Nikolau Vineyards

Vineyard Development Erosion Control Plan

Erosion Control Plan Narrative

1. *The nature and purpose of all/any land clearing, grading or earthmoving activity, the amount of cut & fill, the location of spoils storage and disposal areas, the total number of acres of grading involved including but not limited to roads, vineyards, avenues, trenching for irrigation or pipes, reservoirs, wells, water tanks, septic systems, etc. Indicate the acres of land clearing, grading or earthmoving activity that will occur on 30% or greater slopes. (Note: slopes shall be calculated in whole percent)*

   The project site is on a single parcel of land located at 432 Dutch Henry Canyon Road approximately 2.8 aerial miles northeast of the City of Calistoga in Napa County, California (Napa County APNs 018-050-072). Access to the property is via a private shared driveway known as Dutch Henry Canyon Road which intersects with Silverado Trail approximately 0.5 miles north of Larkmead Lane. The project site is located immediately east of the existing residence and is accessed by an existing paved road that encircles the house. All roads required to provide access to the project site are existing and no new roads are planned as part of this project.

   The proposed vineyard development consists of one contiguous vineyard block.

   The purpose of the proposed land clearing, grading and earthmoving is to prepare the project area for planting with new vineyard. Following is a list of planned land preparation activities:

   - Clearing and grubbing of existing vegetation (grass, shrubs, trees, etc.) and root systems
   - Minor re-contouring of existing topography to promote sheet flow
   - Ripping as needed to fracture subsoils and rock to a depth of approximately 36 to 48 inches to prepare soil for planting and to incorporate soil amendments (ripping to be limited to vineyard block areas shown on the plans)
   - Mechanical and hand rock raking to remove loose rocks from the ground surface
   - Discing and harrowing to prepare seedbed for vegetative erosion control measures
   - Installation of erosion control features
   - Installation of vineyard trellis and irrigation systems

   Grading within the project area will be the minimum amount needed to smooth out the existing ground surface and create smooth slopes to promote sheet flow and to install the proposed runoff and erosion control measures. Cuts and fills will be minor and are expected to average from 0 to 1 foot. The estimated quantity of grading is approximately 2,000 cubic yards of cut and fill. An earthwork balance will be achieved onsite. Import and/or export of soil material is not planned however, soil amendments will be imported and incorporated into the project area as needed to improve soil tilth and thereby support vine and cover crop growth.

All temporary debris, vegetation, soil and soil amendment stockpiles and storage areas, if needed, will be located within the proposed vineyard development area and clearing limits identified on the plans. A small area below the vineyard block has been identified for permanent disposal of stumps and rocks. This footprint is included in the overall project area statistics. Temporary stockpiles, equipment staging and storage areas will be kept within the proposed development area. It is planned that rock will be disposed of within the development footprint by being buried in the vineyard roads or it will be placed in the permanent stump and rock disposal are noted on the plans. Rock may also be processed (crushed to a useable size) and used for lining existing roads within the vineyard development area and/or on other existing ranch roads if sufficient rock is encountered.

The Vineyard Block will have a row spacing of 7 feet and vine spacing along the row of 5 feet for an average vine density of 1,245 vines per acre and a total of approximately 3,113 vines (subject to change based on final viticultural assessments).

The total disturbed area for the vineyard development project is 3.4 ± acres. The total disturbed area includes the area to be planted with vines and the area used for perimeter avenues for farming equipment and the permanent stump and rock disposal area. The total planted area within the project area is 2.5 ± acres.

Stream and drainage course setbacks for the development area are provided in accordance with the Napa County Conservation Regulations. Stream setbacks in the vicinity of the proposed project areas are shown on the Erosion Control Plan.

The details of the proposed vineyard development are shown on the Nikolau Vineyards Vineyard Development Erosion Control Plan prepared by Applied Civil Engineering Incorporated.

2. *Comprehensive description of existing site conditions, including topography, vegetation (including under-story and canopy cover), and soils. Provide extent of tree canopy covered and shrub and brush without a tree canopy covered areas in acres for each parcel. Identify and indicate the project boundaries in watersheds, including municipal watersheds, and in the water deficient area. The plan preparer is required to visit the site and the narrative must include the date, purpose, and persons making each site visit. The description shall verify the source or validity of the topographic map. Wide angle or panoramic photographs documenting existing site conditions shall be provided. A photo location map indicating the date of the site visit and by whom it was made shall accompany such documentation.*

<u>Topography:</u>

The project area is located on moderate to steeply sloping hillside slopes in Napa County northeast of the City of Calistoga (Latitude = 38.532815° N & Longitude = 122.460390° W & Ecotone South Latitude = 38.5974° N & Longitude = 122.527196° W). Topography on the property varies widely and is characterized by gentle to steep slopes ranging from less than 5% to in excess of 50% throughout the property.

