8G: Hydrology Report – Sebastien Marineau-Mes Vineyard

Prepared by Sarah Pistone, CPESC #9225
May 25, 2023

BACKGROUND

The subject site is located at 4000 Silverado Trail, Calistoga, CA, 94515, APN 021-010-077. The property is within the "Calistoga" USGS quadrangle and is positioned on the east side of Napa Valley. The parcel contains about ¾ ac of existing vineyard. The central portion of the parcel is planned for a residence. The upland portion of the site gets steepest at the top (eastern) end with elevation range of 300 ft to 400 ft asl. Vegetation was heavily impacted by the 2020 Glass Fire.

The project is located within the Dutch Henry Creek watershed that flows into Ritchie Creek, and ultimately to San Francisco Bay via the Napa River. The closest blueline stream, Dutch Henry Creek, is location about 650 ft west of the project site.

The watershed that contains the vineyard area was defined as 5.27 acres in area. The watershed is constrained on the uphill (eastern) side by an in-sloped fire road. No obvious areas of concentrated flow were observed within the watershed. Overland flow sheets to the west and discharges to the roadside ditch along the eastern side of Silverado Trail.

The NRCS web soil survey lists the soil type in the vineyard area as 109, Boomer gravelly loam, volcanic bedrock, 14 to 60 percent slopes, MLRA 15, which is in Hydrologic Soil Group (HSG) "C" [1]. The Napa County Soil Survey [2] describes the Boomer series as well-drained soils on uplands derived from weathered mixed igneous rocks. Plant cover is typically Douglas-fir, ponderosa pine, black oak, manzanita, poison oak, and madrone; however, all vegetation within the local watershed was heavily impacted by the 2020 Glass Fire. Please note that a small lower portion of the watershed is Soil Type 104, Bale clay loam, 0 to 2 percent slopes, HSG "B", however for simplicity, all areas of the watershed were assumed to be HSG "C", which is a more conservative analysis since HSG "C" is the soil type with the higher run-off potential.

Existing cover conditions were evaluated in the field on Wednesday, February 16, 2022, with Alexei Belov (Napa County Engineering) as part of a Pre-Application Site Visit. Cover was lighter on the western portion of the block and would qualify as "fair", while the eastern portion would qualify as "good". For Cn analysis, as a conservative measure, "good" ratings were used throughout for existing conditions. Please refer to Application Section 7: Photos for visual documentation of existing cover crop in each block. Although on-site vegetation (canopy and groundcover) was damaged by the 2020 Glass Fire, an effort was made to estimate pre-fire cover for "existing conditions".

The proposed vineyard development area lies on a slightly concave area with average slopes from 22% to 40%, with an overall average of 30% slopes. Existing conditions were defined as Mixed Woods-Grass Combo and Woods in "fair" condition (see Table 1 and Hydrology Map). Post-cover conditions will establish a 75% cover crop throughout, which qualifies as "good" hydrologic condition per the NRCS Engineering Field Handbook [4].

No drainage improvements are proposed and ground contours will remain unchanged, therefore post-development conditions are expected to follow the same flow patterns. No cut/fill is required for avenue construction since the blocks will be hand-farmed. As such, there is no

opportunity for change in time of concentration (Tc) across the site as a result of development and an analysis of a comparison of cover conditions (Cn values) was conducted.

RESULTS

A Cn analysis is presented in Table 1 that compares land cover properties before and after development. The weighted Cn value was calculated for both Pre- and Post-development conditions and show that development will result in a slight decrease in average Cn (74 to 73).

Table 1 Cn Analysis for vineyard development

Watershed						
Landuse	PRE-Development			POST-Development		
	Condition	PRE (ac)	Cn	Condition	POST (ac)	Cn
Woods	good	3.84	70	good	3.46	70
Mixed Woods-Grass Combo	good	1.43	72	good	0.37	72
Vineyard	-	-	-	good	1.44	74
Total acres		**5.27**			**5.27**	
Area-Weighted Ave Cn			**71**			**71**
HSG = C						

