

Hydrologic Analysis
230 Long Ranch Road LLC
Proposed New Vineyard Development
230 Long Ranch Road
Napa, CA 94559
APN 032-560-027
March 25, 2024

The following analysis evaluates a proposed, approximately 18.8-acre vineyard development on an approximately 48.4-acre parcel, located in Napa County, northeast of Napa, California, to determine the proposal's potential to increase runoff from the site. The analysis was prepared by David Steiner, CPESC, CPSWQ, at the request of and in consultation with Mike Muelrath of Applied Civil Engineering. The analysis employs the basic methodology of USDA Technical Release 55, as modeled in Version 1.00.10 of WinTR55 "Small Watershed Hydrology", a Windows-based application. The reader's attention is drawn to accompanying printouts of the analysis—both pre-project and post-project—including storm data, runoff curve number analyses, times of concentration, and summaries of hydrograph peaks. The accompanying maps were drawn on aerial/topographic base maps provided by Applied Civil Engineering.

Three of the four watersheds analyzed (A, B, and D) drain east and north to Lake Hennessey, Conn Creek, and the Napa River. Watershed C drains west to Vinehill Creek and the Napa River. The predominant land use in the area is broadleaf chaparral (chemise), some of which was cleared as firebreak to protect existing rural residential, vineyard, and winery improvements from the recent wildfires in the region. Scrub/interior live oak woodland surrounds some of the ephemeral riparian corridors and blueline creeks that drain the area.

The precipitation data for the modeled **24-hour storms** of 2, 10, 50, and 100-year return intervals were taken from the median of each event's range of likely depths, as per NOAA Atlas 14. A printout of the NOAA website's database page also accompanies this analysis. Peak flow calculations for this location were derived from these values, using the appropriate "CA-1" distribution curve, implicit in the 2013 updates of the Atlas.

Times of Concentration (Tc) for each of the four watersheds were determined by plotting flowpaths from their hydrologically most remote points to designated outlets, or points of interest. (For this project, each basin's origin is at or near the hilltop residential complex.) Each component's data is entered into the model as slope length, gradient, and Manning's "N" roughness factor. Additional characteristics—cross-sectional area and wetted perimeter, or a known velocity— are required for channel flow. Please note that the short run of "channel flow" in Watershed C occurs between two runs of "shallow concentrated flow", whereas data entries in the application place the channel flow downstream. The cumulative Tc is unaffected by the order of placement.

Runoff curve numbers (**CN**) are assigned based on hydrologic soil group (**HSG**), land use, and hydrologic condition. Estimates of existing ("**pre-project**)" land use, cover, and hydrologic condition were based on evaluations made during a field visit on March 7, 2024, and from examination of aerial photographic imagery. HSG designations are derived from the USDA Web Soil Survey. The baseline condition of those areas cleared as firebreak is generally estimated to be equivalent to surrounding, uncleared areas—again, predominantly broadleaf chaparral. Most of this chaparral is in "fair" hydrologic condition (<75% cover) except for the

western half of the cleared hilltop in the northeast corner of Watershed D, where winterization measures have upgraded the surface to "good" hydrologic condition. [1]

Post-project CN. As vineyards are not included among WinTR-55's land use alternatives, the application's "custom CN" field is used to enter selections from a California-specific table found in the NRCS Engineering Field Handbook. [2] This table's guidance calls for vineyard Curve Numbers equivalent to those of "annual grass." To reflect the specifications of the Erosion Control Plan, calling for 75-85%, non-tilled cover management, Curve Numbers for the proposed vineyard blocks are entered into the post-project modeling to indicate "good" hydrologic condition. Where the application's limitations do not include appropriate land use selections, CN printouts have been edited as pdf documents, where necessary to reflect and clarify the actual land uses.

Summary of the Results of Analysis: (Please see accompanying WinTR-55 printouts and electronic files for complete reports, which include parallel predictions of no peak flow increase for 24-hour storms of 2-, 10-, and 50-year return intervals.)

1. Watershed A: Pre-project 100-year peak flow: 11.18 cfs
    - Post-project 100-year peak flow: 11.18 cfs
    - Increase: 0 cfs

2. Watershed B: Pre-project 100-year peak flow: 8.40 cfs
    - Post-project 100-year peak flow: 7.84 cfs
    - Increase: -.56 cfs

3. Watershed C: Pre-project 100-year peak flow: 13.72 cfs
    - Post-project 100-year peak flow: 13.72 cfs
    - Increase: 0 cfs

4. Watershed D: Pre-project 100-year peak flow: 16.73 cfs
    - Post-project 100-year peak flow: 16.73 cfs
    - Increase: 0 cfs

Conclusion: The proposed vineyard development will not increase peak flows.

[1] *Just east of this area, approximately ¼ acre of the proposed Block 3 lies outside any of the plotted watersheds. This area is too small to affect the weighted Runoff Curve Number of any "model-able" watershed of which it is a part. In any event, the appropriate, pre-project CN for this area of "Broadleaf Chaparral, fair condition" (HSG D) is 81, the same as for the proposed vineyard. Moreover, as Napa County GIS slope maps indicate, most if not all of this area is under 5% slope.*

[2] *Engineering Field Handbook, Part 650, Chapter 2, Supplement 1, USDA/NRCS, Oct 2008.*

DAS

Long 230 WS A
Pre-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs)	(hr)	10-Yr (cfs)	(hr)	50-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS								
Main	3.32	12.12	6.42	12.12	9.76	12.12	11.18	12.12
REACHES								
OUTLET	3.32		6.42		9.76		11.18	

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Long 230 WS A
Pre-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

Long 230 WS A
Pre-project
Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0930	0.011				0.010
SHALLOW	480	0.1240	0.050				0.023
SHALLOW	668	0.2800	0.050				0.022
						Time of Concentration	0.1

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Long 230 WS A
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Gravel (w/ right-of-way)		C	.2	89
	Gravel (w/ right-of-way)		D	.2	91
	Broadleaf Chaparral	(fair)	C	6.7	75
	Broadleaf Chaparral	(fair)	D	1.4	81
	Broadleaf Chaparral	(good)	D	.5	78
	Woods	(good)	C	1.6	70
	Woods	(good)	D	.5	77
	Farmsteads		D	.3	86
	Total Area / Weighted Curve Number			11.4	76

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Long 230 WS A
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Gravel (w/ right-of-way)		C	.2	89
	Gravel (w/ right-of-way)		D	.2	91
	Broadleaf Chaparral	(fair)	C	6.7	75
	Broadleaf Chaparral	(fair)	D	1.4	81
	Broadleaf Chaparral	(good)	D	.5	78
	Woods	(good)	C	1.6	70
	Woods	(good)	D	.5	77
	Farmsteads		D	.3	86
	Total Area / Weighted Curve Number			11.4	76

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Long 230 WS A
Post-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs)	(hr)	10-Yr (cfs)	(hr)	50-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS								
Main	3.32	12.12	6.42	12.12	9.76	12.12	11.18	12.12
REACHES								
OUTLET	3.32		6.42		9.76		11.18	

Long 230 WS A
Post-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

DAS

Long 230 WS A
Post-project
Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0930	0.011				0.010
SHALLOW	480	0.1240	0.050				0.023
SHALLOW	668	0.2800	0.050				0.022
						Time of Concentration	0.1

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Long 230 WS A
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Gravel (w/ right-of-way)		C	.2	89
	Gravel (w/ right-of-way)		D	.2	91
	Residential districts (1/4 acre)		B	3.7	75
	Residential districts (1/3 acre)		C	.7	81
	User defined urban (Click button or		C	3.3	75
	User defined urban (Click button or		D	1.2	81
	Row Crop Straight row [SR]	(good)	B	.1	78
	Woods	(good)	C	1.3	70
	Woods	(good)	D	.4	77
	Farmsteads		D	.3	86
	Total Area / Weighted Curve Number			11.4	76

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Long 230 WS A
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Gravel (w/ right-of-way)		C	.2	89
	Gravel (w/ right-of-way)		D	.2	91
	Broadleaf Chaparral	(fair)	C	3.7	75
	Broadleaf Chaparral	(fair)	D	.7	81
	Vineyard (annual grass)	(good)	C	3.3	75
	Vineyard (annual grass)	(good)	D	1.2	81
	Broadleaf Chaparral	(good)	D	.1	78
	Woods	(good)	C	1.3	70
	Woods	(good)	D	.4	77
	Farmsteads		D	.3	86
	Total Area / Weighted Curve Number			11.4	76

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Long 230 WS B
Pre-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs)	(hr)	10-Yr (cfs)	(hr)	50-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS								
Main	2.83	12.17	5.07	12.17	7.41	12.16	8.40	12.16
REACHES								
OUTLET	2.83		5.07		7.41		8.40	

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Long 230 WS B
Pre-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

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Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0190	0.150				0.151
SHALLOW	371	0.1820	0.050				0.015
SHALLOW	555	0.1120	0.050				0.029
						Time of Concentration	.195

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Long 230 WS B
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		C	.2	92
	Paved; open ditches (w/right-of-way)		D	.3	93
	Gravel (w/ right-of-way)		D	.05	91
	Residential districts (1/4 acre)		B	1.6	75
	Residential districts (1/3 acre)		C	4.9	81
	Woods	(good)	C	.05	70
	Woods	(good)	D	.05	77
	Farmsteads		C	.35	82
	Farmsteads		D	1	86
	Total Area / Weighted Curve Number			8.5	81

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Long 230 WS B
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		C	.2	92
	Paved; open ditches (w/right-of-way)		D	.3	93
	Gravel (w/ right-of-way)		D	.05	91
	Broadleaf Chaparral	(fair)	C	1.6	75
	Broadleaf Chaparral	(fair)	D	4.9	81
	Woods	(good)	C	.05	70
	Woods	(good)	D	.05	77
	Farmsteads		C	.35	82
	Farmsteads		D	1	86
	Total Area / Weighted Curve Number			8.5	81

