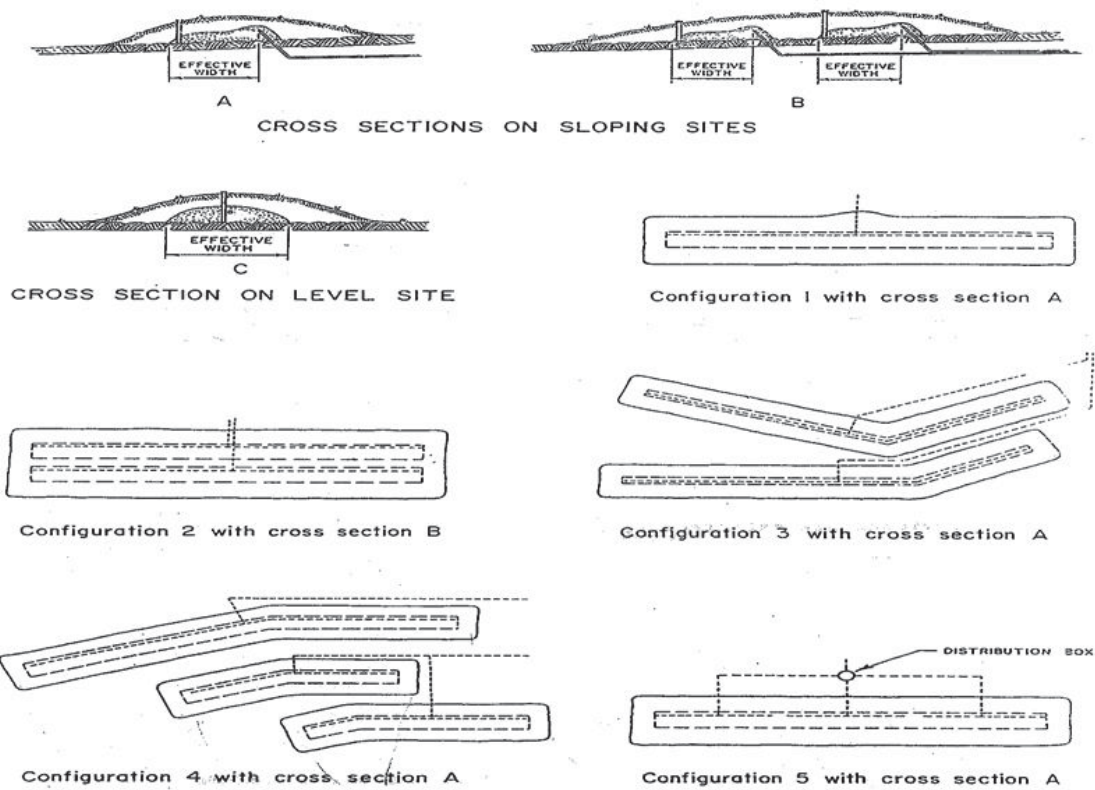
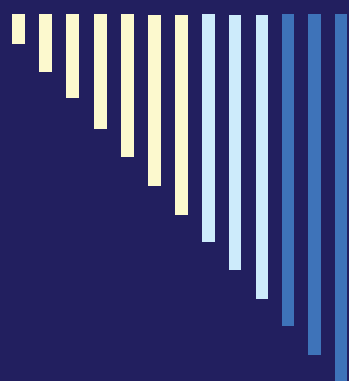


Fig. 4. Typical Configurations of At-Grade Units That Have Been Installed





QUIZ???

What if the soil on a site “fits” between a mound system and at-grade system?

Use a modified mound system! (uses 4” to 6” sand)



Gravel Bed Similar to a Mound



Sand Incorporated into Surface Soil



DAY 2

SEPTIC SITE EVALUATION DEMONSTRATION

ISCA Fall Workshop
Ted McCannon Farm
45 W134 Raymond Rd., Big Rock, IL
October 20th, 2018

Conducting an On-Site Investigation

Background Materials and Site Information

By Mike Konen

SATURDAY OCTOBER 20, 2018

Meet On-Site (Transportation Not Provided)	9:20 AM
Environmental Design Services	
45W134 Raymond Road, Big Rock, IL	
Site Overview	9:30 AM
Dr. Mike Konen	
Septic Site Evaluation Demonstration	9:45 AM
Brad Cate and Bruce Putman	
<u>Lunch (Provided)</u>	<u>11:00 AM</u>
Texture Practice Exercise / Field Practicum	12:45PM
Leave Environmental Design Services	2:30 PM

FOOTNOTES:

- 1) Disturbed soils are highly variable and require special on-site investigations.
- 2) Moderate or strong platy structures for the soil textures in Groups 4, 5 and 6 have a loading rate of 0.40 g/d/sq. ft. Platy structure having firm or very firm consistence and/or caused by mechanical compaction has a loading rate of 0.0 g/d/sq. ft.
- 3) Basal glacial tills structured by geogenic processes have the same loading rates as structureless glacial till.
- 4) This soil group is estimated to have very rapid permeability and exceeds the maximum established rate in Section 905. Illustration H, Exhibit A of this part.
- 5) N/A means not applicable.
- 6) These soil groups are estimated to have moderately slow to very slow permeability and is less than the minimum established rate in Section 905. Illustration H, Exhibit A of this part.
- 7) N/R means not recommended. These soils have loading rates considered too low for conventional subsurface disposal.
- 8) In some areas, lacustrine material may have physical properties similar to glacial till and should be placed in the glacial till columns.
- 9) Non-swelling (1:1 lattice clays) formed in bedrock residuum have a loading rate of .27 g/d/sq. ft. Swelling (2:1 lattice) clays are not recommended for subsurface disposal.

Joint Committee on Administrative Rules
ADMINISTRATIVE CODE

TITLE 77: PUBLIC HEALTH
CHAPTER I: DEPARTMENT OF PUBLIC HEALTH
SUBCHAPTER 1: WATER AND SEWAGE
PART 905 PRIVATE SEWAGE DISPOSAL CODE
SECTION 905.APPENDIX A ILLUSTRATIONS AND EXHIBITS

Section 905.APPENDIX A Illustrations and Exhibits

Section 905.ILLUSTRATION M Soil Suitability for On-Site Sewage Design

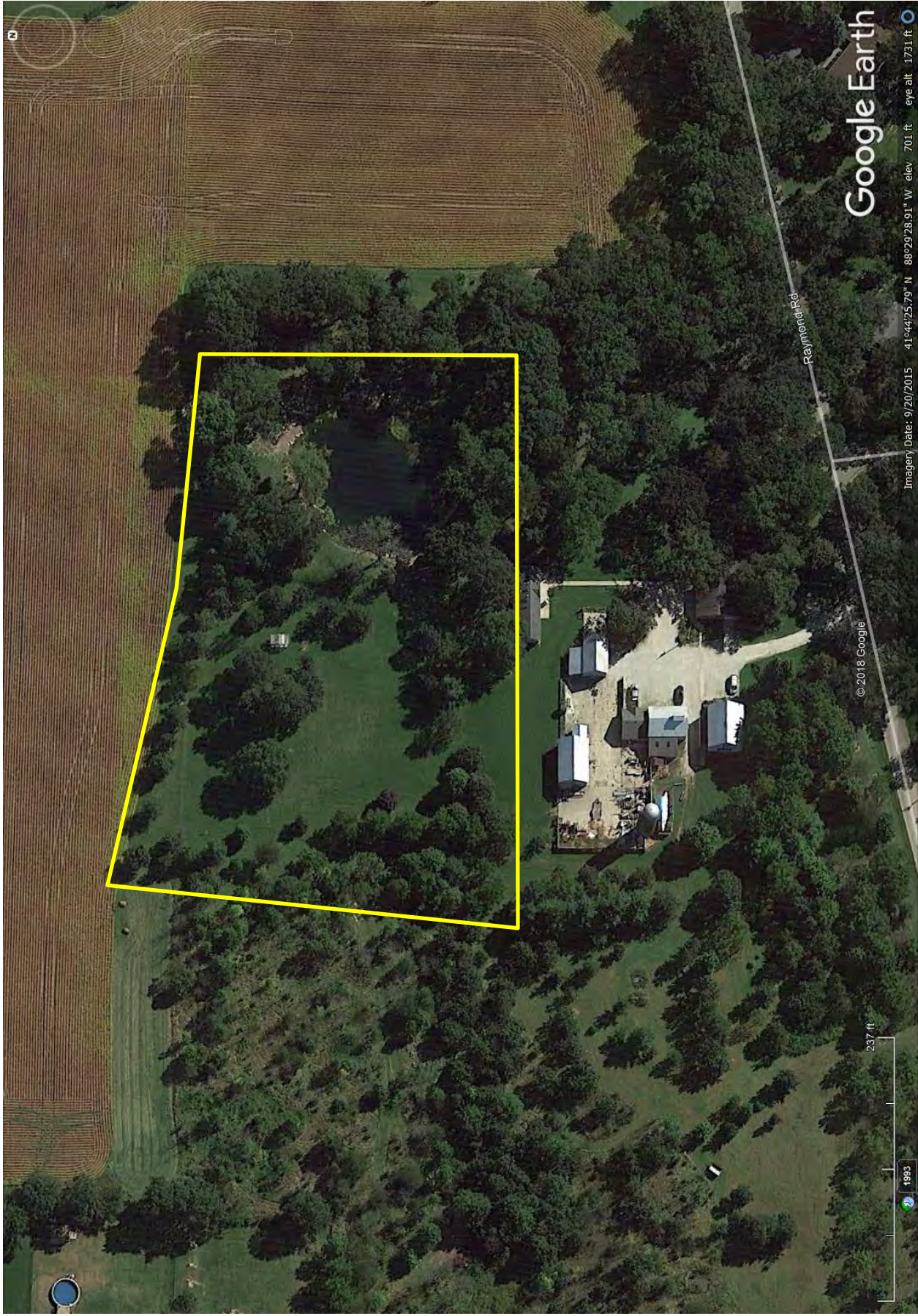
Section 905.EXHIBIT A Loading Rates in Square Feet Per Bedroom and Gallons/Square Feet/Day

Design Group	Soil Group (Most Limiting Layer)	Minimum Separation To Limiting Layer ¹	Permeability Range	Size of System	
				Residential Reg. Absorption (ft ² /bedroom)	Institutional/Commercial Allowable Application Rate (GPD/ft ²)
I	1A	NR ³	Very Rapid	NR ³	NR ³
II	2A; 2B; 2K	3 feet	Rapid	200	1.0
III	3B; 3K	3 feet	High Moderately Rapid	220	0.91
IV	3A; 3L; 4D; 4K	3 feet	Low Moderately Rapid	240	0.84
V	4A;; 4B; 4H; 4L; 5D	3 feet	Very High Moderate	265	0.75
VI	4F; 4M; 5B	3 feet	High Moderate	290	0.69
VII	4N; 5A; 5C; 5H; 5K; 6D	2 feet	Moderate	325	0.62
VIII	4O; 5E; 5I; 5L; 6A; 6B; 6E; 6H; 6K	2 feet	Low Moderate	385	0.52
IX ²	5F; 5M; 6C; 6L; 7D; 7F	2 feet	High Moderately Slow	445	0.45
X ²	5G; 6F; 6I; 7E; 7C; 7H	2 feet	Low Moderately Slow	500	0.40
XI ²	5N; 6G; 6J; 6M; 7F; 7I	2 feet	Slow	740	0.27
XII ²	7G; 7J; 7L; 8E; 8I	2 feet	Very Slow	1000	0.20
XII ²	5O; 6N; 6O; 7M; 7N; 7O; 8J; 8M; 8O	NR ³	NR ³	NR ³	0.00
XIII	9	SUBSURFACE DISPOSAL NOT RECOMMENDED			

NOTES:

- ¹ Limiting layers include fragipans; bedrock; compact glacial tills; seasonal high water table or other soil profile features that will materially affect the absorption of liquid from the disposal field.
- ² Soils in this group are less than the minimum percolation rate established in Appendix A, Illustration H as suitable for subsurface seepage systems.
- ³ NR = Subsurface disposal system not recommended.