CONCLUSIONS

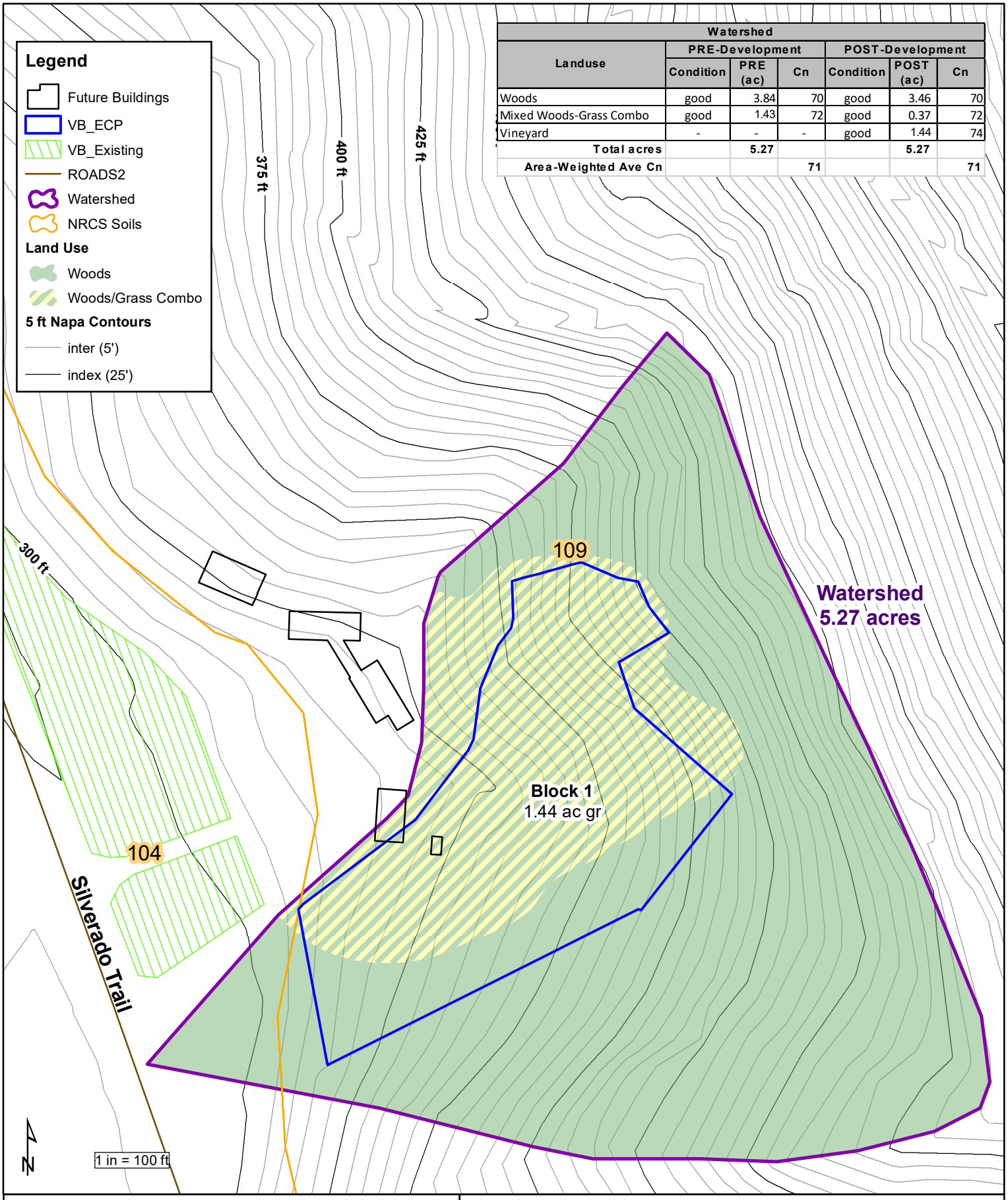
The vineyard development results in no change in average Cn, which correlates to no change in peak flow across the site. No changes to surface topography that might alter surface flow are proposed.

References

1. *Custom Soil Reource Report for Napa County, California, Sebastien Marineau-Mes*, from USDA NRCS Web Soil Survey, May 2022
2. Lambert, G., et al., *Soil Survey of Napa County, California*, USDA in cooperation with UC Agricultural Experiment Station, August 1978
3. *SCS Part 650 Engineering Field Handbook, Chapter 2 – Estimating Runoff*, Amend. 48, January 2012, Table 2-3b

Attachments

1. *Sebastien: Hydrology Map*



Watershed						
Landuse	PRE-Development			POST-Development		
	Condition	PRE (ac)	Cn	Condition	POST (ac)	Cn
Woods	good	3.84	70	good	3.46	70
Mixed Woods-Grass Combo	good	1.43	72	good	0.37	72
Vineyard	-	-	-	good	1.44	74
Total acres		**5.27**			**5.27**	
Area-Weighted Ave Cn			**71**			**71**

Marineau: Hydrology Map (REV1)

Drawn by: Sarah Pistone, CPESC #9225

Date: 5/25/23 | **File:** ...Sebastien_A_Hydro.mxd