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Long 230 WS B
Post-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs)	(hr)	10-Yr (cfs)	(hr)	50-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS								
Main	2.39	12.17	4.55	12.17	6.86	12.16	7.84	12.17
REACHES								
OUTLET	2.39		4.55		6.86		7.84	

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Long 230 WS B
Post-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

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Long 230 WS B
Post-project
Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0190	0.150				0.151
SHALLOW	371	0.1820	0.050				0.015
SHALLOW	555	0.1120	0.050				0.029
						Time of Concentration	.195

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Long 230 WS B
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		C	.2	92
	Paved; open ditches (w/right-of-way)		D	.3	93
	Gravel (w/ right-of-way)		D	.05	91
	Residential districts (1/4 acre)		B	1.3	75
	Residential districts (1/3 acre)		C	1.4	81
	User defined urban (Click button or		C	.3	75
	User defined urban (Click button or		D	3.5	81
	Woods	(good)	C	.05	70
	Woods	(good)	D	.05	77
	Farmsteads		C	.35	82
	Farmsteads		D	1	86
	Total Area / Weighted Curve Number			8.5	77
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Long 230 WS B
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		C	.2	92
	Paved; open ditches (w/right-of-way)		D	.3	93
	Gravel (w/ right-of-way)		D	.05	91
	Broadleaf Chaparral	(fair)	C	1.3	75
	Broadleaf Chaparral	(fair)	D	1.4	81
	Vineyard (annual grass)	(good)	C	.3	75
	Vineyard (annual grass)	(good)	D	3.5	81
	Woods	(good)	C	.05	70
	Woods	(good)	D	.05	77
	Farmsteads		C	.35	82
	Farmsteads		D	1	86
	Total Area / Weighted Curve Number			8.5	77

DAS

Long 230 WS C
Pre-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs)	(hr)	10-Yr (cfs)	(hr)	50-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS								
Main	4.51	12.18	8.21	12.18	12.09	12.19	13.72	12.19
REACHES								
OUTLET	4.51		8.21		12.09		13.72	

Long 230 WS C
Pre-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

DAS

Long 230 WS C
Pre-project
Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0490	0.150				0.103
SHALLOW	290	0.1140	0.050				0.015
SHALLOW	1835	0.0850	0.050				0.108
CHANNEL	333	0.1130	0.035	5.00	5.00	15.417	0.006
					Time of Concentration		.232

DAS

Long 230 WS C
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)	D	.3	93
	Residential districts (1/3 acre)	C	4.4	81
	User defined urban (Click button or	C	3	75
	User defined urban (Click button or	D	5.9	81
	Woods (good)	D	.9	77
	Total Area / Weighted Curve Number		14.5	80

DAS

Long 230 WS C
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		D	.3	93
	Broadleaf Chaparral	(fair)	D	4.4	81
	Vineyard (annual grass)	(good)	C	3	75
	Vineyard (annual grass)	(good)	D	5.9	81
	Woods	(good)	D	.9	77
	Total Area / Weighted Curve Number			14.5	80

DAS

Long 230 WS C
Post-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs)	(hr)	10-Yr (cfs)	(hr)	50-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS								
Main	4.51	12.18	8.21	12.18	12.09	12.19	13.72	12.19
REACHES								
OUTLET	4.51		8.21		12.09		13.72	

DAS

Long 230 WS C
Post-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

DAS

Long 230 WS C
Post-project
Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0490	0.150				0.103
SHALLOW	290	0.1140	0.050				0.015
SHALLOW	1835	0.0850	0.050				0.108
CHANNEL	333	0.1130	0.035	5.00	5.00	15.417	0.006
					Time of Concentration		.232

Long 230 WS C
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)	D	.3	93
	Residential districts (1/3 acre)	C	.9	81
	User defined urban (Click button or	C	3	75
	User defined urban (Click button or	D	9.4	81
	Woods (good)	D	.9	77
	Total Area / Weighted Curve Number		14.5	80

Long 230 WS C
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		D	.3	93
	Broadleaf Chaparral	(fair)	D	.9	81
	Vineyard (annual grass)	(good)	C	3	75
	Vineyard (annual grass)	(good)	D	9.4	81
	Woods	(good)	D	.9	77
	Total Area / Weighted Curve Number			14.5	80

DAS

Long 230 WS D
Pre-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs)	(hr)	10-Yr (cfs)	(hr)	50-Yr (cfs)	(hr)	100-Yr (cfs)	(hr)
SUBAREAS								
Main	5.78	12.14	10.21	12.13	14.80	12.14	16.73	12.13
REACHES								
OUTLET	5.78		10.21		14.80		16.73	

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Long 230 WS D
Pre-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

DAS

Long 230 WS D
Pre-project
Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0680	0.150				0.091
SHALLOW	595	0.0840	0.050				0.035
SHALLOW	390	0.2240	0.050				0.014
CHANNEL	147	0.1760	0.045	5.00	7.00	10.208	0.004
					Time of Concentration		.144

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Long 230 WS D
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)	D	.5	93
	Gravel (w/ right-of-way)	D	.2	91
	Residential districts (1/3 acre)	C	13.7	81
	Row Crop Straight row [SR] (good)	B	.9	78
	Farmsteads	D	.7	86
	Total Area / Weighted Curve Number		16	82
			==	==

Long 230 WS D
Pre-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		D	.5	93
	Gravel (w/ right-of-way)		D	.2	91
	Broadleaf Chaparral	(fair)	D	13.7	81
	Broadleaf Chaparral	(good)	D	.9	78
	Farmsteads		D	.7	86
	Total Area / Weighted Curve Number			16	82

DAS

Long 230 WS D
Post-project
Napa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period			
	2-Yr	10-Yr	50-Yr	100-Yr
	(cfs) (hr)	(cfs) (hr)	(cfs) (hr)	(cfs) (hr)
SUBAREAS				
Main	5.78 12.14	10.21 12.13	14.80 12.14	16.73 12.13
REACHES				
OUTLET	5.78	10.21	14.80	16.73

Long 230 WS D
Post-project
Napa County, California

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	10-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)	-Yr (in)	-Yr (in)
3.89	5.75	7.65	8.45	.0	.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type CA-1
Dimensionless Unit Hydrograph: <standard>

Long 230 WS D
Post-project
Napa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Main							
SHEET	100	0.0680	0.150				0.091
SHALLOW	595	0.0840	0.050				0.035
SHALLOW	390	0.2240	0.050				0.014
CHANNEL	147	0.1760	0.045	5.00	7.00	10.208	0.004
					Time of Concentration		.144

Long 230 WS D
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)	D	.5	93
	Gravel (w/ right-of-way)	D	.2	91
	Residential districts (1/3 acre)	C	7.4	81
	User defined urban (Click button or	D	6.7	81
	Row Crop Straight row [SR] (good)	B	.5	78
	Farmsteads	D	.7	86
	Total Area / Weighted Curve Number		16	82
			==	==

DAS

Long 230 WS D
Post-project
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Paved; open ditches (w/right-of-way)		D	.5	93
	Gravel (w/ right-of-way)		D	.2	91
	Broadleaf Chaparral	(fair)	D	7.4	81
	Vineyard (annual grass)	(good)	D	6.7	81
	Broadleaf Chaparral	(good)	D	.5	78
	Farmsteads		D	.7	86
	Total Area / Weighted Curve Number			16	82
				==	==

Search

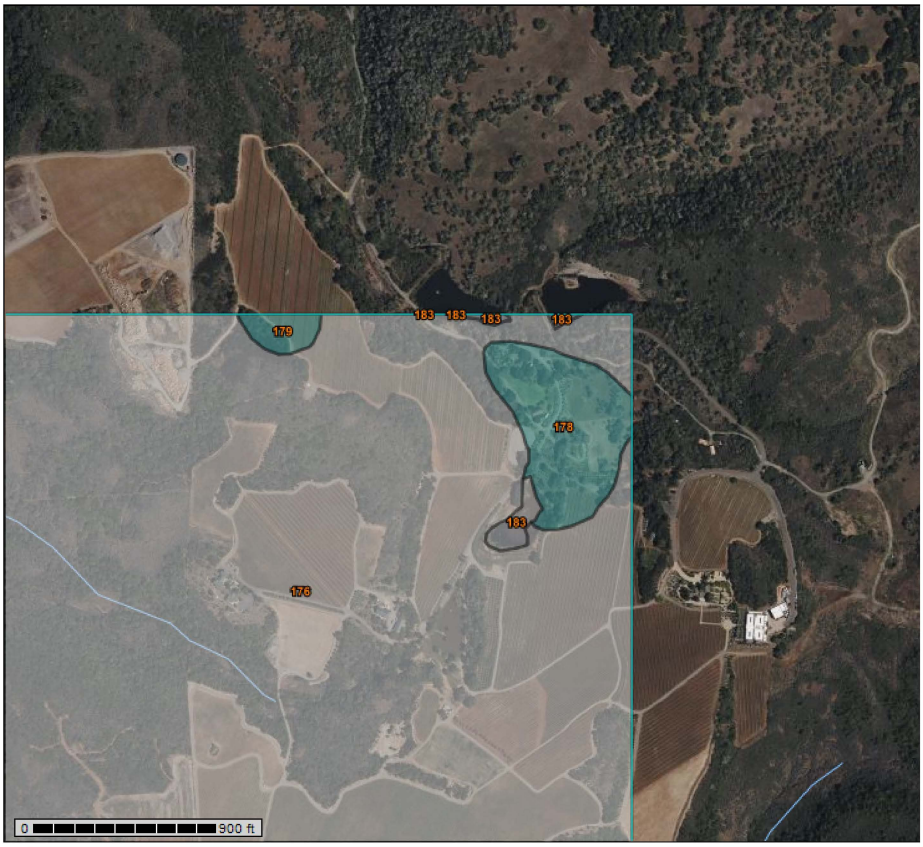
Properties and Qualities Ratings

Open All | Close All

- Soil Chemical Properties
- Soil Erosion Factors
- Soil Health Properties
- Soil Physical Properties
- **Soil Qualities and Features**
  - AASHTO Group Classification (Surface)
  - AASHTO Group Index
  - Depth to a Selected Soil Restrictive Layer
  - Depth to Any Soil Restrictive Layer
  - Depth to Bedrock
  - Drainage Class
  - Frost Action
  - Frost-Free Days
  - Hydrologic Soil Group
    - View Description | View Rating
    - **View Options**
    - **Advanced Options**
    - View Description | View Rating
  - Map Unit Name
  - Parent Material Name
  - Representative Slope
  - Soil Slippage Potential
  - Subsidence, Initial
  - Subsidence, Total
  - Unified Soil Classification (Surface)
- Water Features

Map — Hydrologic Soil Group

Scale (not to scale)



Warning: Soil Ratings Map may not be valid at this scale.

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Map soil surveys that comprise your AOI were mapped at 1:24,000. The design of map units and the leve dependent on that map scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of map maps do not show the small areas of contrasting soils that could have been shown at a more detaile

Tables — Hydrologic Soil Group — Summary By Map Unit

Summary by Map Unit — Napa County, California (CA055)

Summary by Map Unit — Napa County, California (CA055)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
109	Boomer gravelly loam, volcanic bedrock, 14 to 60 percent slopes, MLRA 15	C	26.4	2.2%
125	Cortina very stony loam, 0 to 5 percent slopes	A	26.3	2.2%
152	Hambright rock-Outcrop complex, 30 to 75 percent slopes	D	229.3	19.5%
154	Henneke gravelly loam, 30 to 75 percent slopes	D	41.2	3.5%
168	Perkins gravelly loam, 1 to 10 percent slopes, MLRA 14	B	0.4	0.0%
169	Perkins gravelly loam, 5 to 9 percent slopes	C	8.7	0.7%
Totals for Area of Interest			**1,173.5**	**100.0%**

Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
176	Rock outcrop-Hambright complex, 50 to 75 percent slopes		770.8	65.7%
178	Sobrante loam, 5 to 30 percent slopes	C	31.4	2.7%
179	Sobrante loam, 30 to 50 percent slopes	C	37.7	3.2%
183	Water		1.3	0.1%
Totals for Area of Interest			**1,173.5**	**100.0%**

Description — Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options — Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

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Search

Properties and Qualities Ratings

Open All | Close All

- Soil Chemical Properties
- **Soil Erosion Factors**
  - K Factor, Rock Free
  - K Factor, Whole Soil
  - T Factor
  - Wind Erodibility Group
  - Wind Erodibility Index
- Soil Health Properties
- Soil Physical Properties
- **Soil Qualities and Features**
  - AASHTO Group Classification (Surface)
  - AASHTO Group Index
  - Depth to a Selected Soil Restrictive Layer
  - Depth to Any Soil Restrictive Layer
  - Depth to Bedrock
  - Drainage Class
  - Frost Action
  - Frost-Free Days
  - Hydrologic Soil Group

View Description | View Rating

View Options

Map ☑

Table ☑

Description of Rating ☑

Rating Options ☑

Detailed Description ☐

Advanced Options

Aggregation Method: Dominant Condition

Component Percent Cutoff:

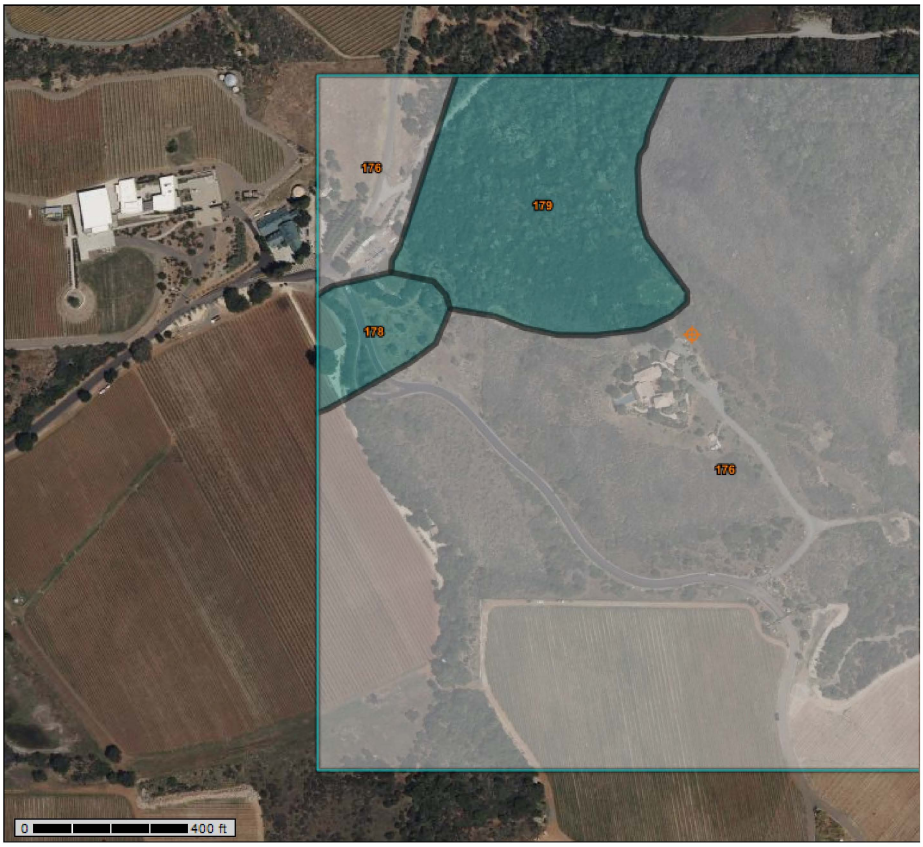
Tie-break Rule: Lower / Higher

View Description | View Rating

  - Map Unit Name
  - Parent Material Name
  - Representative Slope
  - Soil Slippage Potential
  - Subsidence, Initial
  - Subsidence, Total
  - Unified Soil Classification (Surface)
- Water Features

Map — Hydrologic Soil Group

Scale (not to scale)



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Tables — Hydrologic Soil Group — Summary By Map Unit

Summary by Map Unit — Napa County, California (CA055)

Summary by Map Unit — Napa County, California (CA055)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
176	Rock outcrop-Hambright complex, 50 to 75 percent slopes		66.0	86.2%
178	Sobrante loam, 5 to 30 percent slopes	C	1.9	2.5%
179	Sobrante loam, 30 to 50 percent slopes	C	8.7	11.4%
Totals for Area of Interest			**76.6**	**100.0%**

Description — Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high

rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

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If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options — Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

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Land Use	Cover Treatment or Practice	Hydrologic 1/ Condition	Hydrologic Soil Group A	B	C	D
Orchards, deciduous		(See accompanying land-use description)				
Orchards, Evergreen		Poor	55	72	81	86
		Fair	42	64	76	82
		Good	33	58	72	79
Vineyards		(See accompanying land-use description)				
NON-CULTIVATED AGRICULTURAL LAND (Grassland, Woodland, Brushland)						
Annual grass		Poor	65	78	86	89
		Fair	49	69	79	84
		Good	38	61	75	81
Broadleaf chaparral		Poor	53	70	80	85
		Fair	40	63	75	81
		Good	31	57	71	78
Meadow		Poor	63	77	84	90
		Fair	58	70	78	84
		Good	30	58	72	78
Narrowleaf chaparral		Poor	70	82	88	90
		Fair	55	72	81	86
Open brush		Poor	61	76	84	88
		Fair	46	66	77	83
		Good	41	63	75	81

Exhibit 2.1-3

Close-seeded legumes or rotation meadow, contour - Close-seeded legumes or rotation meadow planted on the contour or in straight rows on land with 2 percent slopes or less.

Irrigated pasture - Irrigated land that is planted to perennial grasses and legumes for production of forage and which is cultivated only to establish or renew the stand of plants. For hydrologic purposes, dryland pasture is considered as annual grass.

Orchards, Deciduous - Land planted to such deciduous trees as apples, apricots, pears, walnuts, and almonds. Soil protection during the rainy season is dependent on ground cover. This ground cover may be annual grass or perennial grass cover crops with or without legumes, occasionally legumes alone.

Use curve numbers that apply to the land use or the kind and condition of cover during storm periods; for example, Annual grass curve numbers for annual grass or grass-legume cover. Where orchards are kept bare by disking or the use of herbicides, use Fallow curve numbers.

Because of management practices, ground cover in orchards is seldom continous. Only orchards untilled with more than 75 percent of the ground surface continuously protected by cover are in Good Hydrologic Condition, others are Fair or Poor.

Orchards, Evergreen - Land planted to evergreen trees which include citrus, avocado, and Christmas tree plantations. Soil protection is dependent on ground cover or litter. This ground cover may be annual grass or perennial grass cover crops with or without legumes alone; or the ground protection may be litter where tree canopy is sufficiently dense to produce an effective amount of fallen leaves.

Because of management practices, ground cover in orchards is seldom continous. Only untilled orchards with more than 75 percent of the ground surface continuously protected by litter or plant cover are in Good Hydrologic Condition, others are Fair or Poor.

Vineyards - Land planted to grapes. Soil protection during the rainy season is dependent on ground cover. This ground cover may be annual grass or perennial grass cover crops with or without legumes, occasionally legumes alone.

Use curve numbers that apply to the land use or the kind and condition of cover during the storm periods; for example, Annual grass curve numbers for annual grass or grass legume cover. Where vineyards are kept bare by disking or the use of herbicides, use Fallow curve numbers.

chaparral

chaparral, vegetation composed of broad-leaved evergreen shrubs, bushes, and small trees usually less than 2.5 m (about 8 feet) tall; together they often form dense thickets. Chaparral is found in regions with a climate similar to that of the Mediterranean area, characterized by hot, dry summers and mild, wet winters. The name chaparral is applied primarily to the coastal and inland mountain vegetation of southwestern North America; sometimes it takes the place of a more general term, Mediterranean vegetation, which denotes areas of similar vegetation around the Mediterranean Sea, at the southern tip of Africa, in southwestern Australia, and in central South America.