(Source: Amended at 37 Ill. Reg. 14994, effective August 28, 2013)



Google Earth

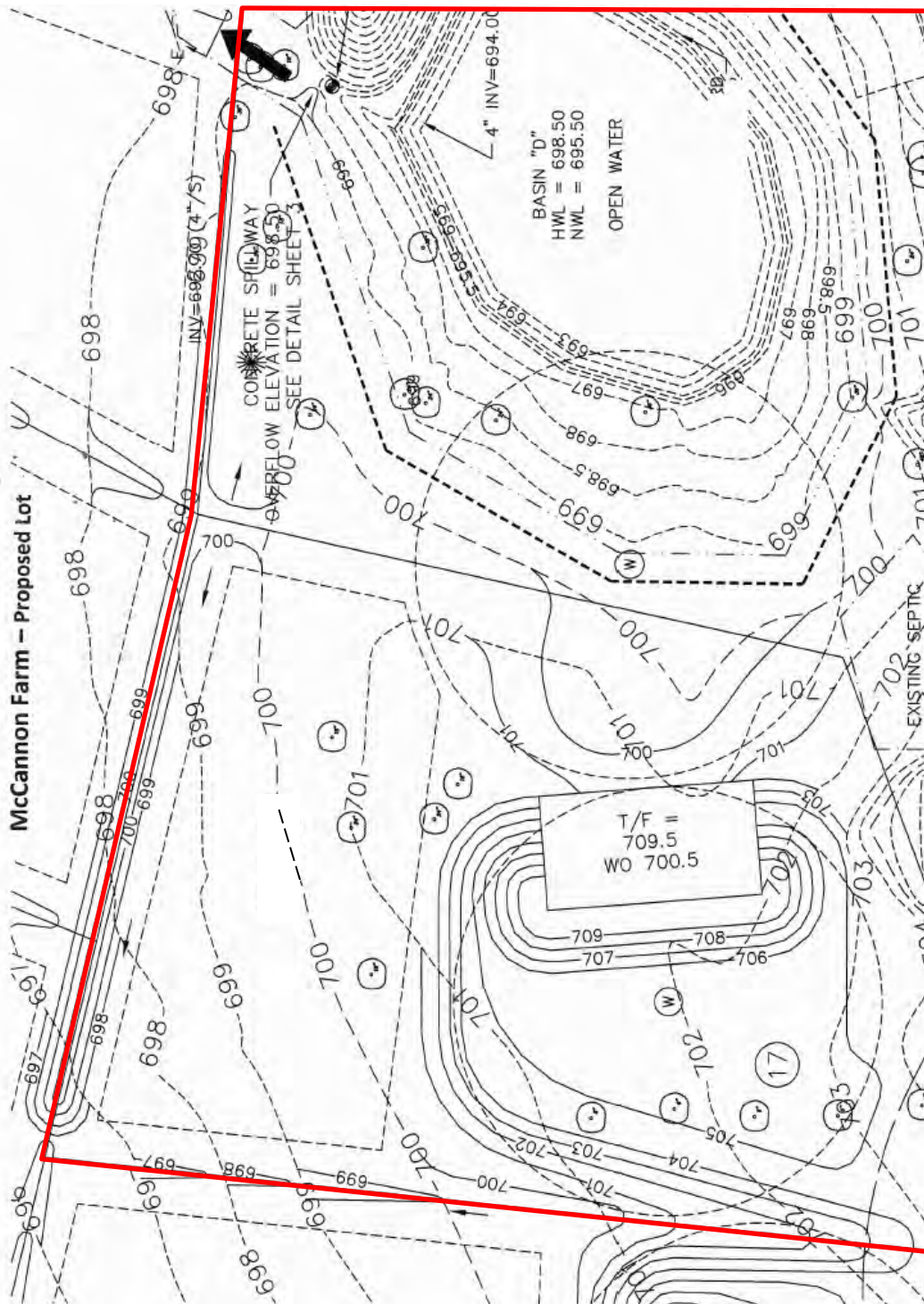
© 2018 Google

Imagery Date: 9/20/2015 41°44'25.79"N 88°29'28.91"W elev. 701 ft eye alt. 1731 ft

