

## MEMORANDUM

Date: July 1, 2020

To: Alexei Belov, Napa County Planning, Building and Environmental Services

From: Matthew S. Bueno, P.E.

Cc: Pamela Arifian, Napa County Planning, Building and Environmental Services

Re: Teachworth Winery Track I ECP - #P20-00063  
APN 020-400-018  
Revised Soil Loss Analysis

This memo transmits the findings of a revised soil loss modeling analysis for the above-referenced Track I Erosion Control Plan (ECP). The Universal Soil Loss Equation (USLE) was used to predict pre-project and post-project soil loss from within the proposed vineyard development areas. A combination of topographic maps, aerial imagery, and a site visit were used to determine pre-project transect locations, slopes, and cover values. Pre-project and post-project cover values are consistent with the United States Department of Agriculture (USDA) – Natural Resource Conservation Service (NRCS) publication titled “The Universal Soil Loss Equation Special Applications for Napa County, California” (May 1994).

A site visit was conducted on March 19, 2019 by Matt Bueno and Cody Corsetti of PPI Engineering to determine the pre-project cover values for each block and/or transect area. An additional site visit was conducted on April 15, 2020 with you to confirm the cover values used in the analysis. After some discussion, it was agreed that the ratio of grass to weeds would be modified and the analysis updated to reflect these changes. Post-project cover values were calculated using the percent cover specified in the ECP. This analysis is limited to the proposed vineyard areas as well as vineyard avenues (5.8 gross acres).

The model, summarized on page 2 of Attachment A, predicts a net decrease of approximately 1.1 tons of soil loss per year for the project as a whole. The ECP has been designed to ensure compliance with Napa County policies requiring no-net-increases in soil loss for post-project conditions. Please see the following supporting documents that contain data tables, calculations, maps of transect locations, and results from the analysis.



**Teachworth Track I**  
**USLE Calculation Sheets**

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**USLE Calculations - Block Summary Sheet**

<b>Proposed Block</b>	<b>Proposed Development Acres</b>	<b>Pre-Project Soil Loss (tons/year)</b>	<b>Post-Project Soil Loss (tons/year)</b>	<b>Net Increase/Decrease (tons/year)</b>
Block A	0.57	0.62	0.52	0.10
Block B	3.73	4.21	3.42	0.79
Block C	1.50	1.24	1.04	0.20
<b>Totals</b>	5.79	6.07	4.98	1.09

Note: Individual estimates may not add to the totals due to rounding

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**USLE Calculations - Transect Summary Sheet**

<b>Proposed Block Transect</b>	<b>Proposed Development Acres</b>	<b>Pre-Project Soil Loss (tons/year)</b>	<b>Post-Project Soil Loss (tons/year)</b>	<b>Net Increase/Decrease (tons/year)</b>
Block A1	0.18	0.15	0.13	0.02
Block A2	0.21	0.20	0.17	0.03
Block A3	0.18	0.26	0.22	0.04
Block B1	0.86	1.06	0.89	0.17
Block B2	2.13	2.58	2.05	0.53
Block B3	0.74	0.57	0.48	0.09
Block C	1.50	1.24	1.04	0.20
<b>Totals</b>	5.79	6.07	4.98	1.09

Note: Individual estimates may not add to the totals due to rounding



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## Block A1

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Proposed Development Acres:	0.18
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	111
Number of Segments:	1
Individual Segment Lengths (ft):	111
Segment:	
Gradient (%):	23
m:	
Individual LS:	4.41
Factor:	
Product:	
LS, Length and Steepness:	4.41
Total Transect Average Gradient (%):	23
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	90%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5) <sup>1</sup> :	0.014
A, Soil Loss (tons/acre):	0.86
Soil Loss in Proposed Development (tons):	0.15

<sup>1</sup> Tables 5 & 6 - USLE Special Applications for Napa County

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## Block A1

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Proposed Development Acres:	0.18
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	111
Number of Segments:	1
Individual Segment Lengths (ft):	111
Segment:	
Gradient (%):	23
m:	
Individual LS:	4.41
Factor:	
Product:	
LS, Length and Steepness:	4.41
Total Transect Average Gradient (%):	23
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4) <sup>1</sup> :	0.011
A, Soil Loss (tons/acre):	0.72
Soil Loss in Proposed Development (tons):	0.13

<sup>1</sup> Tables 4 & 6 - USLE Special Applications for Napa County

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## Block A2

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Proposed Development Acres:	0.21
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	114
Number of Segments:	1
Individual Segment Lengths (ft):	114
Segment:	
Gradient (%):	25
m:	
Individual LS:	4.98
Factor:	
Product:	
LS, Length and Steepness:	4.98
Total Transect Average Gradient (%):	25
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	90%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5) <sup>1</sup> :	0.014
A, Soil Loss (tons/acre):	0.97
Soil Loss in Proposed Development (tons):	0.20