Sages and evergreen oaks are the dominant plants in North American chaparral areas that have an average yearly rainfall of about 500 to 750 mm (20 to 30 inches). Areas with less rainfall or poorer soil have fewer, more drought-resistant shrubs such as chamise and manzanita. Chaparral vegetation becomes extremely dry by late summer. The fires that commonly occur during this period are necessary for the germination of many shrub seeds and also serve to clear away dense ground cover, thus maintaining the shrubby growth form of the vegetation by preventing the spread of trees. Chaparral returns to its prefire density within about 10 years but may become grassland by too frequent burning.

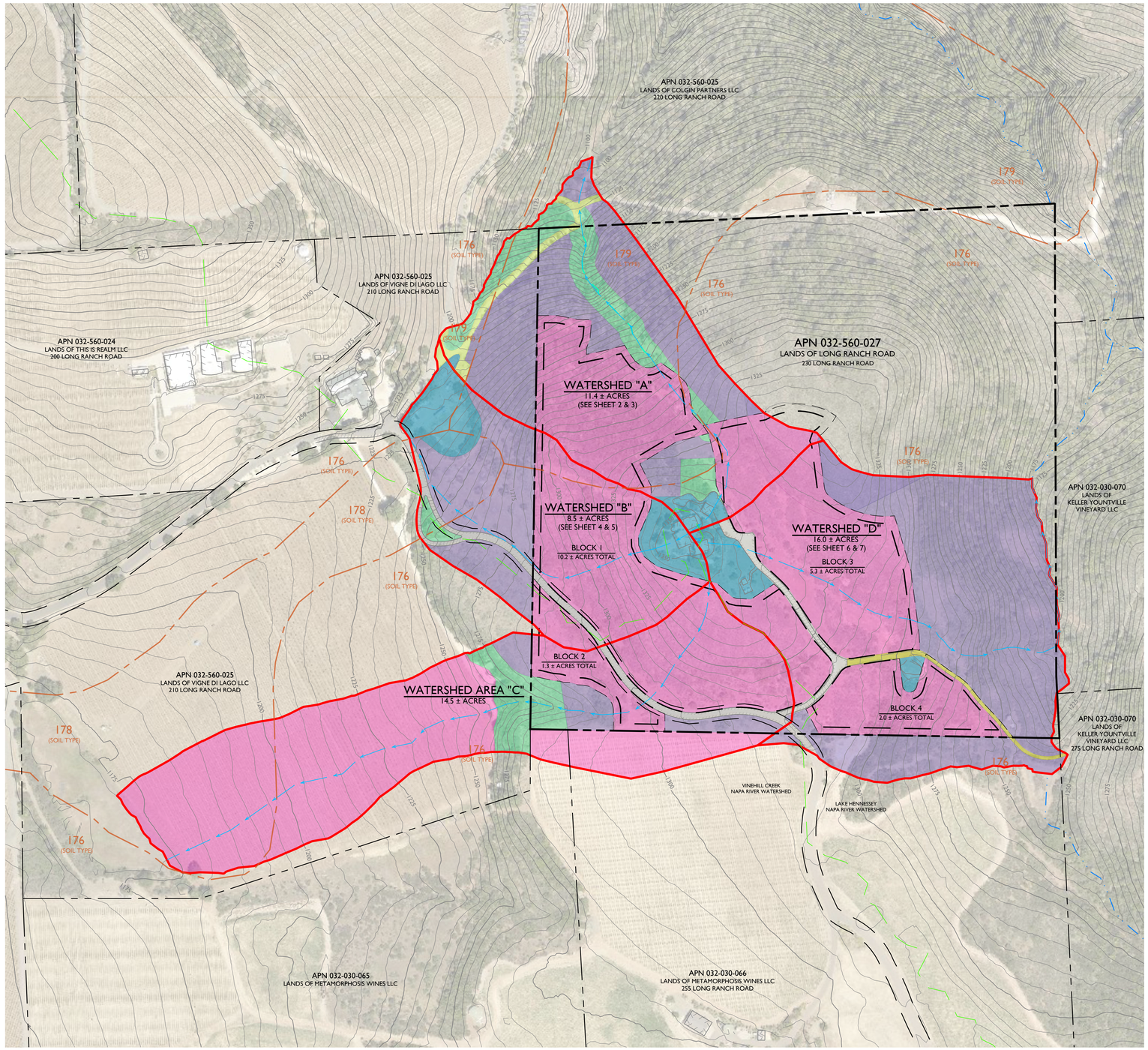
Deer and birds usually inhabit chaparral only during the wet season (the growth period for most chaparral plants), and move northward or to a higher altitude as food becomes scarce during the dry season. Small, dull-coloured animals such as lizards, rabbits, chipmunks, and quail are year-round residents. New chaparral growth provides good grazing for domestic livestock, and chaparral vegetation also is valuable for watershed protection in areas with steep, easily eroded slopes.

Citation Information
Article Title: chaparral
Website Name: Encyclopaedia Britannica
Publisher: Encyclopaedia Britannica, Inc.
Date Published: 18 December 2019
URL: https://www.britannica.com/plant/chaparral
Access Date: December 27, 2021

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230 LONG RANCH ROAD

WATERSHED EXHIBITS

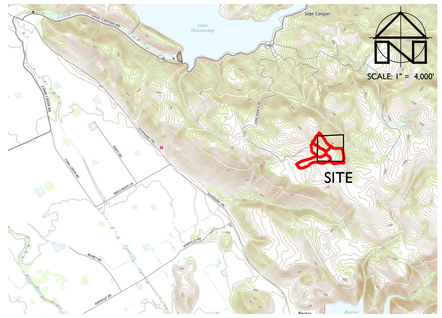


OVERALL SITE PLAN

SCALE: 1" = 150'

SCALE: 1" = 150'

0 150' 300'



LOCATION MAP

SCALE: 1" = 4,000'

PROJECT INFORMATION:

PROPERTY OWNER / SITE ADDRESS:
2030 LONG RANCH ROAD LLC
230 LONG RANCH ROAD
ST. HELENA, CA 94574

ASSESSOR'S PARCEL NUMBER:
032-560-027

PARCEL SIZE:
48.4 ± ACRES

ZONING:
AGRICULTURAL WATERSHED (AW)

SHEET INDEX:

1	OVERALL SITE PLAN
2	WATERSHED AREAS A & B - EXISTING CONDITIONS
3	WATERSHED AREAS A & B - PROPOSED CONDITIONS
4	WATERSHED AREA C - EXISTING CONDITIONS
5	WATERSHED AREA C - PROPOSED CONDITIONS
6	WATERSHED AREA D - EXISTING CONDITIONS
7	WATERSHED AREA D - PROPOSED CONDITIONS

FLOOD HAZARD NOTE:

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0405E, EFFECTIVE SEPTEMBER 26, 2008, THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

NOTES:

1. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION WAS TAKEN FROM ELEVATION DATA DERIVED FROM BARE-EARTH SURFACE DIGITAL ELEVATION MODELS (DEMS) CREATED FROM LIDAR DATA FLOWN IN 2018 IN RESPONSE TO THE WIDESPREAD 2017 FIRES IN NORTHERN CALIFORNIA AS PART OF ONGOING NATIONWIDE 3DEP (U.S. GEOLOGICAL SURVEY 3D ELEVATION PROGRAM) EFFORTS. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
2. AERIAL PHOTOGRAPHS ARE NADIR IMAGES CAPTURED BY PICTOMETRY INTERNATIONAL DATED JULY 15, 2021 AND MAY NOT REPRESENT CURRENT CONDITIONS.
3. CONTOUR INTERVAL: FIVE (5) FEET, HIGHLIGHTED EVERY TWENTY FIVE (25) FEET.
4. VERTICAL DATUM: NAVD 88
5. THE PRIMARY PROPERTY LINE SHOWN ON THESE PLANS IS PER BOOK 22, PARCEL MAPS PAGE 32 / 43.
6. THE ADJACENT PROPERTY LINES SHOWN ON THESE PLANS DO NOT REPRESENT A BOUNDARY SURVEY. THEY ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

SOIL TYPE LEGEND:

TYPE	HSG	DESCRIPTION
176	D	ROCK OUTCROP-HAMBRIGHT COMPLEX, 50 TO 75 PERCENT SLOPES
178	C	SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES
179	C	XSOBRANTE LOAM, 30 TO 50 PERCENT SLOPES

SOIL TYPE BOUNDARIES SHOWN ON THIS MAP ARE BASED ON THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATA AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE PROPERTY LINE (SUBJECT PARCEL)
- APPROXIMATE PROPERTY LINE (ADJACENT PARCEL)
- SOIL TYPE BOUNDARY
- COUNTY DEFINED WATERSHED BOUNDARY
- VINEYARD CLEARING LIMITS / VINEYARD AVENUE
- LIMIT OF VINEYARD BLOCK / RIPPING
- WATERSHED AREA
- SUBWATERSHED AREA
- TIME OF CONCENTRATION FLOW PATH

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Napa, CA 94559
(707) 320-4988 | www.appliedcivil.com

230 LONG RANCH ROAD

WATERSHED EXHIBITS
OVERALL SITE PLAN

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. MCFARREN
No. 72731
Exp. 12/31/2025
CIVIL
STATE OF CALIFORNIA

PRELIMINARY - NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: MARCH 20, 2024