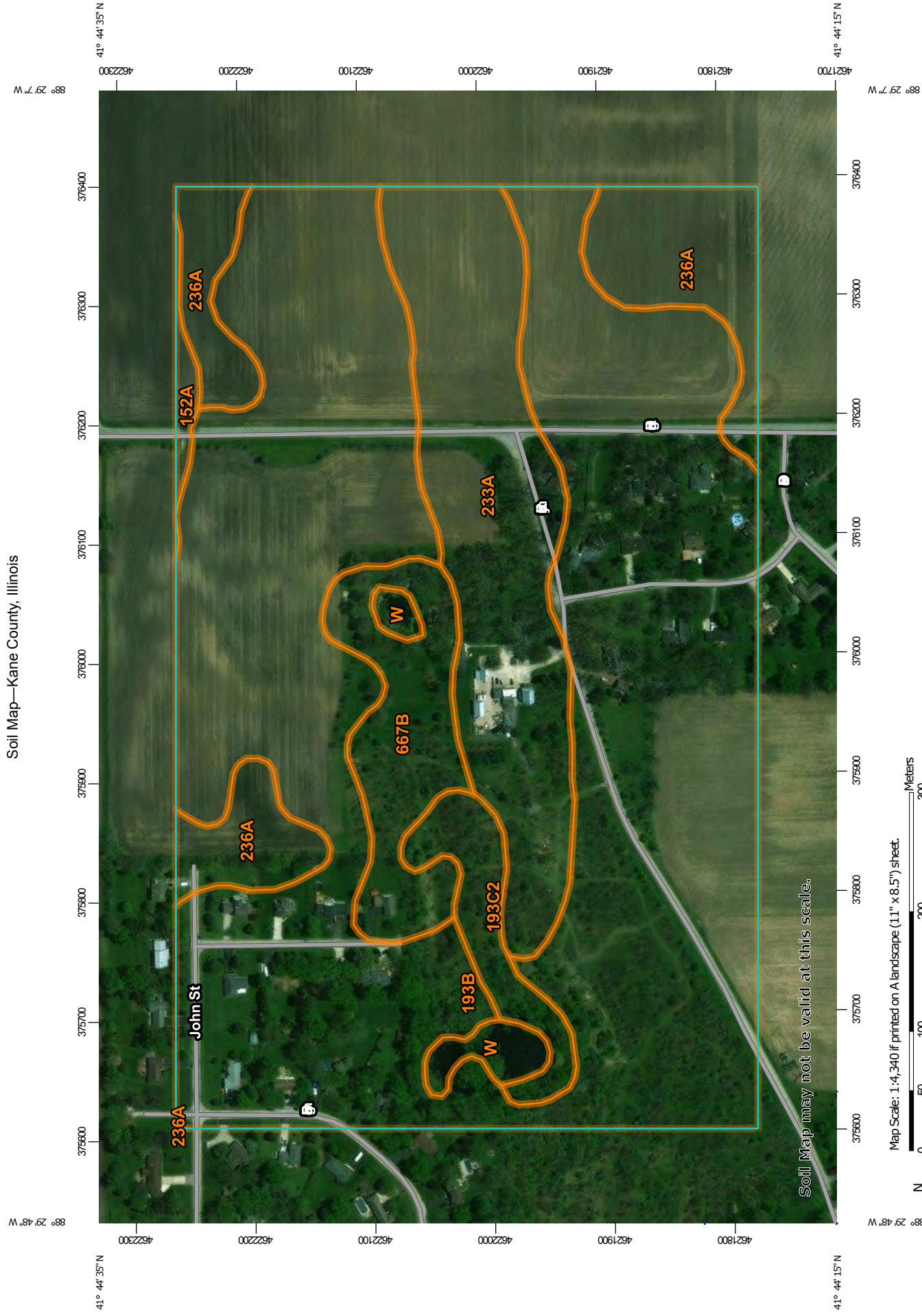
237 ft

1993

McCannon Farm – Proposed Lot



Soil Map—Kane County, Illinois



Natural Resources
Conservation Service

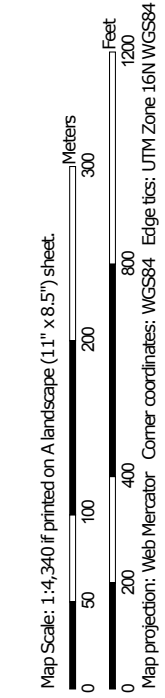
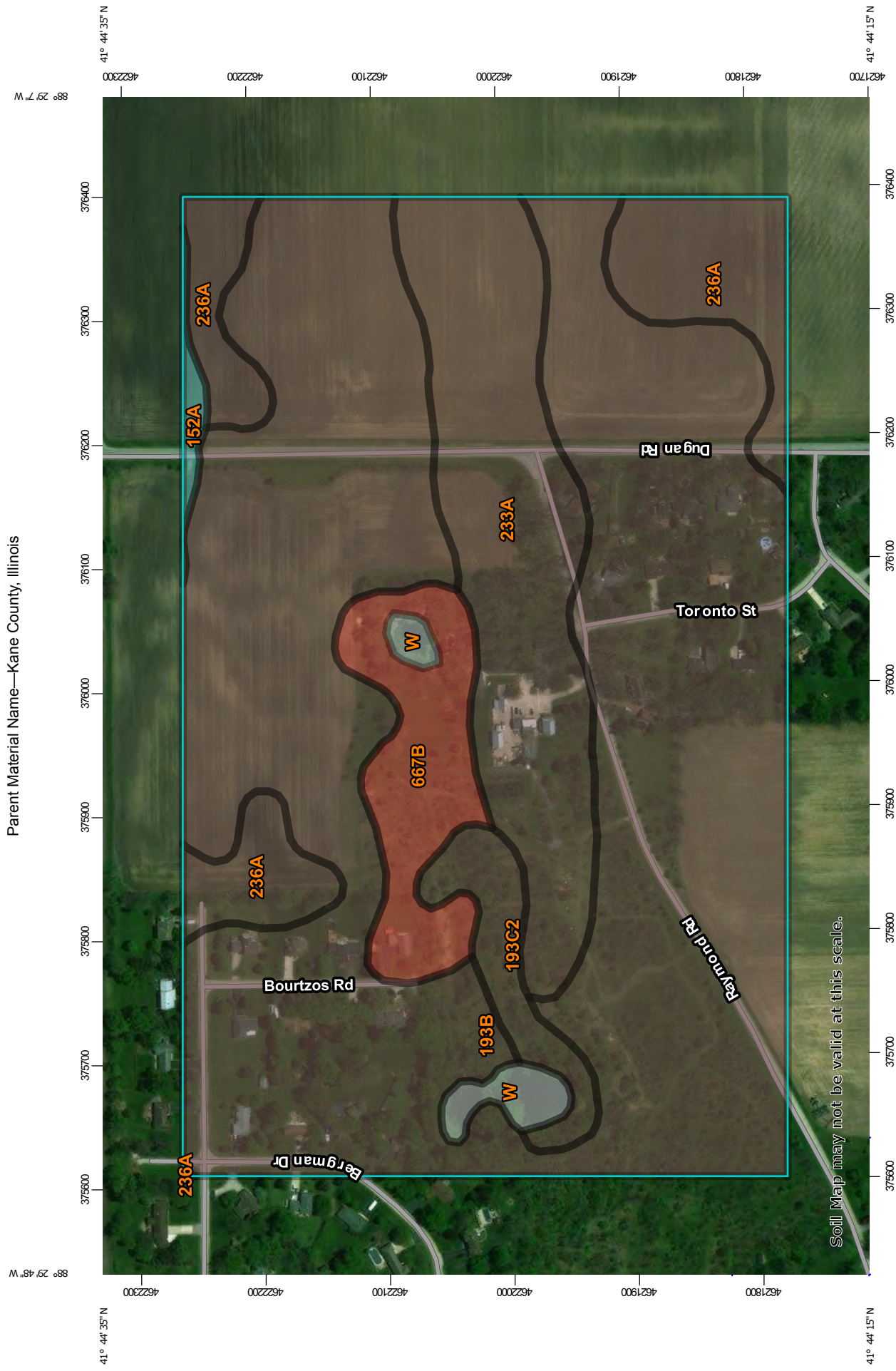
Web Soil Survey
National Cooperative Soil Survey

10/16/2018
Page 1 of 3

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
152A	Drummer silty clay loam, 0 to 2 percent slopes	0.6	0.6%
193B	Mayville silt loam, 2 to 5 percent slopes	62.1	65.2%
193C2	Mayville silt loam, 5 to 10 percent slopes, eroded	2.8	3.0%
233A	Birkbeck silt loam, 0 to 2 percent slopes	14.3	15.0%
236A	Sabina silt loam, 0 to 2 percent slopes	8.4	8.8%
667B	Kaneville silt loam, 2 to 5 percent slopes	5.7	6.0%
W	Water	1.3	1.3%
Totals for Area of Interest		95.2	100.0%

Parent Material Name—Kane County, Illinois



Parent Material Name

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
152A	Drummer silty clay loam, 0 to 2 percent slopes	loess over stratified loamy outwash	0.6	0.6%
193B	Mayville silt loam, 2 to 5 percent slopes	loess over loamy till	62.1	65.2%
193C2	Mayville silt loam, 5 to 10 percent slopes, eroded	loess over loamy till	2.8	3.0%
233A	Birkbeck silt loam, 0 to 2 percent slopes	loess over loamy till	14.3	15.0%
236A	Sabina silt loam, 0 to 2 percent slopes	loess over loamy till	8.4	8.8%
667B	Kaneville silt loam, 2 to 5 percent slopes	Loess and in the underlying outwash	5.7	6.0%
W	Water		1.3	1.3%
Totals for Area of Interest			95.2	100.0%

Description

Parent material name is a term for the general physical, chemical, and mineralogical composition of the unconsolidated material, mineral or organic, in which the soil forms. Mode of deposition and/or weathering may be implied by the name.

The soil surveyor uses parent material to develop a model used for soil mapping. Soil scientists and specialists in other disciplines use parent material to help interpret soil boundaries and project performance of the material below the soil. Many soil properties relate to parent material. Among these properties are proportions of sand, silt, and clay; chemical content; bulk density; structure; and the kinds and amounts of rock fragments. These properties affect interpretations and may be criteria used to separate soil series. Soil properties and landscape information may imply the kind of parent material.

For each soil in the database, one or more parent materials may be identified. One is marked as the representative or most commonly occurring. The representative parent material name is presented here.

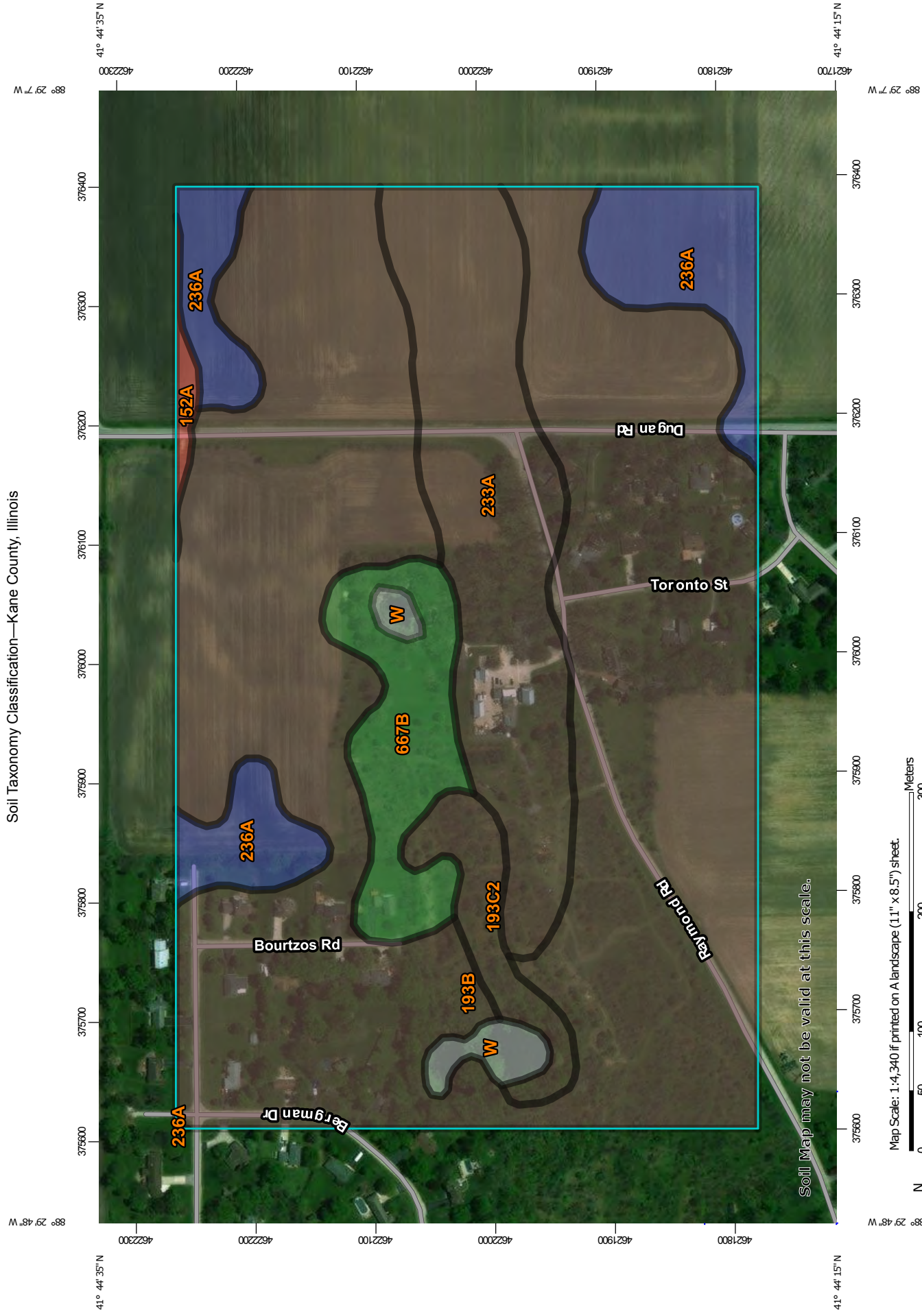
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Soil Taxonomy Classification—Kane County, Illinois



Map Scale: 1:4,340 if printed on A landscape (11" x 8.5") sheet.



