



You, Me & the USLE

Soil Loss & Sediment Discharge Calculations for Construction Sites

Dane County Land & Water Resources Dept.
Water Resource Engineering Division

FEBRUARY 24, 2022

Introductions



Theresa
Nelson



Kaci
Coconate



Jess
Starks



Jim
Neidhart

Webinar Information

- ▶ All participants are muted with no video
- ▶ Questions can be asked through the Q&A
- ▶ PDH certificates will be emailed

Po11 #1

Outline

- ▶ Background
- ▶ Model details
- ▶ Case studies
- ▶ Questions

What is the USLE?

- ▶ Universal Soil Loss Equation
 - ▶ Developed for ag fields
- ▶ Estimate soil loss from sheet & rill erosion
 - ▶ Based on rainfall, soil, topography & management
- ▶ Modified for construction sites
 - ▶ Includes sediment reduction due to BMPs



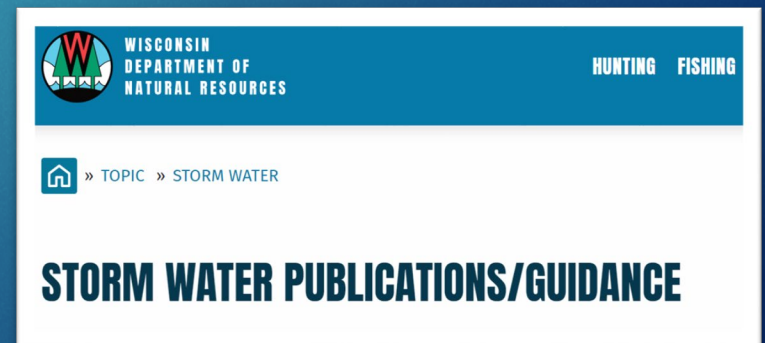
Why we use the USLE

- ▶ Construction site erosion ~30 tons/ac/yr
- ▶ Provides a measureable goal 5 tons/ac/yr
- ▶ County ordinance performance standard
- ▶ Permit expiration
- ▶ Protect water quality



Resources

- ▶ Microsoft Excel spreadsheet and DNR guidance download:
 - ▶ <https://dnr.wisconsin.gov/topic/Stormwater/publications.html>
- ▶ Dane County Wiki
 - ▶ <https://ecsmmanual.countyofdane.com/>
- ▶ Spreadsheet help page



USLEmodel.xlsm - Excel

File Home Insert Page Layout Formulas Data Review View Laserfiche Acrobat Tell me what you want to do...

Clipboard Font Alignment Number Styles Cells Editing

U8

Soil Loss & Sediment Discharge Calculation Tool for Construction Sites in Wisconsin
HELP PAGE

Revised 06-29-2017

The *Soil Loss & Sediment Discharge Tool for Construction Sites in Wisconsin* worksheet was developed to estimate soil loss from sheet and rill erosion and the effect of sediment control practices on sediment discharge. It does not predict soil loss and associated sediment discharge resulting from channel erosion. The worksheet uses the following variables. They are entered by the user or automatically calculated. Included below are the descriptions of the variables used.

Column #	Variable	Type
1	Activity	entered by user
2	Begin Date	entered by user
3	End Date	automatically calculated
4	Period % R	automatically calculated
5	Annual R Factor	automatically calculated
6	Sub Soil Texture	entered by user
7	Soil Erodibility K Factor	automatically calculated
8	Slope % S	entered by user
9	Slope Length L	entered by user
10	LS Factor	automatically calculated
11	Land Cover C Factor	automatically calculated
12	Soil Loss	automatically calculated
13	SDF	automatically calculated
14	Sediment Control Practice	entered by user
15	Sediment Discharge	automatically calculated

Variable Descriptions:
Activity (pull-down menu)
 The activity relates to the type of disturbance or stabilization that is occurring on the ground.

Help Page Year Year 2

DNR Spreadsheet Breakdown



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Project:

Date:

01/10/22

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	04/15/22	05/01/22	3.0%	150	Silt Loam	0.43	1.3%	175	0.18	1.00	0.3	1.129	Silt Fence	0.2
Bare Ground	05/01/22	08/01/22	54.0%	150	Silt Loam	0.43	7.0%	40	0.52	1.00	18.2	0.772	Sediment Basin	2.8
Seed with Mulch or Er	08/01/22	10/01/22	28.0%	150	Silt Loam	0.43	7.0%	40	0.52	0.10	0.9	0.772	Sediment Basin	0.1
End	10/01/22	----	----	----	-----	----	7.0%	40	0.52	-----	----	0.000		0.0
		----	----	----	-----	----	7.0%	0	-----	-----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	-----	-----	----	0.000		0.0
TOTAL											19.5		TOTAL	3.2
													% Reduction Required	NONE

Notes:

See Help Page for further descriptions of variables and items in drop-down boxes.

The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization.

For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

NOTE: THIS TOOL ONLY ADDRESSED SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Project:

Date:

02/14/22

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	08/01/22	08/15/22	9.0%	150	Silt Loam	0.43	2.1%	75	0.19	1.00	1.1	1.026	Silt Fence	0.7
Bare Ground	08/15/22	05/15/23	42.0%	150	Silt Loam	0.43	6.0%	12	0.23	1.00	6.3	0.968	Silt Fence	3.7
Seed with Mulch or Er	05/15/23	07/15/23	38.0%	150	Silt Loam	0.43	6.0%	12	0.23	0.10	0.6	0.968	Silt Fence	0.3
End	07/15/23	----	----	----	-----	----	6.0%	12	0.23	-----	----	0.000		0.0
		----	----	----	-----	----	6.0%	0	----	----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	----	----	0.000		0.0
TOTAL												8.0	TOTAL	4.7
													% Reduction Required	NONE

Notes:

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For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

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Activities

▶ Bare Ground

LAND DISTURBANCE

▶ Directional Tracking

▶ Mulch or erosion mat

▶ Seeding

▶ Land Applied additive

**TEMPORARY
MEASURES**

▶ Seed with mulch or erosion mat

▶ Sod

**FINAL
STABILIZATION**

▶ End

ESTABLISHED

Stabilization Method Efficiency

Table 2- Estimated Erosion Control Efficiency for Soil Stabilization Practices¹

Practice	Erosion Control Efficiency	DNR Technical Standard
Directional Tracking or Tillage	10%	1067
Land Applied Additive ²	50%	1050
Seeding ³	60%	1059
Mulch or Erosion Matting ⁴	80%	1058, 1052
Mulch or Erosion Matting with Seeding	90%	1058, 1052, 1059
Sod	99%	NA
Impervious Surface ⁵	100%	NA

Stabilization Timing

- ▶ Recommended dates for seeding
- ▶ Dates when seeding not recommended
- ▶ If stabilization occurs later than recommended dates, the establishment should be extended to May 15 of the following spring

Seed Type	Jan	February	March	April	May	June	July	August	September	October	November	December
Temporary Seeding												
Spring Oats												
Annual Ryegrass												
Sudangrass/Sorghum												
Winter Wheat												
Winter Rye												
Permanent Seeding												
Native Mixtures												
Turf Grasses												

Thaw

Watering Required

Freeze Up

Freeze Up

Dormant Seeding



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Project:

Dormant Seeding

Date:

01/25/22

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	08/01/22	11/01/22	34.0%	150	Silt Loam	0.43	2.1%	75	0.19	1.00	4.2	1.026	Silt Fence	2.6
Seed with Mulch or Er	11/01/22	05/15/23	17.0%	150	Silt Loam	0.43	2.1%	75	0.19	0.10	0.2	1.026	Silt Fence	0.1
End	05/15/23	----	----	----	----	----	2.1%	75	0.19	----	----	0.000		0.0
		----	----	----	----	----	2.1%	75	0.19	----	----	0.000		0.0
		----	----	----	----	----	2.1%	0	----	----	----	0.000		0.0
		----	----	----	----	----	0.0%	0	----	----	----	0.000		0.0
TOTAL											4.4		TOTAL	2.7
													% Reduction Required	NONE

Notes:

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Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer: _____

Project: _____

Date: 02/14/22

County:

Version 1.0

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End	07/15/23	----	----	----	----	----	6.0%	12	0.23	----	----	0.000		0.0
		----	----	----	----	----	6.0%	0	----	----	----	0.000		0.0
		----	----	----	----	----	0.0%	0	----	----	----	0.000		0.0
TOTAL											8.0		TOTAL	4.7
													% Reduction Required	NONE

Notes:

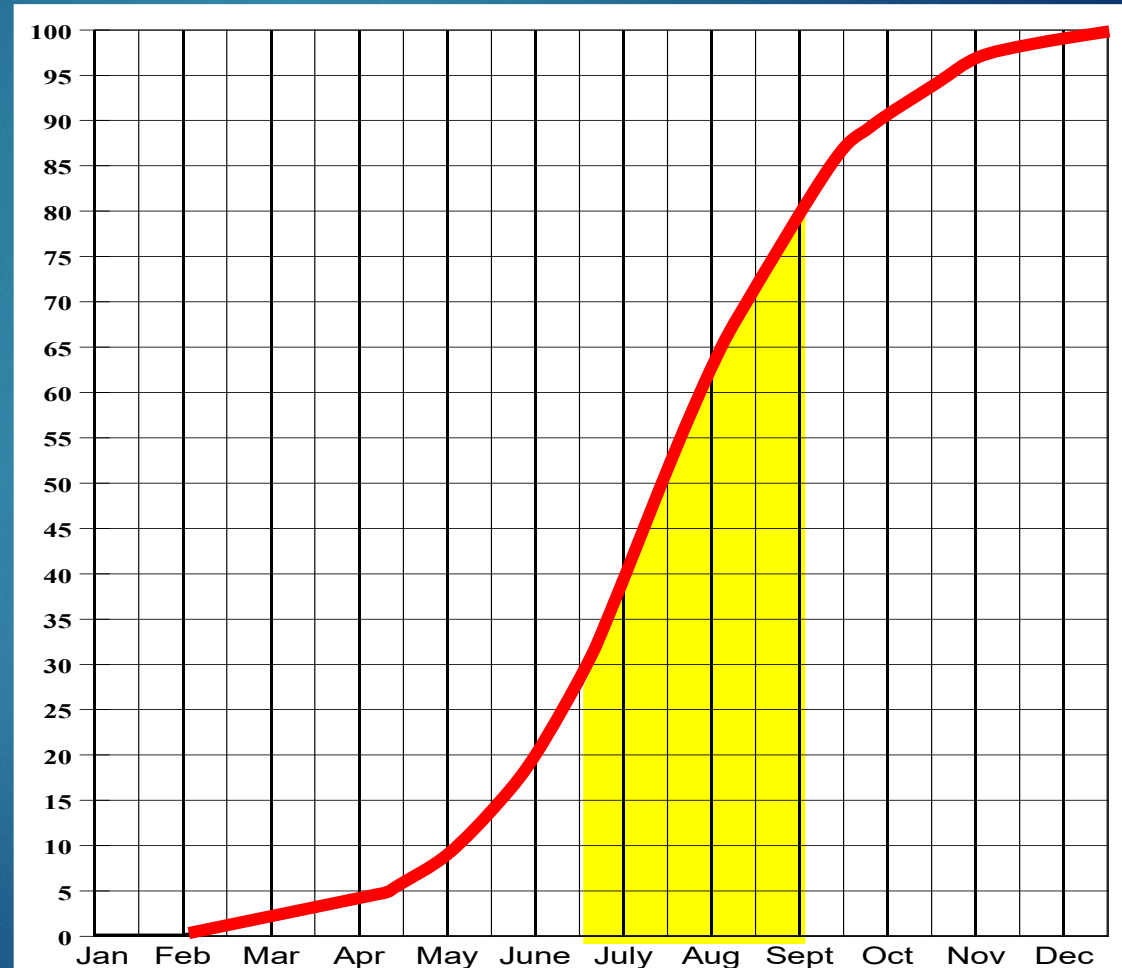
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Rainfall Factor