Slopes within the proposed vineyard development area are gentle to moderate. Average slopes range from 17% to 24% within the proposed vineyard block areas with an overall average slope of 22%. These average slopes were determined using topographic data obtained from Albion Surveys and the slope transect method in several representative locations in the proposed development area. Approximately 0.5 acres within the project area has slopes in excess of 30%.

Vegetation:

The Calveg designations for the subject parcels were obtained from the Napa County GIS database and are as follows:

HG – Annual Grass / Forbs
NX – Mixed Hardwoods
WA – Water

Our visual observation of onsite vegetation in the vicinity of the project area is consistent with the Calveg designations.

Tree canopy and Brush / Grass canopy retention ratios are outlined below:

Tree Canopy	49.8 acres
Tree Canopy Removed	2.9 acres
% Tree Canopy Retained	94%
Brush / Grass Canopy	4.7 acres
Brush / Grass Canopy Removed	0 acres
% Brush / Grass Canopy Retained	100%

*all areas approximate based on 2016 aerial photo interpretation

Watershed:

Rainfall runoff from the project area flows easterly and southerly into Dutch Henry Creek which is located approximately 1,000 feet east of the project site. Dutch Henry Creek is a blueline stream and flows southerly approximately 1.4 miles from the project site to a point at which is merges with Biter Creek and flows under Silverado Trail. Biter Creek then continues to flow southerly for approximately 1.5 miles until it flows into the Napa River. The Napa River is ultimate tributary to San Pablo Bay.

No changes in runoff patterns are proposed as part of this project. All existing drainage patterns will be maintained.

The project area is not located within a municipal drinking water supply watershed.

The subject parcel is not located within the Milliken-Sarco-Tulocay groundwater deficient area.

Site Visits & Photograph Documentation:

Representatives from Applied Civil Engineering Incorporated have visited the site several times since the Spring/Summer of 2020. The purpose of the site visits was to review existing site conditions and to verify the general validity of the topographic mapping for this project that was obtained from the Napa County GIS database. Photographs of the project area were obtained from Google Earth to document site conditions. These photographs are presented in the Photographic Documentation of Existing Site Conditions for the Nikolau Vineyards Vineyard Development Erosion Control Plan.

3. *All natural and man-made features on-site including but not limited to, streams, watercourses (drainage, channels, etc.), wetlands, riparian habitat, lakes, reservoirs, roads, water tanks, septic systems, reservoirs, ponds, etc. Indicate which ones may be affected by the proposed activity. For blue line and County-definitional streams indicate top, toe, and slope of bank, channel depth, and existing and proposed setback conditions. The entire length of blue line streams & 41 County-named streams on the parcel(s) shall be included in photo documentation (a recent aerial may be included). Provide the name and distance of the nearest blue line and/or County-definitional stream(s) to the project site.*

   Existing manmade improvements on the subject parcels include a residence, a garage, outbuildings, paved, gravel and dirt roads, a groundwater well and the related utility infrastructure serving the existing residential uses. The main house survived but the garage and other outbuildings were burned during the 2020 Glass Fire and are being rebuilt. None of the existing manmade improvements will be affected by the proposed project.

   The are no blue-line streams located on the subject property. The nearest blue line stream is Dutch Henry Creek located approximately 1,000 feet east of the project site at its nearest point.

   There are two ephemeral streams located to the northeast and northwest of the project area. The ephemeral drainage fills an existing onsite pond. These drainages and the associated setbacks are shown on the Erosion Control Plan. There are not any other streams in the vicinity of the project that were located by the project biologist (WRA).

4. Location and source of water for irrigation or other uses. Provide copies of all necessary permits.

   The irrigation source for the existing vineyards is from one existing well located on the subject property. The wells currently provide the water used at the existing residence and landscaping on the property. No new wells or other water sources are planned at this time.

5. *Soil types/soil series identified in the Soil Conservation Service (SCS) Napa County Soil Survey, or, if prepared, a site-specific soils report.*

   The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County shows several soil types mapped in the vicinity of the project area including:

109	Boomer gravelly loam, 30 to 50% slopes
140	Forward gravelly loam, 30 to 75 percent slopes
177	Rock outcrop-Kidd complex, 50 to 75 percent slopes
183	Water

   The approximate soil type boundaries based on data obtained from the Napa County Geographic Information System database are illustrated on Sheets C1 & C3 of the Nikolau Vineyards Vineyard Development Erosion Control Plan.