REVISIONS:	BY:
3/20/2024 PERMIT SUBMITTAL	YMS

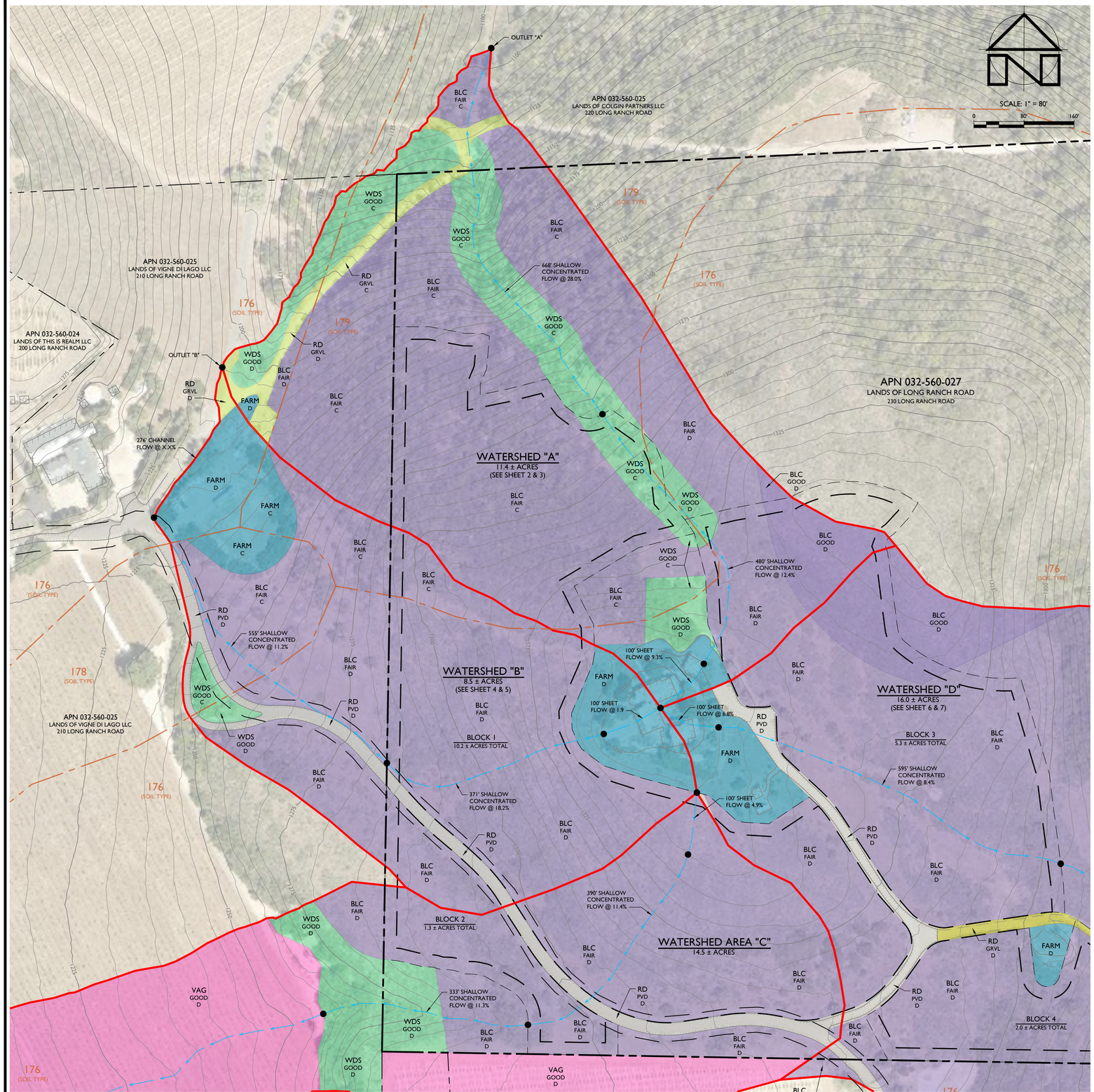
JOB NUMBER: 23-105

FILE: 23-105EXH-WTRSHD.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: 1 OF 7

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WATERSHED AREAS A & B - EXISTING CONDITIONS

SCALE: 1" = 80'

WATERSHED AREA "A" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-GRVL-C	GRAVEL ROAD	N/A	C	89	0.2 ± AC	0	0.2 ± AC
RD-GRVL-D	GRAVEL ROAD	N/A	D	91	0.2 ± AC	0	0.2 ± AC
FARM-D	FARMSTEAD	N/A	D	86	0.3 ± AC	0	0.3 ± AC
BLC-FAIR-C	BROADLEAF CHAPARRAL	FAIR	C	75	6.7 ± AC	3.0 ± AC	3.7 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	1.4 ± AC	0.7 ± AC	0.7 ± AC
BLC-GOOD-D	BROADLEAF CHAPARRAL	GOOD	D	78	0.5 ± AC	0.4 ± AC	0.1 ± AC
WDS-GOOD-C	WOODS	GOOD	C	70	1.6 ± AC	0.3 ± AC	1.3 ± AC
WDS-GOOD-D	WOODS	GOOD	D	77	0.5 ± AC	0.1 ± AC	0.4 ± AC
VAG-GOOD-C	VINEYARD - ANNUAL GRASS (POST)	GOOD	C	75	-	-	3.3 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	1.2 ± AC
				TOTALS	11.4 ± AC	4.5 ± AC	6.9 ± AC

WATERSHED AREA "B" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-PVD-C	ROADS - PAVED	N/A	C	92	0.2 ± AC	0	0.2 ± AC
RD-PVD-D	ROAD - PAVED	N/A	D	93	0.3 ± AC	0	0.3 ± AC
RD-GRVL-D	GRAVEL ROAD	N/A	D	91	0.05 ± AC	0	0.05 ± AC
FARM-C	FARMSTEAD	N/A	C	82	0.35 ± AC	0	0.35 ± AC
FARM-D	FARMSTEAD	N/A	D	86	1.0 ± AC	0	1.0 ± AC
BLC-FAIR-C	BROADLEAF CHAPARRAL	FAIR	C	75	1.6 ± AC	0.3 ± AC	1.3 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	4.9 ± AC	3.5 ± AC	1.4 ± AC
WDS-GOOD-C	WOODS	GOOD	C	70	0.05 ± AC	0	0.05 ± AC
WDS-GOOD-D	WOODS	GOOD	D	77	0.05 ± AC	0	0.05 ± AC
VAG-GOOD-C	VINEYARD - ANNUAL GRASS (POST)	GOOD	C	75	-	-	0.3 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	3.5 ± AC
				TOTALS	8.5 ± AC	3.8 ± AC	8.5 ± AC

SOIL TYPE LEGEND:

TYPE	HSG	DESCRIPTION
176	D	ROCK OUTCROP-HAMBRIGHT COMPLEX, 50 TO 75 PERCENT SLOPES
178	C	SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES
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SOIL TYPE BOUNDARIES SHOWN ON THIS MAP ARE BASED ON THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATA AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE PROPERTY LINE (SUBJECT PARCEL)
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- SOIL TYPE BOUNDARY
- COUNTY DEFINED WATERSHED BOUNDARY
- VINEYARD CLEARING LIMITS / VINEYARD AVENUE
- LIMIT OF VINEYARD BLOCK / RIPPING
- WATERSHED AREA
- SUBWATERSHED AREA
- TIME OF CONCENTRATION FLOW PATH

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230 LONG RANCH ROAD

WATERSHED EXHIBITS
WATERSHED AREAS A & B - EXISTING CONDITIONS

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. MCDERMOTT
No. 83106
CIVIL
STATE OF CALIFORNIA

PRELIMINARY NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: MARCH 20, 2024

REVISIONS: BY:
3/20/2024 YMS
PERMIT SUBMITTAL

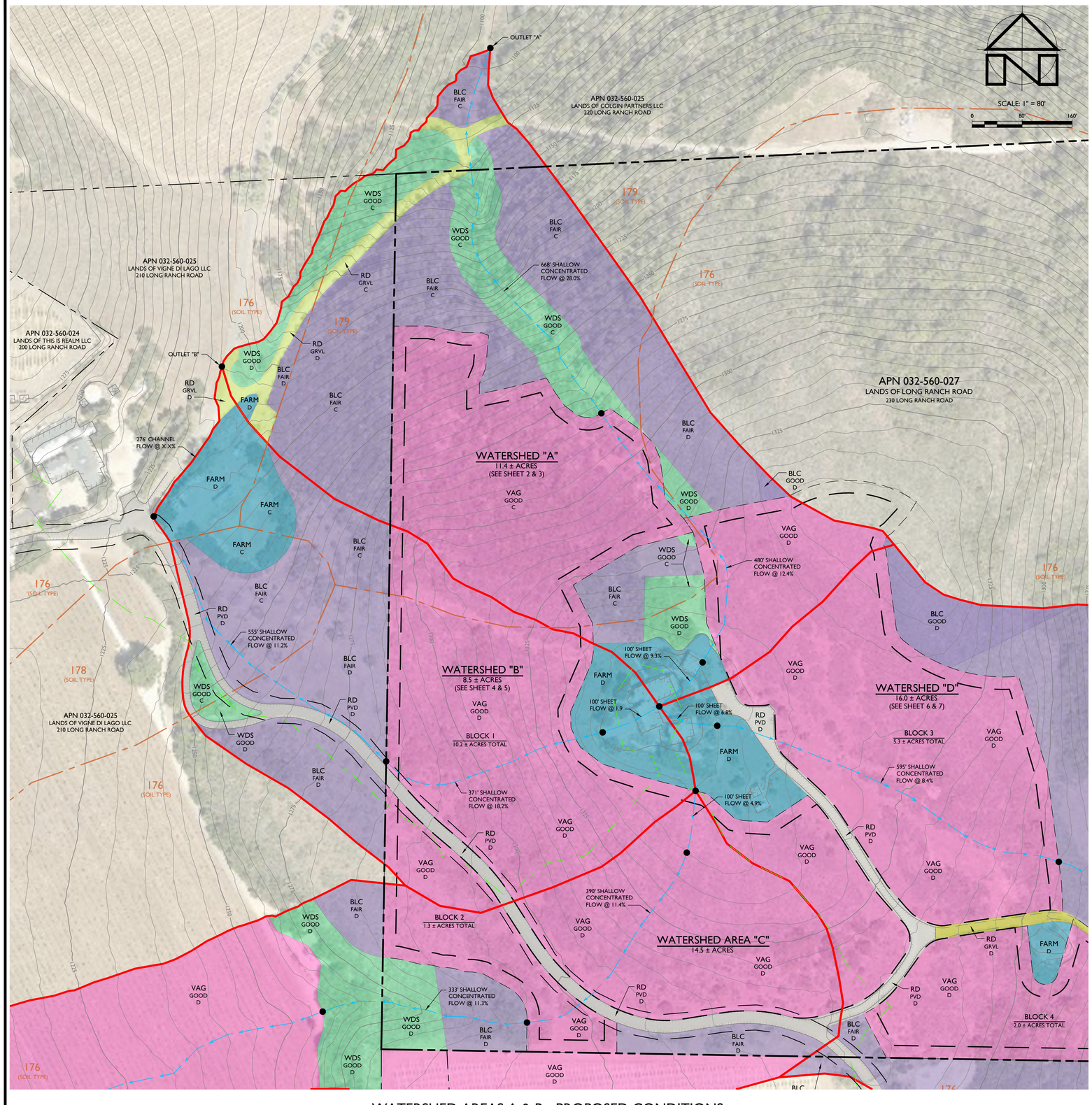
JOB NUMBER: 23-105

FILE: 23-105EXH-WTRSHD.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: 2 OF 7

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WATERSHED AREAS A & B - PROPOSED CONDITIONS

SCALE: 1" = 80'

WATERSHED AREA "A" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-GRVL-C	GRAVEL ROAD	N/A	C	89	0.2 ± AC	0	0.2 ± AC
RD-GRVL-D	GRAVEL ROAD	N/A	D	91	0.2 ± AC	0	0.2 ± AC
FARM-D	FARMSTEAD	N/A	D	86	0.3 ± AC	0	0.3 ± AC
BLC-FAIR-C	BROADLEAF CHAPARRAL	FAIR	C	75	6.7 ± AC	3.0 ± AC	3.7 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	1.4 ± AC	0.7 ± AC	0.7 ± AC
BLC-GOOD-D	BROADLEAF CHAPARRAL	GOOD	D	78	0.5 ± AC	0.4 ± AC	0.1 ± AC
WDS-GOOD-C	WOODS	GOOD	C	70	1.6 ± AC	0.3 ± AC	1.3 ± AC
WDS-GOOD-D	WOODS	GOOD	D	77	0.5 ± AC	0.1 ± AC	0.4 ± AC
VAG-GOOD-C	VINEYARD - ANNUAL GRASS (POST)	GOOD	C	75	-	-	3.3 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	1.2 ± AC
				TOTALS	11.4 ± AC	4.5 ± AC	6.9 ± AC

WATERSHED AREA "B" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-PVD-C	ROADS - PAVED	N/A	C	92	0.2 ± AC	0	0.2 ± AC
RD-PVD-D	ROAD - PAVED	N/A	D	93	0.3 ± AC	0	0.3 ± AC
RD-GRVL-D	GRAVEL ROAD	N/A	D	91	0.05 ± AC	0	0.05 ± AC
FARM-C	FARMSTEAD	N/A	C	82	0.35 ± AC	0	0.35 ± AC
FARM-D	FARMSTEAD	N/A	D	86	1.0 ± AC	0	1.0 ± AC
BLC-FAIR-C	BROADLEAF CHAPARRAL	FAIR	C	75	1.6 ± AC	0.3 ± AC	1.3 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	4.9 ± AC	3.5 ± AC	1.4 ± AC
WDS-GOOD-C	WOODS	GOOD	C	70	0.05 ± AC	0	0.05 ± AC
WDS-GOOD-D	WOODS	GOOD	D	77	0.05 ± AC	0	0.05 ± AC
VAG-GOOD-C	VINEYARD - ANNUAL GRASS (POST)	GOOD	C	75	-	-	0.3 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	3.5 ± AC
				TOTALS	8.5 ± AC	3.8 ± AC	8.5 ± AC

SOIL TYPE LEGEND:

TYPE	HSG	DESCRIPTION
176	D	ROCK OUTCROP-HAMBRIGHT COMPLEX, 50 TO 75 PERCENT SLOPES
178	C	SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES
179	C	XSOBRANTE LOAM, 30 TO 50 PERCENT SLOPES

SOIL TYPE BOUNDARIES SHOWN ON THIS MAP ARE BASED ON THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATA AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE PROPERTY LINE (SUBJECT PARCEL)
- APPROXIMATE PROPERTY LINE (ADJACENT PARCEL)
- SOIL TYPE BOUNDARY
- COUNTY DEFINED WATERSHED BOUNDARY
- VINEYARD CLEARING LIMITS / VINEYARD AVENUE
- LIMIT OF VINEYARD BLOCK / RIPPING
- WATERSHED AREA
- SUBWATERSHED AREA
- TIME OF CONCENTRATION FLOW PATH

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Napa, CA 94559
(707) 320-4988 | www.appliedcivil.com

230 LONG RANCH ROAD

WATERSHED EXHIBITS
WATERSHED AREAS A & B - PROPOSED CONDITIONS

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. MCGRATH
NO. 83102
CIVIL
STATE OF CALIFORNIA

PRELIMINARY NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC
CHECKED BY: MRM
DATE: MARCH 20, 2024

REVISIONS:	BY:
3/20/2024 PERMIT SUBMITTAL	YMS

JOB NUMBER: 23-105
FILE: 23-105EXH-WTRSHD.DWG
ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: 3 OF 7

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WATERSHED AREA "C" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-PVD-D	ROAD - PAVED	N/A	D	93	0.3 ± AC	0	0.3 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	4.4 ± AC	3.5 ± AC	0.9 ± AC
WDS-GOOD-D	WOODS	GOOD	D	77	0.9 ± AC	0	0.9 ± AC
VAG-GOOD-C	VINEYARD - ANNUAL GRASS (PRE)	GOOD	C	75	3.0 ± AC	0	3.0 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (PRE)	GOOD	D	81	5.9 ± AC	0	5.9 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	3.5 ± AC
				TOTALS	14.5 ± AC	3.5	14.5 ± AC

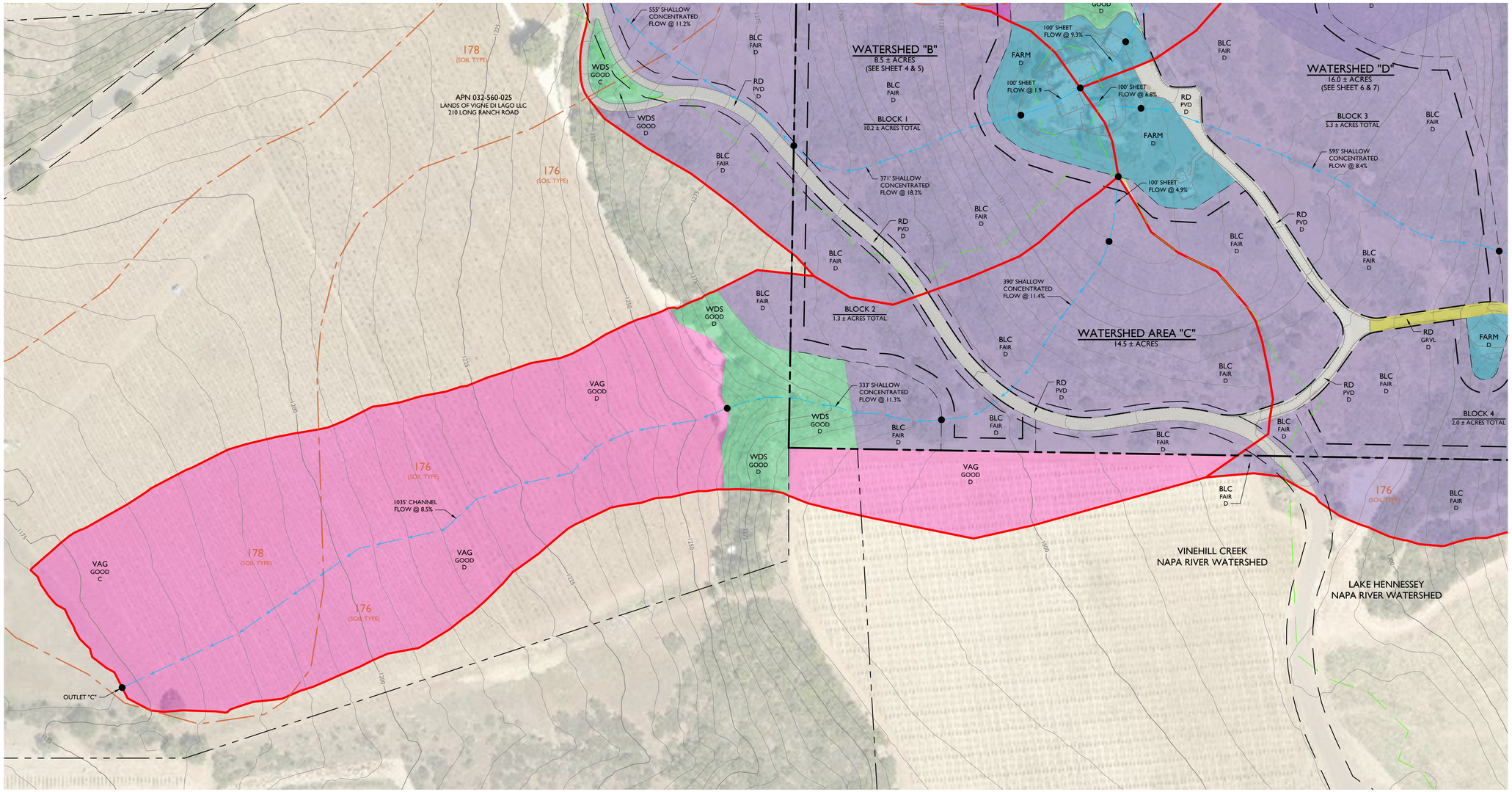
SOIL TYPE LEGEND:

TYPE	HSG	DESCRIPTION
176	D	ROCK OUTCROP-HAMBRIGHT COMPLEX, 50 TO 75 PERCENT SLOPES
178	C	SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES
179	C	XSOBRANTE LOAM, 30 TO 50 PERCENT SLOPES

SOIL TYPE BOUNDARIES SHOWN ON THIS MAP ARE BASED ON THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATA AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE PROPERTY LINE (SUBJECT PARCEL)
- APPROXIMATE PROPERTY LINE (ADJACENT PARCEL)
- SOIL TYPE BOUNDARY
- COUNTY DEFINED WATERSHED BOUNDARY
- VINEYARD CLEARING LIMITS / VINEYARD AVENUE
- LIMIT OF VINEYARD BLOCK / RIPPING
- WATERSHED AREA
- SUBWATERSHED AREA
- TIME OF CONCENTRATION FLOW PATH



SCALE: 1" = 80'

0 80' 160'

WATERSHED AREA C - EXISTING CONDITIONS

SCALE: 1" = 80'

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230 LONG RANCH ROAD

WATERSHED EXHIBITS

WATERSHED AREA C - EXISTING CONDITIONS

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. MCGRATH No. 73310 CIVIL STATE OF CALIFORNIA

PRELIMINARY NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: MARCH 20, 2024

REVISIONS:	BY:
3/20/2024 PERMIT SUBMITTAL	YMS

JOB NUMBER: 23-105

FILE: 23-105EXH-WTRSHD.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: 4 OF 7

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WATERSHED AREA "C" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-PVD-D	ROAD - PAVED	N/A	D	93	0.3 ± AC	0	0.3 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	4.4 ± AC	3.5 ± AC	0.9 ± AC
WDS-GOOD-D	WOODS	GOOD	D	77	0.9 ± AC	0	0.9 ± AC
VAG-GOOD-C	VINEYARD - ANNUAL GRASS (PRE)	GOOD	C	75	3.0 ± AC	0	3.0 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (PRE)	GOOD	D	81	5.9 ± AC	0	5.9 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	3.5 ± AC
				TOTALS	14.5 ± AC	3.5	14.5 ± AC

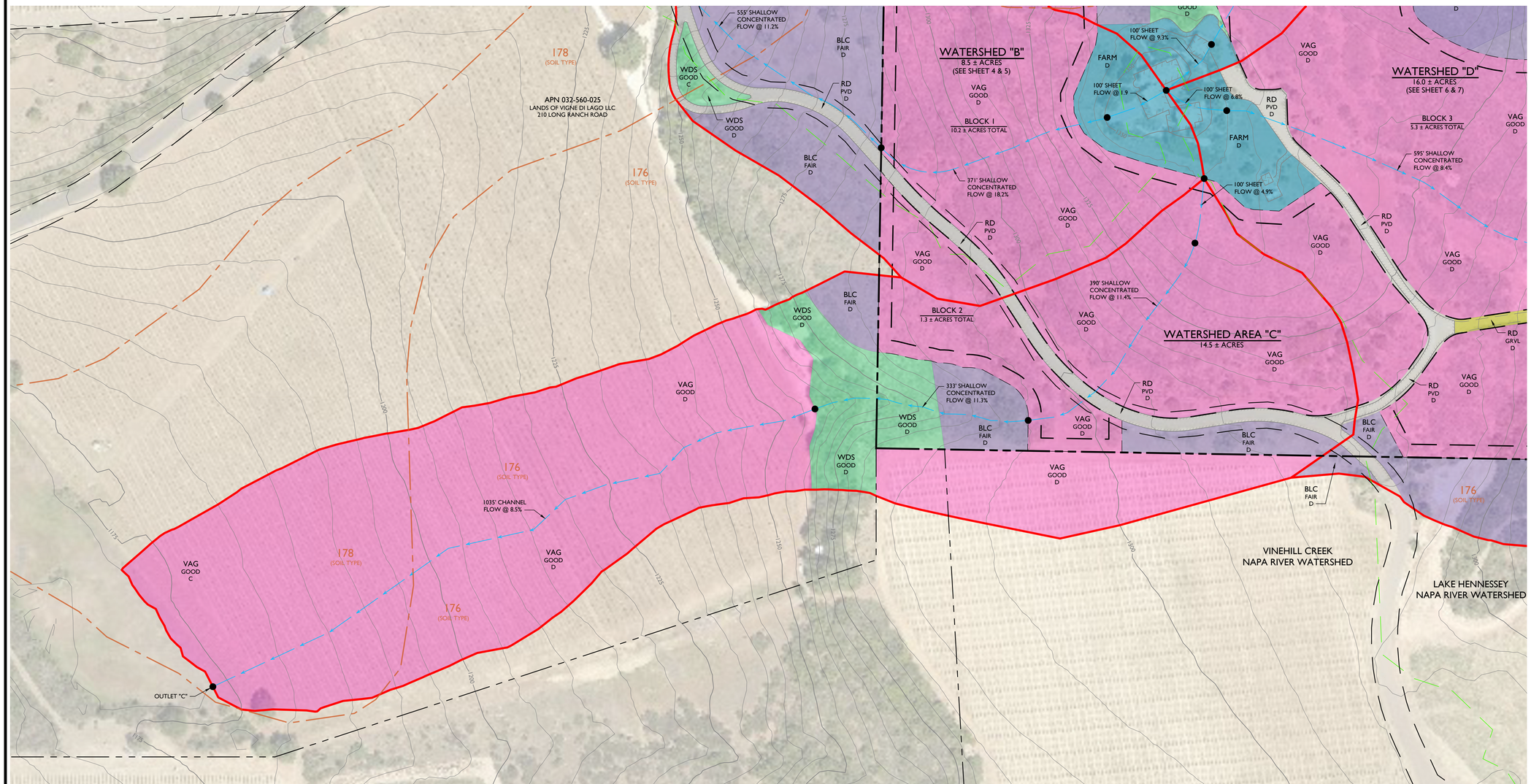
SOIL TYPE LEGEND:

TYPE	HSG	DESCRIPTION
176	D	ROCK OUTCROP-HAMBRIGHT COMPLEX, 50 TO 75 PERCENT SLOPES
178	C	SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES
179	C	XSOBRANTE LOAM, 30 TO 50 PERCENT SLOPES

SOIL TYPE BOUNDARIES SHOWN ON THIS MAP ARE BASED ON THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATA AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE PROPERTY LINE (SUBJECT PARCEL)
- APPROXIMATE PROPERTY LINE (ADJACENT PARCEL)
- SOIL TYPE BOUNDARY
- COUNTY DEFINED WATERSHED BOUNDARY
- VINEYARD CLEARING LIMITS / VINEYARD AVENUE
- LIMIT OF VINEYARD BLOCK / RIPPING
- WATERSHED AREA
- SUBWATERSHED AREA
- TIME OF CONCENTRATION FLOW PATH



SCALE: 1" = 80'

0 80' 160'

WATERSHED AREA C - PROPOSED CONDITIONS

SCALE: 1" = 80'

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230 LONG RANCH ROAD

WATERSHED EXHIBITS
WATERSHED AREA C - PROPOSED CONDITIONS

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. MCGRATH No. C 73135 CIVIL STATE OF CALIFORNIA

PRELIMINARY NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: MARCH 20, 2024

REVISIONS:	BY:
3/20/2024 PERMIT SUBMITTAL	YMS

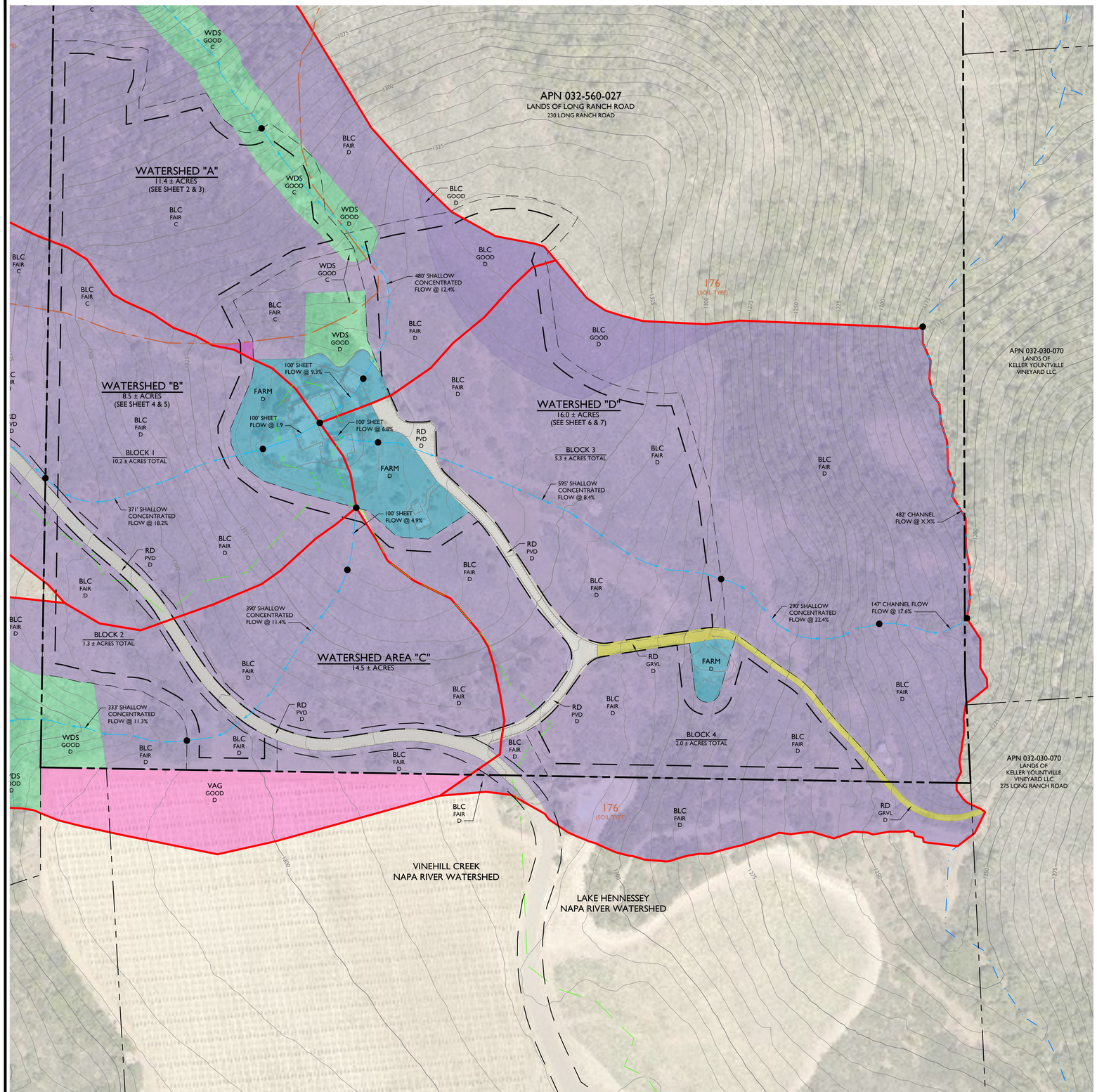
JOB NUMBER: 23-105

FILE: 23-105EXH-WTRSHD.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: 5 OF 7

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WATERSHED AREA D - EXISTING CONDITIONS

SCALE: 1" = 80'

SCALE: 1" = 80'

0 80' 160'

WATERSHED AREA "D" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-PVD-D	ROAD - PAVED	N/A	D	93	0.5 ± AC	0	0.5 ± AC
RD-GRVL-D	GRAVEL ROAD	N/A	D	91	0.2 ± AC	0	0.2 ± AC
FARM-D	FARMSTEAD	N/A	D	86	0.7 ± AC	0	0.7 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	13.7 ± AC	6.3 ± AC	7.4 ± AC
BLC-GOOD-D	BROADLEAF CHAPARRAL	GOOD	D	78	0.9 ± AC	0.4 ± AC	0.5 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	6.7 ± AC
				TOTALS	16.0 ± AC	6.7 ± AC	16.0 ± AC

SOIL TYPE LEGEND:

TYPE	HSG	DESCRIPTION
176	D	ROCK OUTCROP-HAMBRIGHT COMPLEX, 50 TO 75 PERCENT SLOPES
178	C	SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES
179	C	XSOBRANTE LOAM, 30 TO 50 PERCENT SLOPES

SOIL TYPE BOUNDARIES SHOWN ON THIS MAP ARE BASED ON THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATA AND SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE PROPERTY LINE (SUBJECT PARCEL)
- APPROXIMATE PROPERTY LINE (ADJACENT PARCEL)
- SOIL TYPE BOUNDARY
- COUNTY DEFINED WATERSHED BOUNDARY
- BLUE LINE STREAM
- EPHEMERAL STREAM
- WATER BOARD STREAM LAYER
- VINEYARD CLEARING LIMITS / VINEYARD AVENUE
- LIMIT OF VINEYARD BLOCK / RIPPING
- WATERSHED AREA
- SUBWATERSHED AREA
- TIME OF CONCENTRATION FLOW PATH

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230 LONG RANCH ROAD

WATERSHED EXHIBITS
WATERSHED AREA D - EXISTING CONDITIONS

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. MCGRATH No. C 73120 CIVIL STATE OF CALIFORNIA

PRELIMINARY NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: MARCH 20, 2024

REVISIONS:	BY:
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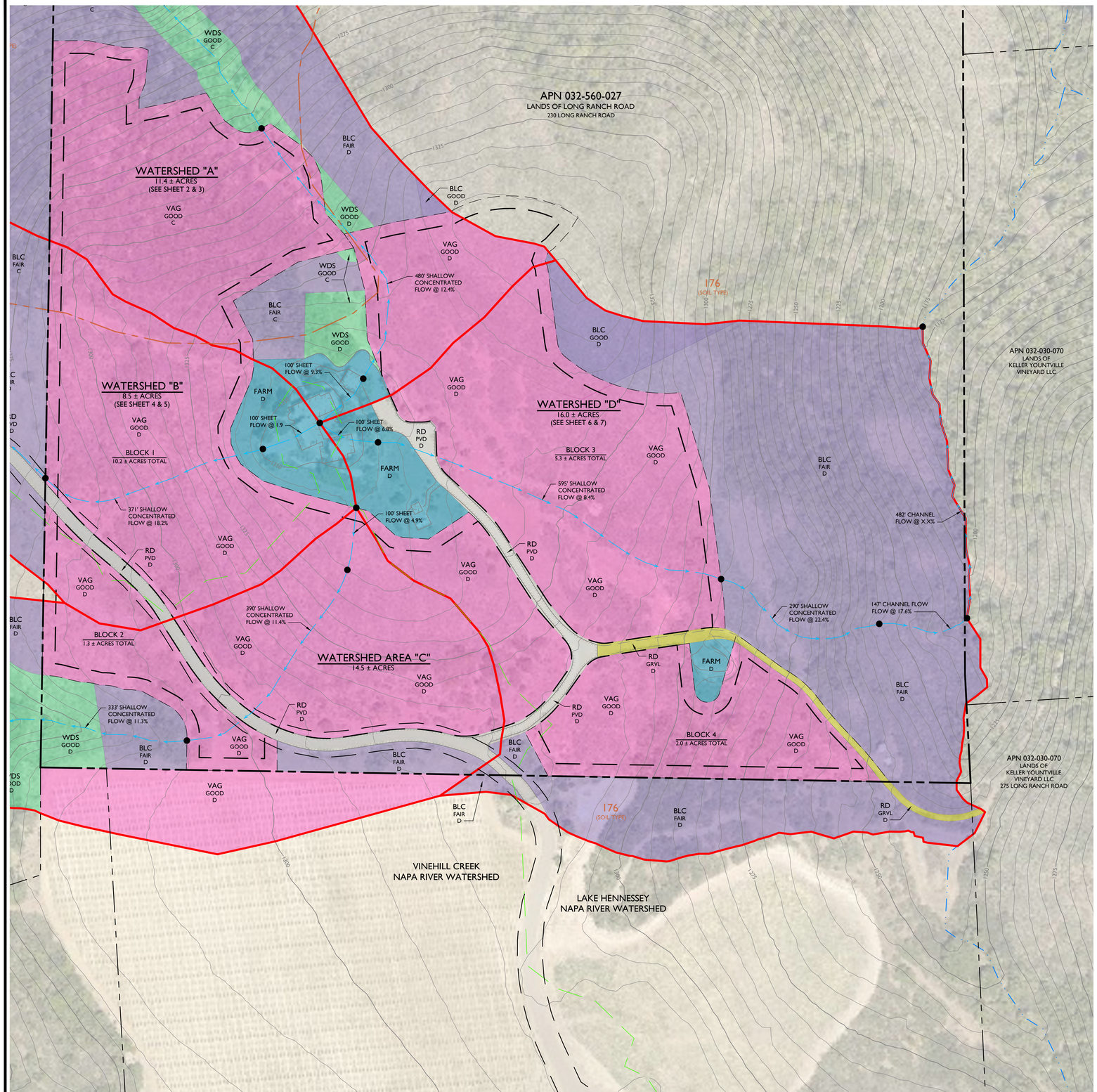
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ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: 6 OF 7

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SCALE: 1" = 80'

0 80' 160'

WATERSHED AREA "D" SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
RD-PVD-D	ROAD - PAVED	N/A	D	93	0.5 ± AC	0	0.5 ± AC
RD-GRVL-D	GRAVEL ROAD	N/A	D	91	0.2 ± AC	0	0.2 ± AC
FARM-D	FARMSTEAD	N/A	D	86	0.7 ± AC	0	0.7 ± AC
BLC-FAIR-D	BROADLEAF CHAPARRAL	FAIR	D	81	13.7 ± AC	6.3 ± AC	7.4 ± AC
BLC-GOOD-D	BROADLEAF CHAPARRAL	GOOD	D	78	0.9 ± AC	0.4 ± AC	0.5 ± AC
VAG-GOOD-D	VINEYARD - ANNUAL GRASS (POST)	GOOD	D	81	-	-	6.7 ± AC
				TOTALS	16.0 ± AC	6.7 ± AC	16.0 ± AC

SOIL TYPE LEGEND:

TYPE	HSG	DESCRIPTION
176	D	ROCK OUTCROP-HAMBRIGHT COMPLEX, 50 TO 75 PERCENT SLOPES
178	C	SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES
179	C	XSOBRANTE LOAM, 30 TO 50 PERCENT SLOPES

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LEGEND:

- APPROXIMATE PROPERTY LINE (SUBJECT PARCEL)
- APPROXIMATE PROPERTY LINE (ADJACENT PARCEL)
- SOIL TYPE BOUNDARY
- COUNTY DEFINED WATERSHED BOUNDARY
- BLUE LINE STREAM
- EPHEMERAL STREAM
- WATER BOARD STREAM LAYER
- VINEYARD CLEARING LIMITS / VINEYARD AVENUE
- LIMIT OF VINEYARD BLOCK / RIPPING
- WATERSHED AREA
- SUBWATERSHED AREA
- TIME OF CONCENTRATION FLOW PATH

WATERSHED AREA D - PROPOSED CONDITIONS

SCALE: 1" = 80'

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230 LONG RANCH ROAD

WATERSHED EXHIBITS
WATERSHED AREA D - PROPOSED CONDITIONS

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. MCGRATH No. 78035 Exp. 03/31/2025 CIVIL STATE OF CALIFORNIA

PRELIMINARY NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: MARCH 20, 2024

REVISIONS:	BY:
3/20/2024 PERMIT SUBMITTAL	YMS

JOB NUMBER: 23-105

FILE: 23-105EXH-WTRSHD.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: 7 OF 7