Soil Taxonomy Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
152A	Drummer silty clay loam, 0 to 2 percent slopes	Fine-silty, mixed, superactive, mesic Typic Endoaquolls	0.6	0.6%
193B	Mayville silt loam, 2 to 5 percent slopes	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalfs	62.1	65.2%
193C2	Mayville silt loam, 5 to 10 percent slopes, eroded	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalfs	2.8	3.0%
233A	Birkbeck silt loam, 0 to 2 percent slopes	Fine-silty, mixed, superactive, mesic Oxyaquic Hapludalfs	14.3	15.0%
236A	Sabina silt loam, 0 to 2 percent slopes	Fine, smectitic, mesic Aeric Epiaqualfs	8.4	8.8%
667B	Kaneville silt loam, 2 to 5 percent slopes	Fine-silty, mixed, superactive, mesic Mollic Oxyaquic Hapludalfs	5.7	6.0%
W	Water		1.3	1.3%
Totals for Area of Interest			95.2	100.0%

Some discussion items (there will be many more!):

- 1) State and individual county requirements
 - Description items required in state and county codes
- 2) Siting boring locations
 - Homeowner, installer, soil classifier
 - Site conditions
- 3) Site sketch or scale drawing with boring locations?
 - Include distances
- 4) Loading Rate chart
 - Published chart <ftp://www.ilga.gov/jcar/admincode/077/07700905sections.html> is incorrect. Missing weak structure till columns and Silty Clay in row 8. See ISCA website for corrected version. <http://www.illinoissoils.org/soil-information.html>
 - FR vs FI implications on design group
 - What do we do when samples “are on the fence”?
Sandy loam vs. Loam massive friable till. 0.62 vs 0.27 g/ft²/day

35% clay
Yorkville and Wadsworth till Bt and C horizons – SiC, SiCl > 35%, SiCl < 35%
 - Sandy loam tills that behave more like outwash? Batestown and Haeger tills common issue.
 - Lacustrine sediments that behave more like till? Guidance is in code.
 - The crud zone, outwash or till?
 - Colluvium
- 5) Seasonally high water table (SHWT) interpretations

0-8 in	10YR 2/1	Ap
8-14 in	10YR 3/1	A
14-20 in	10YR 4/3	Bt with common 2.5Y 4/2 redox depletions
0-9 in	10YR 2/1	Ap
9-15 in	10YR 3/1	A
15-21 in	2.5Y 4/2	Btg
- 6) Overcoming soil limitations
 - Curtain drains
 - System type
 - System depth
- 7) Communication between soil classifier, installer, designer, health department, and homeowner

Joint Committee on Administrative Rules
ADMINISTRATIVE CODE

TITLE 77: PUBLIC HEALTH
CHAPTER I: DEPARTMENT OF PUBLIC HEALTH
SUBCHAPTER r: WATER AND SEWAGE
PART 905 PRIVATE SEWAGE DISPOSAL CODE
SECTION 905.55 SUBSURFACE SEEPAGE SYSTEM DESIGN REQUIREMENTS

Section 905.55 Subsurface Seepage System Design Requirements

After January 1, 2014, when designing a subsurface seepage system, the absorption capacity of the soil shall be determined by subsection (a). After January 1, 2014, subsection (b) shall not be used to determine design requirements for a subsurface system.

- a) Soil Investigation
 - 1) Soil investigations shall be conducted in the following manner:
 - A) Determination of soil characteristics on sites proposed for development with private sewage disposal systems shall be based on soil boring data collected by a soil classifier or an Illinois licensed Professional Engineer.
 - B) There shall be a minimum of 3 borings per soil absorption system site. The soil borings shall be at least 50 feet apart, and the proposed subsurface seepage system shall be located within the area where the soil borings were located. More soil borings may be necessary for accurate and appropriate evaluation of a site where there is some concern about the consistency of the soil materials. One of the borings shall be made at the lowest elevation of the proposed absorption field area. Borings shall extend a minimum of 60 inches below the natural ground surface. An observation pit shall be used in gravelly materials.
 - C) Observation and determination of soil characteristics may also be determined from a pit dug by a backhoe or other excavating equipment. The Department or local authority may require soil pits (backhoe excavation) in cases where ground is frozen, where the soil materials are considerably varied in texture, where there has been previous or current fill material or cutting of soils, or where gravelly

soils are encountered. Soil pits shall be prepared at the perimeter of the expected soil absorption area to minimize damage to natural soil structure. Soil pits shall extend a minimum of 60 inches below the natural ground surface.

- D) Site characteristics to be described include:
- zones of seasonal and permanent water saturation
 - United States Department of Agriculture (USDA) soil textural changes
 - USDA soil structural features for each horizon
 - Slope
 - compaction and depth
 - soil coloration
 - consistence
 - coatings
 - depth of limiting layer
 - depth of soil mottling
 - internal drainage classification
 - permeability range
 - and other limiting soil characteristics that may reduce permeability

The following reference materials shall be used as a guide for describing and classifying soil: Field Book for Describing and Sampling Soils, Soil Taxonomy, and Soil Survey Manual.

- 2) The following persons are qualified to conduct soil investigations:
- A) any person who meets the definition of soil classifier in Section 905.10;
- B) an Illinois licensed Professional Engineer;
- C) an employee of a local health department who has 3 years of experience in designing or approving private sewage disposal systems using soil classification information and 6 semester hours of soils-related coursework;
- D) an employee of a local health department with 5 years of experience reviewing the design and approving private sewage disposal systems using soil classification information under the direct supervision of those persons listed in subsection (a)(2)(A), (B) or (C).
- 3) If conflicting soils investigation information is provided about a given site, a third Soil Classifier may be requested to provide additional information or help to resolve the conflict. A National Resources Conservation Service

(NRCS) Soil Scientist who is also a Soil Classifier may be contacted for technical information or interpretation.

b) Percolation Tests

- 1) Performance of Percolation Tests. At least 3 separate percolation tests, a minimum of 50 feet apart, shall be performed at the site of each proposed subsurface seepage system.
- 2) Procedure for Performing Percolation Tests. Percolation tests shall be performed in accordance with the procedure outlined in Appendix A, Illustration G. Alternate procedures for performing percolation tests may be submitted to the Department for review. If determined to be as stringent as that described in Appendix A, Illustration G, the alternate procedure will be approved.
- 3) The Department or its agent may choose not to accept percolation data results and may require a soil investigation if soils information, permits for private sewage disposal systems in proximity to the proposed site, direct observation or other information shows conditions that will have an impact on the design, construction, installation, modification or performance of the private sewage disposal system.

(Source: Amended at 37 Ill. Reg. 14994, effective August 28, 2013)

ISCA Fall Workshop

Ted McCannon Farm

45 W134 Raymond Rd., Big Rock, IL

October 20th, 2018

How to Conduct a Site Evaluation W/ Example Reports

&

Profile Descriptions of Test Pits Used in Exercise

By Brad Cate

Practical Guide to Conducting a Site Evaluation and Preparing a Report

Purpose

This document is intended to provide a general guidance on how to conduct a site evaluation for siting a septic system in Illinois. Below is a framework to begin the process and bring it to a hopefully successful conclusion.

Booking/Pre Site Visit

It's helpful to discuss the client's preferences and needs in detail prior to heading to the field. If the subject county has a public GIS webpage or a subscription has been purchased, it's a good idea to bring up the parcel information and orthophotography while discussing the job. If you have GIS software, many datasets are in the public domain that can provide similar information. Site conditions like limited access, extensive fencing, or steeply sloping conditions that affect the time on site can be identified prior to delivering a quoted cost. Historical aerial photography can sometimes be helpful (before or after the site visit) to delineate old feedlots, razed barn/home sites, obvious grading or fill activities, etc. This is a good time to determine if a JULIE utility locate needs to be scheduled and determine if you or the owner will complete the application. You may or may not wish to charge for making this application. It's also a good idea to look at published soil survey information, if for nothing else, to determine the parent materials that are prevalent at the job site.

In recorded subdivisions in some counties, you must perform your work within a designated sewage reserve area. If working in one of those counties, a copy of the record plan depicting those areas should also be obtained beforehand.

Site Visit

At the time of the site visit, a printed copy of the GIS map can help to confirm/establish/locate property lines in the field. Few things are more professionally embarrassing than conducting your site evaluation on the wrong property or spanning a property line. How much time and effort is expended to comfortably establish this information is up to you. If working in subdivisions rather than on large tracts, one may wish to purchase and use a magnetic locator to locate property corner monuments (rebar, iron pipe, or concrete monuments). This can also pay dividends later allowing accurate plotting of your information.

In determining where to conduct your borings, the area of study may have been previously selected by the homeowner or contractor providing the referral or it may be up to you. Occasionally, the area selected by others consists of an unfavorable landform such as a drainage head or closed depression. Part of your job as a consultant is to inform your clients that the chosen area is

suboptimal for wastewater disposal and treatment. Suggest evaluations on better landforms when the option exists. You can also conduct borings in the area designated and provide additional borings on more favorable landforms. When client expectations don't appear to be compatible with site conditions, it may be better in the long run to just decline the job with regrets.

Once the area or areas to be evaluated are determined, try to conduct the borings at locations that are representative of the landforms and landscape positions present. Avoid small obvious anomalous areas such as hummocks, depressions, berms or other altered features unless they represent a significant portion of the area to be evaluated. If you use a truck mounted sampler, your options for soil boring locations will be more limited.

Be aware that some counties require borings extended to greater than 5' as per Illinois Code. The extended depth may be a countywide requirement or restricted to areas where shallow bedrock or other limitations are concerns. In addition, some counties, complex, large, or disturbed sites may require more than 3 soil borings. It's entirely reasonable to adjust your fee when additional borings and time are required as would any other contractor or consultant. If hand sampling with a push probe by choice or due to vehicular access limitations, it's helpful to have a long and short push probe for starting and finishing the boring or a means to adjust the probe length to accommodate the required sampling depths.

Some soil scientists prefer to sample and describe in the field. Some collect the samples and describe them back at the office. Each method has its advantages. A larger number of site visits can be conducted if the samples are described later (at the expense of additional time to describe and complete the reports). If the samples are described in the field, any adverse conditions can be identified and alternate areas sampled, without re-visiting the site.

Be especially cognizant of soil compaction, fill, or other disturbance. Soil compaction or disturbance at shallow depths above the gravel (or other absorption media) is not as much a concern as disturbances adjacent to the absorption media where the biomat will form. Placement of a drainfield in compacted materials can cause a nearly instantaneous failure of the soil absorption system. Footnote 2 of Exhibit B in the state code specifies: *"Moderate or strong platy structure for the soil textures in Groups 4, 5 and 6 have a loading rate of 0.40 g/sq.ft/d. Platy structure having firm or very firm consistency or caused by mechanical compaction has a loading rate of 0.0 g/sq.ft/d."* Any disturbance should be noted and evaluated for associated compaction.

Fill soils are especially problematic since the evaluator rarely knows the method of placement, source, and homo/heterogeneity of the fill materials. Footnote 1 of Exhibit B in the state code states: *"Disturbed soils are highly variable and require*

special on-site investigations.” Some classifiers conduct site evaluations in fill with push probes, backhoe pits, or a combination of borings and pits with or without actual permeability testing. The methodology of choice will depend on the comfort level of the evaluator in characterizing the fill and the applicability of values in Exhibits A & B to the fill/disturbed soils. In addition, characterization of saturation depth and patterns may be problematic. Never let yourself be pressured into estimating loading rates and identifying limiting conditions. Again, sometimes it’s best to explain to your client the complexity involved and decline to provide a product.

Soil borings can be located by pacing, tape, compass vectors, measuring wheel, GPS/GNSS (with appropriate corrections), or by using orthophotography (if recent enough and the resolution is fine enough) to accurately determine where the borings were conducted. Flagging and numbering the borings in the field is recommended. Measurements should be as accurate as reasonably possible given the plot or sketch is not intended to be a survey but should allow relocation of the borings in the event flags and boring locations are no longer evident.

Site Evaluation Report

The end users or regulators, will influence the format of the report and the information provided. Local Health Departments (LHD’s) or colleagues can provide example reports for specific counties.

Narrative and Soil Profile Notes

The report should provide site identifying characteristics (tax PIN numbers, street address, section/township/range, physical location from cross streets, etc.). Using Exhibits A & B from Appendix A of the Illinois Private Sewage Code (or other local code), a loading rate should be specified for each subhorizon of the soil profile descriptions. Depths to limiting layers and their types should be characterized for each boring. Profiles can be classified to the series, series map unit, taxonomic subgroup, or taxonomic subgroup and family level based on familiarity with each. Be conscious that as a certified soil classifier classifying to the soil series, you may have some liability should a user access and act upon published series interpretations such as limitations for basements or ponds.

The summary or recommendations report section may discuss possible remedial measures for limiting conditions. This includes but is not limited to prescribing or suggesting specific system types, subsurface drains for shallow seasonal saturation, deep installation to avoid shallow compacted layers, serial distribution on slopes, etc.

Site Evaluation Sketch or Plot Drawing

Plot drawings may be hand sketched or prepared using CADD, GIS or other software. The site evaluation plot drawing or sketch should be to scale and prepared as accurately as possible, minimizing the risk that the system will be designed and installed in the wrong location. If the drawing is not to scale, provide distances of the borings from two semi-permanent points of reference (wells, building corners, utility poles, meter pedestals, corner monumentation, etc.). A scale bar on the drawing helps to identify changes in printed scale or distortion of the plot due to reproduction or print settings.

On large tracts that have few or no nearby points of reference, accurate GPS coordinates may suffice or points can be located by survey. Identify the direction of slope and provide slope percentages at the boring location. LIDAR data (coverage of the majority of Illinois is available and in the public domain) and GIS software will allow you to plot actual contours which may also help in delineation of the area that represents your interpretations. Some county GIS systems can also provide contours. Label exact or approximate lot dimensions based on availability of information if the scale of the drawing permits and lot boundaries are close enough to the evaluated area.

If borings are on different landforms with significant differences in depth to limiting layers and or loading rates, you may wish to indicate, by shading or hatching, what areas of the site are represented by individual or combinations of borings. A boring in alluvium or glacial till may have no relationship for purposes of septic system suitability to one in deep loess on another part of the site and have completely different recommendations/interpretations. Some have remarked that information provided on a site evaluation in addition to the required bare minimum increases the evaluator's liability. Others feel that providing that information rather than leaving it up to non-soil scientists, who may never visit the site, to figure out decreases liability.

Summary

In the end, the methodology, tools, and software used to complete a site evaluation will depend on the evaluator's financial investment capability, skill set, local market regulatory requirements, soils in your area of practice, and planned longevity of practice. Is this a primary or secondary source of employment? Larger, more complex consulting jobs and or being a full-time consultant often requires and justifies a greater expenditure in equipment and software.

It's difficult to anticipate the variables involved with a particular site evaluation. Even after many years of consulting, new and unique challenging situations will continue to arise. The best advice is to rely on your own studied judgment and your colleagues experience working within, but not relying upon, regulatory requirements to insure you're providing the best possible product.

Example Reports

GAINES SOIL CONSULTING

8611 Wieseman Road
Worden, Illinois 62097
618/459-8619 or 636/947-1221
Email: doug@gainessoil.com

SOIL EVALUATION REPORT

in accordance with 77 Illinois Administrative Code, Chapter 1, Subchapter r, Section 905

Client:
Pyatt Cutler Road
Percy, Illinois 62272

Report: October 2018
Site: _____ Residence
Pyatt Cutler Road
County: Perry
Date: October 2018
Job N°:

Sample Locations: see site sketch

Detailed Soil Description¹ / Interpretations - Boring 1

Depth (in)	Matrix Color ²	Texture	Mottles ²	Structure	Consistence	Coatings ²	Notes	Permeability & Loading Rate ³ in (G/D/Ft. ²)
0 - 4	10YR 4/3	Silt Loam ~15 - 25% Clay	--	Moderate Very Fine Angular Blocky	Hard	--	--	Very High Moderate (0.75)
4 - 11	10YR 5/3	Silt Loam ~25 - 27% Clay	--	Moderate Medium Subangular Blocky	Hard	--	--	
10 - 17	10YR 5/3	Silty Clay Loam ~35 - 40% Clay	Common Fine Faint 10YR 5/2 Common Very Fine Distinct 10YR 4/6	Moderate Medium Prismatic / Strong Fine Angular Blocky	Extremely Hard	Few Faint 10YR 5/2	Common Medium Fe & Mn Accumulations	Low Moderately Slow (0.40)
17 - 24	2.5Y 5/3	Silty Clay Loam ~35 - 40% Clay	Common Fine Faint 2.5Y 5/2 Common Fine Prominent 10YR 4/6	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Extremely Hard	Very Few Faint 10YR 5/2	Common Medium Fe & Mn Accumulations	
24 - 32	5Y 6/1	Silty Clay Loam ~30 - 35% Clay	Common Fine Prominent 7.5YR 5/6	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Very Hard	Very Few Faint 10YR 5/2	Common Coarse Fe & Mn Accumulations	Low Moderate (0.52)
32 - 40	5Y 6/1	Silt Loam ~25 - 27% Clay	Many Medium Prominent 7.5YR 4/6	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Hard	--	Common Coarse Fe & Mn Accumulations	Very High Moderate (0.75)
40 - 45	7.5YR 5/2	Silt Loam ~25 - 27% Clay	Common Fine Distinct 7.5YR 4/6	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Hard	--	Common Coarse Fe & Mn Accumulations	
45 - 60	7.5YR 5/3	Silt Loam ~25 - 27% Clay	Common Fine Distinct 7.5YR 5/2 Common Fine Distinct 7.5YR 4/6	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Hard	--	Common Coarse Fe & Mn Accumulations	

Soil profile was a somewhat poorly drained soil. The seasonal high ground water level (seasonal saturation) was 10 inches. The most limiting permeability was the layer with low moderately slow beginning at 10 inches. Physiography was a gently sloping upland with a 2% slope southwest; soil formed in loess.

Detailed Soil Description¹ / Interpretations - Boring 2

Depth (in)	Matrix Color ²	Texture	Mottles ²	Structure	Consistence	Coatings ²	Notes	Permeability & Loading Rate ³ in (G/D/Ft. ²)
0 - 5	2.5Y 4/4	Silt Loam ~25 - 27% Clay	--	Moderate Fine Angular Blocky	Friable	--	--	Very High Moderate (0.75)
5 - 12	10YR 4/3	Silt Loam ~15 - 25% Clay	--	Weak Medium Subangular Blocky	Hard	--	--	High Moderate (0.69)
12 - 18	10YR 6/3	Silty Clay Loam ~27 - 30% Clay	Common Very Fine Distinct 10YR 4/6	Strong Fine Subangular Blocky	Hard	--	Common Medium Fe & Mn Accumulations	Moderate (0.62)
18 - 23	10YR 6/3	Silty Clay Loam ~30 - 35% Clay	Common Very Fine Prominent 5YR 4/6 Common Fine Faint 10YR 6/2	Strong Fine Prismatic / Strong Fine Angular Blocky	Very Hard	Common Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	Low Moderate (0.52)
23 - 30	10YR 5/2	Silty Clay / Clay >40% Clay	Common Fine Distinct 10YR 4/6	Strong Medium Prismatic / Strong Fine Angular Blocky	Extremely Hard	Common Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	Very Slow (0.2)
30 - 35	10YR 5/2	Silt Loam ~25 - 27% Clay	Many Fine Prominent 7.5YR 5/6	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Friable	Very Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	Very High Moderate (0.75)
35 - 45	2.5Y 5/2	Silt Loam ~25 - 27% Clay	Common Medium Prominent 7.5YR 4/6	Moderate Medium Prismatic / Weak Medium Platy	Friable	--	Common Medium Fe & Mn Accumulations	High Moderate (0.69)
45 - 55	2.5Y 5/2	Silt Loam ~25 - 27% Clay	Many Medium Prominent 7.5YR 4/6	Moderate Medium Prismatic / Strong Medium Platy	Friable	--	Common Medium Fe & Mn Accumulations	Low Moderate (0.52)
55 - 60	7.5YR 5/2	Silt Loam ~25 - 27% Clay	Common Medium Distinct 7.5YR 5/6	Moderate Medium Prismatic / Strong Medium Platy	Very Slightly Brittle	--	Many Medium Fe & Mn Accumulations	High Moderately Slow (0.45)

Soil profile was a somewhat poorly drained soil. The seasonal high groundwater level (seasonal saturation) was 12 inches. The most limiting permeability was the layer with very slow beginning at 23 inches. Physiography was a gently sloping upland with a 3% concave slope southeast; soil formed in loess.

Detailed Soil Description¹ / Interpretations - Boring 3

Depth (in)	Matrix Color ²	Texture	Mottles ²	Structure	Consistence	Coatings ²	Notes	Permeability & Loading Rate ³ in (G/D/Ft. ²)
0 - 6	10YR 3/2	Silt Loam ~15 - 25% Clay	--	Weak Medium Subangular Blocky	Friable	--	--	High Moderate (0.69)
6 - 10	10YR 5/3	Silt Loam ~25 - 27% Clay	--	Moderate Medium Subangular Blocky	Friable	--	--	Very High Moderate (0.75)
10 - 18	10YR 5/3	Silty Clay / Clay >40% Clay	Common Very Fine Prominent 7.5YR 5/6 Common Fine Faint 10YR 5/2	Strong Medium Prismatic / Strong Fine Subangular Blocky	Extremely Firm	Common Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	Very Slow (0.2)
18 - 27	10YR 5/2	Silty Clay Loam ~35 - 40% Clay	Common Fine Prominent 7.5YR 5/6	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Very Firm	Very Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	Low Moderately Slow (0.40)
27 - 36	10YR 5/2	Silty Clay Loam ~30 - 35% Clay	Many Fine Prominent 7.5YR 5/6	Moderate Medium Prismatic / Moderate Medium Platy	Firm	Very Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	High Moderately Slow (0.45)
36 - 45	2.5Y 5/2	Silty Clay Loam ~27 - 30% Clay	Many Fine Prominent 7.5YR 5/6	Weak Medium Prismatic	Friable	--	Common Medium Fe & Mn Accumulations	Low Moderate (0.52)
45 - 53	2.5Y 5/2	Silty Clay Loam ~27 - 30% Clay	Many Fine Prominent 7.5YR 5/6	Weak Medium Prismatic	Friable	--	Common Medium Fe & Mn Accumulations	
53 - 60	10YR 5/1	Silty Clay Loam ~27 - 30% Clay	Many Coarse Prominent 7.5YR 4/4	Weak Medium Prismatic / Moderate Medium Platy	Very Slightly Brittle	--	Common Medium Fe & Mn Accumulations	Low Moderately Slow (0.40)

Soil profile was a somewhat poorly drained soil. The seasonal high groundwater level (seasonal saturation) was 10 inches. The most limiting permeability was the layer with very slow beginning at 10 inches. Physiography was a gently sloping upland with a 3% slope east; soil formed in loess.