<sup>1</sup> Tables 5 & 6 - USLE Special Applications for Napa County

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## Block A2

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Proposed Development Acres:	0.21
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	114
Number of Segments:	1
Individual Segment Lengths (ft):	114
Segment:	
Gradient (%):	25
m:	
Individual LS:	4.98
Factor:	
Product:	
LS, Length and Steepness:	4.98
Total Transect Average Gradient (%):	25
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4) <sup>1</sup> :	0.011
A, Soil Loss (tons/acre):	0.81
Soil Loss in Proposed Development (tons):	0.17

<sup>1</sup> Tables 4 & 6 - USLE Special Applications for Napa County

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### Block A3

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Proposed Development Acres:	0.18
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	189
Number of Segments:	1
Individual Segment Lengths (ft):	189
Segment:	
Gradient (%):	28
m:	
Individual LS:	7.40
Factor:	
Product:	
LS, Length and Steepness:	7.40
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	90%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5) <sup>1</sup> :	0.014
A, Soil Loss (tons/acre):	1.44
Soil Loss in Proposed Development (tons):	0.26

<sup>1</sup> Tables 5 & 6 - USLE Special Applications for Napa County

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### Block A3

---

Proposed Development Acres:	0.18
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	189
Number of Segments:	1
Individual Segment Lengths (ft):	189
Segment:	
Gradient (%):	28
m:	
Individual LS:	7.40
Factor:	
Product:	
LS, Length and Steepness:	7.40
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4) <sup>1</sup> :	0.011
A, Soil Loss (tons/acre):	1.21
Soil Loss in Proposed Development (tons):	0.22

<sup>1</sup> Tables 4 & 6 - USLE Special Applications for Napa County

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## Block B1

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Proposed Development Acres:	0.86
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	205
Number of Segments:	1
Individual Segment Lengths (ft):	205
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.33
Factor:	
Product:	
LS, Length and Steepness:	6.33
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	90%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5) <sup>1</sup> :	0.01350
A, Soil Loss (tons/acre):	1.23
Soil Loss in Proposed Development (tons):	1.06

<sup>1</sup> Tables 5 & 6 - USLE Special Applications for Napa County

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## Block B1

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Proposed Development Acres:	0.86
Soil Unit No. (100-182):	141
Soil Name:	Forward-Kidd
K, Soil Erodibility:	0.17
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	205
Number of Segments:	1
Individual Segment Lengths (ft):	205
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.33
Factor:	
Product:	
LS, Length and Steepness:	6.33
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) <sup>1</sup> :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4) <sup>1</sup> :	0.01133
A, Soil Loss (tons/acre):	1.04
Soil Loss in Proposed Development (tons):	0.89

<sup>1</sup> Tables 4 & 6 - USLE Special Applications for Napa County



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## Block B2

Proposed Development Acres:	2.13			
Soil Unit No. (100-182):	141			
Soil Name:	Forward-Kidd			
K, Soil Erodibility:	0.17			
T, Soil Loss Tolerance (tons/acre):	3			
R, Rainfall:	85			
Total Transect Length (ft):	385			
Number of Segments:	4			
Individual Segment Lengths (ft):	96			
Segment:	1	2	3	4
Gradient (%):	24	24	15	18
m:				
Individual LS:	8.67	8.67	4.64	5.93
Factor:	0.12	0.23	0.30	0.30
Product:	1.04	2.00	1.39	1.78
LS, Length and Steepness:	6.21			
Total Transect Average Gradient (%):	20			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6) <sup>1</sup> :	1.00			
Vegetative Canopy:	Trees 13' Tall			
Canopy Cover:	75%			
Ground Cover:	90%			
Percent Grass:	50%			
Percent Weeds:	50%			
C, Cover (Table 5) <sup>1</sup> :	0.014			
A, Soil Loss (tons/acre):	1.21			
Soil Loss in Proposed Development (tons):	2.58			

<sup>1</sup> Tables 5 & 6 - USLE Special Applications for Napa County

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## Block B2

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Proposed Development Acres:	2.13		
Soil Unit No. (100-182):	141		
Soil Name:	Forward-Kidd		
K, Soil Erodibility:	0.17		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	302		
Number of Segments:	3		
Individual Segment Lengths (ft):	101		
Segment:	1	2	3
Gradient (%):	24	24	14
m:			
Individual LS:	7.68	7.68	3.74
Factor:	0.19	0.35	0.46
Product:	1.46	2.69	1.72
LS, Length and Steepness:	5.87		
Total Transect Average Gradient (%):	21		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6) <sup>1</sup> :	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	90%		
C, Cover (Table 4) <sup>1</sup> :	0.011		
A, Soil Loss (tons/acre):	0.96		
Soil Loss in Proposed Development (tons):	2.05		

<sup>1</sup> Tables 4 & 6 - USLE Special Applications for Napa County

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## Block B3

Proposed Development Acres:	0.74		
Soil Unit No. (100-182):	141		
Soil Name:	Forward-Kidd		
K, Soil Erodibility:	0.17		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	260		
Number of Segments:	3		
Individual Segment Lengths (ft):	87		
Segment:	1	2	3
Gradient (%):	21	10	17
m:			
Individual LS:	5.99	2.19	4.52
Factor:	0.19	0.35	0.46
Product:	1.14	0.77	2.08
LS, Length and Steepness:	3.98		
Total Transect Average Gradient (%):	16		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6) <sup>1</sup> :	1.00		
Vegetative Canopy:	Trees 13' Tall		
Canopy Cover:	75%		
Ground Cover:	90%		
Percent Grass:	50%		
Percent Weeds:	50%		
C, Cover (Table 5) <sup>1</sup> :	0.014		
A, Soil Loss (tons/acre):	0.78		
Soil Loss in Proposed Development (tons):	0.57		

<sup>1</sup> Tables 5 & 6 - USLE Special Applications for Napa County

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### Block B3

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Proposed Development Acres:	0.74		
Soil Unit No. (100-182):	141		
Soil Name:	Forward-Kidd		
K, Soil Erodibility:	0.17		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	260		
Number of Segments:	3		
Individual Segment Lengths (ft):	87		
Segment:	1	2	3
Gradient (%):	21	10	17
m:			
Individual LS:	5.99	2.19	4.52
Factor:	0.19	0.35	0.46
Product:	1.14	0.77	2.08
LS, Length and Steepness:	3.98		
Total Transect Average Gradient (%):	16		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6) <sup>1</sup> :	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	90%		
C, Cover (Table 4) <sup>1</sup> :	0.011		
A, Soil Loss (tons/acre):	0.65		
Soil Loss in Proposed Development (tons):	0.48		

<sup>1</sup> Tables 4 & 6 - USLE Special Applications for Napa County

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## Block C

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Proposed Development Acres:	1.50	
Soil Unit No. (100-182):	141	
Soil Name:	Forward-Kidd	
K, Soil Erodibility:	0.17	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	322	
Number of Segments:	2	
Individual Segment Lengths (ft):	161	
Segment:	1	2
Gradient (%):	11	17
m:		
Individual LS:	2.77	5.02
Factor:	0.35	0.65
Product:	0.97	3.27
LS, Length and Steepness:	4.24	
Total Transect Average Gradient (%):	14	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) <sup>1</sup> :	1.00	
Vegetative Canopy:	Trees 13' Tall	
Canopy Cover:	75%	
Ground Cover:	90%	
Percent Grass:	50%	
Percent Weeds:	50%	
C, Cover (Table 5) <sup>1</sup> :	0.014	
A, Soil Loss (tons/acre):	0.83	
Soil Loss in Proposed Development (tons):	1.24	

<sup>1</sup> Tables 5 & 6 - USLE Special Applications for Napa County

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## Block C

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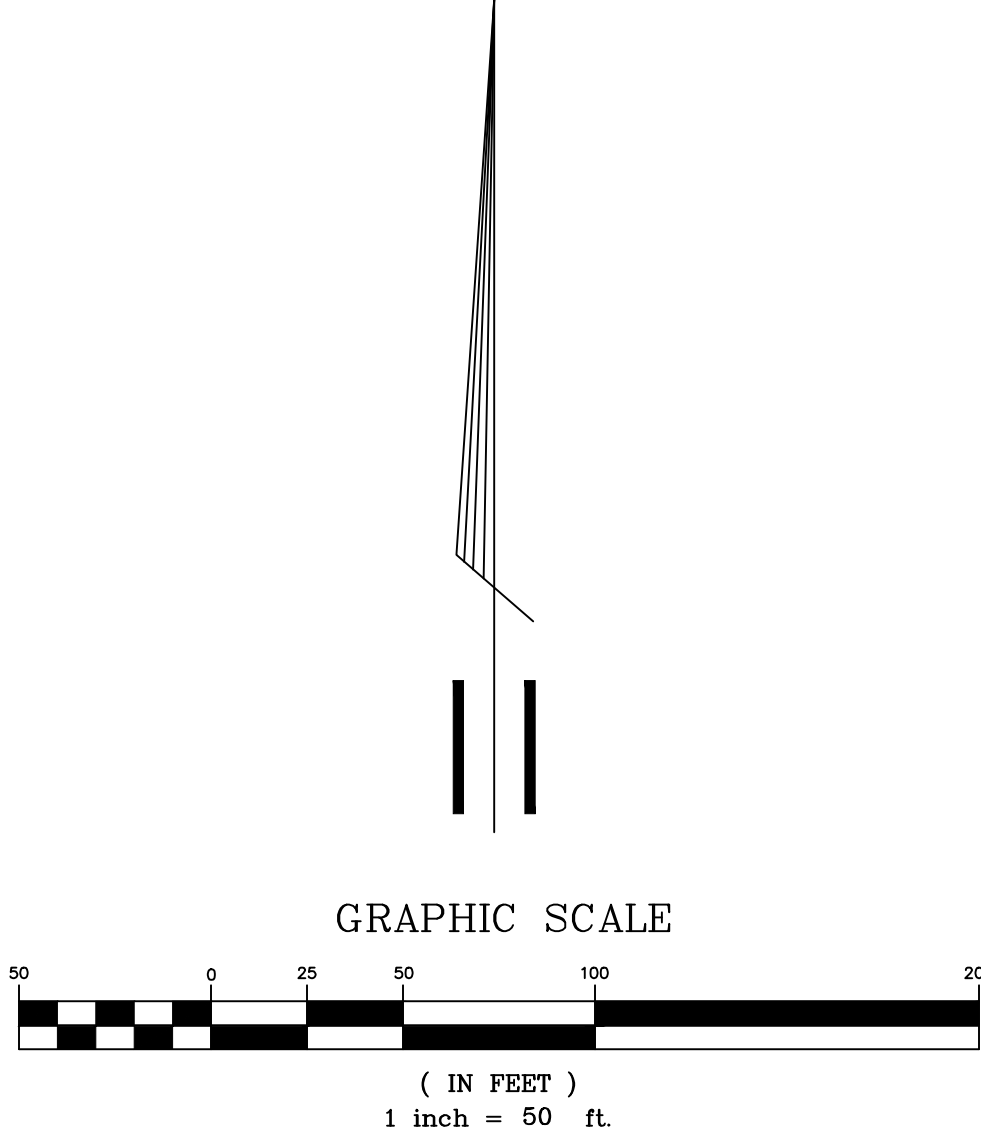
Proposed Development Acres:	1.50	
Soil Unit No. (100-182):	141	
Soil Name:	Forward-Kidd	
K, Soil Erodibility:	0.17	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	322	
Number of Segments:	2	
Individual Segment Lengths (ft):	161	
Segment:	1	2
Gradient (%):	11	17
m:		
Individual LS:	2.77	5.02
Factor:	0.35	0.65
Product:	0.97	3.27
LS, Length and Steepness:	4.24	
Total Transect Average Gradient (%):	14	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) <sup>1</sup> :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	90%	
C, Cover (Table 4) <sup>1</sup> :	0.011	
A, Soil Loss (tons/acre):	0.69	
Soil Loss in Proposed Development (tons):	1.04	

<sup>1</sup> Tables 4 & 6 - USLE Special Applications for Napa County





TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., 2' CONTOUR INTERVAL, DECEMBER 2018  
SUPPLEMENTAL TOPOGRAPHIC MAPPING SOURCE: NAPA COUNTY CONTOURS, 5' CONTOUR INTERVAL, MAY 2003  
NAPA COUNTY AERIAL PHOTO, 2018



LEGEND

- NAPA COUNTY 25' INDEX CONTOUR
- NAPA COUNTY 5' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- EXISTING ROAD
- EXISTING BUILDING
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED SURFACE DRAINAGE LINE (SEE ECP)
- PROPOSED CUTOFF COLLAR (SEE ECP)
- PROPOSED DITCH (SEE ECP)
- PROPOSED DROP INLET (SEE ECP)
- PROPOSED DETENTION BASIN (SEE ECP)
- PROPOSED VINEROW DIRECTION
- USLE TRANSECT PRE PROJECT WITH SLOPE
- USLE TRANSECT POST PROJECT WITH SLOPE
- PROPOSED DETENTION BASIN ROCK LEVEL SPREADER (SEE ECP)
- PROPOSED PIPE LEVEL SPREADER (SEE ECP)
- PROPOSED ROCK APRON (SEE ECP)
- SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

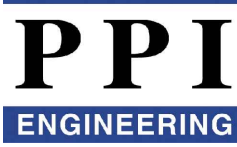
- 140 FORWARD SILT LOAM, 12-57% SLOPES
- 141 FORWARD-KIDD COMPLEX, 11-60% SLOPES

TEACHWORTH VINEYARD DEVELOPMENT  
BLOCKS A, B & C

EROSION CONTROL PLAN

SOIL LOSS ANALYSIS

DESIGN ENGINEER:  
J. BUSHEY, M. BUENO



2800 JEFFERSON STREET  
NAPA, CA 94558  
707/253-1806 FAX 707/253-1804

JOB NO: 11813001  
DWG. NO: 11813001U

SCALE:  
AS SHOWN

DRAWN BY:  
RR

DATE:  
7-1-20

SHEET: 1  
OF: 1