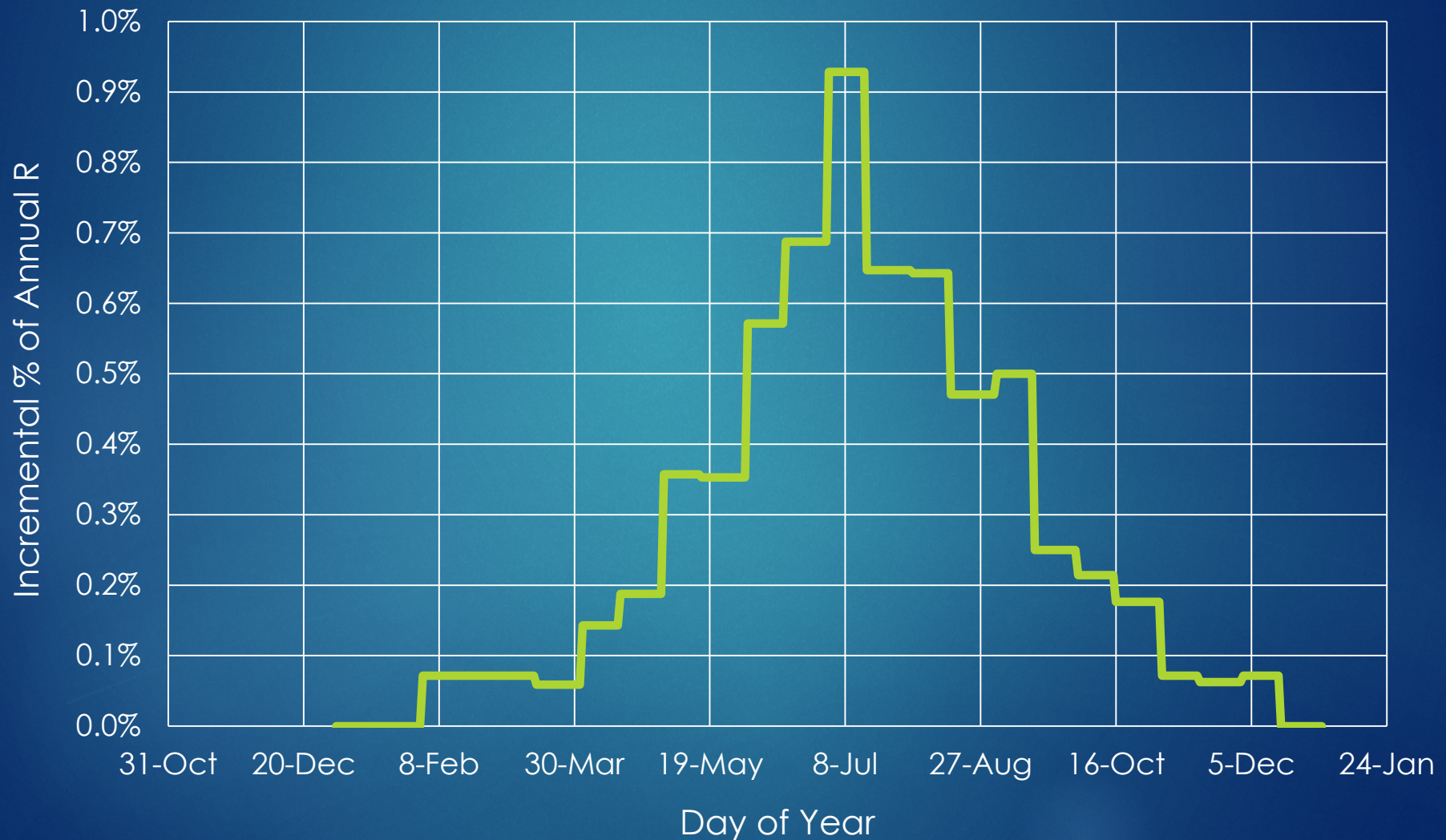
Monthly Distribution of R

Percent
of
Annual R



Rainfall Factor

Annual Rainfall Distribution



Sediment Control Practices



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Project:

Date:

01/10/22

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	04/15/22	05/01/22	3.0%	150	Silt Loam	0.43	1.3%	175	0.18	1.00	0.3	1.129	Silt Fence	0.2
Bare Ground	05/01/22	08/01/22	54.0%	150	Silt Loam	0.43	7.0%	40	0.52	1.00	18.2	0.772	Sediment Basin	2.8
Seed with Mulch or Er	08/01/22	10/01/22	28.0%	150	Silt Loam	0.43	7.0%	40	0.52	0.10	0.9	0.772	Sediment Basin	0.1
End	10/01/22	----	----	----	-----	----	7.0%	40	0.52	-----	----	0.000		0.0
		----	----	----	-----	----	7.0%	0	----	-----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	-----	----	0.000		0.0
TOTAL											19.5		TOTAL	3.2
													% Reduction Required	NONE

Notes:

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Sediment Control Practices

Table 3 – Estimated Sediment Removal Efficiency for Sediment Control Practices⁶

Practice	Sediment Removal Efficiency	DNR Technical Standard
Sediment Basin	80%	1064
Sediment Trap	80%	1063
Silt Fence	40%	1056
Straw Bale Barrier	40%	1055
Manufactured Perimeter Control	40%	1071
Vegetative Buffer	40%	1054
Inlet Protection	30%	1060
Ditch Check Sediment Trap	30%	1063, 1062

Sediment Control Practices

- ▶ Sediment traps/basins
 - ▶ Must be constructed prior to using as practice for USLE
 - ▶ Must be sized correctly with appropriate outlet
 - ▶ Follow technical standards
 - ▶ Infiltration facilities being used as temporary sediment basins must be protected from clogging, have at least 3 ft depth, and proper outlet

PUT NOTES ON PLANS!!!

100



- PRIOR TO ANY GRADING/DISTURBANCE OF THE COLD STORAGE BUILDING AREA, THE EXISTING NW DETENTION BASIN TO BE GRADED TO PROPOSED CONTOURS AND SERVE AS A TEMPORARY SEDIMENT TRAP DURING THE GRADING/DISTURBANCE OF THE COLD STORAGE PROJECT AREA. THE EXISTING OUTLET CULVERT TO BE PLUGGED AND/OR REMOVED DURING USE AS A SEDIMENT TRAP. THE PROPOSED OVERFLOW WEIR TO BE CONSTRUCTED PER PLAN AND SERVE AS THE OUTLET FOR THE TEMPORARY SEDIMENT TRAP. THE PROPOSED OUTLET STRUCTURE SHALL NOT BE INSTALLED UNTIL AFTER COLD STORAGE BUILDING PROJECT AREA IS COMPLETED WITH GRADING/DISTURBANCE AND SITE IS STABILIZED.

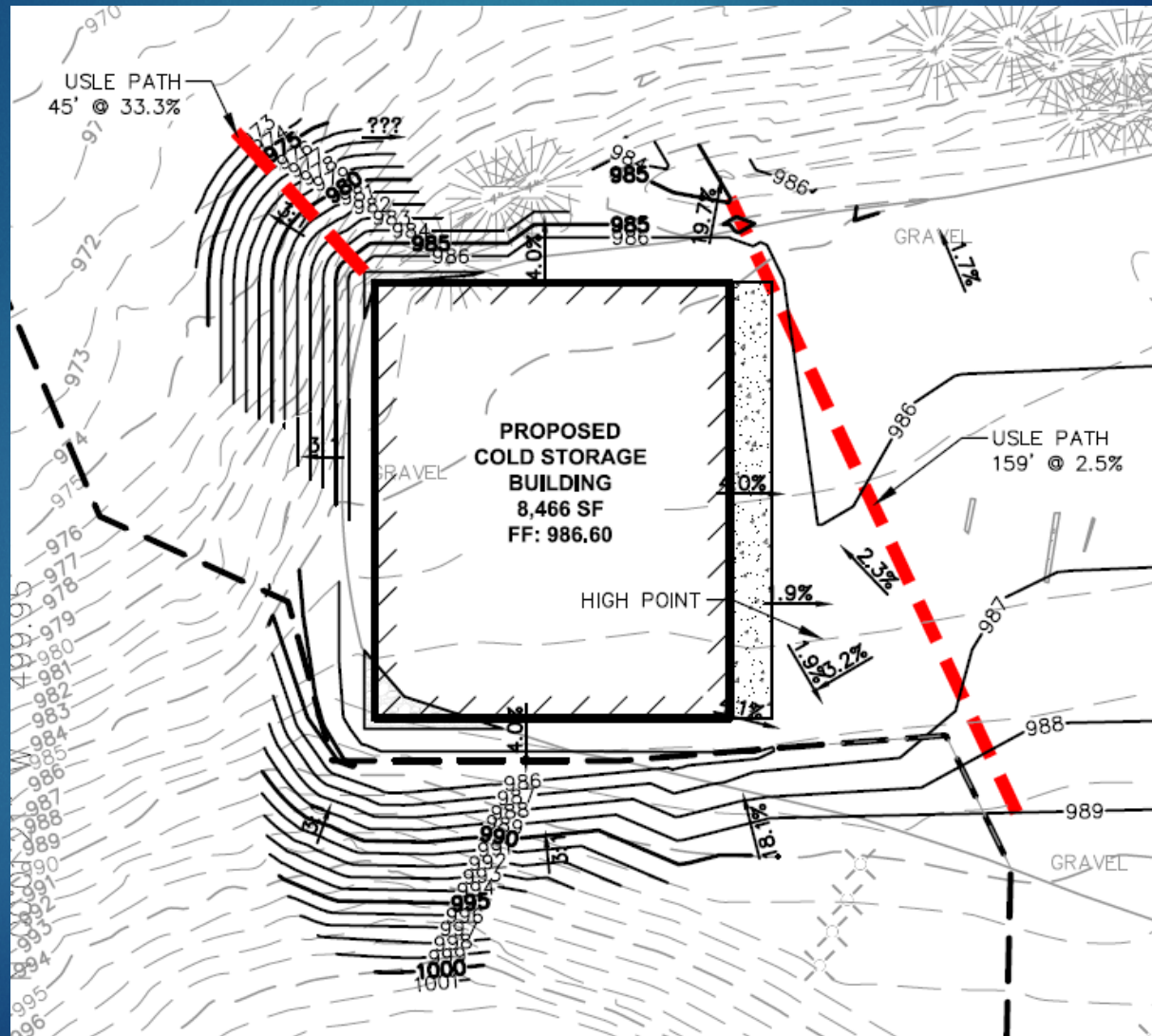
Representative Flow Paths

- ▶ Perpendicular to contours
- ▶ Represent site variations
- ▶ May need to model more than one
- ▶ Worst case slope/slope length combination
- ▶ Can change throughout the project
 - ▶ Topsoil stripping – existing topography
 - ▶ Mass grading – proposed topography
- ▶ Model up to 3:1 or 33% slopes

USLE Map

- ▶ Show & label USLE Slope line(s) on grading and erosion control plan
- ▶ Include:
 - ▶ Existing & proposed contours
 - ▶ Erosion and sediment control measures
 - ▶ Construction schedule

USLE Map



Construction Schedule

- ▶ Activities/dates used in USLE should correspond to construction schedule
- ▶ Realistic dates/timeframes
 - ▶ Communicate with contractor
- ▶ Exact dates unknown?
 - ▶ Conservative guess then revise



100

- | | | | |
|---------------------|-----|------|-------|
| --- | --- | --- | 0.000 |
| TOTAL | | 20.9 | |
| DATES EXCEED 1 YEAR | | | |
- ization.
month period
- NOTE: THIS TOOL ONLY AD
SHEET FLOW MEASURES

Notes:

Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Sediment Trap	6.8
Sediment Trap	0.7
	0.0
	0.0
	0.0
	0.0
TOTAL	7.6
% Reduction Required	34%

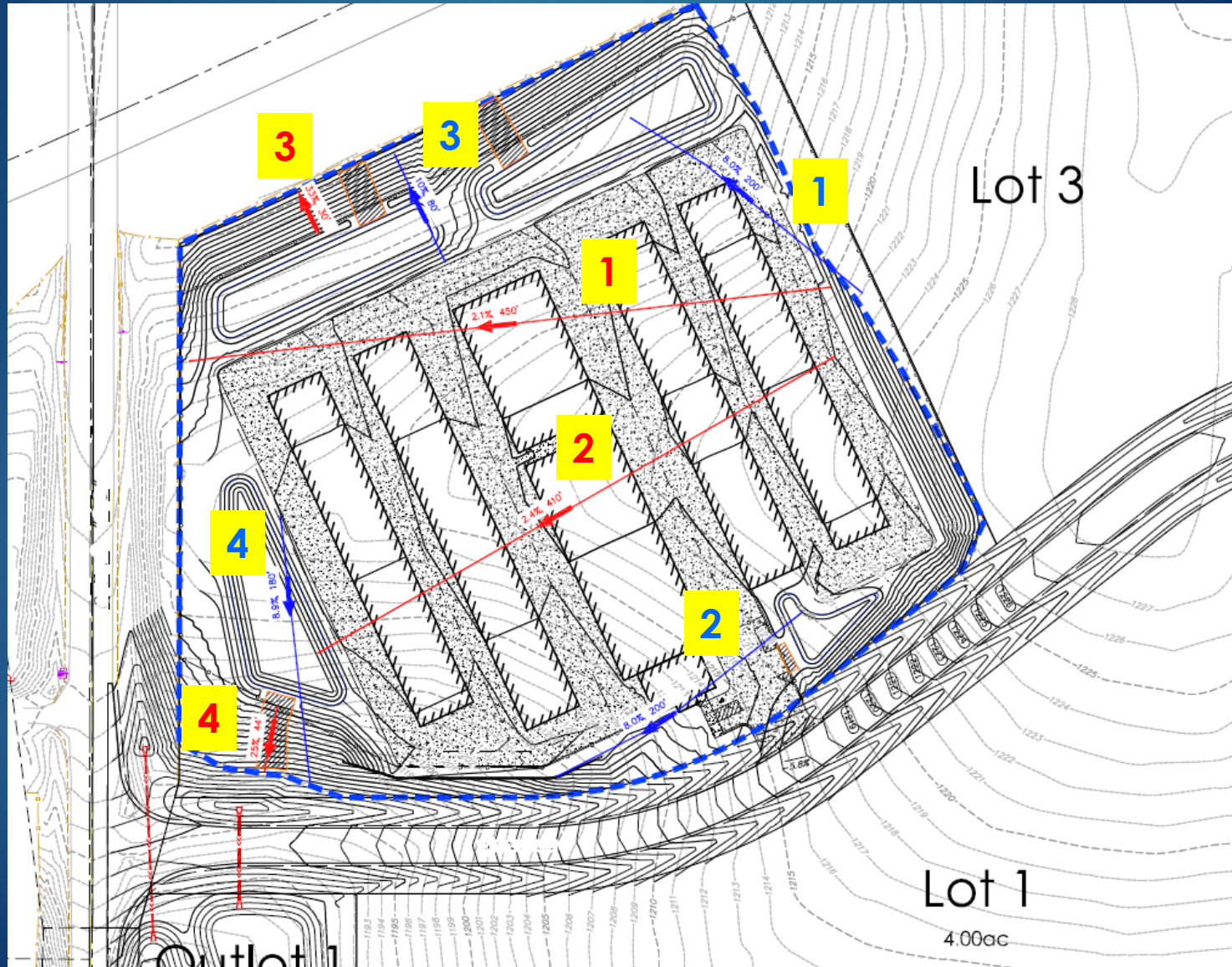
COVER ESTABLISHMENT FROM SEEDING MUST BE AT LEAST 60 DAYS

Po11 #2

Case Studies

- ▶ Choosing representative slopes
- ▶ Grade changes throughout construction
- ▶ Temporary stabilization
- ▶ Slope breaks
- ▶ Project exceeds a 12 month period

Case 1



SLOPE 1



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Mount Horeb Self Storage

Project:

Self Storage - Mounds View Business Park - NORTH

Date:

03/17/21

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	04/12/21	04/19/21	1.2%	150	Silt Loam	0.43	8.0%	200	1.41	1.00	1.1	0.859	Silt Fence	0.6
Bare Ground	04/19/21	05/31/21	13.1%	150	Silt Loam	0.43	2.1%	450	0.33	1.00	2.8	1.178	Silt Fence	2.0
End	05/31/21	----	----	----	-----	----	0.0%	0	----	----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	----	----	0.000		0.0
TOTAL												3.9	TOTAL	2.5
													% Reduction Required	NONE

Notes:

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SLOPE 2



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Mount Horeb Self Storage

Project:

Self Storage - Mounds View Business Park - SOUTH

Date:

03/17/21

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	04/12/21	04/19/21	1.2%	150	Silt Loam	0.43	8.0%	200	1.41	1.00	1.1	0.859	Silt Fence	0.6
Bare Ground	04/19/21	05/31/21	13.1%	150	Silt Loam	0.43	2.4%	410	0.36	1.00	3.0	1.157	Silt Fence	2.1
End	05/31/21	-----	-----	-----	-----	-----	0.0%	0	-----	-----	-----	0.000	Silt Fence	0.0
		-----	-----	-----	-----	-----	0.0%	0	-----	-----	-----	0.000	Silt Fence	0.0
		-----	-----	-----	-----	-----	0.0%	0	-----	-----	-----	0.000	Silt Fence	0.0
		-----	-----	-----	-----	-----	0.0%	0	-----	-----	-----	0.000	Silt Fence	0.0
TOTAL											4.1		TOTAL	2.7
													% Reduction Required	NONE

Notes:

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SLOPE 3



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Mount Horeb Self Storage

Project:

Self Storage - Mounds View Business Park - NORTH Back of Berm

Date:

03/17/21

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	04/12/21	04/20/21	1.4%	150	Silt Loam	0.43	10.0%	80	1.23	1.00	1.1	0.758	Silt Fence	0.5
Bare Ground	04/20/21	04/23/21	0.6%	150	Silt Loam	0.43	33.0%	30	5.59	1.00	2.0	0.645	Silt Fence	0.8
Seed with Mulch or Er	04/23/21	06/23/21	26.5%	150	Silt Loam	0.43	33.0%	30	5.59	0.10	9.6	0.645	Silt Fence	3.7
End	06/23/21	----	----	----	-----	----	0.0%	0	----	-----	-----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	-----	-----	0.000		0.0
		----	----	----	-----	----	0.0%	0	----	-----	-----	0.000		0.0
TOTAL											12.7		TOTAL	5.0
													% Reduction Required	NONE

SLOPE > 20% USE PRESCRIPTIVE COMPLIANCE

Notes:

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SLOPE 4



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer: Mount Horeb Self Storage

Project: Self Storage - Mounds View Business Park - SOUTH Back of Berm

Date: 03/17/21

County: Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	04/12/21	04/19/21	1.2%	150	Silt Loam	0.43	8.9%	180	1.56	1.00	1.2	0.812	Silt Fence	0.6
Bare Ground	04/19/21	04/23/21	0.7%	150	Silt Loam	0.43	25.0%	44	4.12	1.00	2.0	0.687	Silt Fence	0.8
Seed with Mulch or Er	04/23/21	06/23/21	26.5%	150	Silt Loam	0.43	25.0%	44	4.12	0.10	7.0	0.687	Silt Fence	2.9
End	06/23/21	-----	-----	-----	-----	-----	25.0%	44	4.12	-----	-----	0.000	Silt Fence	0.0
		-----	-----	-----	-----	-----	25.0%	0	-----	-----	-----	0.000		0.0
		-----	-----	-----	-----	-----	0.0%	0	-----	-----	-----	0.000		0.0
TOTAL											10.3		TOTAL	4.3
													% Reduction Required	NONE

SLOPE > 20% USE PRESCRIPTIVE COMPLIANCE

Notes:

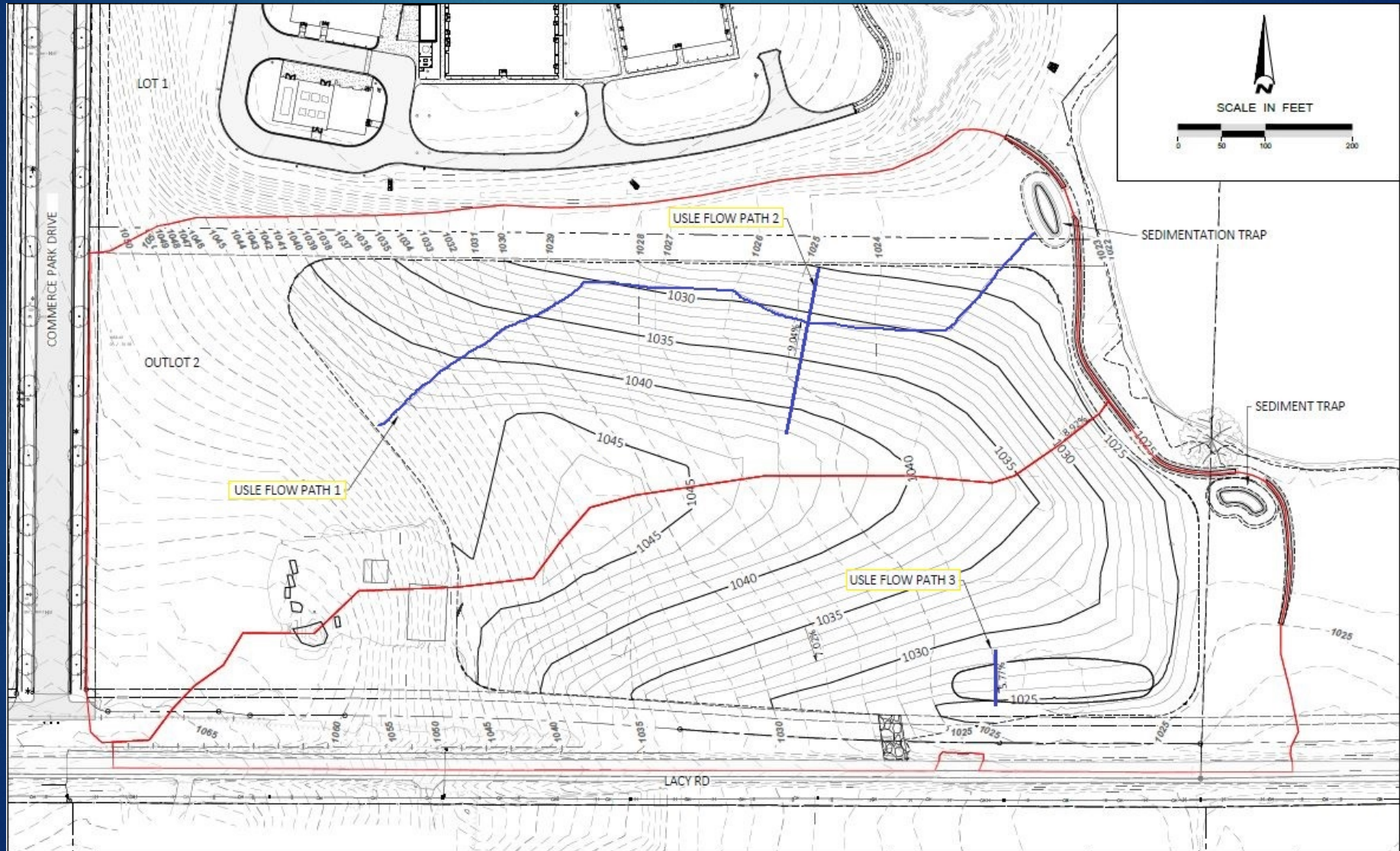
See Help Page for further descriptions of variables and items in drop-down boxes.

The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization.

For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

NOTE: THIS TOOL ONLY ADDRESSED SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.

Case 2 – Grade Changes





Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Project:

Outlot 2 Earthwork

Date:

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	08/03/21	08/31/21	15.1%	150	Silt Loam	0.43	2.6%	830	0.46	1.00	4.5	1.217	Sediment Trap	1.1
Bare Ground	08/31/21	10/15/21	14.2%	150	Silt Loam	0.43	9.0%	195	1.65	1.00	15.1	0.815	Sediment Trap	2.5
Seed with Mulch or E	10/15/21	11/15/21	3.9%	150	Silt Loam	0.43	9.0%	195	1.65	0.10	0.4	0.815	Sediment Trap	0.1
Bare Ground	11/15/21	04/15/22	7.9%	150	Silt Loam	0.43	5.8%	65	0.52	1.00	2.6	0.861	Sediment Trap	0.5
Seed with Mulch or E	04/15/22	08/02/22	57.6%	150	Silt Loam	0.43	5.8%	65	0.52	0.10	1.9	0.859	Sediment Trap	0.3
End	08/02/22	-----	-----	-----	-----	-----	5.8%	65	0.52	0.10	-----	0.000	Sediment Trap	0.0
TOTAL											24.6		TOTAL	4.4
													% Reduction Required	NONE

Notes:

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Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 2

Developer:

Project:

Date:

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	08/02/22	06/01/23	56.4%	150	Silt Loam	0.43	5.8%	65	0.52	1.00	18.9	0.859	Sediment Trap	3.2
Seed with Mulch or En	06/01/23	08/01/23	43.0%	150	Silt Loam	0.43	5.8%	65	0.52	0.10	1.4	0.859	Sediment Trap	0.2
End	08/01/23	----	----	----	----	----	5.8%	65	0.52	----	----	0.000		0.0
		----	----	----	----	----	5.8%	65	0.52	----	----	0.000		0.0
		----	----	----	----	----	5.8%	0	----	----	----	0.000		0.0
		----	----	----	----	----	0.0%	0	----	----	----	0.000		0.0
TOTAL											20.3		TOTAL	3.5
													% Reduction Required	NONE

Notes:

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100

- ▶ Project Start: 10/28/20
- ▶ Project End: 7/5/22
- ▶ Year 1 = Start Date to Start Date + one year
- ▶ Year 2 = End Date – one year to End Date

OCT 2020	NOV 2020	DEC 2020	JAN 2021	FEB 2021	MAR 2021	APR 2021	MAY 2021	JUN 2021	JUL 2021	AUG 2021	SEP 2021	OCT 2021	NOV 2021	DEC 2021	JAN 2022	FEB 2022	MAR 2022	APR 2022	MAY 2022	JUN 2022	JUL 2022
10/28/20 USLE - YEAR 1 10/27/21																					
									7/6/21 USLE - YEAR 2 7/5/22												

Project Exceeding 12 Months Year 1



Soil Loss & Sediment Discharge Calculation Tool for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Project:

Example

Date:

02/24/22

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	10/28/20	12/28/20	3.5%	150	Silt Loam	0.43	3.4%	89	0.32	1.00	0.7	0.985	Silt Fence	0.4
Bare Ground	12/28/20	10/27/21	96.3%	150	Silt Loam	0.43	3.1%	58	0.25	1.00	15.3	0.964	Sediment Trap	2.9
End	10/27/21	-----	-----	-----	-----	-----	3.1%	58	0.25	-----	-----	0.000		0.0
		-----	-----	-----	-----	-----	3.1%	58	0.25	-----	-----	0.000		0.0
		-----	-----	-----	-----	-----	3.1%	0	-----	-----	-----	0.000		0.0
		-----	-----	-----	-----	-----	0.0%	0	-----	-----	-----	0.000		0.0
TOTAL											16.0		TOTAL	3.4
													% Reduction Required	NONE

Notes:

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NOTE: THIS TOOL ONLY ADDRESSED SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.

Recommended Permanent Seeding Dates:

4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes
Thaw-6/30 Native Grasses, forbs, and legumes

Designed By:

Date

Project Exceeding 12 Months Year 2



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 2

Developer:

0

Project:

Example

Date:

2/21/2022

County:

Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Erodibilit y K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	07/06/21	05/05/22	65.9%	150	Silt Loam	0.43	3.1%	58	0.25	1.00	10.5	0.964	Sediment Trap	2.0
Seed with Mulch or Er	05/05/22	07/05/22	32.3%	150	Silt Loam	0.43	3.1%	58	0.25	0.10	0.5	0.964	Silt Fence	0.3
End	07/05/22	----	----	----	-----	----	3.1%	58	0.25	-----	----	0.000		0.0
		----	----	----	-----	----	3.1%	58	0.25	-----	----	0.000		0.0
		----	----	----	-----	----	3.1%	0	-----	-----	----	0.000		0.0
		----	----	----	-----	----	0.0%	0	-----	-----	----	0.000		0.0
TOTAL												11.0	TOTAL	2.3
													% Reduction Required	NONE

Notes:

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Recommended Permanent Seeding Dates:

4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes
Thaw-6/30 Native Grasses, forbs, and legumes

Designed By:
Date

Case 4 – Slope Breaks



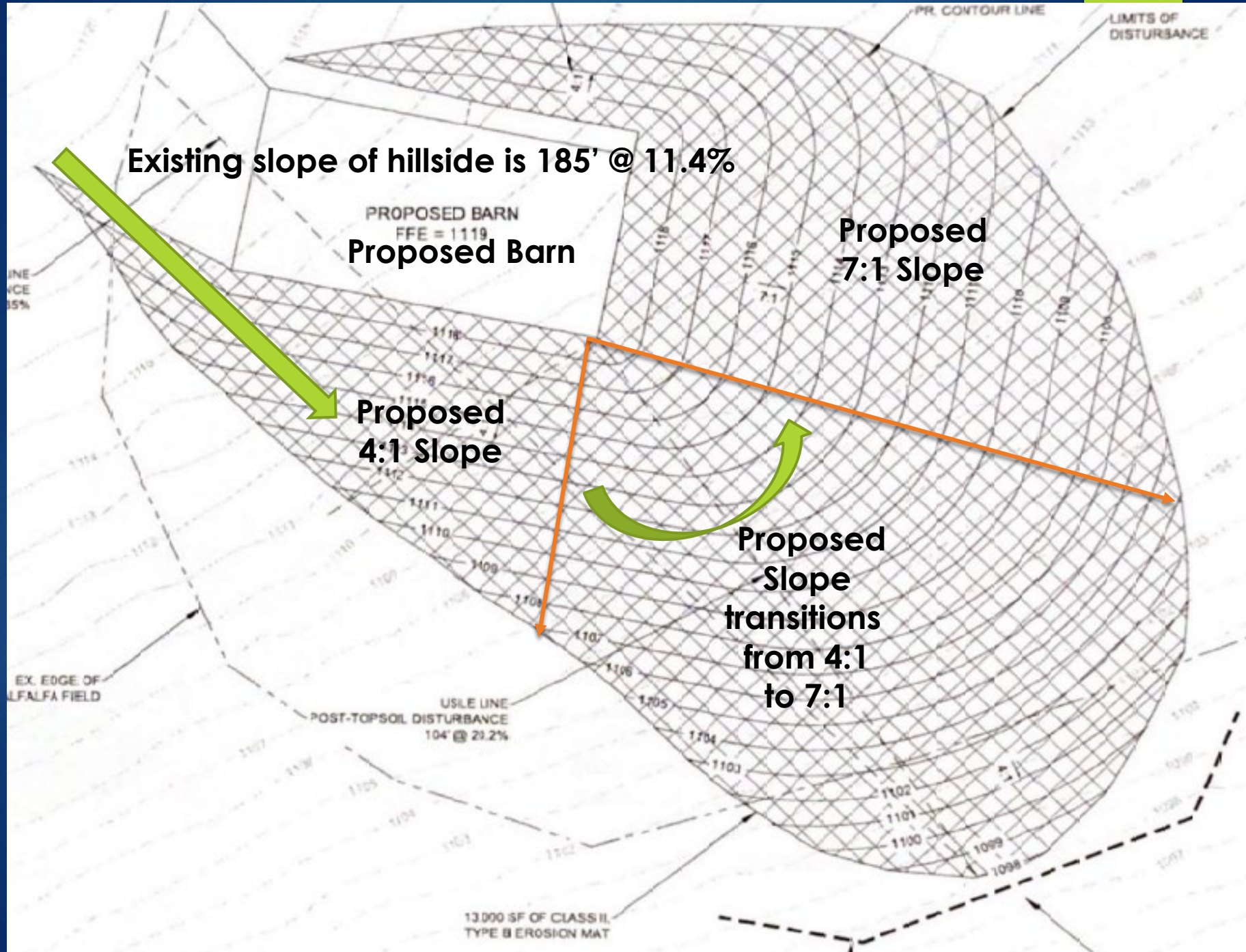
Existing slope of hillside is 185' @ 11.4%

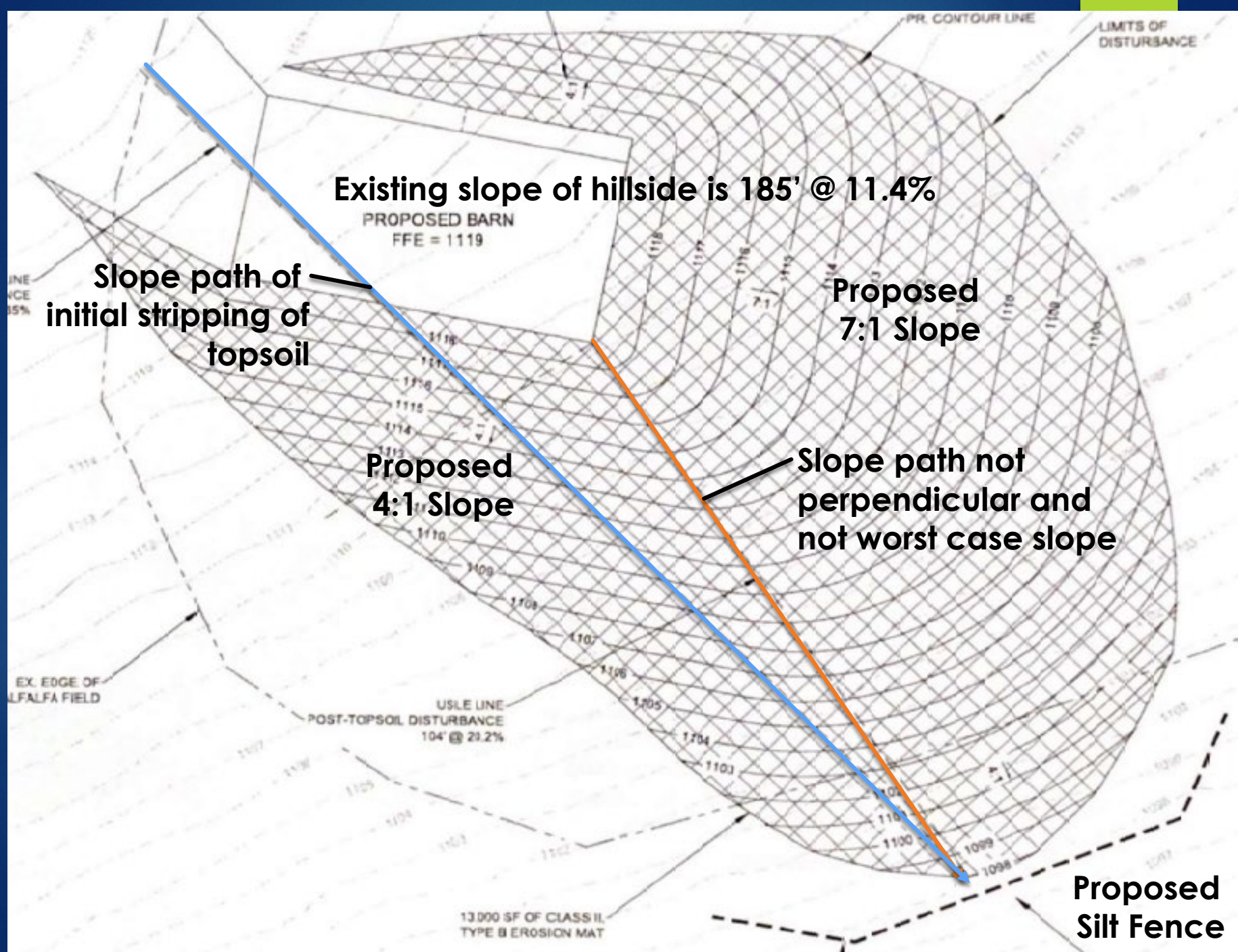
PROPOSED BARN
FFE = 1119
Proposed Barn

Proposed
7:1 Slope

Proposed
4:1 Slope

Proposed
Slope
transitions
from 4:1
to 7:1







Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer:

Project:

Date:

01/31/22

County:

Dane



Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	02/01/22	02/15/22	1.0%	150	Silt Loam	0.43	11.4%	185	2.29	1.00	1.5	0.871	Silt Fence	0.8
Bare Ground	02/15/22	03/08/22	1.5%	150	Silt Loam	0.43	25.0%	24	3.04	1.00	2.9	0.622	Silt Fence	1.1
Mulch or Erosion Mat	03/08/22	05/01/22	6.5%	150	Silt Loam	0.43	25.0%	24	3.04	0.20	2.6	0.622	Silt Fence	1.0
Seed with Mulch or Er	05/01/22	07/01/22	30.0%	150	Silt Loam	0.43	25.0%	24	3.04	0.10	5.9	0.622	Silt Fence	2.2
End	07/01/22		----	----	----	----			----	----	----	0.000		0.0
			----	----	----	----			----	----	----	0.000		0.0
TOTAL												12.9	TOTAL	5.0
#VALUE!													% Reduction Required	0%

SLOPE > 20% USE PRESCRIPTIVE COMPLIANCE

Notes:

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Recommended Permanent Seeding Dates:

4/1-5/15
Thaw-8/30

and
8/7-8/29

Turf, introduced grasses and legumes
Native Grasses, forbs, and legumes

Designed By:

Date



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer: _____

Project: _____

Date: 01/31/22

County: Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	02/01/22	02/15/22	1.0%	150	Silt Loam	0.43	11.4%	185	2.29	1.00	1.5	0.871	Silt Fence	0.8
Bare Ground	02/15/22	03/24/22	2.5%	150	Silt Loam	0.43	20.0%	35	2.50	1.00	4.1	0.662	Silt Fence	1.6
Mulch or Erosion Mat	03/24/22	05/01/22	5.5%	150	Silt Loam	0.43	20.0%	35	2.50	0.20	1.8	0.662	Silt Fence	0.7
Seed with Mulch or En	05/01/22	07/01/22	30.0%	150	Silt Loam	0.43	20.0%	35	2.50	0.10	4.8	0.662	Silt Fence	1.9
End	07/01/22		----	----	----	----			----	----	----	0.000		0.0
												0.000		0.0
TOTAL												12.1	TOTAL	5.0
#VALUE!													% Reduction Required	0%

Notes:

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Recommended Permanent Seeding Dates:

4/1-5/15
Thaw-6/30

8/7-8/29 Turf, introduced grasses and legumes
Native Grasses, forbs, and legumes

Designed By: _____
Date: _____



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer: _____

Project: _____

Date: 01/31/22

County: Dane

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	02/01/22	02/15/22	1.0%	150	Silt Loam	0.43	11.4%	185	2.29	1.00	1.5	0.871	Silt Fence	0.8
Bare Ground	02/15/22	03/24/22	2.5%	150	Silt Loam	0.43	14.3%	81	2.17	1.00	3.5	0.760	Silt Fence	1.6
Mulch or Erosion Mat	03/24/22	05/01/22	5.5%	150	Silt Loam	0.43	14.3%	81	2.17	0.20	1.5	0.760	Silt Fence	0.7
Seed with Mulch or En	05/01/22	07/01/22	30.0%	150	Silt Loam	0.43	14.3%	81	2.17	0.10	4.2	0.760	Silt Fence	1.9
End	07/01/22		----	----	-----	----			----	-----	-----	0.000		0.0
												0.000		0.0
TOTAL											10.7		TOTAL	5.0
#VALUE!													% Reduction Required	0%

Notes:

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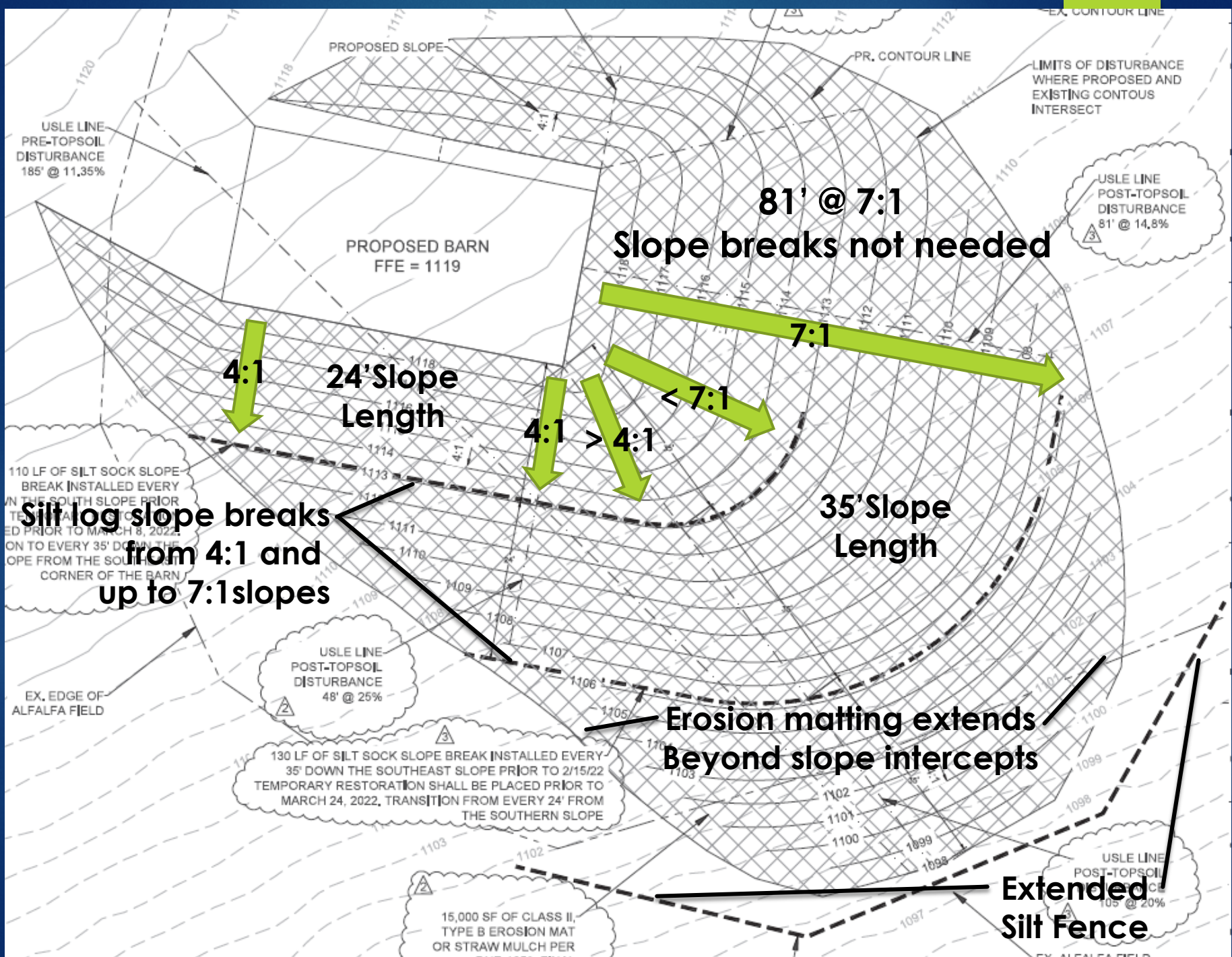
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4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes
Thaw-6/30 Native Grasses, forbs, and legumes

Designed By:	
Date	

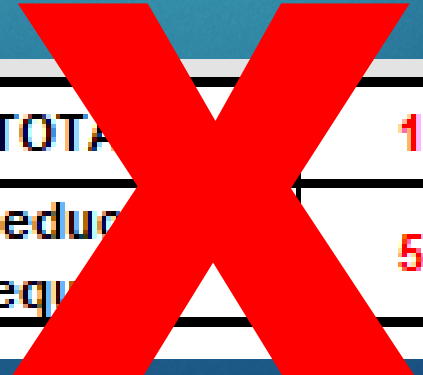


Tips for Reducing Loss

- ▶ Reduce duration of bare soil
- ▶ Time of year
- ▶ Phasing
- ▶ Slope interruption
- ▶ Temporary stabilization
- ▶ Target erosive areas

Tips for Efficient Approval

- ▶ Make sure total is < 5 ton/ac/yr
- ▶ Choose representative slopes
- ▶ Include explanations in narrative
- ▶ Include map with required info & labels
- ▶ Provide realistic start date given review timing



TOTAL	10.2
% Reduction Required	51%

Po11 #3

Questions?



WREDIV@COUNTYOFDANE.COM

[HTTPS://LWRP.DANE.GOV/TOOLS/PERMIT-RESOURCES](https://lwrp.dane.gov/tools/permit-resources)