CORE ENGINEERING GROUP

15004 1st Avenue S.
Burnsville, MN 55306
Telephone: (719) 570-1100
E-mail: rich@ceg1.com

Date: December 12, 2018

Project Number: 100.044

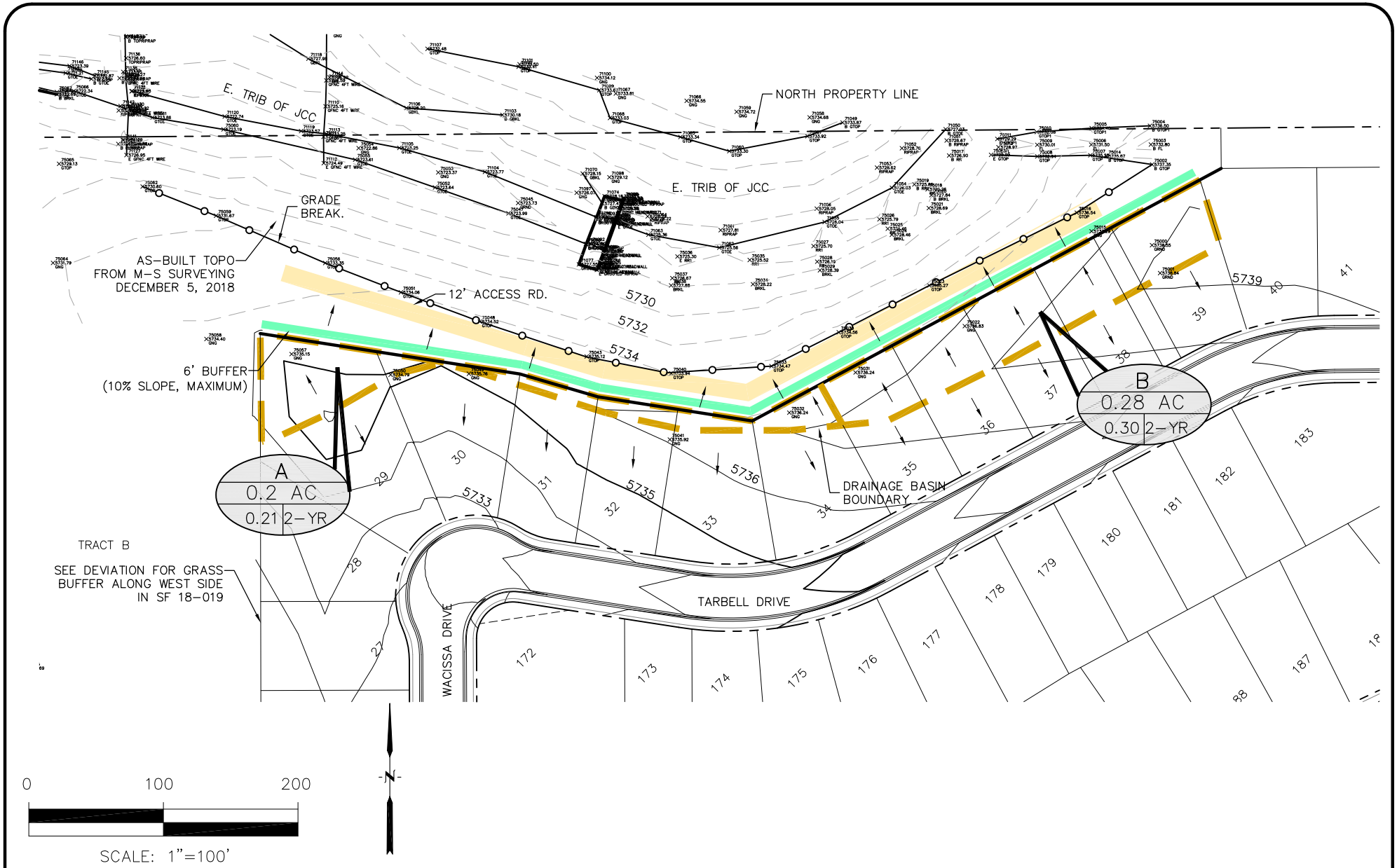
MEMORANDUM

To:	Jeff Rice, El Paso County PCD	**From:**	Richard Schindler
Re:	Lorson Ranch East Fil No. 2 Grass Buffer Width Calculation Revisions (SF 18-019)		

This memorandum is to provide additional drainage calculations to determine the revised width of the grass buffer on the north side of Lorson Ranch East Filing No. 2 located adjacent to the East Tributary of Jimmy Camp Creek. On the north side of Lorson Ranch East No. 2 (LRE2) the maintenance road for the channel occupies a portion of the original buffer location and updated calculations are necessary to determine the minimum width of the grass buffer to ensure it fits between the backlot lines, maintenance road, and the creek in Tract B. The current grass buffer width of 26' was calculated based on the entire area of backyards (1.75ac) draining across the buffer to the East Tributary per the Grass Buffer deviation submitted as part of plat submittal SF 18-019. See WQ deviation in plat submittal SF 18-019 for buffer location. On the north side of LRE2 the drainage area of backyard drainage flowing north is substantially less than the backyard drainage along the west side of LRE2 so it can be broken out into separate buffer width calculations to match the topography. The revised drainage is broken into Drainage Area "A" and "B". The resultant grass buffer width from the Xcel spreadsheets is 6' wide based on the tributary areas. On December 5, 2018 the East Tributary was as-built surveyed by M-S Civil which shows the maintenance road and the backyard grades. Based on the as-built topo the 6' wide grass buffer can fit between the backlot line and the existing maintenance road.

Att Xcel worksheet for 2-yr storm
Xcel worksheet for grass buffer
Grass Buffer Exhibit

From: Richard L. Schindler



CORE ENGINEERING GROUP

15004 1ST AVENUE S.
BURNSVILLE, MN 55306
PH: 719.570.1100
CONTACT: RICHARD L. SCHINDLER, P.E.
EMAIL: Rich@ceg1.com

LORSON RANCH EAST FIL. NO. 2
REVISED GRASS BUFFER - NORTH SIDE

SCALE:	DATE:	FIGURE NO.
NTS	DEC 12, 2018	--

Calculation of Peak Runoff using Rational Method

Designer:
Company:
Date: 12/12/2018
Project:
Location:

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides.

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

$$\text{Computed } t_c = t_i + t_t$$

$$\text{Regional } t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

$t_{minimum} = 5$ (urban)
$t_{minimum} = 10$ (non-urban)

$$\text{Selected } t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.83	1.09	1.33	1.69	1.99	2.31	3.14

	a	b	c
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.20	C	52.0	0.40	0.46	0.51	0.61	0.65	0.70	0.75	40.00			0.020	5.82	0.00			0.020	7	0.99	0.00	5.82	17.16	5.82	2.68	3.54	4.33	5.50	6.47	7.51	10.21	0.21	0.33	0.44	0.67	0.84	1.05	1.54
B	0.28	C	52.0	0.40	0.46	0.51	0.61	0.65	0.70	0.75	40.00			0.020	5.82	0.00			0.020	7	0.99	0.00	5.82	17.16	5.82	2.68	3.54	4.33	5.50	6.47	7.51	10.21	0.30	0.46	0.62	0.94	1.18	1.47	2.15

Design Procedure Form: Grass Buffer (GB)

UD-BMP (Version 3.06, November 2016)

Designer:
Company: Core Engineering Group
Date: December 12, 2018
Project: Lorson Ranch East Filing No. 2 - North Grass Buffer Calculations
Location: Lorson Ranch

1. Design Discharge A) 2-Year Peak Flow Rate of the Area Draining to the Grass Buffer	Q_2 = 0.3 cfs
2. Minimum Width of Grass Buffer	W_G = 6 ft
3. Length of Grass Buffer (14' or greater recommended)	L_G = 60 ft
4. Buffer Slope (in the direction of flow, not to exceed 0.1 ft / ft)	S_G = 0.100 ft / ft
5. Flow Characteristics (sheet or concentrated) A) Does runoff flow into the grass buffer across the entire width of the buffer?	Choose One: (●) Yes ( ) No
B) Watershed Flow Length	F_L= 50 ft
C) Interface Slope (normal to flow)	S_I= 0.010 ft / ft
D) Type of Flow Sheet Flow: $F_L * S_I \leq 1$ Concentrated Flow: $F_L * S_I > 1$	SHEET FLOW
6. Flow Distribution for Concentrated Flows	Choose One: ( ) None (sheet flow) ( ) Slotted Curbing ( ) Level Spreader ( ) Other (Explain):
7 Soil Preparation (Describe soil amendment)	4" topsoil
8 Vegetation (Check the type used or describe "Other")	Choose One: (●) Existing Xeric Turf Grass ( ) Irrigated Turf Grass ( ) Other (Explain):
9. Irrigation (*Select None if existing buffer area has 80% vegetation AND will not be disturbed during construction.)	Choose One: ( ) Temporary ( ) Permanent (●) None*
10. Outflow Collection (Check the type used or describe "Other")	Choose One: ( ) Grass Swale ( ) Street Gutter ( ) Storm Sewer Inlet (●) Other (Explain): Etrib of Jimmy Camp Creek

Notes: