

Exhibit E

Johnson Vineyard USLE - Analysis

Prepared by Napa Valley Vineyard Engineering, Inc
March 27, 2019, January 9, 2020
Revision 1

INTRODUCTION

Johnson Vineyard seeks approval of approximately 7.09 net acres of proposed vineyard. The project lies within APN 017-160-036 a parcel totaling about 40.0 acres, located at 3363 HWY 128, Calistoga.

This analysis is to predict the affect the proposed vineyard development project will have on local soil erosion. Modeling of existing and proposed conditions was performed using the Universal Soil Loss Equation (USLE). Following is a summary of the data used and the results of the analysis.

RAINFALL DATA

The 2 year, 6 hour rainfall depth is used to determine the "R" value in the USLE. The rainfall depth for the project site was obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2, Precipitation Frequency Data for California, which uses the latitude and longitude of a site to interpolate rainfall depths between data points. The latitude and longitude of the Johnson Vineyard project are estimated to be 38.5891° N, -122.6255° W, based on information obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Precipitation Frequency Data. The 2 year, 6 hour rainfall depth at the project site ranges from 1.87-inches to 2.40-inches. This analysis conservatively uses the high end of the range (2.40-inches), which equals an "R" value of 110. "R" is constant in the pre-project and post-project models.

SOIL EROSIVENESS

Each soil type listed in the United States Department of Agriculture, Soil Conservation Service (SCS), Napa County Soil Survey has an erodibility factor ("K"). The SCS soil maps indicate that soils on the project site as:

SCS# 139 & 140, Forward gravelly loam - K value of 0.17
SCS# 141 Forward kidd complex - K value of 0.17

"K" is constant in the pre-project and post-project models.

SLOPE LENGTH and STEEPNESS

Napa County GIS database 2002 contour mapping was used to determine slope steepness on the project site. The Slope lengths and Transects were selected to analyze the soil loss from the longest and steepest slopes or at ground cover change in the blocks for the project area, as shown on the map included in the Appendix. The slope lengths, transaction lengths and gradients for the blocks remain constant in the pre-project and post-project models and are identified on the map and in the USLE worksheets included in the Appendix.

VEGETATIVE COVER

Cover factors ("C") for pre-project and post-project conditions were determined using the guidelines provided in the SCS pamphlet entitled "The Universal Soil Loss Equation: Special Applications for Napa County, California (guide).

Pre Project

The existing site was burned in the Napa County Fire and was being cleared, conditions for Blocks A1, A2 and 2 consists of approximately 75% tree canopy with little appreciable low brush. The ground cover for this block is approximately 10% grass-like herbaceous plants (grassy) and 90% broadleaf herbaceous plants (woody), and covers approximately 80% of the area.

The existing site was burned in the Napa County Fire and was being cleared, conditions for Blocks B and F consists of approximately 25% tree canopy with little appreciable low brush. The ground cover for this block is approximately 50% grass-like herbaceous plants (grassy) and 50% broadleaf herbaceous plants (woody), and covers approximately 70% of the area.

The existing site conditions for Block C consists of approximately 25% tree canopy with little appreciable low brush. The ground cover for this block is approximately 60% grass-like herbaceous plants (grassy) and 40% broadleaf herbaceous plants (woody), and covers approximately 70% of the area.

The existing site conditions for Block E consists of existing vineyard and approximately 50% tree canopy with little appreciable low brush. The ground cover on site is approximately 50% grass-like herbaceous plants (grassy) and 50% broadleaf herbaceous plants (woody), and covers approximately 75% of the area.

Using Table 5 in the guide, "Factor C for permanent pasture, range, idle land or grazed woodland", the pre-project C factor is determined by calculating the weighted average of the C factors for grassy cover, brush cover and woody cover per block area conditions, see pre USLE worksheets for the pre-project C factors used per block.

Post Project

The project proposes a “permanent non-till cover crop with spot spray” cultivation scheme with no ripping or tillage (refer to ECP narrative). Using the table in the guide, “USLE “C” Factors for Vineyards”, the post-project C factor for a no till with spot spray assuming 80% ground cover (0.022). Block E upper area added diversion ditches and the lower remains the same with existing diversion ditch with 80% ground cover and spot spray.

PRACTICE FACTOR

The accepted practice factor for the existing conditions is 1.0. Using the table in the guide, “P (“Practice”) Factors for USLE in Napa Valley Vineyards, the practice factor for vineyard Blocks A2, B and 2 is 0.60-0.67 cross slope the remaining Blocks the practice factor is 1.0 for up and down the slopes.

RESULTS, CONCLUSION

The pre-project and post-project modeling is presented with Appendix. A comparison of pre-project and post-project modeling shown:

<u>Transect</u>	<u>Soil Loss (tons/ac.)</u>	
	Pre Project	Post Project
A1	1.35	0.78
A2	6.13	2.13
B	3.69	1.16
C	0.50	0.26
2	1.41	0.39
E upper	4.94	1.96
E lower	1.50	1.50
F	3.83	1.79

The analysis shows, in each case, that the estimated post-project soil loss is less than the pre-project condition, and that the proposed vineyard project will not result in increased soil loss.

Napa Valley Vineyard Engineering
Pre & Post Project - USLE Worksheet R1

FOR: Ed Johnson
DATE: 1/9/2020
Concave Slope

TRANSECT:	A upper	A lower
SOIL TYPE:	140	140
T=	2	2

# /ACRES:		Pre Block A		Pre Block A		Post Block A		Post Block A	
FACTOR:	DESCRIPTION	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe
	Slope length (ft)	166		166		166		166	
S	Gradient	15.0		8.0		15.0		8.0	
LS	Calculated LS	3.05		1.28		3.05		1.28	
F	Fraction	0.35		0.65		0.35		0.65	
K	Soil Erosiveness	0.17		0.17		0.17		0.17	
C	Cover	0.038	(1)	0.038		0.022		0.022	
	Product	0.007		0.005		0.004		0.003	
	Combined LS	0.012				0.007			
R	Rainfall	110				110			
P	Practice	1				1			
A=RK(LS)CP	Soil loss, tons/acre	1.35				0.78			

80% cover
spot spray

(1) 75% Trees with 80% Ground Cover
 10% Grass (0.10)(.012)= 0.0012
 90% Broadleaf Cover (0.90)(.041)= 0.0369
 Weighted Avg C= 0.038

Napa Valley Vineyard Engineering
Pre & Post Project - USLE Worksheet R1

FOR: Ed Johnson
DATE: 1/9/2020
Convex Slope

TRANSECT:	A2 upper	A2 lower	
SOIL TYPE:	141	141	
T=	2	2	

# /ACRES:		Pre Block A2		Pre Block A2		Post Block A2		Post Block A2	
FACTOR:	DESCRIPTION	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe
	Slope length (ft)	173		173		173		173	
S	Gradient	15.0		30.0		15.0		30.0	
LS	Calculated LS	3.11		7.72		3.11		7.72	
F	Fraction	0.35		0.65		0.35		0.65	
K	Soil Erosiveness	0.24		0.24		0.24		0.24	
C	Cover	0.038	(1)	0.038	(1)	0.022		0.022	
	Product	0.010		0.046		0.006		0.027	
	Combined LS	0.056				0.032			
R	Rainfall	110				110			
P	Practice	1				0.60			
A=RK(LS)CP	Soil loss, tons/acre	6.13				2.13			

80% cover
spot spray

(1) 75% Trees with 80% Ground Cover
 10% Grass (0.10)(.012)= 0.0012
 90% Broadleaf Cover (0.90)(.041)= 0.0369
 Weighted Avg C= 0.038

Napa Valley Vineyard Engineering
Pre & Post Project - USLE Worksheet R1

FOR: Ed Johnson
DATE: 1/9/2020
Concave Slope

TRANSECT:	E upper	E lower
SOIL TYPE:	139	139
T=	2	2

# /ACRES:		Pre Block E		Pre Block E		Post Block E		Post Block E	
FACTOR:	DESCRIPTION	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe
	Slope length (ft)	393		393		393		393	
S	Gradient	32.0		15.0		32.0		15.0	
LS	Calculated LS	12.60		4.69		12.60		4.69	
F	Fraction	0.35		0.65		0.35		0.65	
K	Soil Erosiveness	0.17		0.17		0.24		0.24	
C	Cover	0.037	(1)	0.022	spot spray	0.022		0.022	
	Product	0.028		0.011		0.023		0.016	
	Combined LS	0.039				0.039			
R	Rainfall	110				110			
P	Practice	1				1			
A=RK(LS)CP	Soil loss, tons/acre	4.31				4.33			

80% cover
spot spray

(1) 50% Trees with 75% Ground Cover
 50% Grass (0.50)(.020)= 0.0100
 50% Broadleaf Cover (0.50)(.054)= 0.0270
 Weighted Avg C= 0.037

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Pre Project - USLE Worksheet R1											
FOR:	Ed Johnson										
DATE:	1/9/2020										
	Ranch: Johnson										
	SOIL TYPE:	139	140	141							
	T=	2	2	2							
		S=140	Tran B1	S=141	Tran B2	S=139		S=139		S=139 upper	
# /ACRES:		1.00	Block B	1.00	Block B	1.00	Block C	1.00	Block 2	1.00	Block E
FACTOR:	DESCRIPTION	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe
R	Rainfall	110		110		110		110		110	
K	Soil Erosiveness	0.17		0.17		0.17		0.17		0.17	
	Slope length (ft)	410		113		140		28		126	
S	Gradient	16.0		22.0		5.0		18.0		32.0	
LS	Calculated LS	5.22		4.20		0.63		1.60		7.14	
C	Cover	0.047	(1)	0.047	(1)	0.042	(2)	0.047	(1)	0.037	(3)
P	Practice	1		1		1		1		1	
A	Soil loss, tons/acre	4.59		3.69		0.50		1.41		4.94	
	Soil loss, tons	4.59		3.69		0.50		1.41		4.94	
		(1)	25% Trees with 70% Ground Cover			(2)	25% Trees with 70% Ground Cover				
			50% Grass (0.50)(.027)=	0.0135			60% Grass (0.60)(.027)=	0.0162			
A=(R) (K) (LS) (C) (P)			50% Broadleaf Cover (0.50)(.066)=	0.033			40% Broadleaf Cover (0.40)(.065)=	0.0260			
			Weighted Avg C=	0.047			Weighted Avg C=	0.042			
		(3)	50% Trees with 75% Ground Cover								
			50% Grass (0.50)(.020)=	0.0100							
			50% Broadleaf Cover (0.50)(.054)=	0.0270							
			Weighted Avg C=	0.037							

Napa Valley Vineyard Engineering									
Pre Project - USLE Worksheet R1									
FOR:	Ed Johnson								
DATE:	1/9/2020								
	Ranch: Johnson								
	SOIL TYPE: 139								
	T= 2								
	S=139	lower	S=139						
# /ACRES:		1.00	Block E	1.00	Block F				
FACTOR:	DESCRIPTION	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe
R	Rainfall	110		110					
K	Soil Erosiveness	0.17		0.17					
	Slope length (ft)	238		47					
S	Gradient	15.0		32.0					
LS	Calculated LS	3.65		4.36		0.00		0.00	
C	Cover	0.022	(2)	0.047	(1)				
P	Practice	1		1					
A	Soil loss, tons/acre	1.50		3.83		0.00		0.00	
	Soil loss, tons	1.50		3.83		0.00		0.00	
		(1)	25% Trees with 70% Ground Cover			(2)	80% Cover		
			50% Grass	(0.50)(.027)=	0.0135		No Till, Spot Spray		
A=(R) (K) (LS) (C) (P)			50% Broadleaf Cover	(0.50)(.066)=	0.033				
			Weighted Avg C=	0.047					

Napa Valley Vineyard Engineering
Post Project - USLE Worksheet R1

FOR:	Ed Johnson										
DATE:	1/9/2020										
	Ranch: Johnson										
	SOIL TYPE:	139	140	141							
	T=	2	2	2							
		S=141	S=140	Tran B1	S=141	Tran B2	S=139	S=139			
# /ACRES:		1.00	Block A2	1.00	Block B	1.00	Block B	1.00	Block C	1.00	Block 2
FACTOR:	DESCRIPTION	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe
R	Rainfall	110		110		110		110		110	
K	Soil Erosiveness	0.17		0.17		0.17		0.17		0.17	
	Slope length (ft)	173		410		113		140		28	
S	Gradient	17.0		16.0		22.0		5.0		18.0	
LS	Calculated LS	3.68		5.22		4.20		0.63		1.60	
C	Cover	0.022		0.022		0.022		0.022		0.022	
P	Practice	0.60		0.60		0.67		1		0.6	
A	Soil loss, tons/acre	0.91		1.29		1.16		0.26		0.39	
	Soil loss, tons	0.91		1.29		1.16		0.26		0.39	
		80% Cover		80% Cover		80% Cover		80% Cover		80% Cover	
		No Till, Spot Spray		No Till, Spot Spray		No Till, Spot Spray		No Till, Spot Spray		No Till, Spot Spray	
A=(R) (K) (LS) (C) (P)											

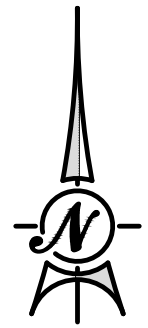
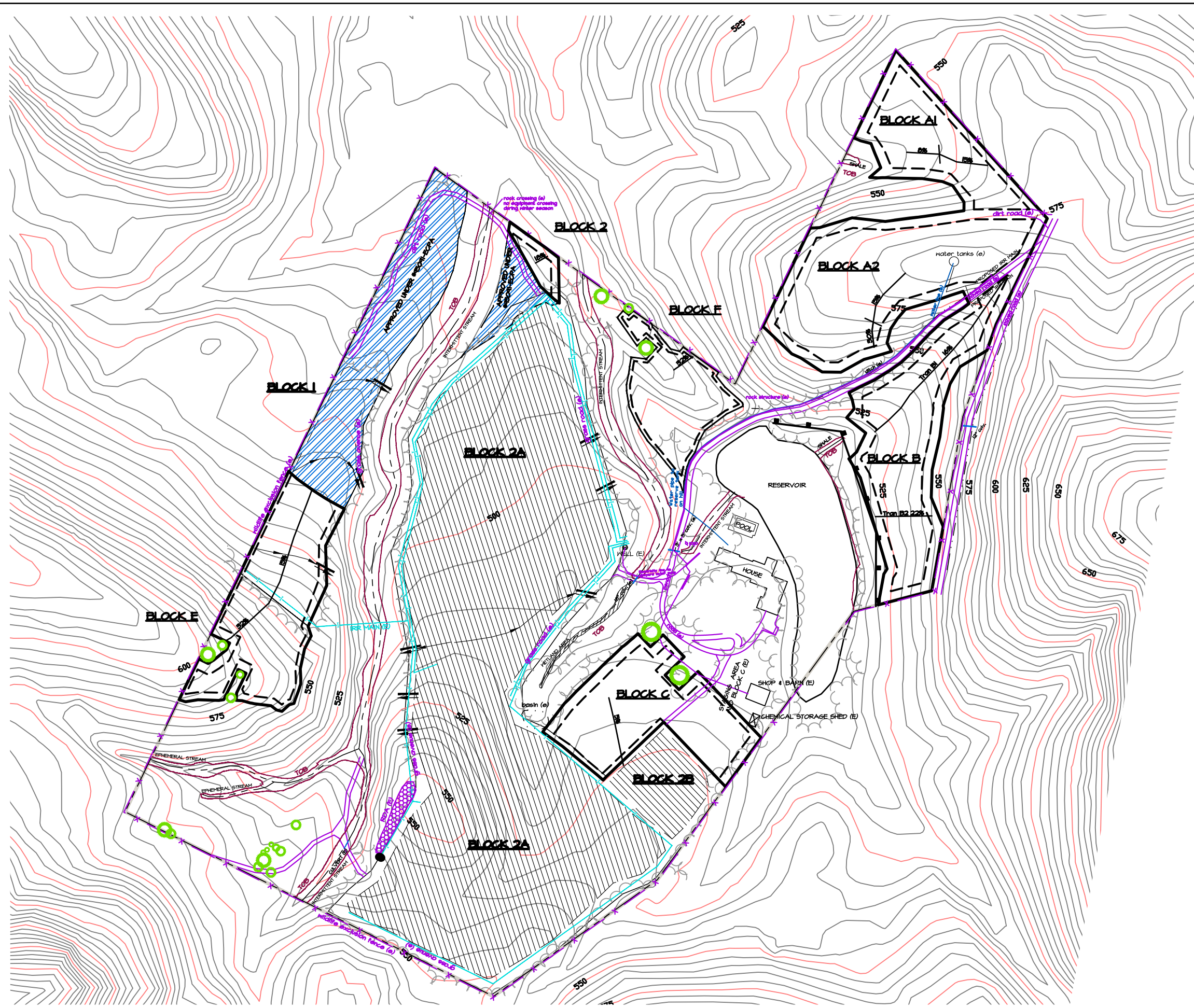
Napa Valley Vineyard Engineering
Post Project - USLE Worksheet R1

FOR: Ed Johnson
DATE: 1/9/2020

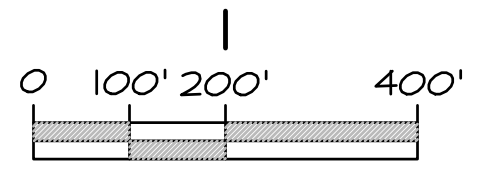
Ranch: Johnson
SOIL TYPE: 139
T= 2

		S=139	upper	S=139	upper	S=139	upper	S=139	lower	S=139	
# /ACRES:		1.00	Block E	1.00	Block E	1.00	Block E	1.00	Block E	1.00	Block F
FACTOR:	DESCRIPTION	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe	Value	/Describe
R	Rainfall	110		110		110		110		110	
K	Soil Erosiveness	0.17		0.17		0.17		0.17		0.17	
	Slope length (ft)	54		56		16		238		47	
S	Gradient	31.0		32.0		31.0		15.0		32.0	
LS	Calculated LS	4.49		4.76		2.45		3.65		4.36	
C	Cover	0.022		0.022		0.022		0.022		0.022	
P	Practice	1		1		1		1		1	
A	Soil loss, tons/acre	1.85		1.96		1.01		1.50		1.79	
	Soil loss, tons	1.85		1.96		1.01		1.50		1.79	
		80% Cover		80% Cover		80% Cover		80% Cover		80% Cover	
		No Till, Spot Spray		No Till, Spot Spray		No Till, Spot Spray		No Till, Spot Spray		No Till, Spot Spray	

A=(R) (K) (LS) (C) (P)



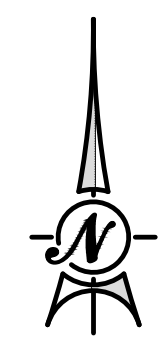
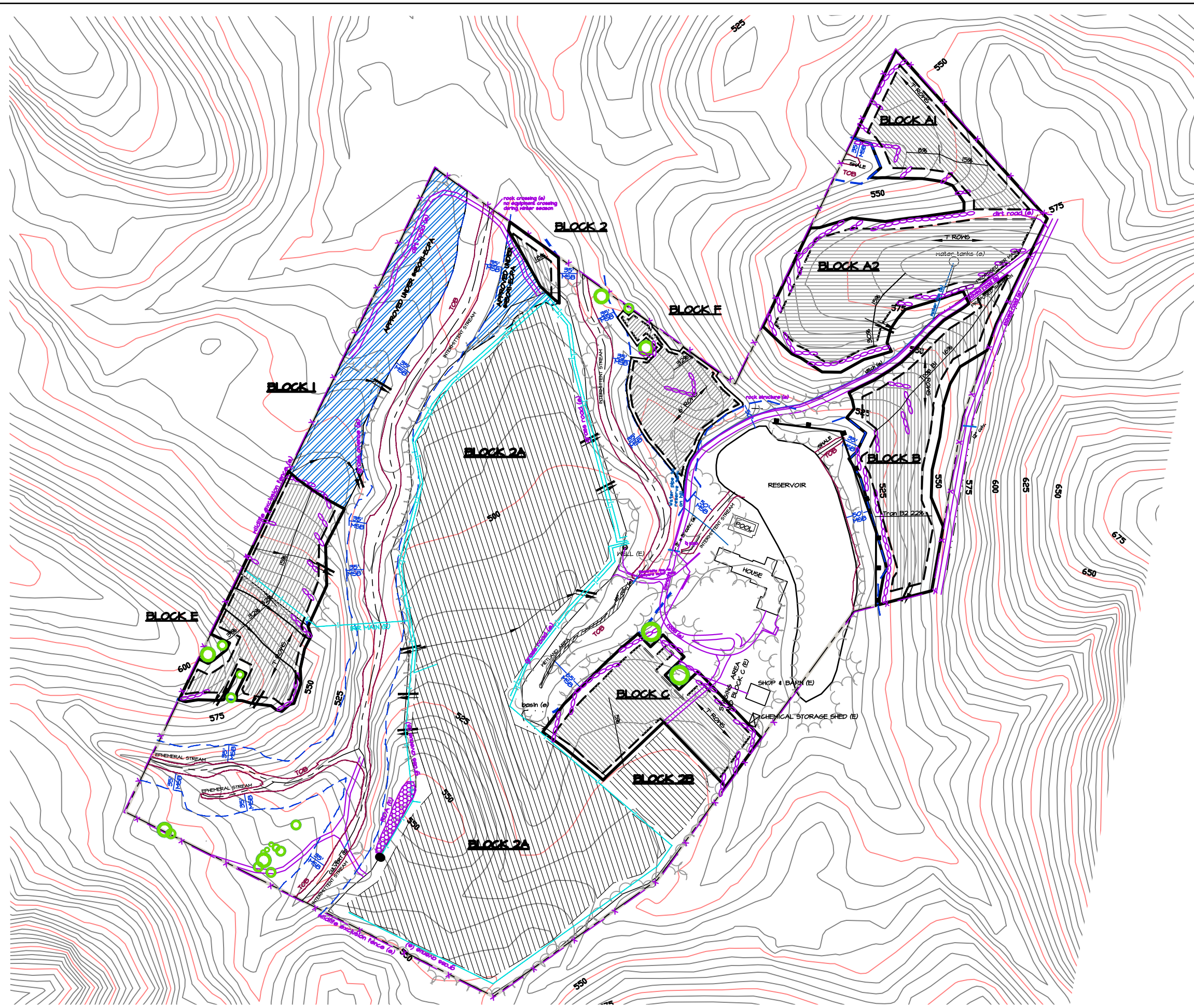
SCALE: 1"=200'
 CONTOUR INTERVAL: 5'



JOHNSON VINEYARD
 3363 HWY 128
 PRE USLE MAP

EROSION CONTROL PLAN
 TRACK I

NVVE 1-9-20
 REVISION 1



SCALE: 1"=200'
 CONTOUR INTERVAL: 5'

0 100' 200' 400'

JOHNSON VINEYARD
 3363 HWY 128
 POST USLE MAP

EROSION CONTROL PLAN
 TRACK I

NVVE 1-9-20
 REVISION 1