Remarks:

New construction for on-site septic system for a three-bedroom home.

NOTE: For best results Do Not disturb, pasture, or drive heavy machinery on lateral field area at any time. The suitability of the soils will be affected and the inspector may not approve area if it has been disturbed prior to construction. Proposed drain field area should be fenced off to help prevent any disturbance.

This report is to be used exclusively for the sizing / design of a subsurface seepage field. In the case a surface discharge system is planned, additional information may be required concerning Waters of the US.

GAINES SOIL CONSULTING does not represent nor warrant the operation or proper functioning of installed system for any period of time.

cc: Perry County Health Department

Douglas B. Gaines, CPSS/SC
Principal

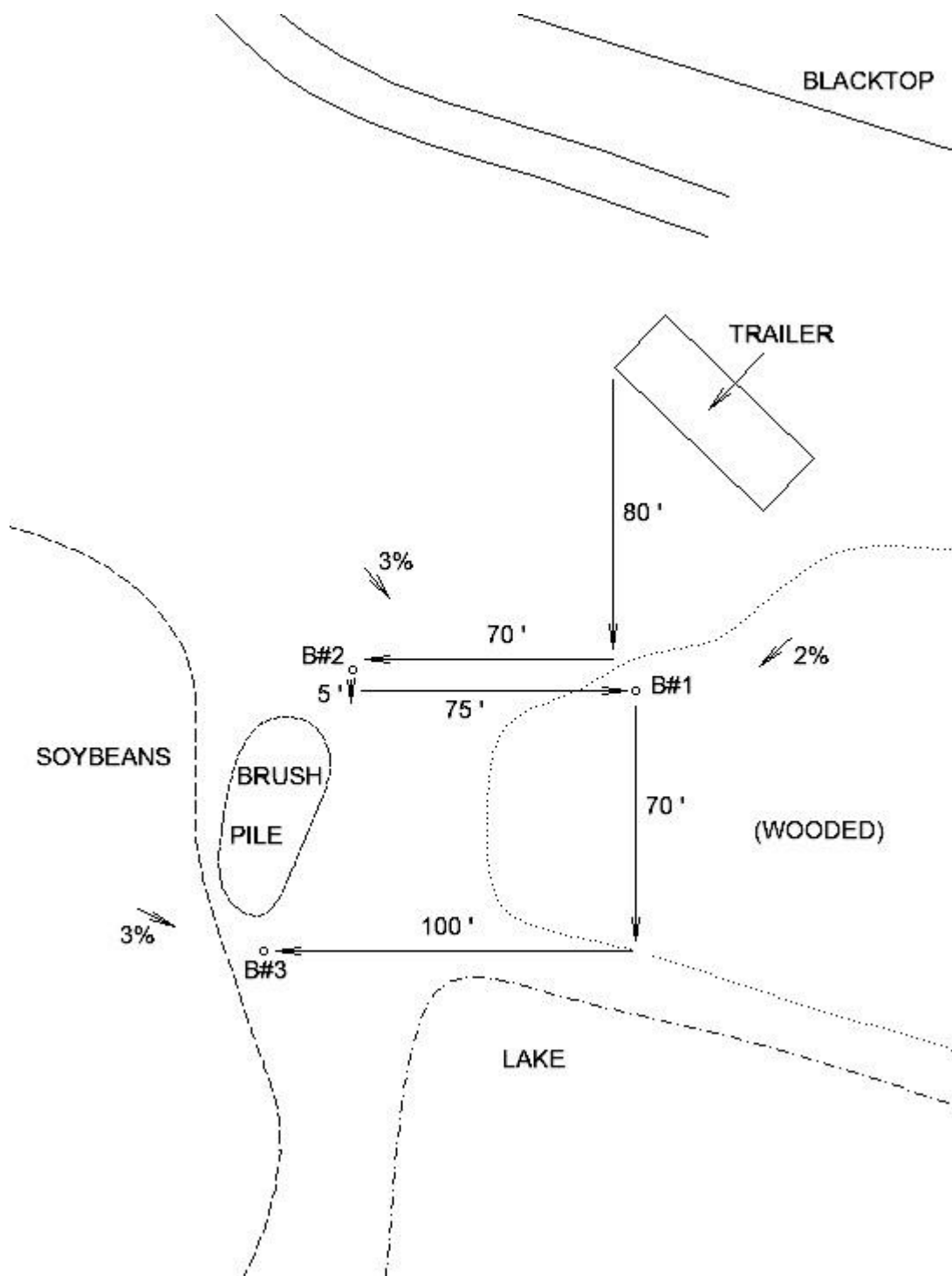
¹ USDA Soil Survey Manual, Ag Handbook N^o 18, (1993)

² Soil color designations, Munsell Soil Color Charts, (2009).

³ Private Sewage Disposal Licensing Act and Code, Illinois Department of Public Health, Appendix A Illustration M (2013)

* Loading Rate Estimated due to N/A or no listing in Illustration M Exhibit B

**Loading Rate Estimated and designated as Not Recommended (no listing in Illustration M Exhibit B)



DISTANCES APPROXIMATED

Pyatt Cutler Road
Perry County, Illinois

October 2018

GAINES SOIL CONSULTING

SOIL ANALYSIS

William Teater

Telephone (309) 241-1367

June 28, 2018

Owner Address:

John Doe

Phone:

Email:

Property Description:

Street: Same

City:

Subdivision:

Installer:

Lot #:

Property Number:



Legal:

SE 1/4 (160ac.) of

Section: 26

Twp: 12N

Range: 1W

Township: Kelly

County: Warren

Site

New: ☐ Existing: ☒

Lot Size: 5 acres

Bedrooms: 3

Water: well

Garbage Disposal: no

Water Softener: yes

Basement Plumbing: yes

of residents:

Boring #1

(See map)

Location: 48 yards S and 7 yards W of the SE corner of house

Percent Slope: 6-9%

Saturated soil at time of boring: None

Limitations:

Steep slope (percent): 7-9%

Very rapidly permeable layer(s) depth:

Very slowly permeable layer(s) depth:

Seasonal High Water Table in most years peaks at: >60"



Depth (Inches)	Brief Description of Soil Boring				*Soil Group	*Filter Field size (sq. ft. / bdrm.)
	Texture	Parent Material	Structure	Consistence		
0-7	Silt loam	Loess	Moderate granular	Friable	5D	265
7-24	<35% silty clay loam	Loess	Moderate blocky	Friable	6D	325
24-46	<35% silty clay loam	Loess	Moderate prismatic	Friable	6D	325
46-60	<35% silty clay loam	Loess	Weak prismatic	Friable	6B	385

Boring #2

(See map)

Location: 63 yards S and 19 yards W of the SE corner of house

Percent Slope: 6-9%

Saturated soil at time of boring: None

Limitations:

Steep slope (percent): 7-9%

Very rapidly permeable layer(s) depth:

Very slowly permeable layer(s) depth:

Seasonal High Water Table in most years peaks at: >60"



Depth (Inches)	Brief Description of Soil Boring				*Soil Group	*Filter Field size (sq. ft. / bdrm.)
	Texture	Parent Material	Structure	Consistence		
0-4	Silt loam	Loess	Moderate granular	Friable	5D	265
4-27	<35% silty clay loam	Loess	Moderate blocky	Friable	6D	325
27-48	<35% silty clay loam	Loess	Moderate prismatic	Friable	6D	325
48-60	<35% silty clay loam	Loess	Weak prismatic	Friable	6B	385

Boring #3

(See map)

Location: 64 yards S and 3 yards W of the SE corner of house

Percent Slope: 9-12%

Saturated soil at time of boring: None

Limitations:

Steep slope (percent): 9-12%

Very rapidly permeable layer(s) depth:

Very slowly permeable layer(s) depth:

Seasonal High Water Table in most years peaks at: >60"



Depth (Inches)	Brief Description of Soil Boring				*Soil Group	*Filter Field size (sq. ft. / bdrm.)
	Texture	Parent Material	Structure	Consistence		
0-5	Silt loam	Loess	Moderate granular	Friable	5D	265
5-21	<35% silty clay loam	Loess	Moderate blocky	Friable	6D	325
21-44	<35% silty clay loam	Loess	Moderate prismatic	Friable	6D	325
44-60	<35% silty clay loam	Loess	Weak prismatic	Friable	6B	385

The Soil Group, and the filter field size (sq. ft. / bedroom) are a part of the 2013 Private Sewage Disposal Licensing Act and Code, created by the State of Illinois Department of Public Health. The determinations listed in this report are based on the soil conditions found in the borings and their corresponding interpretations in Exhibit A & B, Illustration M, Section 905 Appendix A of this code. The Codes designations and recommendations are placed in this report as a help to the County Health Departments. I do not attest to the veracity of the Codes recommendations or restrictions, but only to the description of the soil properties found in my borings.

Summary:

The seasonal high water table is deep.

Water softener brine should not be discharged into a conventional filter bed. The most recent studies show an adverse effect on soil permeability and a shortened filter bed life span.

William Teater
Illinois Soil Classifier
CPSC No. 66



Site Evaluation Report

Eastern Shore Soil Services
P.O. Box 411, Savanna, IL 61074 (815) 273-3550
P.O. Box 411, Georgetown, DE 19947 (302) 856-1853
esss@grics.net www.easternshoresoil.com

21-Sep-17

File #: 4671

Owner's Name and Rick J. & Laurie Hasken

596 S. Van Brocklin Road
Freeport, IL 61032

Telephone #: (815) 266-9071

Tax Map and Parcel #: 04-04-14-413-137 **County:** Carroll

Property Location: 13137 Quail Hollow Drive, Lanark

Name of Development Lake Carroll

Lot # 137, Sec. 13

Date of Investigation: 9/18/17

Evaluated by Test Pits: No **Evaluated by Soil Borings:** Yes

<u>Evaluated by Test Pits:</u>		No	<u>Evaluated by Soil Borings:</u>	Yes	<u>Soil Group, Loading Rate</u>
<u>Profile #:</u>	<u>Depth to</u> <u>Limiting Layer:</u>	<u>Type of Limiting Layer:</u>	<u>Subgroup Taxon</u> <u>Classification:</u>		<u>(gpd/sq.ft.). Req'd Area</u> <u>(sq.ft./Bedroom)*</u>
1	51"	Slowly permeable material	Typic Hapludalf		0.62GPD/Sq.Ft.
2	42"	Slowly permeable material	Typic Hapludalf		0.62GPD/Sq.Ft.
3	>66"		Typic Hapludalf		0.62GPD/Sq.Ft.

Summary of Evaluation:

Soils at this site consist of loess over silty clays derived from weathered limestone over weathered limestone. The silty clays were shallowest at soil boring location 2 and were deeper than 66" at boring location 1 at the top of the slope. In order to use the loading rates above, the seepage trenches must not be deeper than 18" if the system is sited in the vicinity of soil borings 1 & 2. Maintaining this depth will require serial distribution.

Design Criteria- Soil Borings 1 & 2

Depth to Limiting Layer(s): 42"

Type of Limiting Layer: Seasonally Saturated Soils

Design Loading Rate: 0.62 GPD/Sq.Ft. (109 linear ft./bedroom)

Other: The trenches should not be deeper than 18". Serial distribution will be required.

Design Criteria- Soil Boring 3

Depth to Limiting Layer(s): >66"

Type of Limiting Layer: N/A

Design Loading Rate: 0.62 GPD/Sq.Ft. (109 linear ft./bedroom)

Other: Serial distribution may be required.

Evaluated By: Bradley J. Cate

ARCPACS CPSC #: 2361, ISCA CPSC #71

Note:

Information contained in this site evaluation report and shown on the accompanying plot drawing reflects current regulatory policies and procedures at the time the evaluation was conducted. Changes made to the property and to adjacent properties after the evaluation was conducted or changes in regulatory policy may preclude or modify the type or location of the recommended on-site sewage system regardless of site evaluation approval. Soil groups, loading rates, and required drainfield area per bedroom are from Illinois Private Sewage Code, Section 905. Eastern Shore Soil Services is responsible for applying the appropriate values from the code based on observed soil properties but is not responsible for failures resulting from the values in the code. Data contained in this report may include information obtained from property owners, their agents, residents, adjacent residents, and other interested parties. While this information is believed to be accurate it does not guarantee a septic permit. The attached plot should not be construed as a survey. All information should be verified by interested parties prior to the transfer of the property as well as prior to design and installation of the septic system. Interpretations made in this evaluation are intended for siting and design of a septic system only and are not suitable for other uses. Unless approved by the regulatory agency(ies) this report represents only a technical opinion rendered and does not constitute an approval for siting or design of any septic system on this site.

Soil Profile Description

www.easternshoresoil.com

Soil Profile #: 1 Date Described: 9/10/17 County: Carroll
 Property Owner: Hess/Lea Twp.: _____ Range: _____ Sec.: _____
 Property Location: Sec. 13, Lot 132, Lake Carroll
 Described By: Bradley J. Cate, ARCPACS CPSS/SC #2361, Ill Soil Classifiers CPSC 72, DE Lic.# 2052

Eastern Shore Soil Services
 Environmental Consulting:
 Soil Mapping, Land Use Planning, Wetland Studies,
 Site Evaluations, Environmental Feasibility
 P.O. Box 411, Georgetown, DE 19947
 Phone: (302) 856-1833
 P.O. Box 411, Saratoga, IL 61074
 Phone: (815) 273-3330
 Email: east@grks.net

Slope: See Topo Relief: _____

Estimated Permeability Class: _____

Depth to Limiting Layer: 5' to hydraulically restrictive subsoil

Subgroup Taxon or Soil Series: Typic Hapludalf

Observation Method		
Hand Auger	Push	Pit
	2"	

Horizon	Depth (in.)	Matrix Color (moist)	Redoximorphic Features		Coatings			USDA Texture	Structure (Grade/Size/Type)	Consistence	Boundary	Reaction (10% HCL)	Loading Rate (1)
			Color	Abundance/Size/Contrast	Type	Color	Location						
Ap	0-3	10YR 4/3	/					S.L	2m 5b4	wfr			.25
B0	3-13	10YR 5/4	/					S.L	3f 5b4	wfr			.25
BH1	13-25	10YR 5/4	/		argilline	10YR 4/4	S.O.A	S.RL	3-5b4	f			.62
BH2	25-37	10YR 5/6	/ *		"	"	"	S.cL	3c 5b4	fr			.62
BH3	37-51	10YR 5/6	/		"	"	"	S.cL	2c 5b4	fr			.62
20c	51-55	5YR 4/4	/					S.cL	1c 5b4	f			.2
2c	55-61	10YR 5/6	/					gr Lufs	-	wfr			.50

(1) If applicable, value from appropriate state or local code.

Current Hydrology: Free Water @ 261 ± Upper Boundary of Capillary Fringe @ _____ ±

Notes: * gell of 5YR 4/4 s.cL @ 31-33" 3-26k
 ** weathered limestone

* Soil Group and Sewage Loading Rates are from appropriate state code, when applicable. These values are derived from the properties of the description above. Eastern Shore Soil Services is responsible for accurately describing the soil profile but is not responsible for failures resulting from the values assigned by the code(s).

Signature: _____

Bradley J. Cate, CPSC

Soil Profile Description

www.easternshoresoil.com

Soil Profile #: 2 Date Described: 9/18/17 County: Carroll
 Property Owner: Hosken Twp.: _____ Range: _____ Sec.: _____
 Property Location: Lot 137, Sec 13, T24N R24E
 Described By: Bradley J. Cate, ARCPACS CPSS/SC #2361, III Soil Classifiers CPSC 72, DE Lic.# 2052

Eastern Shore Soil Services
 Environmental Consulting
 Soil Mapping, Land Use Planning, Wetland Studies,
 Site Evaluations, Environmental Permits
 P.O. Box 411, Georgetown, DE 19647
 Phone: (302) 856-1853
 P.O. Box 411, Savannah, IL 61074
 Phone: (815) 273-3550
 Email: east@igric.com

Slope: Sec 13 Relief: _____

Estimated Permeability Class: _____

Depth to Limiting Layer: 42" to Hydrozulia 24" restrictive natl.

Subgroup Taxon or Soil Series: Typic Hapludalf

Observation Method		
Hand Auger	Push Probe	Pit
	<u>2"</u>	

Horizon	Depth (in.)	Matrix Color (moist)	Redoximorphic Features		Coatings			USDA Texture	Structure (Grade/Size/Type)	Consistence	Boundary	Reaction (10% HCL)	Loading Rate (1)
			Color	Abundance/Size/Contrast	Type	Color	Location						
A ₀	0-7	10YR 4/3	✓					S.L.	2f5b ₂ ↓	f			.75
B ₀₁	2-15	10YR 4/4	✓		arsill ₂ h ₁	10YR 4/3	S.O.R	S.L.	2f5b ₁	fr			.62
B ₀₂	15-29	10YR 4/6	✓		"	"	"	S.L.	2m3b ₁	fi			.62
B ₀₃	29-42	10YR 4/6	✓		"	10YR 4/4	"	S.L.	3m3b ₁	fi			.62
2C	42-52	5YR 4/6	✓					S.L.	1m3p ₁	ufi			0
3C _r	52-62	10YR 6/6	✓					vg rds*	m	↓			.52

(1) If applicable, value from appropriate state or local code.

Current Hydrology: Free Water @ 26L ± Upper Boundary of Capillary Finge @ _____ ±

Notes: * Weathered limestone

* Soil Group and Sewage Loading Rates are from appropriate state code, when applicable. These values are derived from the properties of the description above. Eastern Shore Soil Services is responsible for accurately describing the soil profile but is not responsible for failures resulting from the values assigned by the code(s).

Signature: _____

Bradley J. Cate, CPSC

Soil Profile Description

www.easternshoresoil.com

Soil Profile #: 3 Date Described: 9/19/17 County: Carroll
 Property Owner: Haskins Twp.: _____ Range: _____ Sec.: _____
 Property Location: Lot 137, Sec. 17, Lake Carroll
 Described By: Bradley J. Cate, ARCPACS CPSS/SC #2361, III Soil Classifiers CPSC 72, DE Lic.# 2052

Eastern Shore Soil Services
 Environmental Consulting:
 Soil Mapping, Land Use Planning, Wetland Studies,
 Site Evaluations, Environmental Permits
 P.O. Box 411, Georgetown, DE 19947
 Phone: (302) 856-1853
 P.O. Box 411, Sevens, IL 61074
 Phone: (815) 273-3550
 Email: esss@grka.net

Slope: See Topo Relief: _____

Estimated Permeability Class: _____

Depth to Limiting Layer: 266"

Subgroup Taxon or Soil Series: Typic Hapludalf

Observation Method		
Hand Auger	Push Probe	Pit
	<u>2</u>	

Horizon	Depth (in.)	Matrix Color (moist)	Redoximorphic Features		Coatings			USDA Texture	Structure (Grade/Size/Type)	Consistence	Boundary	Reaction (10%HCL)	Loading Rate (1)
			Color	Abundance/Size/Contrast	Type	Color	Location						
Ap	0-3	10YR 4/3	/					S.L	2F5Bk 1F5r	wfr			.75
EB	8-11	10YR 4/4	/					S.L	1m5Bk 2F5p	fr			.75
Bt1	11-22	10YR 4/4	/		2F5r/1m	10YR 4/3	S2.P	S1CL	3F5Bk	fr			.62
Bt2	22-30	10YR 4/6	/		"	10YR 4/4	"	S1CL	3m5Bk	fr			.62
Bt3	30-41	10YR 4/6	/		"	"	"	S1CL	3C5Bk	fr			.62
Bt4	41-51	10YR 4/6	/		"	"	"	S1CL	1v4pr	fi			.62
Bc	51-66	10YR 5/4	/					S.L	1v4pr	fr			.29

(1) If applicable, value from appropriate state or local code.

Current Hydrology: Free Water @ 266" ± Upper Boundary of Capillary Fingers @ _____ ±

Notes

* Soil Group and Sewage Loading Rates are from appropriate state code, when applicable. These values are derived from the properties of the description above. Eastern Shore Soil Services is responsible for accurately describing the soil profile but is not responsible for failures resulting from the values assigned by the code(s).