6. *Critical areas of erosion and slope instability such as gullies, landslides, etc. within or potentially affecting the "development site" (i.e., the area disturbed by the project) or potentially affected by the work to be undertaken within the development site. In the case of landslides a report indicating the probable effects of the planned work on slope stability and erosion levels shall be prepared and submitted by a registered geologist.*

   Representatives from Applied Civil Engineering Incorporated have visited the site several times to review the project area and have not observed any signs of gullies, landslides, slope instability or excessive erosion within the project area or in close proximity to the project area that would affect, or be affected by, the proposed project.

   While the Napa GIS database indicates the potential presence of landslides in the vicinity of the property, we have reviewed the California Geologic Service web-based landslide inventory and it appears that such features are mapped as a large scale landslide deposit of historic nature. We judge that given the onsite soil conditions and shallow bedrock depths the project will not affect or be affected by historical landslide features.

7. *Any erosion calculations prepared.*

   The Universal Soil Loss Equation (USLE) was used to model pre-project and post-project conditions and estimate soil loss rates from the project area due to sheet erosion. The Soil Loss Analysis prepared by Dave Steiner, CPESC, CPSWC is included as an attachment to this document.

   The USLE calculations predict that net soil loss rates will decrease slightly relative to existing conditions after implementation of the proposed vineyard erosion control plan and in all cases will be less than the prescribed soil loss tolerance (T) for each soil type.

8. *Any/all proposed erosion control methods including, but not limited to:*

   a. *All drainage systems and facilities, walls, cribbing or other erosion protection devices to be constructed with, or as a part of the proposed work.*

      The following measures will be implemented to minimize the potential for erosion on the project site during development and following completion of the vineyard development program:

      - Sediment Barriers – Temporary silt fence and straw wattle type sediment barriers will be installed throughout the development area. The planned locations and installation details are provided on the erosion control plan. Additional sediment barriers will be installed as deemed necessary throughout the course of construction. The sediment barriers are intended to provide temporary sediment control during development and until the cover crop is established.

      - Erosion Control Blankets – Erosion control blankets will be installed over seed on all cut and fill slopes that are steeper than 4:1 (Horizontal : Vertical). Erosion control blankets will provide additional protection from rainfall impact on exposed soils while the cover crop is getting established. The erosion control blanket locations, specifications and installation details are provided on the erosion control plan.

      - Water Bars – Temporary water bars will be installed on vineyard avenues to divert runoff from the avenues to prevent rutting. Water bar locations and installation details are shown on the erosion control plan. Water bar locations will be field verified and adjusted by the Engineer based on field conditions.

      - Energy Dissipators – Rock rip-rap energy dissipators will be constructed at the outlet of all water bars that direct flow outside of the vineyard area to dissipate runoff energy and minimize the potential for erosion.

   b. *Proposed vegetative erosion control measures including maintenance of plant material and slopes until a specified percentage of plant coverage is uniformly established.*

      Establishing an effective vegetative cover crop will be the primary method of preventing erosion from the vineyard development area. After the land preparation activities are complete a temporary cover crop will be planted and straw mulch will be spread throughout the cleared area to stabilize the project area through the winter. Minimum coverage has been calculated for each block in order to maintain soil loss rates at or below existing conditions and also below the soil loss tolerance "T" for each soil type. Minimum coverage rates for each development area are as follows:

VINEYARD BLOCK COVER CROP SPECIFICATION TABLE		
Block ID	Required Cover %	Cover Type
Vineyard Block #1	85%	No-Till

The seed, fertilizer and mulch specifications are provided on the erosion control plan.

This temporary cover crop will be cultivated in the spring and replanted in the fall for the first three years of the vineyard establishment period. Straw mulch will also be applied each fall during the vineyard established period. In the Fall following the vineyard establishment period all vineyard blocks that are to have no-till cover will be planted with a permanent cover crop seed mix and farming practices will transition to a permanent cover, no-till, farming regime.

The permanent cover crop will be mowed in the Spring. Spring mowing will be timed to allow maturation of seeds and promote natural stand regeneration. All permanent cover crop areas will be reseeded every two to three years or more frequently as needed to maintain the required cover percentage. Straw mulching and/or compost will also be applied each fall as needed to achieve the required coverage level.

In blocks with permanent no-till cover weed control under the vine rows will be primarily via mechanical means such as string trimmers and minimal herbicide usage. Herbicide used to control weeds within the vineyard block will be limited to spraying of post-emergent herbicide in a narrow 18 inch maximum width strip spray, if necessary to control weeds at the bases of the vines. The post emergent herbicide will be applied in the late winter or early spring to ensure that the spray area has vegetative protection through the rainy season. If the spray areas are not achieving adequate cover they must be mulched with straw or compost and reseeded each year to provide the required cover.

The cover crop should be irrigated prior to the onset of the rainy season for at least the first Fall following development to establish a dense cover prior to the onset of heavy winter rains.

c. *Proposed erosion control measures for vineyard avenues to accommodate farm or vineyard equipment and materials storage locations*

A permanent cover crop will be planted in the vineyard avenues the first Fall following land preparation activities and it will be maintained as permanent cover throughout the life of the vineyard. No tilling will occur in the vineyard avenues. The permanent cover crop will be mowed in the Spring. Mowing will be timed to allow maturation of seeds and promote natural cover crop regeneration. All permanent cover crop areas will be reseeded every two to three years or more frequently as needed to maintain at least coverage level specified for each vineyard block. Straw mulching and / or pre-irrigation of the cover crop will also be implemented as needed to achieve the required coverage. No herbicides will be used in the vineyard avenues.

Alternatively, vineyard avenues may be lined with crushed rock to limit their susceptibility to erosion and provide all weather access.

Water bars and / or straw wattles will be installed across the sloping vineyard avenues to force runoff off of the avenue and onto adjacent stable areas so that runoff does not concentrate on the vineyard avenues and cause erosion.

9. *Storm water stabilization measures to handle any increased peak rates of runoff from the development of the site that would result in flooding or channel degradation downstream. Include calculations of estimated increased runoff and/or an explanation of why an increase is/is not expected.*

Detailed calculations for predicted runoff rates within the project area for both pre- and post-project conditions utilizing the United States Department of Agriculture Technical Release 55 (USDA TR-55) methodologies are presented in the Hydrologic Analysis prepared by David Steiner, CPESC, CPSWQ. These calculations indicate that post-project conditions, including built in mitigations (i.e. dense cover crops) will result in runoff rates that are not greater than current conditions for the 2, 5, 10, 25, 50 and 100 year design storm events.

Since the project has been designed to maintain existing drainage patterns and since there will be no increase in peak runoff rates, the proposed project will not result in any significant change to local or regional hydrology / runoff patterns that could result in downstream flooding or channel degradation.

10. An implementation schedule indicating:

a. *The proposed vegetation clearing, earth moving/grading, and construction/planting schedule.*
b. *The proposed schedule for winterizing the site (by October 15th of each year the permit is in effect except in a municipal watershed where it is by September 1st).*
c. *The proposed schedule for installation of all interim erosion and sediment control measures (including vegetative measures) and the state of completion of such devices/measures at the end of the grading season (i.e., on October 15th [except in 5 designated municipal watersheds where it is September 1st] of each year the permit will be in effect).*
d. *The proposed schedule for installation of any permanent erosion and sediment control devices required.*

Vineyard Development Schedule

The schedule below is an estimate and is subject to change. Implementation of winterization and erosion control measure must be adjusted to accommodate any changes in development and planning under consultation with the Engineer. All land preparation, planting and erosion control work is to be performed by the property owner or by their contractor / vineyard manager.

April 2022	Commence Vineyard Development Program (To be Adjusted Based on Timing of Approval of Erosion Control Plan) Begin clearing and grubbing of existing vegetation. Complete land preparation for vineyard planting including: ripping, discing, rock removal and processing, recontouring and incorporation of soil amendments. Install waterbars and rock energy dissipators. Install irrigation and trellis systems. Plant rootstock.
Prior to October 15, 2022	Complete all earth disturbing activities. Winterize Site Seed vineyard with temporary cover crop seed mix Seed vineyard avenues with permanent cover crop seed mix Place fertilizer, straw mulch and erosion control blankets Install sediment barriers Install water bars Pre-irrigate cover crop to establish cover prior to rainy season.

	Establish reserve of erosion control measures to be maintained onsite throughout the rainy season to facilitate rapid deployment. Materials shall include silt fence, straw wattle, straw, erosion control seed mix, erosion control blanket and plastic sheeting.
October 15, 2022 - April 2023	Inspect and maintain vegetative cover and erosion control devices at least once per week, prior to each anticipated rainfall event, at least once every 24 hours during extended rainfall events and following each rainfall event. Reseed and mulch any erosion damaged areas or areas with less than the specified cover percentage and repair or replace erosion control devices as necessary.
Spring 2023	Cultivate temporary cover crop within vineyard block footprint area and perform fine site grading to repair any storm damaged areas. No tilling of vineyard avenues is to be performed.
Prior to October 15, 2023	Complete all earth disturbing activities & drainage improvements installation. Winterize Site Seed vineyard with temporary cover crop seed mix Seed vineyard avenues with permanent cover crop seed mix Place fertilizer, straw mulch and erosion control blankets Install sediment barriers Install water bars Establish reserve of erosion control measures to be maintained onsite throughout the rainy season to facilitate rapid deployment. Materials shall include silt fence, straw wattle, straw, erosion control seed mix, erosion control blanket and plastic sheeting.
October 15, 2023 - April 2024	Inspect and maintain vegetative cover and erosion control devices at least once per week, prior to each anticipated rainfall event, at least once every 24 hours during extended rainfall events and following each rainfall event. Reseed and mulch any erosion damaged areas or areas with less than the specified cover percentage and repair or replace erosion control devices as necessary.

Spring 2024	Cultivate temporary cover crop and perform fine site grading to repair any storm damaged areas.
Prior to October 15, 2024	Complete all earth disturbing activities & drainage improvements installation. Winterize Site Seed vineyard with temporary cover crop seed mix Seed vineyard avenues with permanent cover crop seed mix Place fertilizer, straw mulch and erosion control blankets Install sediment barriers Install water bars Establish reserve of erosion control measures to be maintained onsite throughout the rainy season to facilitate rapid deployment. Materials shall include silt fence, straw wattle, straw, erosion control seed mix, erosion control blanket and plastic sheeting.
October 15, 2024 - April 2025	Inspect and maintain vegetative cover and erosion control devices at least once per week, prior to each anticipated rainfall event, at least once every 24 hours during extended rainfall events and following each rainfall event. Reseed and mulch any erosion damaged areas or areas with less than the specified cover percentage and repair or replace erosion control devices as necessary.
Spring 2025	Cultivate temporary cover crop and perform fine site grading to repair any storm damaged areas.
Prior to October 15, 2025	Complete all earth disturbing activities & drainage improvements installation. Winterize Site Seed vineyard with permanent cover crop seed mix Seed vineyard avenues with permanent cover crop seed mix Place fertilizer, straw mulch and erosion control blankets Install sediment barriers Install water bars Establish reserve of erosion control measures to be maintained onsite throughout the rainy season to facilitate

	rapid deployment. Materials shall include silt fence, straw wattle, straw, erosion control seed mix, erosion control blanket and plastic sheeting.
October 15, 2025 - April 2026	Inspect and maintain vegetative cover and erosion control devices at least once per week, prior to each anticipated rainfall event, at least once every 24 hours during extended rainfall events and following each rainfall event. Reseed and mulch any erosion damaged areas or areas with less than the specified cover percentage and repair or replace erosion control devices as necessary.
Spring 2026 & Beyond	See Annual Maintenance Schedule

<u>Annual Maintenance Schedule</u>

Spring	Mow permanent cover crop in vineyard and vineyard avenues and perform fine site grading to repair any storm damaged areas.
Prior to October 15	Winterize Site Repair any damage to vineyard and vineyard avenues that has occurred during the farming season. Place seed and straw on all vineyard avenues as needed to achieve the specified cover percentage. Install water bars. Place erosion control seed, fertilizer, straw mulch, erosion control blankets and sediment barriers as necessary to stabilize any erosion prone areas outside and adjacent to the vineyard areas.
October 15 - April 1	Inspect and maintain vegetative cover and erosion control devices at least once per week, prior to each anticipated rainfall event, at least once every 24 hours during extended rainfall events and following each rainfall event. Reseed and mulch any erosion damaged areas or areas with less than the specified percentage cover and repair or replace erosion control devices as necessary.

11. The estimated cost of implementation of the erosion and sediment control measures.

Implementation of erosion and sediment control measures for this project is anticipated to cost approximately $5,000 to $10,000 per acre for installation and maintenance. This estimate includes only the erosion and sediment control portions of the project, not the entire cost of permitting, engineering, land preparation, development, irrigation systems, trellis systems, and plants.