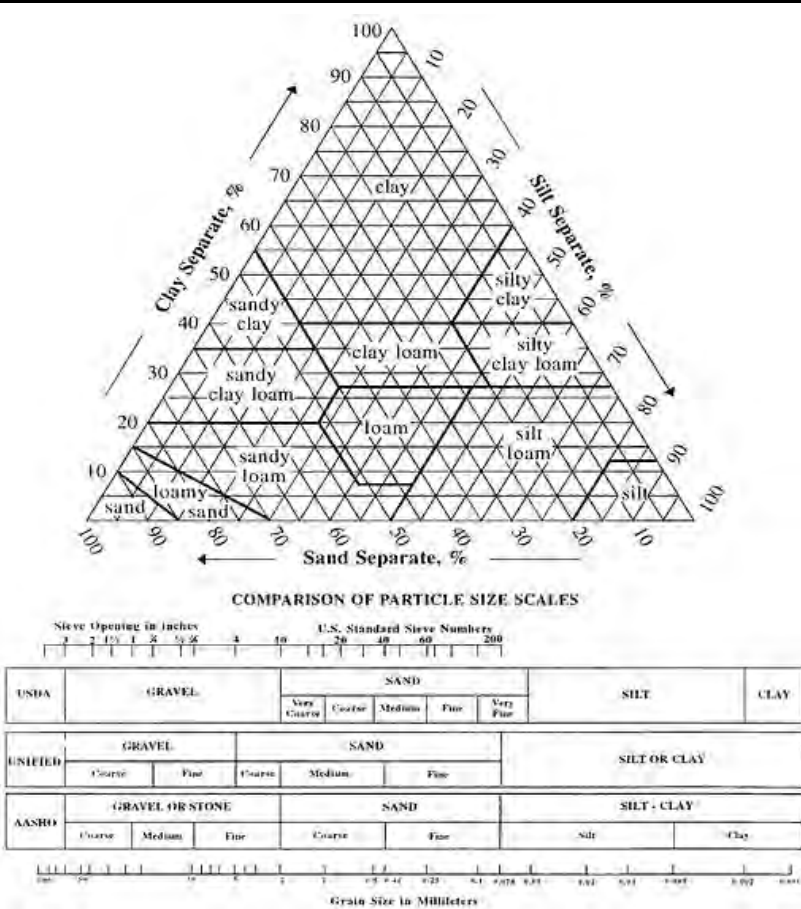
Signature: Bradley J. Cate, CPSC

Common Abbreviations

Texture Class or Subclass	Abbreviation
Coarse Sand	coS
Sand	S
Fine Sand	fS
Very Fine Sand	vfS
Loamy Coarse Sand	LcoS
Loamy Sand	LS
Loamy Fine Sand	LfS
Loamy Very Fine Sand	LvfS
Coarse Sandy Loam	coSL
Sandy Loam	SL
Fine Sandy Loam	fSL
Very Fine Sandy Loam	vfSL
Loam	L
Silt Loam	SiL
Silt	Si
Sandy Clay Loam	SCL
Clay Loam	CL
Silty Clay Loam	SiCL
Sandy Clay	SC
Silty Clay	SiC
Clay	C

Coatings	
Continuity Class	Abbreviation
Continuous (entire surface cover)	c
Discontinuous (partial surface cover)	d
Patchy (isolated surface cover)	p
Distinctness	
Faint (Visible with magnification only (10X hand lens); little contrast between materials.)	f
Distinct (Visible without magnification; significant contrast between materials.)	d
Prominent (Markedly visible without magnification; sharp visual contrast between materials.)	p
Types	
Argillans (clay coatings)	n/a
Orgainc (orgainc coatings)	n/a
Skeletans (silt coatings)	n/a
Mangans (manganese oxide coatings)	n/a
Ferrans (iron oxide coatings)	n/a
Location	
Surface of Ped	S.O.P.
Pore Linings	n/a
ex. (C,D 10YR5/4 argillans S.O.P. = common, distinct 10YR5/4	

Soil Structure Classification		
Grade	Abbreviation	
Weak	1	Units are barely observable in place or in a hand sample.
Moderate	2	Units well-formed and evident in place or in a hand sample.
Strong	3	Units are distinct in place (undisturbed soil), and separate cleanly when disturbed.
Size		Granular & Platy
Very Fine (very thin) ₁	vf (vn) ₁	<1mm
Fine (thin) ₁	f (tn) ₁	1 to <2mm
Medium	m	2 to <5mm
Coarse (thick) ₁	co (tk) ₁	5 to <10mm
Very Coarse (very thick) ₁	vc (vk) ₁	≥10mm
Extremely Coarse	ec	-
(1) Platy Structure Size		
Type		
Granular	gr	Small polyhedrals, with curved or very irregular faces.
Angular Blocky	abk	Polyhedrals with faces that intersect at sharp angles (planes).
Subangular Blocky	sbk	Polyhedrals with sub-rounded and planar faces, lack sharp angles.
Platy	pty	Flat and tabular-like units.
Prismatic	pr	Vertically elongated units with flat tops.
Columnar	col	Vertically elongated units with rounded tops which commonly are "bleached".
Single Grain	sg	No structural units; entirely noncoherent; e.g., loose sand.
Massive	m	No structural units; material is a coherent mass (not necessarily cemented).
ex. (1msbk= weak medium subangular blocky structure)		



Mottle or Redoximorphic Feature Descriptions	
Abundance	Abbreviation
Few (<2% of surface area)	f
Common (2-20% of surface area)	c
Many (≥20% of surface area)	m
Size	
Fine (<2mm)	1
Medium (2-<5mm)	2
Coarse (5-20mm)	3
Very Coarse (20-76mm)	4
Extremely Coarse (≥76mm)	5
Contrast with Matrix Color	
Faint (Δh =0; Δv ≤2 & Δc ≤1) (Δh =1; Δv ≤1 & Δc ≤1) (Δh =2; Δv =0 & Δc =0)	f
Distinct (Δh =0; Δv ≤2 & Δc >1 to <4) or Δv =>2 to <4 & Δc <4) (Δh =1; Δv ≤1 & Δc >1 to <3) or Δv >1 to <3 & Δc <3) (Δh =2; Δv =0 & Δc >0 to <2) or Δv >0 to <2 & Δc <2)	d
Prominent (Δh =0; Δv ≥4 or Δc ≥4) (Δh =1; Δv ≥3 or Δc ≥3) (Δh =2; Δv ≥2 or Δc ≥2) (Δh ≥3;)	p
if Δv ≥3 & Δc ≥2, the contrast is Faint ex. (f, 1, f 10YR5/4= few, fine, faint 10YR5/4 mottles)	

Coarse Fragments		
Fragment	Size (mm)	Abundance vs. Textural Modifier
Gravel	Fine 2-5	<15% no modifier
	Medium 5-20	15-35% gravelly, cobbly, etc.
	Coarse 20-75	35-60% very gravelly, etc.
Cobbles	75-250	60-90% extremely gravelly, etc.
Stones	250-600	>90% gravel, cobbles, etc.
Boulders	>600	



MM Scale



Legend

- Soil Boring Location
- Iron Pipe
- Rebar
- Utility Enclosure/Pedestal
- Approx. Property Line/R.O.W.
- Evaluated Area SB #1 & 2
- Evaluated Area SB #3

Note: This plot drawing is not represented as a survey. Boundary information has been compiled from any of the following sources: county GIS, tax map, deed, survey, recorded plot, or field located property corners. Locations of wells and septic systems are by direct observation where possible but, as with boundary information above, may include anecdotal information supplied by property owners, adjacent residents, and/or, other interested parties. This plot represents site conditions at the time of evaluation. Subsequent alteration of the site or adjacent properties may negate the validity or usefulness of the information. Elevation contours, if provided, are derived from public domain lidar or GIS and should be confirmed prior to use. All information should be re-verified prior to purchase or use. In some cases, features such as property lines, utility poles, transformers, etc. may be slightly at odds with aerial photography due to minor errors in GPS data collection or due to horizontal biases inherited from the aerial photography source used.

Site Evaluation Plot Plan
N/F Rick J. & Laurie Hasken
Lot 137, Sec. 13, Lake Carroll
PIN# 04-04014-413-137

Eastern Shore Soil Services
Environmental Consulting:
Soil Mapping, Land Use Planning, Wetland Studies,
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Phone: (302) 856-1853
P.O. Box 411, Savannah, IL 61074
Phone: (815) 273-3550
Email: ess@grice.net



Test Pit Descriptions

McCannon Farm

LEGAL DESCRIPTION: McCannon,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 1 SOIL SERIES: 766 (Lamartine)
MOTTLE DEPTH (in.): 16
RESTRICTIVE PERMEABILITY (in.): >60
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Kane
CLASSIFICATION: fine silty, Aquic Hapludalf
PARENT MATERIAL: loess/loam-sandy loam till
SAMPLE METHOD: 2-inch core
SLOPE: 4 percent to the west

HORIZ.	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
A	0-8	10YR 4/2	Sil		2-m-gr	Fr		5D	.75
Bt1	8-16	10YR 4/4	Sicl	f-1-d 10YR 5/6	2-f-sbk	Fr	C 10YR 4/3	6D	.62
Bt2	16-24	10YR 4/3	Sicl	c-2-d 10YR 5/2, c-2-d 10YR 5/6	2-m-sbk	Fr	C 10YR 4/2	6D	.62
2Btg	24-29	10YR 5/2	Cl	m-2-p 10YR 5/6 m-2-p 10YR 5/8	2-m-sbk	Fr		6H	.52
2BCt	29-37	2.5Y 6/2	L	m-2-p 10YR 5/8	1-m-sbk	Fr	C 10YR 5/2	5F, 5B	.62
2Cg	37-60	2.5Y 6/2	L, Sl	m-2-p 10YR 5/8	M	Fr, Vfr		5N, 4N	.52

REMARKS: Lower site.

LEGAL DESCRIPTION: McCannon,
SECTION #: 9 TOWNSHIP: T40N RANGE: R4E
BORING #: 2 SOIL SERIES: 193-310 (Mayville-McHenry)
MOTTLE DEPTH (in.): 20
RESTRICTIVE PERMEABILITY (in.): >60
OBSERVED GROUNDWATER TABLE: None

DATE: October 15, 2018
COUNTY: Kane
CLASSIFICATION: fine silty, Oxyaquic Hapludalf
PARENT MATERIAL: loess/sandy loam-loam till
SAMPLE METHOD: 2-inch core
SLOPE: 4 percent to the west

HORIZ.	DEPTH	COLOR	TEXTURE	REDOX FEATURES	STRUCTURE	CONS.	COATINGS	STATE SOIL GROUP	PERMEABILITY AND LOADING RATE
Ap	0-9	10YR 4/2	Sil		2-f-gr	Fr		5D	.75
Bt1	9-20	10YR 4/4	Sicl		2-f-sbk	Fr	C 10YR 4/3	6D	.62
Bt2	20-24	10YR 4/4	Sicl	c-1-d 10YR 5/6, c-1-d 10YR 6/2	2-m-sbk	Fr	C 10YR 4/3	6D	.62
2Bt3	24-28	10YR 4/4	Cl	c-1-d 10YR 5/6, c-2-d 10YR 6/2	2-m-sbk	Fr	C 10YR 4/3	6H	.52
2BCt	28-36	10YR 5/4	L	c-2-d 10YR 6/2, c-2-d 10YR 5/6	1-m-sbk	Fr	C 10YR 4/3	5F, 5B	.69
2C	36-60	10YR 5/4	Sl, L	c-2-d 10YR 6/2, c-2-d 10YR 5/6	M	Fr		5N, 4N	.52

REMARKS: