Proposed Mitigated Negative Declaration

Sonoma County Permit and Resource Management Department
2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 565-1900 FAX (707) 565-1103

Publication Date: January 10, 2019
Public Review Period: 1/15/19 to 2/14/19
State Clearinghouse Number:
Permit Sonoma File Number**:** UPE17-0053
Prepared by: Brian Millar
Phone: (530) 902-9218

Pursuant to Section 15071 of the State CEQA Guidelines, this proposed Negative Declaration and the attached Initial Study, constitute the environmental review conducted by the County of Sonoma as lead agency for the proposed project described below:

Project Name: Bricoleur Winery Use Permit

Project Applicant/Operator: Starr Holdings, LLC

Project Location/Address: 7390 Starr Road, Windsor

APN: 066-220-019

General Plan Land Use Designation: Diverse Agriculture (DA) 40

Zoning Designation: Diverse Agriculture (DA) B6 40; Floodway Combining District (F1); Floodplain Combining District (F2); Riparian Corridor Combining District (RC) 50/50; Riparian Corridor Combining District (RC) 100/50; Valley Oak Habitat (VOH)

Decision Making Body: Board of Zoning Adjustments

Appeal Body: Board of Supervisors

Project Description: See Item III, below

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" or "Less than Significant with Mitigation" as indicated in the attached Initial Study and in the summary table below.

Table 1. Summary of Topic Areas

Topic Area	Abbreviation*	**Yes**	**No**
Aesthetics	VIS	Yes	
Agricultural & Forest Resources	AG		No
Air Quality	AIR	Yes	
Biological Resources	BIO		No
Cultural Resources	CUL		No
Geology and Soils	GEO	Yes	
Greenhouse Gas Emission	GHG		
Hazards and Hazardous Materials	HAZ		No
Hydrology and Water Quality	HYDRO	Yes	
Land Use and Planning	LU		No
Mineral Resources	MIN		No
Noise	NOISE	Yes	
Population and Housing	POP		No
Public Services	PS		No
Recreation	REC		No
Transportation and Traffic	TRAF	Yes	
Utility and Service Systems	UTL		No
Mandatory Findings of Significance			No

RESPONSIBLE AND TRUSTEE AGENCIES

The following lists other public agencies whose approval is required for the project, or who have jurisdiction over resources potentially affected by the project.

Table 2

Agency	**Activity**	**Authorization**
Regional Water Quality Control Board (North Coast)	Discharge or potential discharge to waters of the state	California Clean Water Act (Porter Cologen) – Waste Discharge requirements, general permit or waiver
State Water Resources Control Board	Generating stormwater (construction, industrial, or municipal)	National Pollutant Discharge Elimination System (NPDES) requires submittal of NOI

ENVIRONMENTAL FINDING:

Based on the evaluation in the attached Expanded Initial Study, I find that the project described above will not have a significant adverse impact on the environment, provided that the mitigation measures identified in the Initial Study are included as conditions of approval for the project and a Mitigated Negative Declaration is proposed. The applicant has agreed in writing to incorporate identified mitigation measure into the project plans.

Prepared by: Brian Millar Date: January 15, 2019

Expanded Initial Study

Sonoma County Permit and Resource Management Department
2550 Ventura Avenue, Santa Rosa, CA 95403
(707) 565-1900 FAX (707) 565-1103

I. INTRODUCTION

This document is an Initial Study (IS) with supporting environmental studies, which provides justification for a Mitigated Negative Declaration (MND) pursuant to the California Environmental Quality Act (CEQA) for a Use Permit for the Bricoleur Winery Project The IS/MND is a public document to be used by the County of Sonoma Permit and Resource Management Department (PRMD), acting as the CEQA lead agency to determine whether the proposed Project may have a significant effect on the environment pursuant to CEQA. The project is located at 7390 Starr Road, Windsor, CA.

The Project Applicant, Starr Holdings, LLC, proposes to operate a winery with an annual production of 40,000 cases, new winery building of 29,000 sq ft, with public hours and tasting, and 26 agricultural promotional and industry wide events days annually. A referral letter was sent to the appropriate local, state and federal agencies and interest groups who may wish to comment on the project.

This report is the Initial Study required by the California Environmental Quality Act (CEQA). The report was prepared by Brian Millar, Contract Project Review Planner with the Sonoma County Permit and Resource Management Department, Project Review Division. Information on the project was provided by Starr Holdings, LLC. Technical studies provided by qualified consultants are attached to this Expanded Initial Study to support the conclusions. Other reports, documents, maps and studies referred to in this document are available for review at the Permit and Resource Management Department (Permit Sonoma) or on the County's website at: http://www.sonoma-county.org/prmd/divpages/projrevdiv.htm

Please contact Brian Millar, Project Planner, at (530) 902-9218 or at brian@landlogistics.com for more information.

II. EXISTING FACILITY AND SITE CONDITIONS

The project site currently supports 21 acres of vineyards and 180 producing olive trees, and contains an 11,000 sq. ft. agricultural barn. The barn structure is part of an active Code Enforcement case for construction without benefit of a building permit; the applicant has filed the necessary permit, which is being processed concurrent with the Use Permit application). The project site also contains an accessory dwelling unit; a 20,000 sq. ft. commercial equestrian arena (which will be demolished to facilitate construction of the proposed project); a 4-bedroom primary single-family dwelling; a garden pavilion; and an agricultural employee unit. In addition, there are three small utility buildings, including an electrical, water / pump house and fire pump house. There is an existing septic system and water well on the western edge of the project site. The site contains a large number of native oak trees, as well as landscaping improvements around the agricultural barn and pavilion area.

III. PROJECT DESCRIPTION

The project proposes to modify existing structures and construct a new 29,000 sq. ft. winery building for the production of up to 40,000 cases annually, wine tasting rooms, and agricultural and industry-wide events. The existing 20,000 sq. ft. equestrian arena is proposed to be demolished to allow for the construction of the new winery building. The new winery building would include a crush pad under an awning, fermentation rooms, barrel storage rooms, a tasting room, an office, a laboratory, and employee and visitor restrooms. The existing 11,000 sq. ft. agricultural barn would be converted to a winery building to be used for barrel aging, storage, a commercial kitchen, bathrooms, conference room and employee offices, and would contain two tasting rooms. Additional parking would be provided on-site to meet Zoning Code and use requirements, and the existing septic system would be enlarged to accommodate the range of the proposed new uses. Landscaping, including non-native and native species, would be utilized around the winery buildings, and parking areas.

The project also proposes a total of 26 event days (18 agricultural promotional and 8 industry wide events) per year at the new winery facility.

The applicant indicates a potential five-year phasing plan to complete project construction.

IV. PROJECT DETAILS

Proposed Construction: The new 29,000 sq ft winery building would be two stories and house the wine tasting areas, a wine library, fermentation tanks, barrel storage, offices, a laboratory and storage. The existing 11,000 sq. ft. agricultural barn would be remodeled to accommodate a retail store, kitchen, two wine tasting rooms, and barrel storage. All phases of wine production including crushing, fermenting, barrel aging and bottling would occur in the covered crush pad area. The applicant is currently working to install photo-voltaic (solar panels) on the existing agricultural barn.

Design Style: The architecture for the winery building would emphasize a “California rural agriculture” theme, using stone, wood and natural toned plasters. Many elements of this structure are similar to the existing agricultural barn.

Food Preparation: Food preparation for the tasting room will be sourced from local Sonoma County suppliers and prepared in the commercial kitchen. Food preparation for all events, including wine pairing dinners, will be done offsite by local, licensed catering companies who will deliver, heat and serve the food onsite.

Tasting Rooms: Wine tasting would be available in two locations in the Winery Barn building (existing Ag barn) either at a 100 square foot standing tasting bar or in a tasting room of 760 square feet. Wine tasting in the new main Winery building would include two tasting areas on the first floor totaling 1,100 square feet and three tasting areas on the second-floor totaling ~1,500 square feet. When the new, main Winery Barn is completed, the Winery Barn (converted Ag barn) building would continue to be used for wine tasting and events.

Events:

Requested Project Events

Event Description	Quantity	Dates Occurring	# Guests (max.)
Wine Club Member's Event[1]	4	March – October	150
Agricultural Promotional Events[2]	3	March - October	100
Industry-wide Events	4	March – October	100
Weddings, Non-Profit & Other Special Events	4	March - October	100
Agricultural Promotional Events[2]	3	March - October	200
Industry-wide Events	4	March - October	200
Weddings, Non-Profit & Other Special Events	4	March - October	200

Employees:
Full-time employees: 9 to 10, including owner/operators
Part-time: 5 additional employees (harvest and bottling season)

Hours of Operation:
Winery: 7 a.m. to 6 p.m., 5 days a week (no- harvest season)
6 a.m. to 10 p.m. or hours as needed 7 days a week (harvest/crush season)
Tasting Room: 10:00 a.m. to 5:30 p.m. 5 days a week
Events: 10:00 a.m. to 9:30 p.m. (guests exiting site) with employees exiting by 10:00 p.m.

Parking: All parking would be done on-site.

- Guests and Employees: 72 parking spaces, including 6 ADA accessible spaces.
- An additional 50 "temporary" marked spaces for overflow agricultural promotional and industry wide event parking.

Access: All access and egress for vehicles and trucks would be via the existing driveway entrance directly off of Starr Road.

Sewage Disposal: Winery process wastewater would be screened, settled in settling tanks, and treated by an aerobic unit and discharged to the irrigation reservoir for reclamation. The design must conform to the requirements of the North Coast Regional Water Quality Control Board (RWQCB) and will be operated under permit with the NCRWQCB and PRMD.

Domestic wastewater disposal: Sanitary sewage would be via an on-site septic systems.

Water supply: An existing on-site well is proposed to be utilized. Irrigation water for vineyards and landscaping is provided from the Town of Windsor's recycled wastewater.

Pomace Disposal: Stems and seeds would be composted and spread in the vineyard as a soil conditioner and supplemental nutrient source or hauled offsite.

V. SETTING

Land use in the project vicinity is a mix of vineyard development, open space, grazing, and rural residential uses. There are two wineries and vineyards within approximately one mile of the project site. Primary access to properties in the area is provided via Starr Road, which connects to Reiman Lane, leading to Windsor Road. The closest off-site residence is approximately 370 feet northeast of the proposed winery building.

Lands to the north are in agricultural (rangeland) and rural residential use.
Lands to the west are in agriculture and rural residential use, with one business, the Starr Pet Resort.
Lands to the east and south are in open space/utility use, with Windsor Waste Water use of the parcel to the east as a release area. Pool Creek runs along the eastern edge of the parcel.

VI. ISSUES RAISED BY THE PUBLIC OR AGENCIES

A referral packet was drafted and circulated to inform and solicit comments from selected relevant local, state and federal agencies; and to special interest groups that were anticipated to take interest in the project.

Staff has received comments about potential traffic from the project on Starr Road.

Agency comments have included:

- Agriculture Department: stated concerns locating public use buildings in close proximity to working vineyards. The Department recommends any proposed public use buildings maintain a 200' setback from any existing vineyards
- RWQCB: will require permit review.
- Town of Windsor: addressed potential use of treated wastewater from the City for vineyard and landscaping areas.
- Tribal: Lytton Rancheria requested a Phase 1 archaeological survey be prepared. The applicant prepared the study, and it was provided to the Rancheria.

VII. OTHER RELATED PROJECTS

There are no known private or public projects in the area that may affect the proposed project, including any that could contribute to cumulative environmental impacts.

VIII. EVALUATION OF ENVIRONMENTAL IMPACTS

This section analyzes the potential environmental impacts of this project based on the criteria set forth in the State CEQA Guidelines and the County's implementing ordinances and guidelines. For each item, one of four responses is given:

> **No Impact: The project would not have the impact described.** The project may have a beneficial effect, but there is no potential for the project to create or add increment to the impact described.
>
> **Less Than Significant Impact**: The project would have the impact described, but the impact would not be significant. Mitigation is not required, although the project applicant may choose to modify the project to avoid the impacts.
>
> **Potentially Significant Unless Mitigated:** The project would have the impact described, and the impact could be significant. One or more mitigation measures have been identified that will reduce the impact to a less than significant level.
>
> **Potentially Significant Impact:** The project would have the impact described, and the impact could be significant. The impact cannot be reduced to less than significant by incorporating mitigation measures. An environmental impact report must be prepared for this project.

Each question was answered by evaluating the project as proposed, that is, without considering the effect of any added mitigation measures. The Initial Study includes a discussion of the potential impacts and identifies mitigation measures to substantially reduce those impacts to a level of insignificance where feasible. All references and sources used in this Initial Study are listed in the Reference section at the end of this report and are incorporated herein by reference.

The Project Applicant, Starr Holdings, LLC, has agreed to accept all mitigation measures listed in this Initial Study as conditions of approval for the proposed project, and to obtain all necessary permits, notify all contractors, agents and employees involved in project implementation and any new owners should the property be transferred to ensure compliance with the mitigation measures.

1. AESTHETICS:

Would the project:

a) Have a substantial adverse effect on a scenic vista?

Comment:
The Project is in an area designated as Scenic Landscape Unit and visually sensitive by the Sonoma County General Plan. The existing structures can be seen from Starr Road.

Use of Visual Assessment Guidelines

To evaluate the potential visual impacts of the project related to the Scenic Resource designation, staff utilized the Visual Assessment Guidelines of PRMD. This consisted of evaluating public viewpoints from the public roadway fronting the site (Starr Road). Key viewpoints were considered and photographs from these vantage points were taken, shown below.

The visual assessment then considered the overall site sensitivity, utilizing criteria of the Visual Assessment Guidelines.

The Visual Assessment Guidelines consider a site as being in a “High” sensitivity area when 1) any portion of a project site is within a land use or zoning designation protecting scenic or natural resources, such as scenic corridors; 2) the site vicinity is generally characterized by the natural setting and forms a scenic backdrop for the community or scenic corridor, and includes building and construction areas within the SR designation located on prominent hilltops, visible slopes less than 40 percent or where there are significant natural features of aesthetic value that are visible from public roads or public use areas.

The visual dominance of the site was also considered using the Visual Assessment Guidelines. This included evaluation of visual elements such as proposed building forms, lines, potential for building silhouetting above ridgelines, building orientation, use of building colors and textures, and use of night lighting.

View of project site from project frontage on Starr Road.

View of existing outdoor pavilion area.

View of existing “agricultural barn” that is undergoing renovation for the proposed winery use

Visual Assessment Findings

Staff determined that the project site contains elements that primarily qualify as “Moderate” sensitivity due to the visibility of the project site from Starr Road; this is focused mostly on the lands closer to the roadway, while portions of the project site to the rear of the site (to the east) are less visible.

The existing agricultural barn would not be further modified (exterior changes) as part of the project, and the project would be consistent with applicable Visual Assessment Guidelines.

The existing equestrian area would be demolished to allow placement of the proposed new winery building. This building would be located approximately 230 feet from the edge of the roadway. The design would generally be consistent with the rural, semi-agricultural setting of the site and with the design theme of the agricultural barn. Partial screening of this structure would occur by existing and planted landscaping near the property frontage and an outdoor use area. The project site has only moderate slopes, and the proposed placement of the winery building would not result in silhouetting above a ridgeline as seen from Starr Road. Design Review would be required when the winery building, part of a future phase, is to be constructed (the applicant indicates this would likely be several years after the initiation of the use). Design Review would allow for more specific evaluation of development plans to ensure there will be no significant visual impact from the adjoining Scenic Corridor or public viewpoints along Starr Road. See additional discussion under item 1(c), below.

The project is therefore considered to be consistent with the criteria of the County’s Visual Assessment Guidelines, and would not result in significant aesthetic impacts to a scenic vista.

Significance Level:

Less than Significant Impact

b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

Comment:
The parcel is not located on a site visible from a state scenic highway.

Significance Level:

No Impact

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Comment:
The project site is currently developed with a 20,000 sq. ft. equestrian area, an existing agriculture barn, a four (4) bedroom single family dwelling, and 3 (three) "out buildings" all visible from Starr Road. There is an agriculture employee unit which is located to the rear of the parcel and not clearly visible from Starr Road. Adjacent to Starr Road, between the existing equestrian arena and Starr Road, the property has been developed with Bocce Ball courts and an extensive rose garden. The site includes 8 acres of vineyards and 180 producing olive trees. The project proposes to eliminate the equestrian arena and construct a 29,000 sq. ft. winery building. The existing agriculture barn will be converted for winery use but will not be expanded in size. In addition, there will be the construction of a 2,000 +/- sq. ft. agriculture storage building. Although set back approximately 150 feet, it will be visible from Starr Road. The entire project site is generally flat with no significant hillsides or ridgelines.

The proposed winery building would be set back approximately 230 feet from Starr Road. The proposed design is a "barn"-like structure with peaked roofs and which would be consistent with the character of the surrounding agricultural area. The use of vertical wood siding, stone cladding, wood barn doors, in neutral colors would help the building blend with the surrounding landscape.

The modifications to the existing agricultural barn and the construction of a new winery building to replace the equestrian arena will not significantly alter or degrade the visual character or quality of the site beyond that which exists now.

Significance Level:

Less than Significant Impact

d) Create a new source of substantial light or glare which would adversely affect day or nighttime view in the area?

Comment:
The project proposes the modification of existing structures. The modifications may introduce additional sources of light and glare than currently exist. Lighting of the facility, especially lighting of the parking lot, security and safety lighting, may affect nighttime views.

Mitigation VIS-1:

Prior to issuance of building permits, an exterior lighting plan shall be submitted for design review by PRMD and the Design Review Committee. Exterior lighting shall be low mounted, downward casting and fully shielded to prevent glare. Lighting shall not wash out structures or any portions of the site. Light fixtures shall not be located at the periphery of the property and shall not spill over onto adjacent properties or into the night sky. Flood lights are not permitted. All parking lot and street lights shall be full cut-off fixtures. Lighting shall shut of automatically after closing and security lighting shall be motion sensor activated.

Mitigation Monitoring VIS-1:
The Permit and Resource Management Department shall not issue the Building Permit until an

exterior night lighting plan has been submitted that is consistent with the approved plans and County standards. The Permit and Resource Management Department shall not sign off final occupancy on the Building Permit until a site inspection of the property has been conducted that indicates all lighting improvements have been installed according to the approved plans and conditions. If light and glare complaints are received, the Permit and Resource Management Department shall conduct a site inspection and require the property be brought into compliance or initiate procedures to revoke or modify the permit. (Ongoing)

Significance Level:

Less than Significant with Mitigation Incorporated

2. AGRICULTURE AND FOREST RESOURCES:

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

Comment:
According to the Sonoma County Important Farmlands Map, the project site is designated as Important/Other Farmland. No important farmlands would be converted to develop the proposed project. The project involves: the conversion of an existing agricultural barn for winery use; the replacement of an existing equestrian arena with a winery; and related site improvements. No change in the land use or zoning is proposed. Foreseeable development includes those uses permitted by the Diverse Agriculture (DA) zoning district, subject to a use permit. The primary use of the site would remain agricultural production. Therefore, the project would not convert a significant amount of important farmland to non-agricultural use, and potential impacts are less than significant.

Significance Level:

Less than Significant Impact

b) Conflict with existing zoning for agricultural use, or Williamson Act Contract?

Comment:
The project site is in the Diverse Agriculture zoning district which allows the proposed use with the issuance of a Use Permit. The project site is not included in a Williamson Act contract.

Significance Level:

No Impact

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 4526) or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)?

Comment:

The project does not involve other changes in the environment that could result in conversion of timberland to non-agricultural use.

Significance Level:

No Impact

d) Result in the loss of forest land or conversion of forest land to non-forest use?

Comment:

The project does not involve other changes in the environment that could result in conversion of forest land to non-forest use.

Significance Level:

No Impact

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use?

Comment:
The project does not involve other changes in the environment that could result in conversion of farmland to non-agricultural use or forest land to non-forest use.

Significance Level:

No Impact

3. AIR QUALITY:

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

Comment:
The project is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) which is currently designated as a nonattainment area for state and federal ozone standards, the state PM 10 standard, and the state and federal PM 2.5 standard. The District has adopted an Ozone Attainment Plan and a Clean Air Plan in compliance with Federal and State Clean Air Acts. These plans include measures to achieve compliance with both ozone standards. The plans deal primarily with emissions of ozone precursors (nitrogen oxides (NOx) and volatile organic compounds, also referred to as Reactive Organic Gases (ROG)). Based on thresholds developed by BAAQMD in its report, *California Environmental Quality Act Air Quality Guidelines May 2017*, the proposed use is

well below the emission thresholds for PM_{10}, $PM_{2.5}$ and ozone precursors and does not conflict with or obstruct the implementation of applicable air quality plans. See Table in Section 3(b) below.

Significance Level:

Less than Significant Impact

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Comment:
State and Federal standards have been established for the "criteria pollutants" including ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide and particulates (PM_{10} and $PM_{2.5}$).

The pollutants NOx (nitrogen oxides) and reactive organic gases (ROG) form ozone in the atmosphere in the presence of sunlight. The principal source of ozone precursors is vehicle emissions, although stationary internal combustion engines are also sources.

Estimates of potential air quality impacts are provided based on grading, construction and operational aspects of the proposed project. Key contributors to criteria pollutants would be construction of the 72-space parking lot, driveway and new 29,000 sq ft winery building; vehicle traffic related to tasting room and winery operations, plus event traffic from 26 proposed event days (peak traffic projected to be 180 trip ends for the largest 11 events); and wine production of 40,000 cases. The project is expected to be well below BAAQMD thresholds for potentially significant impacts for criteria pollutants as outlined in the report titled *California Environmental Quality Act Air Quality Guidelines May 2017.*

Construction phase and average daily operational emissions for criteria pollutants would be expected to be less than 10% of the BAAQMD threshold amounts shown below, with emissions of nitrogen dioxide estimated to be less than 50% of the threshold amount. Maximum annual emissions for criteria pollutants are expected to be less than 10% of threshold amounts, with carbon monoxide emissions expected to be less than 50% of the threshold amount.

Criteria Pollutant & GHG Emissions				
Pollutant				
ROG	**NOx**	**PM_{10} (Exhaust)**	**$PM_{2.5}$ (Exhaust)**	**CO_2e**
Construction Phase & Average Daily Emissions (lbs/day)				
BAAQMD Threshold				
54	54	82	54	N/A
Estimated Emissions Exceed (Average Daily) BAAQMD Threshold?				
No	No	No	No	N/A
Maximum Annual Emissions (tons/yr)				
BAAQMD Threshold (Maximum Annual)				
10	10	15	10	1,100
Emissions Exceed (Maximum Annual) BAAQMD Threshold?				
No	No	No	No	No

Significance Level:

Less than Significant Impact

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Comment:
The project is within the jurisdiction of the Bay Area Air Quality Management District, which is currently designated as a nonattainment area for state and federal ozone standards

The project will generate some additional criteria pollutants primarily from new vehicle trips. A Traffic Study prepared by W-Trans, dated May 10, 2018, found that the project is expected to generate an average of 75 vehicle trips per day during harvest conditions. Additionally, events, with an estimated 200 attendees per event, would be expected to generate 80 "end trips" before and after the event. Even with the increased vehicle trips expected, the criteria pollutants generated by the project are expected to be below the pollutant thresholds published by the BAAQMD in the report titled *California Environmental Quality Act Air Quality Guidelines May 2017* (refer to table in Section 3(b) above). The project will not have a cumulative significant effect on ozone because it will not generate substantial traffic resulting in significant new emissions of ozone precursors (ROG and NOx). Additionally, new sources of $PM_{2.5}$ and PM_{10}, would be minimized because the project proposes to cover all exposed soil areas with paved gravel, vegetation or landscaping to stabilize soils and minimize dust generation.

During construction short-term emission of dust (which would include $PM_{2.5}$ and PM_{10}) will be controlled using measures outlined in Section 3, above, and include 1) Water or dust palliative shall be sprayed on unpaved construction and staging areas during any construction activity as directed by the County; 2) Trucks hauling soil, sand and other loose materials over public roads will cover the loads, or will keep the loads at least two feet below the level of the sides of the container, or will wet the load sufficiently to prevent dust emissions; and 3) Paved roads will be swept as needed to remove soil that has been carried onto them from the project site. County Building Inspectors may red tag and stop construction projects during their routine site inspections if the project does not meet dust control BMP's. Given the short-term nature of the potential construction dust impact, and the required implementation of adopted Best Management Practices as mitigation, and the regular inspection of construction sites by County Building Inspectors, no significant cumulative dust impacts from the project are expected.

Mitigation Measure AIR-1:
The following dust control measures shall be included in the project:

a. Water or alternative dust control method shall be sprayed to control dust on construction areas, soil stockpiles, and staging areas during construction as directed by the County.
b. Trucks hauling soil, sand and other loose materials over public roads will cover the loads, or will keep the loads at least two feet below the level of the sides of the container, or will wet the load sufficiently to prevent dust emissions.
c. Paved roads will be swept as needed to remove soil that has been carried onto them from the project site.

Mitigation Monitoring AIR-1:
PRMD staff shall ensure that the measures are listed on all site alteration, grading, building or improvement plans prior to issuance of grading or building permits.

Significance Level:

Less than Significant with Mitigation Incorporated

d) Expose sensitive receptors to substantial pollutant concentrations?

Comment:
Sensitive receptors include hospitals, schools, convalescent facilities, and residential areas. No such receptors are located near the proposed project site, therefore, the project would not expose sensitive receptors to significant concentrations of pollutants because of the analysis above in 1 (b) and 1(c).

Significance Level:

Less than Significant Impact

e) Create objectionable odors affecting a substantial number of people?

Comment:

The project is not an odor generating use, nor located near an odor generating source that may affect the use and would have no odor impact.

Significance Level:

Less than Significant Impact

4. BIOLOGICAL RESOURCES:

Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Comment:
The majority of the site is developed with vineyards, structures, roadways and parking areas. The area of the proposed winery building would occur where the existing equestrian arena is located. No significant amount of vegetation will be removed. There are no known special status species that would be impacted by the project. No such special status species occur on or immediately adjacent to the site, based on the California Natural Diversity Database and Sonoma County biological resource maps. Additionally, the project site has been previously disturbed with the planting of the vineyard and olive trees, the construction of the single-family residence, equestrian arena, agricultural barn and related site improvements, further reducing potential for presence of such species. No trees would be removed in the proposed winery building, parking areas and other site improvements, and there would be no impact to any nesting birds in the immediate area. This impact would therefore be less than significant.

Significance Level:

Less than Significant Impact

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Comment:
The project property includes a Riparian Corridor 50/50 and Riparian Corridor 100/50 Combining Districts, calling for a streamside conservation area 50-feet from the top of the highest bank along with a 50-foot wide minimum setback for cultivation. The project development footprint, including grading, is not in the vicinity of the riparian corridor of Pool Creek, which is located approximately 600 feet to the southeast, and no impacts would occur involving grading or development within the required 50-foot setback area. The project is therefore not expected to result in impacts to the creek corridor, wetlands or related riparian habitat, or conflict with any applicable plans, policies or regulations by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

The project does not propose any development within the required RC setbacks.

Significance Level:

Less Than Significant Impact

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Comment:
The project development footprint would be located approximately 600 feet northwest of the Pool Creek and removed from any water features. The project therefore would not directly or indirectly impact Waters of the U.S**.**

Significance Level:

No Impact

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Comment:
The proposed project will not interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites as the project development area will not be located in the riparian area of the adjoining unnamed creek, and as any wildlife movement though the vineyard area would continue to be able to occur.

Significance Level:

Less than Significant Impact

e) Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance?

Comment:
Chapter 26, Article 88. Sec. 26-08-010 (m) of the Sonoma County Code contains a tree protection ordinance (Sonoma County 2013). The ordinance designates ‘protected’ trees as well as provides mitigation standards for impacts to protected trees. Although the project parcel is zoned VOH (Valley Oak Habitat) and is subject to the Tree Protection Ordinance, there are no Valley Oak trees proposed for removal as a result of the proposed construction.

Significance Level:

Less than Significant Impact

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan?

Comment:
There are no adopted Habitat Conservation Plans or Natural Community Conservation Plans applicable to the project site.

Significance Level:

No Impact

5. CULTURAL RESOURCES:

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Comments:
An Historical Resources Study issued on February 20, 2018, performed by Tom Origer & Associates determined that there were no historical resources on the project site, therefore there will be no impact.

Significance Level:

No Impact

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Comment:
On December 27, 2017 Permit Sonoma staff referred the project application to Native American Tribes within Sonoma County to request consultation under AB-52. On January 4, 2018 a representative for the Lytton Rancheria requested that a Phase I archaeological study be performed. Construction monitoring Mitigation Measure CUL-1, which is also included as a Condition of Approval of the project.

Tom Origer & Associates (February 2018) evaluated the property for potential presence of archaeological resources. This study included archival research at the Northwest Information Center, Sonoma State University, examination of the library and files of Tom Origer & Associates, field inspection of the project location, and contact with the Native American community. No archaeological sites were discovered within the study area.

There are no known archaeological resources on the site, but the project could uncover such materials during construction. The following measures will reduce the impact to less than significant.

Mitigation Measure CUL-1
A Tribal or Archaeological Monitor is required to be present onsite during all grading and ground disturbance work. Prior to submittal of the application for Grading Permit or any other ground disturbing activity. The applicant shall provide a contact with a qualified consultant to monitor ground

disturbing activities to Permit Sonoma and the Tribal Representative for Lytton Rancheria Tribe.

All building and/or grading permits shall have the following note printed on grading or earthwork plan sheets:

NOTE ON MAP:
"A Tribal or Archaeological Monitor is required to be present during all grading or other ground-disturbing work. The Tribal Monitor must be present on site before the start of any ground-disturbing work, including scraping. In the event that cultural resources are discovered at any time during grading, scraping or excavation within the property, all work should be halted in the vicinity of the find. Artifacts associated with prehistoric sites may include humanly modified stone, shell, bone or other cultural materials such as charcoal, ash and burned rock indicative of food procurement or processing activities. Prehistoric domestic resources include hearths, firepits, or house floor depressions whereas typical mortuary resources are represented by human skeletal remains. The Tribal Monitor, Archaeological Monitor, and Permit Sonoma - Project Review Staff shall be notified. Permit Sonoma Staff should consult with the appropriate tribal representative(s) from the tribes known to Permit Sonoma to have interests in the area to determine if the resources qualify as Tribal Cultural Resources (as defined in Public Resource Code § 21074). If determined to be a Tribal Cultural Resource, Permit Sonoma would further consult with the appropriate tribal representative(s) and project proponents in order to develop and coordinate proper protection/mitigation measures required for the discovery. Permit Sonoma may refer the mitigation/protection plan to designated tribal representatives for review and comment. No work shall commence until a protection/mitigation plan is reviewed and approved by Permit Sonoma - Project Review Staff. Mitigations may include avoidance, removal, preservation and/or recordation in accordance with California law. Evaluation and mitigation shall be at the applicant's sole expense.

If human remains, paleontological or historical resources are encountered, all work must stop in the immediate vicinity of the discovered remains and Permit Sonoma Staff and County Coroner must be notified immediately pursuant to State law so that an evaluation can be performed. If the remains are deemed to be Native American, the Native American Heritage Commission must be contacted by the Coroner so that a ''Most Likely Descendant'' can be designated and the appropriate provisions of the California Government Code and California Public Resources Code would be followed.''

Mitigation Monitoring CUL-1

Building/grading permits shall not be approved for issuance by Permit Sonoma - Project Review Staff until the above notes are printed on the building, grading and improvement plans. The applicant shall provide a contact with a qualified consultant to monitor ground disturbing activities to Permit Sonoma and the Tribal Representative for the Lytton Rancheria Tribe.

Significance Level:

Less than Significant with Mitigation Incorporated

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Comment:
The proposed project will not destroy unique geologic features. However, the project could uncover previously undiscovered paleontological resources during project construction. The above mitigation measure will reduce the impact to less than significant.

Significance Level:

Less Than Significant with Mitigation Incorporated

d) Disturb any human remains, including those interred outside of formal cemeteries?

Comment:
There are no known burial sites in the vicinity of the project, and most of the project site has already been disturbed by past construction. In the event that human remains are unearthed during construction, state law requires that the County Coroner be contacted in accordance with Section 7050.5 of the State Health and Safety Code to investigate the nature and circumstances of the discovery. If the remains were determined to be native American interment, the Coroner will follow the procedure outlined in CEQA Guidelines Section 15065.5(e). The above mitigation measure will reduce the impact to less than significant.

Significance Level:

Less than Significant with Mitigation Incorporated

6. GEOLOGY AND SOILS:

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Existing geologic conditions that could affect new development are considered in this analysis. Impacts of the environment on the project are analyzed as a matter of County policy and not because such analysis is required by CEQA.

Comment:
The project site is not within a fault hazard zone as defined by the Alquist-Priolo fault maps. (General Plan Public Safety Figure PS-1b).

Significance Level:

No Impact

ii. Strong seismic ground shaking?

Comment:
All of Sonoma County is subject to seismic shaking that would result from earthquakes along the San Andreas, Healdsburg-Rodgers Creek, and other faults. By applying geotechnical evaluation techniques and appropriate engineering practices, potential injury and damage from seismic activity can be diminished, thereby exposing fewer people and less property to the effects of a major damaging earthquake. The design and construction of new structures are subject to engineering standards of the California Building Code (CBC), which take into account soil properties, seismic shaking and foundation type. Project conditions of approval require that building permits be obtained for all construction and that the project meet all standard seismic and soil test/compaction requirements. The project would therefore not expose people to substantial risk of injury from seismic shaking. The following mitigation measures will ensure that potential impacts are reduced to less than significant levels.

Mitigation GEO-1
All earthwork, grading, trenching, backfilling and compaction operations shall be conducted in accordance with the County Subdivision Ordinance (Chapter 25, Sonoma County Code). All construction activities shall meet the California Building Code regulations for seismic safety. Construction plans shall be subject to review and approval of Permit Sonoma prior to the issuance of a building permit. All work shall be subject to inspection by Permit Sonoma and must conform to all applicable code requirements and approved improvement plans prior to the issuance of a certificate of occupancy.

Mitigation Monitoring GEO-1

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Significance Level:

Less than Significant with Mitigation Incorporated

iii. Seismic-related ground failure, including liquefaction?

Comment:
Strong ground shaking can result in liquefaction, the sudden loss of shear strength in saturated sandy material, resulting ground failure. Areas of Sonoma County most at risk of liquefaction are along San Pablo Bay and in alluvial valleys. General Plan Public Safety Figure PS-1, Liquefication Hazzard Areas identifies that sections of the project site are located within an area of "very high susceptibility" to liquefaction. If the project includes structures located within a liquefaction hazard area strong ground shaking during an earthquake can result in ground failure or settlement, including deformation of slopes, particularly fill slopes. Therefore the property has the potential to experience liquefaction and settlement during a seismic event. All structures will be required to meet building permit requirements, including seismic safety standards and soil test/compaction requirements. Implementation of Mitigation Measures GEO-1, above would reduce any impacts to less than significant.

Significance Level:

Less than Significant Impact

iv. Landslides?

Comment:
Steep slopes characterize much of Sonoma County, particularly the northern and eastern portion of the County. Where these areas are underlain by weak or unconsolidated earth materials landslides are a hazard. General Plan Public Safety Figure PS-1d does not identify the project site as a landslide hazard area. If the project includes structures located in the footprint of a mapped landslide or within a landslide hazard area building or grading could destabilize slopes resulting in slope failure. All structures will be required to meet building permit requirements, including seismic safety standards and soil test/compaction requirements. Implementation of Mitigation Measures GEO-1, above, would reduce any impacts to less than significant.

Significance Level:

Less than Significant Impact

b) Result in substantial soil erosion or the loss of topsoil?

Comment:
The proposed project would include grading which requires the issuance of a grading permit. Unregulated grading, both during and post construction, has the potential to increase the volume of runoff from a site which could have adverse downstream flooding and increase soil erosion on and off site which could adversely impact downstream water quality.

County grading ordinance design and adopted best management practices require that soil erosion be minimized and that stormwater facilities be engineered to treat storm events and associated runoff to the 85-percentile storm event. Adopted flow control best management practices must be designed to treat storm events and associated runoff to the channel forming discharge storm event, which is commonly referred to at the two-year storm event. Required inspection by County building inspectors insure that all work is constructed per the approved plans. These ordinance requirements and adopted best management practices are specifically designed to maintain potential project water quantity impacts at a less than significant level during and post construction.

To address both pre-and post-construction water quality impacts the County has adopted grading ordinance design requirements, grading standards and best management practices, has mandated limitations on work in wet weather and has standard grading inspection requirements which are specifically designed to maintain potential water quality impacts at a less than significant level during project construction. Post construction impacts use adopted grading permit standards and best management practices to require creation of areas that allow stormwater to be detained, infiltrated or retained for later use. Other adopted water quality best management practices include storm water treatment devices based on filtering, settling or removing pollutants. These construction standards are specifically designed to maintain potential water quality grading impacts at a less than significant level post construction.

Issuance of the grading permit will require that the project comply with County adopted grading ordinances and standards. The related conditions of approval which enforce them are specific and require compliance with all standards and regulations adopted by the State and Regional Water Quality Control Board, such as the Standard Urban Stormwater Mitigation Plan (SUSMP) requirements, Low Impact Development (LID) and any other adopted best management practices. See further discussion of related issues (such as maintenance of required post construction water quality facilities) under section 8 Hydrology and Water Quality.

Therefore, no significant adverse soil erosion or related soil erosion water quality impacts are expected given the mandated conditions and standards that need to be met.

Significance Level:

Less Than Significant Impact

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Comment:
The project site is subject to seismic shaking and other geologic hazards as described in item 6.a.ii, iii, and iv, above. Refer back to appropriate mitigation measures.

Significance Level:

Less than Significant Impact

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Comment:
Table 18-1-B of the Uniform Building Code is an index of the relative expansive characteristics of soil as determined through laboratory testing. For the proposed project, soils at the site have not been tested for their expansive characteristics. No substantial risks to life or property would be created from soil expansion at the proposed project, even if it were to be affected by expansive soils.

Significance Level:

Less than Significant Impact

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

Comment:
The project site is not in an area served by public sewer. Preliminary documentation provided by the applicant and reviewed by the Permit Sonoma Project Review Health Specialist indicates that the soils on site could support a septic system and the required expansion area.

Significance Level:

Less Than Significant Impact

7. GREENHOUSE GAS EMISSIONS:

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Comment:
A Climate Action 2020 Plan was developed by the Sonoma County Regional Climate Plan Authority (RCPA) in 2016 but was unable to be formally adopted due to litigation. The Sonoma County Board of Supervisors adopted a Climate Change Action Resolution on May 8, 2018 which acknowledged the Climate Action 2020 Plan and resolved to "…work towards the RCPA's countywide target to reduce GHG emissions by 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050" as well as adopting twenty goals for reducing GHG emissions including increasing carbon sequestration, increasing renewable energy use, and reducing emissions from the consumption of goods and services. The Bay Area Air Quality Management District (BAAQMD) has published greenhouse gas significance thresholds for use by local governments in the report titled *California Environmental Quality Act Air Quality Guidelines May 2017.* For projects other than stationary sources, the greenhouse gas significance threshold is 1,100 metric tons per year of CO_2e or 4.6 metric tons of CO_2e per service population (residents and employees) per year.

To assess potential greenhouse gas emissions related to the project, air quality impacts were projected. The results of the analysis, summarized in the table in Section 3(b), above, indicate that emissions from the project would be below the thresholds developed by the BAAQMD.

Significance Level:

Less than Significant Impact

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Comment:
The County has adopted General Plan Objective OSRC-14.4 which states, "Reduce greenhouse gas emissions by 25% below 1990 levels by 2015." In May 2018, the Board of Supervisors adopted a Resolution of Intent to Reduce Greenhouse Gas Emissions that included adoption of the Regional Climate Protection Agency's goal to further reduce greenhouse gas emissions by 40% below 1990 levels by 2030 and by 80% below 1990 levels by 2050. The Resolution of Intent included specific measures that can further reduce greenhouse gas emissions. All new development is required to evaluate all reasonably feasible measures to reduce greenhouse gas emissions and enhance carbon sequestration. The project will not conflict with applicable goals, objectives, plans, policies, or regulations provided mitigation measures specified below are implemented.

Mitigation Measure AIR-1:
The applicant shall submit a Greenhouse Gas Reduction Plan for PRMD review and approval that defines measures to reduce greenhouse gas emissions in the design, construction, and long-term operations of the project. The Greenhouse Gas Reduction Plan shall include all reasonably feasible measures to reduce greenhouse gas emissions to the maximum extent feasible. Measures that must be evaluated include but are not limited to best available conservation technologies for all energy and water uses, installation of renewable energy facilities to meet demand on-site, provisions of electric vehicle charging stations, bicycle facilities including secure bike parking, and lockers and showers for employees, employing best management practices for carbon sequestration, such as no till soils, reduced use of fertilizers, etc. Noted is that the applicant has filed a building permit (#BLD17-3520) to install approximately 260 panels on the western roof of the existing Ag Barn (proposed for conversion to the winery use under this use permit) which the applicant estimates could supply 95% of the existing electricity needs for the property.

Mitigation Monitoring AIR-1:
PRMD staff shall ensure that the methods selected in the Greenhouse Gas Emissions Reduction Plan are listed on all site alteration, grading, building or improvement plans prior to issuance of grading or building permits. Building/grading permits shall not be approved for issuance by Project Review Staff until the Greenhouse Gas Reduction Plan has been approved and incorporated into the design and construction documents for the project.

Significance Level:

Less than Significant with Mitigation Incorporated

8. HAZARDS AND HAZARDOUS MATERIALS:

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Comment:
Small amounts of potentially hazardous materials will be used on this project such as fuel, lubricants, and cleaning materials. Proper use of materials in accordance with local, state, and federal requirements, and as required in the construction documents, will minimize the potential for accidental releases or emissions from hazardous materials. This will assure that the risks of the

project use impacting the human or biological environment will be reduced to a less than significant level.

Significance Level:

Less than Significant Impact

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Comment:
During construction there could be spills of hazardous materials, though only small amounts of potentially hazardous materials would be involved with the proposed use. See Item 8.a,. above.

Significance Level:

Less than Significant Impact

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Comment:
The project is not located within one quarter mile of any existing or proposed school

Significance Level:

No Impact

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Comment:
The project site was not identified on, or in the vicinity of, any parcels on lists compiled by the California Environmental Protection Agency, Regional Water Quality Control Board, California Department of Toxic Substances Control, and the CalRecycle Waste Management Board Solid Development Waste Information System (SWIS). The project area is not included on the list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Significance Level:

No Impact

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Comment:
The project site is located northwest of the Charles M. Schulz – Sonoma County Airport. The project would be consistent with the Comprehensive Airport Land Use Plan, and project construction and operation is not anticipated to result in a safety hazard for people residing or working in the project area.

Significance Level:

f) For a project located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

Comment:
There are no known private airstrips within the vicinity of the proposed project.

Significance Level:

No Impact

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Comment:
The project would not impair implementation of, or physically interfere with the County's adopted emergency operations plan. There is no separate emergency evacuation plan for the County. In any case, the project would not change existing circulation patterns significantly, and would have no effect on emergency response routes.

Significance Level:

No Impact

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas of where residences are intermixed with wildlands?

Comment:
According to the Wildland Fire Hazard Areas map PS-1g of the Sonoma County General Plan 2020, the project is located in a moderate to low fire hazard zone. Construction on the project site must conform to Fire Safe Standards related to fire sprinklers, emergency vehicle access, and water supply making the impact from risk of wildland fire less than significant.

Significance Level:

Less than Significant Impact

9. HYDROLOGY AND WATER QUALITY:

Would the project:

a) Violate any water quality standards or waste discharge requirements?

Comment:
As discussed under Section 6b, (under Geology and Soils), potential water quality impacts could result from improper grading activities on site. In addition, as discussed under Section 8, (Hazards and Hazardous Materials) construction activities and use of the site by vehicles and equipment might result in drips or minor amounts of oil, fuel, or similar substances dropping onto impervious surfaces and later being washed into nearby surface waters. These types of water quality impacts can occur during project construction, post construction, and during the long term if installed methods to permanently control runoff and water quality are not maintained.

Permit Sonoma requires the project applicant to implement Low Impact Development (LID), a site design strategy of BMPs that mimics the pre-development site hydrology through features that promote storm water infiltration, interception, reuse, and evapotranspiration. LID techniques include use of small scale landscape-based BMPs such as vegetated natural filters and bioretention areas (e.g., vegetated swales and raingardens) to treat and filter storm water runoff. LID also requires preservation and protection of sensitive environmental features such as riparian buffers, wetlands, woodlands, steep slopes, native vegetation, valuable trees, flood plains, and permeable soils.

As discussed in Section 6 and Section 8, both a grading permit and hazardous materials plan subject to specific ordinance, adopted standards, and other State and Regional Agency requirements are mandated to be obtained and will reduce potential impacts from grading and hazardous materials during and post construction to a less than significant level.

The proposed project is subject to water quality regulations adopted by the State and Regional Water Quality Control Board and Permit Sonoma, including a requirement for a Standard Urban Stormwater Mitigation Plan (SUSMP). The SUSMP program requires that facilities constructed to control water quantity and quality be maintained in such a manner as to prevent their long-term degradation and insure that future increased water quality or quantity impacts do not occur. Installation of a new septic system is also subject to standard water quality protection measures.

Given the above construction, post construction, and long-term maintenance requirements and adopted standards, no significant adverse water quantity or quality impacts are expected given the mandated conditions and standards that need to be met.

Mitigation HYD-1- Grading Permits
Permit Sonoma shall require a Grading Permit and associated Erosion Prevention and Sediment Control Plan for the proposed cuts, fills, or other movement of soils to construct the proposed project, to which all applicable standards and provisions of the Sonoma County Grading and Drainage Ordinance would apply.

Mitigation Monitoring HYD-1- Grading Permits
Permit Sonoma shall not issue the Grading Permit until the Drainage Review Section receives the NOI and the WDID.

Significance Level:

Less than Significant with Mitigation Incorporated

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Comment:
As designated in the Sonoma County General Plan 2020, most of the subject parcel lies within Groundwater Availability Area Zone 1, a “major groundwater basin”. The project lies at the northern margin of the Santa Rosa Valley, Santa Rosa Plain Sub-basin, which is presently designated by the California Department of Water Resources (CDWR) as a medium priority basin.

A Groundwater Availability Study, dated July 2018 was performed for the project by Wagner & Bonsignore and was updated in 2018. For the basis of its studies, Wagner & Bonsignore determined the projected water use for the project as follows:

PROJECTED WATER USAGE CALCULATIONS:

Special Events	19,000 gallons per year (gpy)
Tasting Room	19,500 gpy
Winery Staff	39,000 gpy
Winery Staff during crush	12,600 gpy
Winery Process Wastewater	288,000 gpy
Annual Projected Water Use:	378,100 gpy or 1.2 acre-feet

Water for site landscaping and vineyard irrigation will be obtained from treated wastewater provided by the Town of Windsor. Groundwater pumping will be limited to potable water use for the onsite residences and facilities.

The maximum domestic wastewater flow per day is estimated at 785 gallons. Average daily flows during crush are estimated at 1,600 gallons, with a peak flow during crush of 2,400 gallons. Based on the water use calculations, it was determined the additional cumulative impact with development of the project would be 1.2 acre-feet of groundwater use per year. Wastewater flows to a planned expanded on-site septic system, sized to accommodate the demand.

The groundwater use study, which was reviewed and accepted by the County Geologist, determined, based on the calculated water demand, published precipitation and recharge data, and the well hydrograph estimate, annual groundwater recharge is sufficient to meet the groundwater demand for the vicinity during both average rainfall and drought years. The study found that the hydrographs reviewed in the study do not indicate long-term declines in water levels. Using the County's criteria of 50 percent rainfall during drought years, it is possible that some water level decline could occur during future dry years. However, the available data indicate that temporary declines in water levels during periods of drought have subsequently recovered in more normal rainfall years.

Given the projected water demand for the planned project, the location of the project water supply well in a major groundwater basin, and proximity to recycled water disposal areas, it is unlikely that the additional cumulative impact associated with the proposed project would lead to overdraft of the aquifer. Therefore, for the reasons discussed above, the proposed project should not result in a net deficit in aquifer volume or a lowering of the local groundwater table. Additionally, standard conditions of approval would be applied to the proposed project, including requirements for quarterly measuring of groundwater levels and quantities of use with installation of water meters; should net groundwater use exceed 1.0 acre feet per year, PRMD may bring the project to the Board of Zoning Adjustments for review. The proposed project would therefore have a less than significant impact on groundwater resources.

Mitigation Measure – HYD-2 – Groundwater Monitoring

a. Groundwater levels and quantities extracted for this use shall be measured quarterly. Data shall be reported to PRMD in January of the following year pursuant to Section WR-2d of the Sonoma County General Plan and County policies. Data shall be provided on template monitoring forms provided by PRMD.
b. Additionally, water meters shall be calibrated, and copies of receipts and correction factors shall be submitted to PRMD Natural Resources Geologist at least once every five years.
c. In the event that net water use exceeds 1.0 acre feet per year, Permit Sonoma may bring the project back to the Board of Zoning Adjustments for review of additional measures to reduce water use. If use exceeds 1.0 acre feet per year by more than 10 percent, Permit Sonoma shall bring this project back to the Board of Zoning Adjustment for review of additional measures to reduce water use.
d. The project shall comply with all applicable regulations, monitoring and fees associated with the Groundwater Sustainability Agency as applicable to the project.

Mitigation Monitoring – HYD-2 – Groundwater Monitoring

Permit Sonoma shall review operator groundwater monitoring reports and data, and bring the project

back to the Board of Zoning Adjustment if groundwater use exceeds specified limits.

Significance Level:

Less than Significant with Mitigation Incorporated

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Comment:
Construction of the proposed project involves cuts, fills and other grading. Unregulated grading during construction has the potential to increase soil erosion from a site, which could cause downstream flooding and further erosion, which could adversely impact downstream water quality. Construction grading activities shall be in compliance with performance standards in the Sonoma County Grading and Drainage Ordinance. The ordinance and adopted construction site Best Management Practices (BMPs) require installation of adequate erosion prevention and sediment control management practices. These ordinance requirements and BMPs are specifically designed to maintain water quantity and ensure erosion and siltation impacts are less than significant level during and post construction, based on the mitigation measure provided under item 8.a, above.

Significance Level:

Less than Significant with Mitigation Incorporated

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Comment:
Prior to grading or building permit issuance, construction details for all post-construction storm water Best Management Practices shall be submitted for review and approval by the Grading & Storm Water Section of Permit Sonoma. The construction plans shall be in substantial conformance with the conceptual plan reviewed at the planning permit stage.

Post-construction storm water Best Management Practices must be installed per approved plans and specifications, and working properly prior to finalizing the grading or building permits. Post-construction storm water Best Management Practices shall be designed and installed pursuant to the adopted Sonoma County Best Management Practice Guide, as required by project conditions of approval. The Best Management Practices would prevent the alteration of site drainage, or increase in surface runoff and avoid flooding. Project Low Impact Development techniques would include limiting impervious surfaces, dispersing development over larger areas, and creation of storm water detainment areas. Post construction storm water Best Management Practices include filtering, settling, or removing pollutants. The impact therefore would be less than significant based on the below mitigation measure.

Mitigation Measure HYD-3 – Best Management Practices
Permit Sonoma would verify post-construction storm water Best Management Practices installation and functionality, through inspections, prior to finalizing the permit(s). The owner/operator shall maintain the required post-construction Best Management Practices for the life of the development. The owner/operator shall conduct annual inspections of the post-construction Best Management Practices to ensure proper maintenance and functionality. The annual inspections shall typically be conducted between September 1 and September 30 of each year.

Mitigation Monitoring HYD-3 – Best Management Practices
Permit Sonoma shall conduct an inspection of the project site to ensure implementation of the

required Best Management Practices.

Significance Level:

Less than Significant with Mitigation Incorporated

e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

Comment:
The project is subject to Permit Sonoma grading and stormwater regulations. A Preliminary Storm Water Mitigation will be prepared and submitted for review by PRMD Drainage. The project would not substantially alter drainage patterns or capacities of the project site, or result in substantial additional sources of polluted runoff

Mitigation Measure HYD-4 – Storm Water
In accordance with General Plan Policy WR-1c, limit to the maximum extent practicable, post-development storm water runoff from pre-development quantities as follows:

a. Use paving surfaces on roads and parking areas that are designed to infiltrate precipitation (pervious pavement) into the ground and avoid stor water run-off from roads and parking areas;
b. Install appropriately sized rainwater catchment (large cisterns), green roofs, and/or roof infiltration devices (rain chains, spreaders, infiltration devices, etc.) on all roofs; and
c. Design storm water management on the site such that storm water runoff is not directly connected to waters of the state (streams, lakes, wetlands) via pipes, channels or other storm water outfalls.

The construction plans and final drainage report shall be prepared by a civil engineer, registered in the State of California, be submitted with the grading or building permit application or improvement plans, as applicable, and be subject to review and approval by the Grading & Storm Water Section of the Permit Sonoma prior to the issuance of any grading or building permits.

Mitigation Monitoring HYD-4 – Storm Water
Permit Sonoma shall not issue the Grading Permit until the Drainage Review Section receives, reviews and approves the construction plans and final drainage report.

Significance Level:

Less than Significant with Mitigation Incorporated

f) Otherwise substantially degrade water quality?

Comment:
Any future grading, cuts, and fills would require the issuance of a grading permit. Unregulated grading during construction has the potential to increase soil erosion which leads to water turbidity and degraded water quality. Prior to grading or building permit issuance, construction details for all water quality Best Management Practices shall be submitted for review and approval by the Grading & Storm Water Section of Permit Sonoma. The construction plans shall be in substantial conformance with the conceptual plans reviewed at the planning permit stage.

The County Grading and Drainage Ordinance and adopted Best Management Practices require installation of adequate erosion prevention and sediment control features. Inspection by County inspectors ensures that Best Management Practices are specifically designed to maintain potential water quality impacts of project construction at a less than significant level during and post construction.

Permit Sonoma would require that any construction be designed and conducted so as to prevent or minimize the discharge of pollutants or waste from the project site. Best Management Practices to be used to accomplish this goal include measures such as silt fencing, straw wattles, and soils discharge controls at construction site entrance(s). Storm water Best Management Practices may also include primary and secondary containment for petroleum products, paints, lime and other hazardous materials of concern.

Significance Level:

Less than Significant Impact

g) Place housing within a 100-year hazard area as mapped on a federal Flood hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Comment:
The project property is not located within Flood Zone A as shown on FEMA flood map 06097C056E and does not include construction of any housing.

Significance Level:

Less than Significant Impact

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Comment:
The proposed winery building development area is not located in a 100-year flood hazard area.

Significance Level:

Less than Significant Impact

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Comment:
The project winery area is not located in an area subject to flooding or inundation as a result of dam failure.

Significance Level:

Less than Significant Impact

j) Inundation by seiche, tsunami, or mudflow?

Comment:
The proposed project is not subject to seiche or tsunami. The project site is not located in an area subject to seiche or tsunami. Seiche is a wave in a lake triggered by an earthquake. Mudflow can be triggered by heavy rainfall, earthquakes or volcanic eruption. See discussion of landslide in 6.a.iv. above for areas with high potential for mudflow.

Significance Level:

No Impact

10. LAND USE AND PLANNING:

Would the project:

a) Physically divide an established community?

Comment:
The project would not physically divide a community. It does not involve construction of a facility that would result in division of a community or removal of a primary access route (such as a road or bridge) that would impair mobility within an established community or between a community and outlying areas.

Significance Level:

No Impact

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

Comment:
The project site is designated Diverse Agriculture (DA) by the County General Plan. The proposed project is consistent with General Plan goals, policies and objectives, including those which currently exist in this area. The project site is zoned Diverse Agriculture (DA) B6 40 and allows for the proposed use with a Use Permit. to modify existing structures and construct a new 29,000 sq. ft. winery building for the production of up to 40,000 cases annually, wine tasting rooms, and agricultural and industry-wide events. The existing 20,000 sq. ft. equestrian arena is proposed to be demolished to allow for the construction of the new winery building. The new winery building would include a crush pad under an awning, fermentation rooms, barrel storage rooms, a tasting room, an office, a laboratory, and employee and visitor restrooms. The existing 11,000 sq. ft. agricultural barn would be converted to a winery building to be used for barrel aging, storage, a commercial kitchen, bathrooms, conference room and employee offices, and would contain two tasting rooms. The project also proposes a total of 26 event days (18 agricultural promotional and 8 industry wide events) per year at the new winery facility.

The project would not conflict with any applicable land use plan adopted for the purpose of avoiding or mitigating an environmental effect, including in the Sonoma County General Plan and zoning ordinance.

The proposed winery use is consistent with the DA requirements. The proposed project is consistent with the General Plan's Agricultural Element Goals, Objectives and Policies, which include the following:

Policy AR-4a: The primary use of any parcel within the three agricultural land use categories shall be agricultural production and related processing, support services, and visitor serving uses. Residential uses in these areas shall recognize that the primary use of the land may create traffic and agricultural nuisance situations, such as flies, noise, odors, and spraying of chemicals."

Comment: The project site is within the DA General Plan land use category, and the primary proposed use would remain vineyards with an agricultural processing facility. The potential impacts related to noise, odors, traffic and light have been addressed in specific sections of this Initial Study, and, where appropriate, mitigation measures established to reduce impacts to levels of insignificance. Additionally, project conditions of approval would further regulate the proposed use.

Policy AR-6d: Follow these guidelines for approval of visitor serving uses in agricultural areas:

(1) *The use promotes and markets only agricultural products grown or processed in the local area.*
Comment: The winery will continue to promote agricultural products grown in the local area.

(2) The use is compatible with and secondary and incidental to agricultural production activities in the area.
Comment: The primary agricultural production activity in Sonoma County is wine grape vineyards. Because the proposed wine tasting room would support continued facilitation of the processing of grapes into wine, it is considered incidental and secondary to agricultural activities on site and in the area.

(3) The use will not require the extension of sewer and water.
Comment: The use will be served by on-site septic system (new leach field system is proposed near the location of the existing system) and existing well.

(4) The use is compatible with existing uses in the area.
Comment: The tasting room will operate only during normal business hours. Events are proposed at various times during the day and into evening hours. As discussed in this Initial Study, noise, traffic and other land use considerations are addressed and regulated through project design, application of mitigation measures (where appropriate) and conditions of project approval. The winery and tasting room and events therefore are not expected to result in a significant impact or disturbance to residential neighbors, the nearest being located several hundred feet off-site.

(5) Hotels, motels, resorts, and similar lodging are not allowed.
Comment: The proposed project does not propose any overnight marketing accommodations.

(6) Activities that promote and market agricultural products such as tasting rooms, sales and promotion of products grown or processed in the County, educational activities and tours, incidental sales of items related to local area agricultural products are allowed.
Comment: The project includes a tasting room proposed for sales and both marketing and agricultural events that promote local wine.

With respect to General Plan's Water Resources Element, protection of local groundwater supplies are addressed through the following:

Objective WR-2.3: Encourage new groundwater recharge opportunities and protect existing groundwater recharge areas.

Comment: The applicant's project plans include use of LID measures to help ensure on-site capture and infiltration of runoff to storm-drain improvements and channels.

Policy WR-2e: Require proof of groundwater with a sufficient yield and quality to support proposed uses in Class 3 and 4 water areas. Require test wells or the establishment of community water systems in Class 4 water areas. Test wells may be required in Class 3 areas. Deny discretionary applications in Class 3 and 4 areas unless a hydrogeologic report establishes that groundwater quality and quantity are adequate and will not be adversely impacted by the cumulative amount of development and uses allowed in the area, so that the proposed use will not cause or exacerbate an overdraft condition in a groundwater basin or subbasin. Procedures for proving adequate groundwater should consider groundwater overdraft, land subsidence, saltwater intrusion, and the expense of such study in relation to the water needs of the project.

Comment: The applicant provided a groundwater availability study which determined that the project would result in an approximate net increase of 1.2 acre feet/year for increased use of groundwater.

This increased water demand could be accommodated through continued use of the existing well, and the project would not be expected to result in a significant impact to groundwater levels in the project impact area. See further discussion above in Section 8.b, above.

The project as proposed is consistent with the General Plan and Zoning Ordinance policies related to agricultural processing facilities and related visitor serving uses. Mitigation measures and monitoring have been incorporated into this Initial Study to reduce potential environmental impacts; thus potential conflicts with land use and zoning policies are considered less than significant. The existing vineyard operation is a permitted use and is not a part of the project or subject to CEQA requirements.

Significance Level:

Less than Significant Impact

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

Comment:
Habitat conservation plans and natural community conservation plans are site-specific plans to address effects on sensitive species of plants and animals. The project site is not located in an area subject to a habitat conservation plan or natural community conservation plan. See additional discussion under item 4.f, above.

Significance Level:

No Impact

11. MINERAL RESOURCES:

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Comment:
The project site is not located within a known mineral resource deposit area (Sonoma County Aggregate Resources Management Plan, 2010).

Significance Level:

No Impact

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Comment:
The project site is not located within an area of locally-important mineral resource recovery site and the site is not zoned MR (Mineral Resources) (Sonoma County Aggregate Resources Management Plan, as amended 2010 and Sonoma County Zoning Code). No locally-important mineral resources are known to occur at the site.

Significance Level:

No Impact

12. NOISE:

Would the project:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Comment:
The Noise Element of the Sonoma County General Plan establishes goals, objectives and policies including performance standards to regulate noise affecting residential and other sensitive receptors. The General Plan sets separate standards for transportation noise and for noise from non-transportation land uses, listed below.

TABLE NE-2: Maximum Allowable Exterior Noise Exposures

Hourly Noise Metric[1], dBA	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
L50 (30 minutes in any hour)	50	45
L25 (15 minutes in any hour)	55	50
L08 (4 minutes 48 seconds in any hour)	60	55
L02 (72 seconds in any hour)	65	60

[1] The sound level exceeded n% of the time in any hour. For example, the L50 is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L02 is the sound level exceeded 1 minute and 12 seconds in any hour.

A noise assessment of the project was conducted by the applicant's consultant, Illingworth & Rodkin (May 2016), and further clarified in a letter dated August 11, 2017. The noise assessment considered existing noise conditions at the site, as well as projected noise levels resulting from project construction and new tasting room operations, including the use of the outdoor garden areas, and proposed use of amplified sound during events. The use of amplified music would take place inside the Winery Building and will not be permitted after 9:30 p.m.

To quantify the existing noise levels near the property lines of the closest noise sensitive (residential) uses, an ambient noise monitoring survey consisting of one long-term noise measurement was conducted. The long-term sound level measurement (LT-1) was made on the project property at a distance of 45 feet from the centerline of Starr Road on the project site at the setback of the existing residence above the agricultural barn, the approximate setback of the property line setback of the closest off-site residential use from Starr Road. Noise levels measured at this site were primarily produced by traffic on Starr Road, with aircraft overflights associated with the Sonoma County Airport, on-site landscaping work, dogs barking at Residence 1, and bird chirps, insects, and other noise associated with wooded rural areas also contributing to the ambient noise environment. The average weekday noise levels at this site ranged from 42 to 62 dBA Leq during the day, and 33 to 51 dBA Leq at night, and average weekend noise levels ranged from 38 to 56 dBA Leq during the day and 32 to 44 dBA Leq at night. The calculated average day/night noise level (Ldn) at this location was 53 dBA on weekdays and 52 dBA weekends.

Proposed Project – Vehicle-Related Noise:

Automobile parking and traffic
Based on a review of the development areas shown in the project site plan and distance information

obtained via Goggle Earth, the primary visitor parking areas on the site would be situated approximately 600 feet from the outdoor use areas of the onsite residential unit and the three residential units closest to the site and 400, 760, and 820 feet from the respective property lines. Considering this, maximum noise generated by automobile and light vehicle parking on the winery site would be 36 dBA at the outdoor use area of onsite residence, 40 dBA at the property line of one residence, and 33 dBA at the property lines of the two others.

A review of the project site development plan and distance information obtained via Goggle Earth indicate that the visitor access drive would be on the western side of the site approximately 620 feet from the outdoor use areas of the onsite residence and 350, 780, and 800 feet from the respective property lines of the other three. Considering these distances and that automobile speeds on the driveway would be expected to be 20 mph or less, the noise analysis found the highest average noise generated by automobile and light vehicles on the access road would be 38 dBA at the outdoor use area of the onsite residence, 43 dBA at the property line of Residence 1, 36 at the property line of Residence 2, and 35 dBA at the property line of Residence 3.

Given the expected visitor and employee use, these activities are expected to occur for less than 5 minutes out of an hour on a typical day and fall in the 5 minutes per hour or L25 NE-2 daytime category of 60 dBA. However, during events or on busy weekends, such activities may occur more frequently and fall in the 15 minutes per hour or L25 NE-2 daytime category of 55 dBA.

Considering the findings of the noise analysis, noise levels associated with automobiles and light vehicles using the project driveways and parking lots would not be expected to exceed the daytime NE-2 noise standards at the property lines of any adjacent noise sensitive residential uses.

Truck traffic

Trucks visiting the winery site will also use the existing site driveways at the perimeter and traversing the northern portion of the site access road. This would take medium trucks approximately 620 feet from the outdoor use areas of the onsite residence and 160, 780, and 800 feet from the respective property lines of Residences 1, 2 and 3, and heavy trucks approximately 620 feet from the outdoor use areas of the onsite residence and 350, 780, and 800 feet from the respective property lines of Residences 1, 2 and 3. Considering these distances, and the highest average noise generated by medium and heavy trucks passing on the access road would, respectively, be 44 and 54 dBA at the outdoor use area of onsite residence, 52 and 57 dBA at the property line of Residence 1, and 42 and 52 dBA at the property lines of Residences 2 and 3.

The findings of the noise study indicate that noise associated with daytime heavy trucks and daytime or nighttime medium trucks on the project would not exceed the County NE-2 noise standards at the identified property lines or use areas of the nearby adjacent noise sensitive uses. However, the Table 6 findings also show that the nighttime use of heavy trucks on the site would exceed the nighttime NE-2 noise standards at the property line of Residence 1. Considering these findings, the project noise study has recommended limiting use of heavy truck traffic between the hours of 10 pm and 7 am, included as a condition of approval for the project.

Winery Production Noise

Expected winery operational noise would be related to crush and bottling, including use of equipment such as fork lifts. The noise analysis found that maximum noise readings of 45 dBA (L_{50}) at the property line of offsite Residence 1 could occur as part of crush activities and a 45 dBA (L_{25}) noise reading from intermittent use of fork lifts; these readings would meet the County's noise limits.

Event Noise

The winery requests up to a total of 26 event days per year. Based on the project description these events would consist of 11 events with 200 guests, 4 events with 150 guests, and 11 events with 100 guests. Live amplified music at events is requested, however live amplified music will only occur inside the winery buildings.

A review of the development plan and distance information obtained via Goggle Earth indicates that the center of the outdoor garden areas will be approximately 700 feet from the outdoor use areas of the onsite residence and 400, 790, and 810 feet from the respective property lines of Residences 1, 2 and 3, and the winery buildings will be approximately 680 feet from the outdoor use areas of onsite residence and 250, 790, and 810 feet from the respective property lines of Residences 1, 2 and 3. Using these distances and the noise shielding considerations for outdoor and indoor events, the noise analysis found that the L50 sound levels for the typical noise source levels for outdoor and indoor events were calculated at the outdoor use areas of the onsite residence and the near property lines of Residences 1, 2 and 3.

The analysis found that all events would be expected to comply with daytime or nighttime NE-2 noise standards at the property line of the nearest adjacent residences. The maximum level of noise would be that associated with outdoor activities of the largest events (200 guests, at 11 event days per year) and conversational noise, with a reading of 45 dBA (L_{50}) at the property line of offsite Residence 1; this would meet the County's noise limit. The maximum noise reading associated with amplified music (which would occur indoors during events) would be 43 dBA (L_{50}) at the property line of offsite Residence 1; this would also meet the County's noise limit.

Permit Sonoma – Health, has provided requirements that will be applicable to the proposed project, including:

- Noise shall be controlled in accordance with Table NE-2 (or an adjusted Table NE-2 with respect to ambient noise as described in General Plan 2020, Policy NE-1c,) as measured at the exterior property line of any affected residential or sensitive land use:

TABLE NE-2: Maximum Allowable Exterior Noise Exposures

Hourly Noise Metric[1], dBA	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
L50 (30 minutes in any hour)	50	45
L25 (15 minutes in any hour)	55	50
L08 (4 minutes 48 seconds in any hour)	60	55
L02 (one minute and 12 seconds in any hour)	65	60

[1] The sound level exceeded n% of the time in any hour. For example, the L50 is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L02 is the sound level exceeded 1 minute in any hour.

Adjusted TABLE NE-2: Maximum Allowable Exterior Noise Exposures

Hourly Noise Metric[1], dBA	Daytime[2] (7 a.m. to 10 p.m.)	Nighttime Not allowed during nighttime hours (10 p.m. to 7 a.m.)
L50 (30 minutes in any hour)	45	
L25 (15 minutes in any hour)	50	
L08 (4 minutes 48 seconds in any hour)	55	
L02 (one minute and 12 seconds in any hour)	60	

[1] The sound level exceeded n% of the time in any hour. For example, the L50 is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L02 is the sound level exceeded 1 minute in any hour.
[2] Adjusted down 5 dBA for speech and music.

- Special events shall be limited to the hours of the Daytime Noise Standard found in the Noise Element of the Sonoma County General Plan (currently 7:00 a.m. to 10:00 p.m.).

- Amplified sound and the very loud musical instruments (such as horns, drums and cymbals) are not permitted outdoors, however are permitted indoors with all the windows closed. The quieter, non-amplified musical instruments (such as piano, stringed instruments, woodwinds, flute, etc) are allowed outdoors when in compliance with the Noise Element of the Sonoma County General Plan.

- If noise complaints are received from nearby residents, and they appear to be valid complaints in PRMD's opinion, then the applicant shall conduct a Noise Study to determine if the current operations meet noise standards and identify any additional noise Mitigation Measures if necessary.

- Agricultural promotional events that include outdoor music shall be background music not exceeding the level of ordinary conversations.

These measures, contained in the project conditions of approval, are combined with the below mitigation measure:

Mitigation Measure NOISE-1:
PRMD Project Review Division staff shall ensure that the project complies with project conditions of approval and measures identified in the project noise analysis prepared by Illingworth & Rodkin.

Mitigation Monitoring NOISE-1:
PRMD Project Review Division staff shall ensure that the measures are listed on all site alteration, grading, building or improvement plans, prior to issuance of grading or building permits. PRMD staff shall inspect the site prior to construction to assure that the signs are in place and the applicable phone numbers are correct. Any noise complaints will be investigated by PRMD staff. If violations are found, PRMD shall seek voluntary compliance from the permit holder, or may require a noise consultant to evaluate the problem and recommend corrective actions, and thereafter may initiate an enforcement action and/or revocation or modification proceedings, as appropriate.

Significance Level:

Less than Significant with Mitigation Incorporated

b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?

Comment:
The project includes construction activities, including use of heavy equipment (such as bulldozers and trucks) and construction tools, that may generate ground-borne vibration and noise. With construction activities (including grading) located a minimum of approximately 1,000 feet from the nearest off-site residence, and limited to daytime hours, short-term and temporary construction-related noise is not expected to be significant, and construction noise is not anticipated to exceed County noise standards of 65 dBA L02 or 60 dBA L08 at off-site residences. There are no other activities or uses associated with the project that would expose persons to or generate excessive ground borne vibration or ground borne noise levels. This is a less-than-significant impact.

Construction activities are also regulated by County Codes and conditions of the project that would also limit construction hours. There are no other activities or uses associated with the project that would expose persons to or generate excessive ground borne vibration or ground borne noise levels.

Significance Level:

Less than Significant Impact

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Comment:
The noise assessment of the project was conducted by the applicant's consultant, Illingworth & Rodkin (March, 2018), included assessment of existing (ambient) noise levels, as well noise levels expected to result from the addition of the project to winery operations. The average weekday noise levels at this site ranged from 42 to 62 dBA Leq during the day, and 33 to 51 dBA Leq at night, and average weekend noise levels ranged from 38 to 56 dBA Leq during the day and 32 to 44 dBA Leq at night. The calculated average day/night noise level (Ldn) at this location was 53 dBA on weekdays and 52 dBA weekends.

Effects of noise from proposed project vehicle trips and event noise were also assessed relative to ambient noise levels. The additional trips resulting from the proposed project would not measurably increase existing ambient traffic noise levels. Residential receptors in the vicinity of the site would be located as close as 400 feet and as far away as 820 feet from the newly constructed winery building. The resultant noise levels at the property lines of these residences were calculated to range from 31 to 45 dBA L08 on a typical day.

Significance Level:

Less than Significant Impact

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Comment:
The noise assessment of the project was conducted by the applicant's consultant, Illingworth & Rodkin (May 2018), included assessment of existing (ambient) noise levels, as well noise levels expected to result from the addition of the project to winery operations. Existing ambient day-night average noise levels were found to range from 37 to 57 dBA Ldn. The resultant noise levels at the property lines of the four residences were calculated to range from 33 to 45 dBA L08 on a typical day. Noise resulting from the operation of the tasting room parking lot would be in the range of existing ambient noise levels during the daytime and would not exceed the Table NE-2 noise limits contained in the Sonoma County General Plan. See mitigation incorporated in item 12(a) above.

Significance Level:

Less than Significant Impact

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Comment:
The project site is located northwest of the Charles M. Schulz – Sonoma County Airport. The project would be consistent with the Comprehensive Airport Land Use Plan, and project construction and

operation is not anticipated to result in a significant noise impact for people residing or working in the project area.

Significance Level:

Less than Significant Impact

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Comment:
There are no known private airstrips within the project area and people residing or working in the project area would not be exposed to excessive noise.

Significance Level:

No Impact

13. POPULATION AND HOUSING:

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Comment:
The proposed project will not require any new infrastructure that would induce substantial population growth.

Significance Level:

No Impact

b) Displace substantial numbers of existing housing necessitating the construction of replacement housing elsewhere?

Comment:
No housing will be displaced by the project and no replacement housing is proposed to be constructed.

Significance Level:

No Impact

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

Comment:
No people will be displaced by the project and no replacement housing will be required.

Significance Level:

No Impact

14. PUBLIC SERVICES:

Would the project:

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service rations, response times or other performance objectives for any of the public services:

Comment:
Construction of the project would not involve substantial adverse physical impacts associated with provision of public facilities or services. The impact would be less than significant.

Significance Level:

Less than Significant Impact

i. Fire protection?

Comment:
The Windsor Fire Protection District will provide service to this area. There will be no significant increased need for fire protection resulting from the proposed project.

Sonoma County Code requires that all new development meet Fire Safe Standards (Chapter 13). The County Fire Marshal reviewed the project description and requires that the expansion comply with Fire Safe Standards, including fire protection methods such as sprinklers in buildings, alarm systems, extinguishers, vegetation management, hazardous materials management and management of flammable or combustible liquids and gases. This is a standard condition of approval and required by county code and impacts would be less than significant.

Significance Level:

Less than Significant Impact

ii. Police?

Comment:
The Sonoma County Sheriff will provide service to this area. There is no anticipated significant increased need for police protection resulting from the proposed project.

Significance Level:

Less than Significant Impact

iii. Schools, parks, or other public facilities?

Comment:
There are no anticipated impacts on public services associated with the use.

Significance Level:

No Impact

iv. Parks?

Comment:
The project will not result in the need for any new park facilities. The project includes on-site, private recreational facilities for use by guests.

Significance Level:

No Impact

v. Other public facilities?

Comment:
There are no other anticipated impacts on public services associated with the use.

Significance Level:

No Impact

15. RECREATION:

Would the project:

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Comment:
The proposed project would not involve activities that would cause or accelerate substantial physical deterioration of parks or recreational facilities. The project includes on-site, private recreational facilities for use by guests. The project will have no impact on the use of existing neighborhood and regional parks or other recreational facilities.

Significance Level:

No Impact

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Comment:
The proposed project involves construction of private recreational facilities for use by guests. The construction impacts have been addressed in this Initial Study, including for potential impacts in the areas of Aesthetic, Biological Resources, Cultural Resources, and Geology and Soils.

Significance Level:

No Impact

16. TRANSPORTATION / TRAFFIC:

Would the project:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Comment:
The *Sonoma County General Plan 2020* established significance standards for both intersections (LOS D or better) and roadways (LOS C or better). Compliance with these LOS standards ensures County-accepted traffic movement standards will be met with respect to operation of intersections and along roadways

The proposed project would generate traffic related to the production of 40,000 cases of wine annually; a tasting room open to the public seven (7) days a week; and 26 proposed events.

To address these concerns, a traffic impact study was conducted for the project by W-Trans (May 2018). The analysis considered existing and future transportation and circulation conditions at the project site and included the intersections of Starr Road/Reiman Lane, Windsor Road/Shiloh Road, and Mark West Station Road/Starr Road.

The traffic study indicates that, using the County's wine trip generation assumptions, the proposed project is expected to generate 75 trips per day during harvest conditions, including 18 weekday p.m. peak hour trips and 19 trips during the midday peak hour on weekends. The largest proposed agricultural promotional event of 200 attendees would be expected to generate 80 trip ends before and after the event on a weekend. Under anticipated future volumes, the study intersections are expected to operate at LOS A or B overall during both peak hours with the addition of the project and event-related trips.

The assessment found that the study area lacks pedestrian facilities or transit service. Given the rural nature of the area it is reasonable to assume there would not be any pedestrian travel or demand for transit service. Therefore, the lack of facilitates is considered acceptable. The study further determined that existing and planned on-site bicycle facilities, along with the proposed 25 bicycle parking spaces, would provide adequate access for bicyclists.

The project fences obscures sight distances to the west and east of the project driveway. To provide adequate sight lines, the applicant has agreed to move the fences back. A left-turn lane entering or exiting the site is not warranted based on the results of the Traffic Study, and was not recommended for the project driveway on Starr Road.

Mitigation Measure – TRAF-1
The applicant shall move the existing fence at the perimeter of subject parcel bordering on Starr Drive back to provide adequate sight lines at the project entry.

Mitigation Monitoring – TRAF-1
Planning will not sign off on building plans until the fence has been moved and inspected by PRMD.

Significance Level:

Less than Significant with Mitigation Incorporated

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Comment:
Sonoma County does not have a congestion management program but LOS standards are established by the Sonoma County General Plan Circulation and Transit Element. See Item 16(a) above for a discussion of traffic resulting from project construction and operation.

Significance Level:

Less than Significant Impact

c) Result in change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Comment:
The project would have no effect on air traffic patterns.

Significance Level:

No Impact

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Comment:
The project would not include any hazardous design features or uses that would obstruct roadways or compromise sight distances.

Significance Level:

No Impact

e) Result in inadequate emergency access?

Comment:
Development on the site will be required to comply with all emergency access requirements of the Sonoma County Fire Safety Code (Sonoma County Code Chapter 13), including emergency vehicle access requirements, pursuant to standard conditions of approval. Project development plans are required to be reviewed by a Department of Fire and Emergency services Fire Inspector during the building permit process to ensure compliance with emergency access issues.

Significance Level:

Less than Significant Impact

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Comment:
The project would not create conflicts with County bicycle standards or plans for use alternative transportation, including bus turnouts. Starr Road is identified for use as a Class III bikeway in the County's 2010 Bikeways Management Plan. The project Traffic Study did not identify a conflict for bicycle use along Starr Road.

Significance Level:

No Impact

g) Result in inadequate parking capacity?

Comment:
W-Trans analyzed the proposed parking Traffic Study for the project. A total of 122 marked spaces, including 6 ADA accessible spaces, will be provided. The maximum number of parking spaces that would be needed on-site to accommodate employees and visitors during a 200-person agriculture promotional event was estimated based on the County's standard vehicle occupancies of 1 employee or 2.5 visitors per vehicle. Based on these operational parameters, during a 200-person event, a total of 104 parking spaces would be needed, including 80 for guests, ten for event staff, and 14 for winery employees. The total parking supply of 122 spaces at the winery is therefore anticipated to exceed parking demand. sufficient to meet the anticipated peak parking demand.

Significance Level:

Less Than Significant Impact

17. UTILITIES AND SERVICE SYSTEMS:

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Comment:
Domestic wastewater disposal would be by septic systems, and therefore, would have no impact upon a wastewater treatment system, or require action by the Regional Water Quality Control Board.

Significance Level:

No Impact

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Comment:
The project would not contribute to the need for construction of new water or wastewater treatment facilities, other than construction to expand the existing septic system.

Significance Level:

No Impact

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Comment:
The project proposes the construction of the new 29,000 sq. ft. winery, construction of a 2,000 sq. ft. agriculture storage building and the expansion of the existing septic system. Grading of the site for

the proposed new construction and septic systems may alter the natural topography and may alter the drainage pattern and increase storm water runoff. Development would only be permitted after Permit Sonoma reviews storm water drainage development plans designed by a storm water engineer to ensure adequate management of storm-water drainage facilities on the site.

Significance Level:

Less than Significant Impact

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Comment:
The proposed project is located within a Class 1 groundwater area and within the medium priority Santa Rosa Basin defined through CA DWR Bulletin 118. Per requirements of the General Plan Policy WR-2E and Sonoma County Code Chapter 26-88-250 a hydrogeologic report was required of the project.

A Groundwater Availability Study, dated July 2018 was performed for the project by Wagner & Bonsignore and was updated in 2018. For the basis of its studies, Wagner & Bonsignore determined the projected water use for the project as follows:

PROJECTED WATER USAGE CALCULATIONS:

Special Events	19,000 gallons per year (gpy)
Tasting Room	19,500 gpy
Winery Staff	39,000 gpy
Winery Staff during crush	12,600 gpy
Winery Process Wastewater	288,000 gpy
Annual Projected Water Use:	378,100 gpy or 1.2 acre-feet

Water for site landscaping and vineyard irrigation will be obtained from treated wastewater provided by the Town of Windsor. Groundwater pumping will be limited to potable water use for the onsite residences and facilities.

The maximum domestic wastewater flow per day is estimated at 785 gallons. Average daily flows during crush are estimated at 1,600 gallons, with a peak flow during crush of 2,400 gallons. Based on the water use calculations, it was determined the additional cumulative impact with development of the project would be 1.2 acre-feet of groundwater use per year.

The Hydrogeologic Study Wagner and & Bonsignore meets the specifications of PRMD Policy 8-1-14 for hydrogeologic studies. The report finds that groundwater storage (2,900 acre-feet) and recharge (21 to 42 acre-feet/year) are substantially greater than proposed water demands of the project (1.2 acre-feet/year) or the cumulative impact area (13.5 acre-feet/year). The report concludes there is little potential to negatively impact groundwater supply, groundwater levels in neighboring wells, and surface waters. PRMD review of the report finds that the analysis well documented and of appropriate detail and effort to support the finding. It is also noted that the water use estimate of the project is conservative in nature and likely overestimates groundwater use of the project at 1.95 acre-feet/year. Based on water use rates from similar projects, the project is expected to have a water use rate between 0.5 and 1.0 acre-feet/year, similar to the water use rate of a rural residence.

Given the projected water demand for the planned project, the location of the project water supply well in a major groundwater basin, and proximity to recycled water disposal areas, it is unlikely that the additional cumulative impact associated with the proposed project would lead to overdraft of the aquifer. Therefore, for the reasons discussed above, the proposed project should not result in a net deficit in aquifer volume or a lowering of the local groundwater table. Additionally, conditions of

approval, addressed above (Section 9.b) as project mitigation measures, would be applied to the proposed project, including requirements for quarterly measuring of groundwater levels and quantities of use with installation of water meters; should net groundwater use exceed 1.0 acre feet per year, PRMD may bring the project to the Board of Zoning Adjustments for review. The proposed project would therefore have a less than significant impact on groundwater resources.

Significance Level:

Less than Significant Impact with Mitigation

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Comment:
Sanitary wastewater will be discharged to new and existing permitted septic systems. The main components of the standard septic system will be a 2,000-gallon capacity septic tank and a combination of standard trench leach and pre-treatment with sub-surface drip disposal systems. A report created by Huffman Engineering and Surveying, dated January 30, 2017, concluded the proposed system would support the peak flows of the new uses. There will be no sewage treatment by an off-site provider.

Significance Level:

Less than Significant Impact

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Comment:
Sonoma County has a solid waste management program in place that provides solid waste collection and disposal services for the entire County. The program can accommodate the permitted collection and disposal of the waste that would result from the proposed project.

Significance Level:

Less than Significant Impact

g) Comply with federal, state, and local statutes and regulations related to solid waste?

Comment:
Sonoma County has access to adequate permitted landfill capacity to serve the proposed project.

Significance Level:

No Impact

18. MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

There are no known special status species on the project site, and none listed on the State's Diversity Database. The project development does not include any work within a creek or waterway. The project will not cause a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means; the project will not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites; the project site does not contain any unique habitat, or unique plant or animal population; the project will not conflict with any local policies or ordinances protecting biological resources, such as the County's Tree Protection Ordinance. With implementation of Best Management Practices related to grading and erosion control, the project will not result in any potentially significant adverse biological impacts to the environment on site or off site.

Less than Significant Impact

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Cumulative projects include development of the new winery building and related site improvements in the project area, as well as existing and other recently approved improvements to the project site. These projects have not resulted in any significant effects to which the project would make a cumulatively considerable contribution. As noted in this Initial Study, this project will not result in incremental contribution to any cumulatively significant impacts. For aesthetics, lighting impacts will be reduced to levels of insignificance through application of mitigation measures that will limit use and placement of nighttime lighting, and thereby limit project contribution to cumulative lighting levels in the project area. Biological resource impacts are insignificant related to site development and would not contribute to any incrementally significant cumulative impact to area biological resources. There would be no use of hazardous materials that would result in individually limited but cumulatively significant impact in the area. Storm drainage controls on-site as part of the project would limit project impacts and any potential contribution to cumulative drainage impacts in the area. The project's traffic study analyzed expected project impacts and cumulative traffic conditions in the area, inclusive of existing/project/future cumulative conditions, and found that the project would operate within prescribed County Levels of Service and not significantly impact traffic conditions at the project level. Potential air quality and greenhouse gas impacts of the project were determined to avoid potentially significant cumulative impact based on the traffic that would be generated from winery use and during events, t was found to be below all applicable BAAQMD air quality and GHG thresholds, along with application of standard County grading and permitting requirements. Noise impacts were also evaluated and were determined to be insignificant at the project level, and would not, based on noise assessment of project noise-generating activities, result in a cumulatively significant impact when considering current, project and cumulative condition scenarios. Conditions of approval and a noise mitigation measure have been identified. A groundwater availability study analyzed potential impacts to area (off-site) wells, and found that the project would not adversely affect area groundwater levels

or adversely impact area wells, and therefore would not result in a cumulatively significant impact to local groundwater supplies.

Less than Significant Impact

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

The project would not result in any significant changes to the existing environment. Based on the discussion and information provided in this initial study, there are no project-related environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly. Compliance with local area design guidelines ensure that aesthetic impacts are less than significant. Conditions have been incorporated into the project and mitigation measures imposed which reduce traffic and cultural impacts to a less than significant level. Specific conditions are placed on the project to control noise levels and limit hours of operation

Less than Significant Impact

References

1. Sonoma County Important Farmland Map 1996. California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program.

2. Assessor's Parcel Maps, County of Sonoma

3. BAAQMD CEQA Guidelines; Bay Area Air Quality Management District; April 1999; California Air Resources Board (CARB) http://www.arb.ca.gov/

4. California Natural Diversity Database, California Department of Fish & Game.

5. PRMD, Sonoma County General Plan 2020 (as amended), September 23, 2008.

6. Bricoleur Winery Environmental Noise Assessment, prepared by Illingworth & Rodkin, March 2018.

7. Historical Resources Study for the Bricoleur Winery Project, prepared by Tom Origer & Associates, February 2018.

8. Groundwater Availability Study, prepared by Wagner & Bonsignore, February 2018),

9. Traffic Impact Study for Bricoleur Winery Project, prepared by W-Trans, May 2018.

10. California Environmental Protection Agency - http://www.calepa.ca.gov/SiteCleanup/corteseList/default.htm; California Regional Water Quality Control Board - http://geotracker.swrcb.ca.gov/; California Dept of Toxic Substances Control http://www.dtsc.ca.gov/database/calsites/cortese_list.cfm, and Integrated Waste Management Board - http://www.ciwmb.ca.gov/SWIS/Search.asp

11. Alquist-Priolo Special Studies Zones; State of California; 1983. http://www.conservation.ca.gov/cgs/rghm/ap/Pages/official_release.aspx

12. Flood Insurance Rate Maps, Federal Emergency Management Agency https://msc.fema.gov/portal

13. General Plan Environmental Impact Report, Sonoma County Permit & Resource Management Department. http://www.sonoma-county.org/prmd/gp2020/gp2020eir/index.htm

14. Valley Oak Protection Ordinance, County Code Section 26-67; Sonoma County, December 1996.

15. Heritage or Landmark Tree Ordinance, County Code Chapter 26D; Sonoma County.

16. Manual of Standards for Erosion and Sediment Control Measures, Association of Bay Area Governments; May, 1995.

17. Soil Survey of Sonoma County, California, Sonoma County, U.S. Department of Agriculture; 1972. https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/sonomaCA1972/sonomaCA1972.pdf

18. Evaluation of Groundwater Resources, California Department of Water Resources Bulletin 118; 2003. http://water.ca.gov/groundwater/bulletin118/publications.cfm

19. Sonoma County Congestion Management Program, Sonoma County Transportation Authority; December 18, 1995.

20. Sonoma County Bikeways Plan, Sonoma County Permit and Resource Management Department, August 24, 2010.

21. Sonoma County Permit and Resource Management Department and Department of Transportation and Public Works Traffic Guidelines, 2014

22. Sonoma County Permit and Resource Management Department, Visual Assessment Guidelines, (no date)

23. Sonoma County Permit and Resource Management Department Noise Guidelines, 2017

24. Sonoma County Water Agency, Sonoma Valley Groundwater Management Plan, 2007 and annual reports. http://www.scwa.ca.gov/svgw-documents/

25. Sonoma County Water Agency, Santa Rosa Plain Groundwater Management Plan, 2014. http://www.water.ca.gov/groundwater/docs/GWMP/NC-5_SRP_SonomaCoWaterAgency_GWMP_2014.pdf

Attachments

A. Applicant's Project Description

B. Project Plans

C. Groundwater Availability Study Update

D. Septic Findings Report

E. Well and Septic Letter, January 2017

F. Noise Assessment

G. Traffic Study

PROPOSAL STATEMENT

Use Permit Application for a Winery

Applicant/Agent:	Starr Holdings, LLC Mark Hanson - Manager 2269 Chestnut Street, Suite 450 San Francisco, CA 94123
Architect:	Michael Guthrie Michael Guthrie + Co. Architects 601 4th Ave, Suite 110 San Francisco, CA 94107
Engineer:	Tom Atterbury Atterbury & Associates, Inc. 16109 Healdsburg Ave., Suite D Healdsburg, CA 95448
Owner:	Starr Holdings, LLC Mark Hanson - Manager 2269 Chestnut Street, Suite 450 San Francisco, CA 94123
Location:	7390 / 7394 Starr Road Windsor, CA 95492
APN:	APN #066-220-019
Site Size:	18.93 acres
Zoning:	Diverse Agriculture (DA) B6 40, BR, F1, F2, VOH
Updated:	February 15, 2018

Applicant requests the issuance of a use permit for a winery with an annual production capacity of 40,000 cases, with public tours and tastings, and a specific list of authorized events.

Current Use: The property has 8 acres of producing vineyards and an additional 13 acres of producing vineyards on the adjoining parcel to the west (also owned by Starr Holdings, LLC), and 180 producing olive trees. The property contains an ag barn (being modified under Building Permit BLD16-4417 and BLD16-6355), a commercial equestrian arena, a 4-bedroom primary single-family dwelling, a garden pavilion (being built under BLD17-1917), an accessory dwelling above the milk barn (BLD – In Process), and an Ag employee unit, and three small utility buildings (electrical, water / pump house and fire pump house).

Proposed Use: The applicant requests a use permit for a winery producing up to 40,000 cases/year, including a tasting room with public tours and tastings, and a specific list of authorized events. The tasting room would sell olive oil, honey, vegetables, and other farm products grown on the property and from local Sonoma County farms. The existing Ag Barn would be converted to a winery building utilized for barrel aging and storage with a commercial kitchen, bathrooms, conference room and employee offices. The tasting room would be in this building until construction of a new tasting room is warranted. The actual crushing of the grapes, fermentation, wine production and barrel cleaning would continue to be performed at an off-site, third-party custom crush facility until the winery production facility is complete.

Construction: The winery buildings include new construction on the site of the existing 20,000 sq. ft. commercial equestrian arena which will be removed. The total footprint area of the property dedicated to buildings will remain in approximately the same area as existing buildings. The winery would include a crush pad under a covered roof, fermentation rooms, barrel storage rooms, a tasting room, an office, a laboratory, and employee and visitor restrooms. The proposed building footprint is approximately 29,000 square feet.

Solar: We have submitted for a permit (#BLD17-3520) to install ~260 panels on the western roof of the existing Ag Barn (proposed Winery) which could supply ~95% + of the existing electricity needs for the property. Additional solar would be installed on the Winery and Ag Storage buildings to handle future energy requirements with the goal of being energy self-sufficient.

Operations: The winery will engage in all phases of wine production, including crushing, fermenting, barrel aging and bottling which will be provided by mobile truck a few times a year. The mobile truck would pull into the covered crush pad area. Grapes will be sourced from the 8 acres of existing vineyards on the property and an additional 13 acres on the adjoining parcel to the west, and from other third party vineyards in Sonoma County.

Hours: The requested hours of operation for the winery will be from 7:00 am to 6:00 pm, 5 days a week, except during harvest when operations will be conducted 7 days a week from 7 am to 8 pm or as needed. The hours of operation for the tasting room will be from 10:00 am to 5:30 pm, 7 days a week. The winery expects a maximum of 30 visitors per day spread out through the day to the tasting room.

Tasting room: The winery will be set up to offer a range of personalized wine tasting experience which is consistent with current marketing methods. Studies have shown that this personalize approach leads to higher conversion to become wine club members and increased wine sales. Wine tasting will be available in two locations in the Winery Barn building (existing Ag barn) either at a 100 square foot standing tasting bar or in a tasting room of 760 square feet. Wine tasting in the main Winery building will include two tasting areas on the first floor totaling 1,100 square feet and three tasting areas on the second-floor totaling ~1,500 square feet. When the main Winery Barn is completed, the Winery Barn building will continue to be used for wine tasting and events. The total square footage of all of the tasting areas will be less than 10% of the square footage of the total winery.

Events: The winery requests permission for the following events:

Event Description	Quantity	Attendees (maximum)	Months when Events will Occur	Time of day (start & end)
Wine Club Member's Event[1]	4	150	January - December	12:00pm - 9:00pm
Agricultural Promotional Events[2]	3	100	March - October	11:00am - 6:00pm
Industry-wide Events	4	100	March - October	11:00am - 8:00pm
Weddings, Non-Profit & Other Special Events	4	100	March - October	1:00pm - 9:00pm
Agricultural Promotional Events[2]	3	200	March - October	11:00am - 6:00pm
Industry-wide Events	4	200	March - October	11:00am - 8:00pm
Weddings, Non-Profit & Other Special Events	4	200	March - October	1:00pm - 9:00pm

1. Wine Club Member events include Pick-up Weekend, Barrel Tasting Day, and other marketing activities to support and build the Wine Club list.
2. These promotional gatherings may include a vintner association lunch and seminar or other hospitality event for the promotion of the wines.

The events will take place on the property in the proposed winery or outdoor garden areas.

Food Preparation: Food preparation for the tasting room will be sourced from local Sonoma County suppliers and prepared in the commercial kitchen following all health department regulations. Food preparation for all events, including wine pairing dinners, will be done offsite by local, licensed catering companies who will deliver, heat and serve the food onsite. The aim of the food service is to highlight and sell different varieties of wines.

Music: Live and amplified music are requested and shall be limited to inside the winery buildings only. No music will be permitted after 9:30 pm.

Setting: The site is in a very rural area with only one neighbor's residence within 10 acres. A ~ 500 acre parcel to the north is all rural and 69.2 acre parcel to the east of the property is the Windsor Waste Water release where no residences exists.

Number of Employees: The winery, tasting room and vineyard operations are expected to require 10 full time employees. During harvest, the number of temporary employees will be added as necessary.

Entrance: There is a dedicated entrance (#BLD17-4675 and #ENC17-0051) to the property in the north-west corner of the property off Starr Road. All necessary upgrades to comply with the county's Fire Safe Standards have been made.

Parking: The location of employee, visitor parking and truck loading zone are identified on the attached site plan, along with proposed circulation and traffic control signage. Parking designations for ADA accessible locations have been labeled in accordance with current County code. The site plan currently shows parking for 60 cars, including 24 regular parking spaces plus 4 ADA parking spaces close to the winery buildings and 32 overflow parking spaces. Additionally, parking along the vineyard roads on the property are also available for events, if needed.

Vacation Rental Unit: The primary single-family house currently has a vacation rental zoning permit #ZPE15-0806. The Winery would like to continue to offer this vacation rental as an option to its wine club members or special event attendees.

Water: Water supply will be accommodated by the existing onsite wells, currently producing approximately 180 g.p.m. and stored in the four existing 5,000 gallon water storage tanks located on the property. Extensive water conservation methods have been incorporated into the site development including restricted irrigation practices and low flow plumbing fixtures.

Fire Protection: 195,000 gallons is dedicated to existing fire protection system (BLD03-6383) as required within the existing landscape irrigation pond.

Waste Disposal: Winery process wastewater will be screened, settled in settling tanks and treated by an aerobic unit, and discharged to the irrigation reservoir for reclamation. Pomace will be spread and decomposed within the vineyard or hauled offsite in a timely manner.

Sanitary wastewater will be discharged to new and existing permitted septic systems (SEP03-0981 and SEP13-0487). The main components of the standard septic system will be a 2,000 gallon capacity septic tank and a combination of standard trench leach lines and pre-treatment with sub-surface drip disposal systems. Portable restrooms will be rented for all events with 100 people or more.

Signage: The primary signage consists of an identification monument sign at the Starr Road entry conforming to County sign standards. Low-level post and panel signs will be employed on-site to direct visitors and winery related vehicles. For scheduled events, a sign indicating that “the winery is closed for private event” shall be posted. No offsite signage is proposed.

BRICOLEUR VINEYARDS WINERY

7390/7394 STARR ROAD, WINDSOR, CALIFORNIA, 95492

USE PERMIT

PROJECT DIRECTORY

APPLICANT/AGENT:

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ARCHITECT:

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F:

CIVIL:

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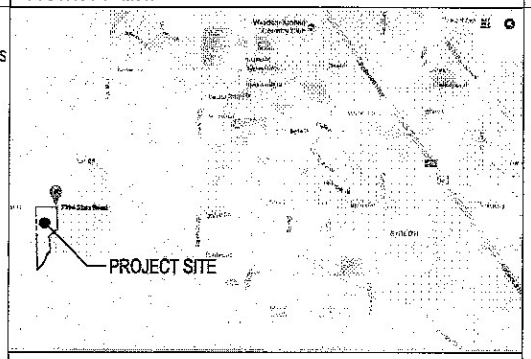
CONTACT: PHIL MANOUKIAN

T: (707) 433-1112
F: ARMANIAC@SONIC.NET

VICINITY MAP



PROJECT INFORMATION

PROJECT LOCATION:	7390/7394 STARR ROAD WINDSOR, CALIFORNIA 95492
APN:	066-220-019
PROJECT TYPE:	BUILDING ONE (1) WINERY BUILDING AND INTERIOR IMPROVEMENT OF AN EXISTING AGRICULTURAL BARN
EXISTING CONDITIONS:	PARTIALLY CLEARED LOT
ZONING:	RESIDENTIAL SCALED COMMERCIAL (RSC)
OCCUPANCY GROUP:	A2, B, S2, M
CONSTRUCTION TYPE:	
STORY:	VISITOR CENTER: TWO (2) STORIES WINERY: ONE (1) STORY WITH A PARTIAL 2 STORIES
SIZE OF PROPERTY:	18.93 ACRES

SHEET INDEX

GENERAL:
UP-000 COVER SHEET

ARCHITECTURAL:
UP-001 IMAGES - EXISTING CONDITIONS
UP-002 RENDERINGS - AERIAL VIEWS
UP-003 RENDERINGS - PERSPECTIVE VIEWS
UP-100 OVERALL SITE PLAN
UP-101 SITE PLAN - EXISTING
UP-102 SITE PLAN - PROPOSED
UP-103 FLOOR PLAN - PROPOSED WINERY LOWER LEVEL
UP-104 FLOOR PLAN - PROPOSED WINERY UPPER LEVEL
UP-105 FLOOR PLAN - EXISTING AG BARN TO CONVERT TO WINERY
UP-111 PHOTOVOLTAIC - EXISTING AG BARN TO CONVERT TO WINERY
UP-201 ELEVATIONS - PROPOSED WINERY
UP-202 ELEVATIONS - PROPOSED WINERY
UP-203 ELEVATIONS - EXISTING AG BARN TO CONVERT TO WINERY
UP-301 SECTIONS - PROPOSED WINERY
UP-302 SECTIONS - PROPOSED WINERY
UP-303 SECTIONS - PROPOSED WINERY
UP-401 MATERIALS BOARD

CIVIL:
C-1 COVER SHEET
C-2 CONSTRUCTION NOTES
C-3 PRELIMINARY GRADING SITE PLAN
C-4 PRELIMINARY GRADING SECTIONS AND DETAILS

LANDSCAPE:
L-1 PRELIMINARY LANDSCAPE PLAN

MG+CO

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CONSULTANTS

BRICOLEUR VINEYARDS WINERY

7390/7394 STARR ROAD
WINDSOR, CALIFORNIA 95492

OWNER

STARR HOLDINGS, LLC
7394 Starr Road
Windsor, California 95492

MARK	DATE	DESCRIPTION
	11.06.17	USE PERMIT SUBMITTAL

PROJECT NO: 1738
CAD DWG FILE: 1738-UP-000 COVER SHEET.DWG
DRAWN BY: -
CHK'D BY: -
COPYRIGHT:

SHEET TITLE:
COVER SHEET

UP-000

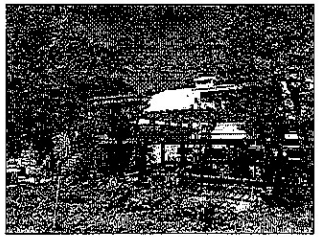
SHEET - OF -

EXISTING PRIMARY RESIDENCE GATE
VIEW FROM PRIMARY RESIDENCE

EXISTING PRIMARY RESIDENCE
VIEW FROM EXISTING OLIVE ORCHARD

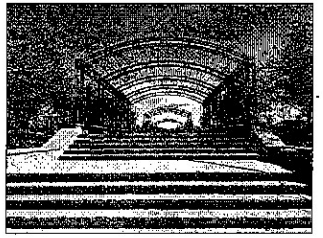
EXISTING PAVILION AREA WITH TRELLIS
VIEW FROM EXISTING DRIVEWAY

EXISTING GATE #1
VIEW FROM STARR ROAD

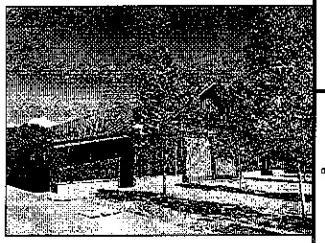


EXISTING ACCESSORY DWELLING UNIT ABOVE MILK BARN
VIEW FROM EXISTING DRIVEWAY

EXISTING OLIVE ORCHARD
VIEW FROM EXISTING DRIVEWAY

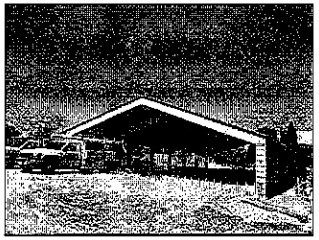


EXISTING TRELLIS
VIEW FROM EXISTING OLIVE TREES

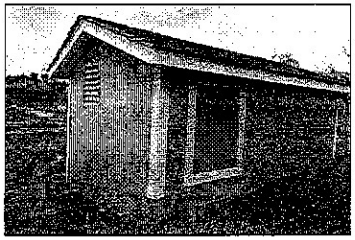


EXISTING AG BARN
VIEW FROM EXISTING COMMERCIAL HORSE RIDING ARENA

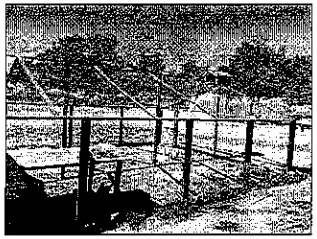
EXISTING FIRE PROTECTION POND — UNDER CONSTRUCTION
VIEW FROM EXISTING DRIVEWAY



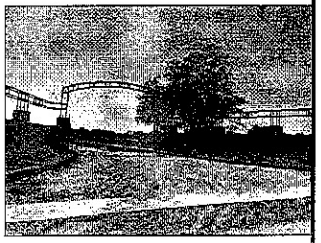
EXISTING COMMERCIAL HORSE RIDING ARENA
VIEW FROM EXISTING DRIVEWAY



EXISTING FIRE PUMP STATION
VIEW FROM EXISTING COMMERCIAL HORSE RIDING ARENA



EXISTING CHICKEN COOP
VIEW FROM EXISTING COMMERCIAL HORSE RIDING ARENA

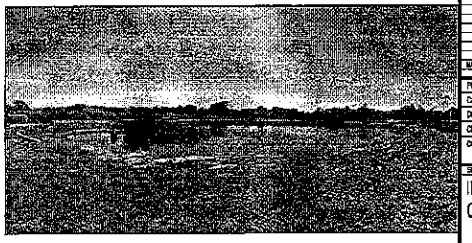


EXISTING GATE #2
VIEW FROM STARR ROAD

EXISTING VINEYARDS
VIEW FROM EXISTING DIRT ROAD

EXISTING WELL AND RO PUMP
VIEW FROM EXISTING DIRT ROAD

EXISTING TRANSFORMER
VIEW FROM EXISTING DIRT ROAD



EXISTING FROST PROTECTION POND
VIEW FROM EXISTING DIRT ROAD

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OWNER
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Windsor, California 95492

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CAD DWG FILE: 1738-UP-001 IMAGES – EXISTING CONDITIONS.DWG
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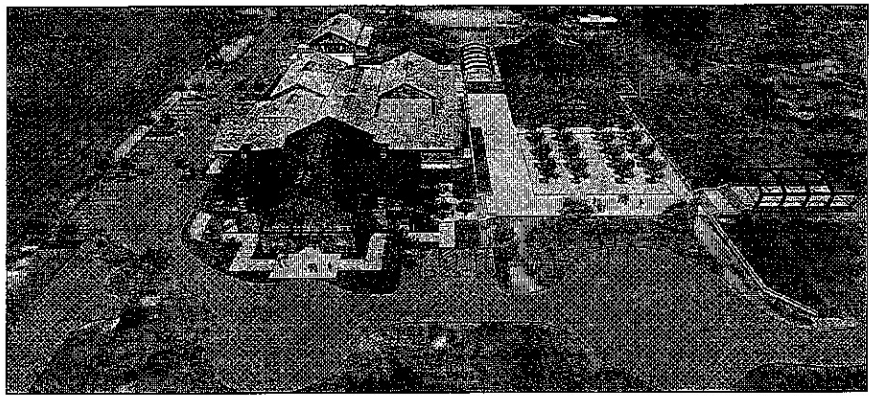
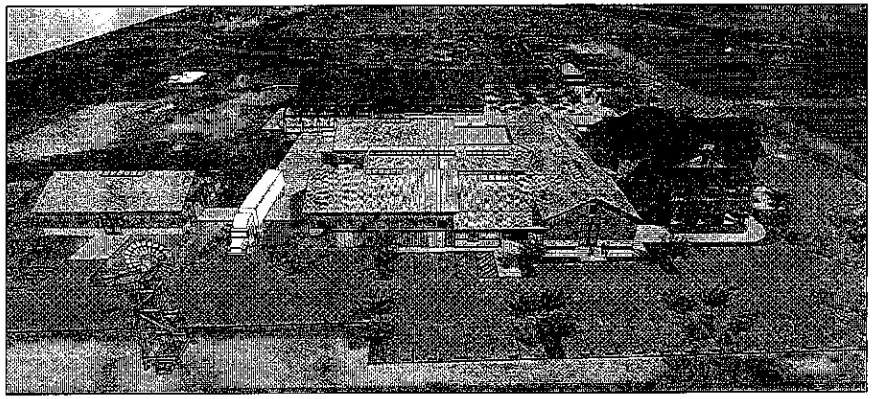
IMAGES - EXISTING CONDITIONS

UP-001

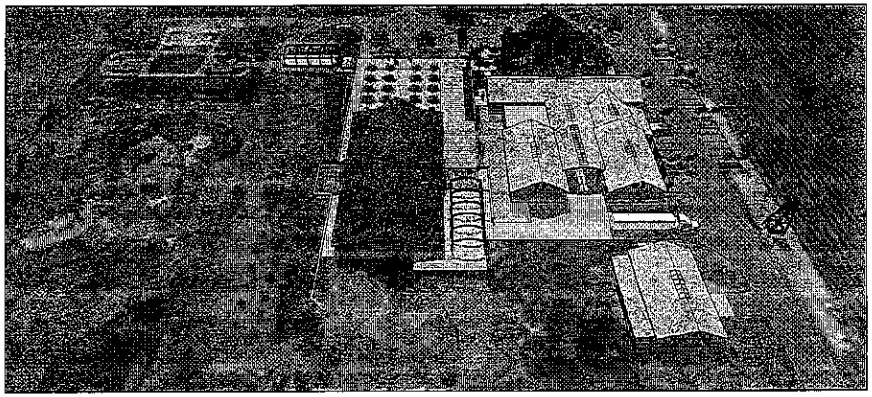
SHEET – OF –



RENDERING – AERIAL VIEW – PROPOSED WINERY
VIEW FROM SOUTH VINEYARD



RENDERING – AERIAL VIEW – PROPOSED WINERY
VIEW FROM WEST VINEYARD



RENDERING – AERIAL VIEW – PROPOSED WINERY
VIEW FROM STARR ROAD

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RENDERINGS - AERIAL VIEWS

UP-002

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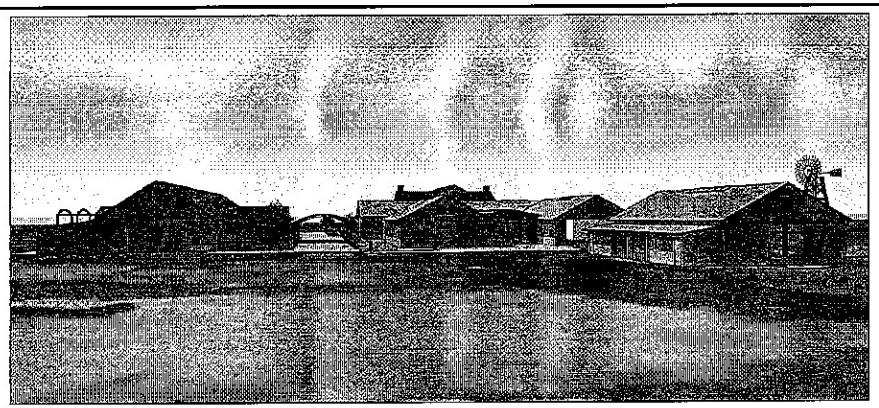
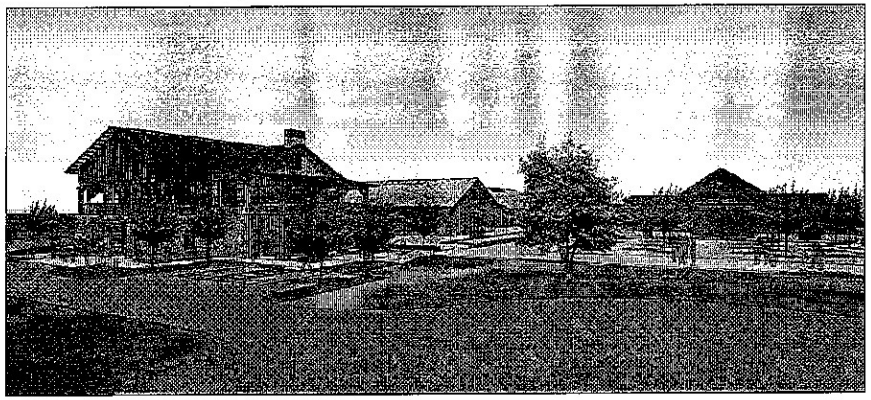
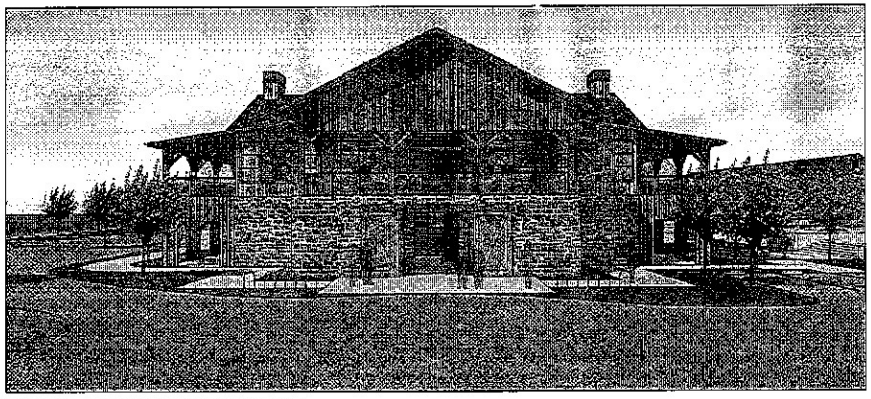


RENDERING – PERSPECTIVE VIEW OF PROPOSED WINERY
VIEW FROM EXISTING FIRE PROTECTION POND



RENDERING – PERSPECTIVE VIEW OF PROPOSED WINERY
VIEW FROM PROPOSED OVERFLOW PARKING



RENDERING – PERSPECTIVE VIEW OF PROPOSED WINERY
VIEW FROM PROPOSED DRIVE WAY

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RENDERINGS - PERSPECTIVE VIEWS

UP-003

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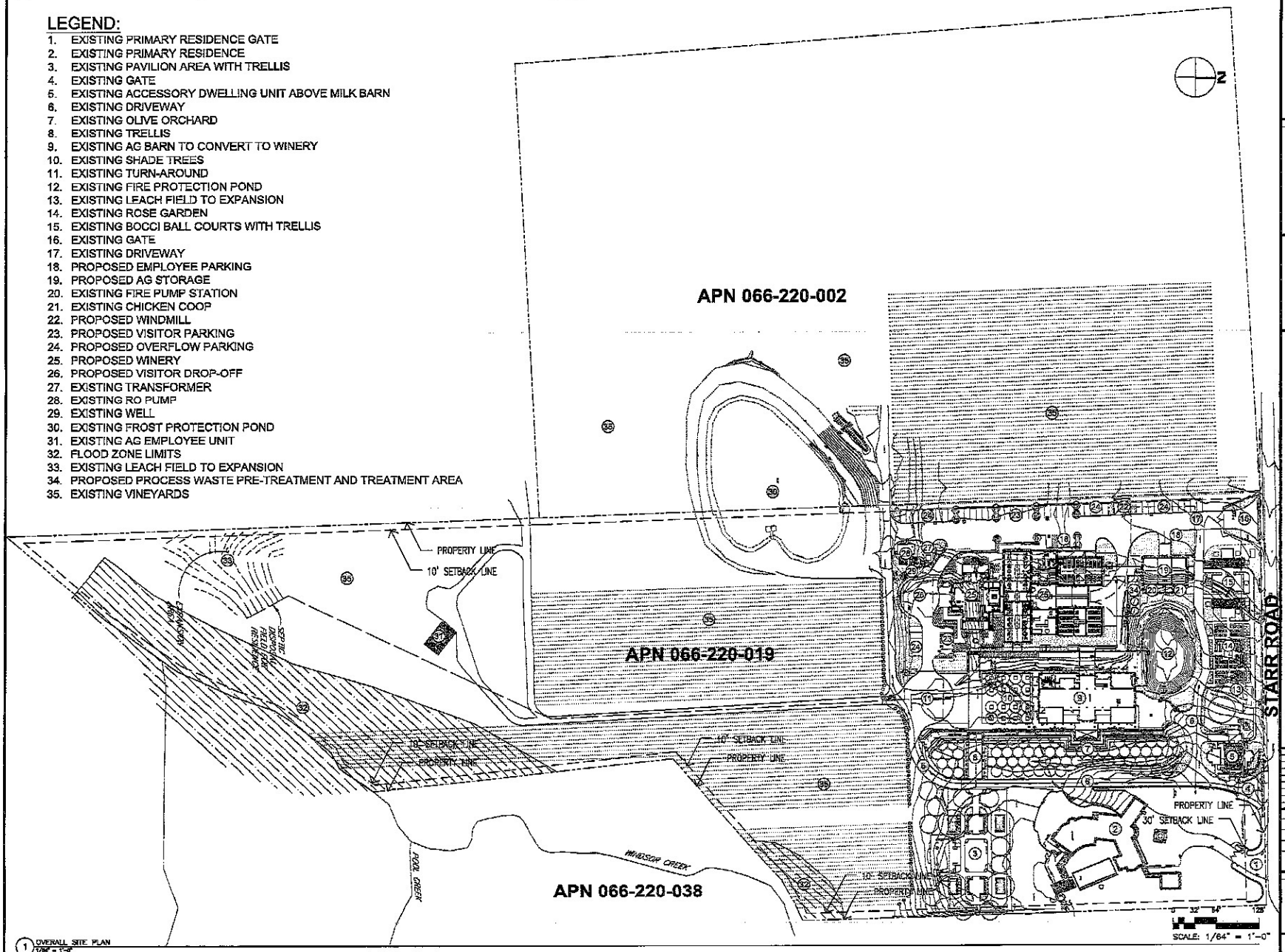
LEGEND:

1. EXISTING PRIMARY RESIDENCE GATE
2. EXISTING PRIMARY RESIDENCE
3. EXISTING PAVILION AREA WITH TRELLIS
4. EXISTING GATE
5. EXISTING ACCESSORY DWELLING UNIT ABOVE MILK BARN
6. EXISTING DRIVEWAY
7. EXISTING OLIVE ORCHARD
8. EXISTING TRELLIS
9. EXISTING AG BARN TO CONVERT TO WINERY
10. EXISTING SHADE TREES
11. EXISTING TURN-AROUND
12. EXISTING FIRE PROTECTION POND
13. EXISTING LEACH FIELD TO EXPANSION
14. EXISTING ROSE GARDEN
15. EXISTING BOCCI BALL COURTS WITH TRELLIS
16. EXISTING GATE
17. EXISTING DRIVEWAY
18. PROPOSED EMPLOYEE PARKING
19. PROPOSED AG STORAGE
20. EXISTING FIRE PUMP STATION
21. EXISTING CHICKEN COOP
22. PROPOSED WINDMILL
23. PROPOSED VISITOR PARKING
24. PROPOSED OVERFLOW PARKING
25. PROPOSED WINERY
26. PROPOSED VISITOR DROP-OFF
27. EXISTING TRANSFORMER
28. EXISTING RO PUMP
29. EXISTING WELL
30. EXISTING FROST PROTECTION POND
31. EXISTING AG EMPLOYEE UNIT
32. FLOOD ZONE LIMITS
33. EXISTING LEACH FIELD TO EXPANSION
34. PROPOSED PROCESS WASTE PRE-TREATMENT AND TREATMENT AREA
35. EXISTING VINEYARDS



1 OVERALL SITE PLAN
1/64" = 1'-0"

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PROJECT NO: 1708
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OVERALL SITE PLAN

UP-100

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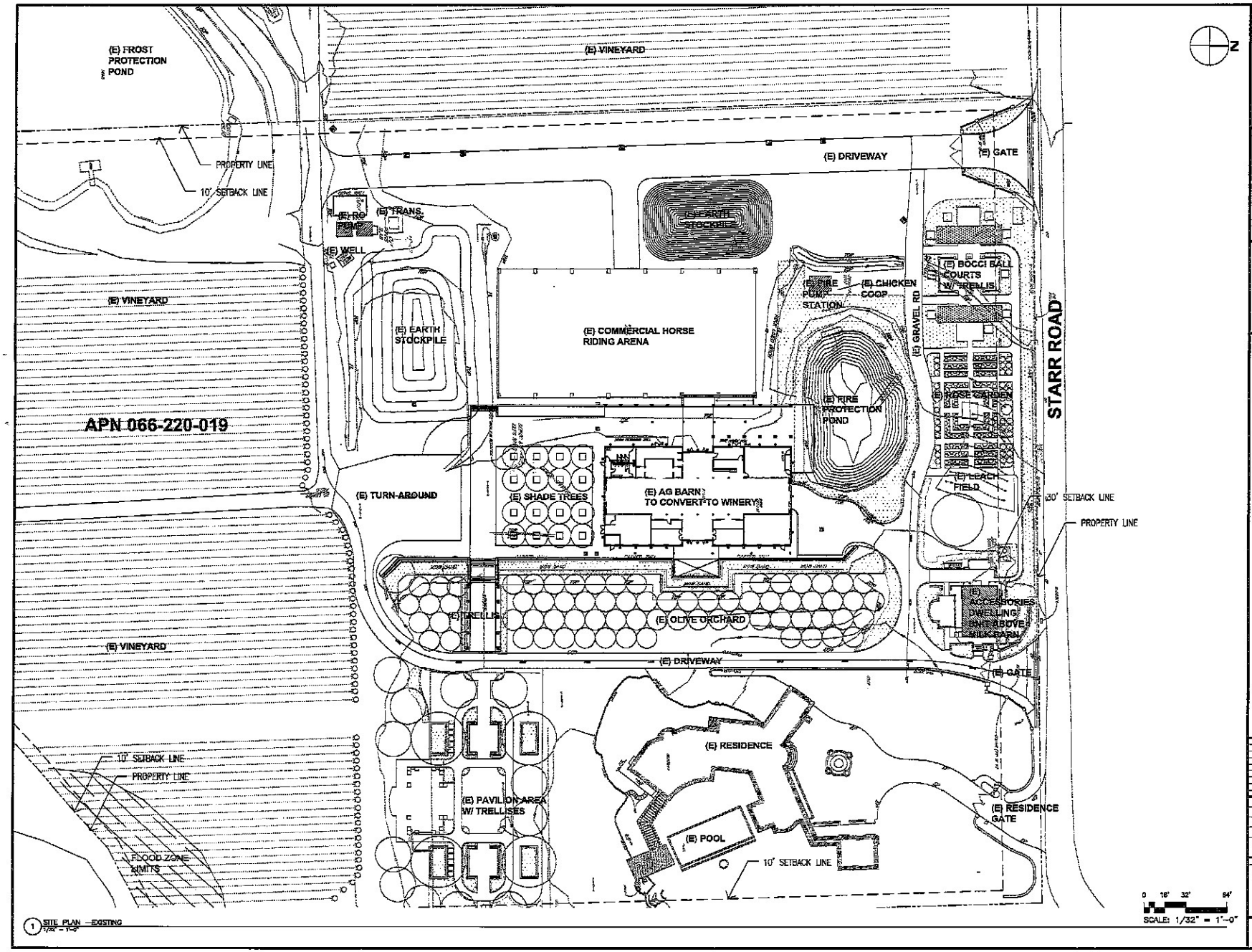

1 SITE PLAN - EXISTING
1/32" = 1'-0"

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PROJECT NO: 1708
CAD DWG FILE: 1708-UP-101 SITE PLAN - EXISTING.DWG
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SHEET TITLE
SITE PLAN - EXISTING

UP-101

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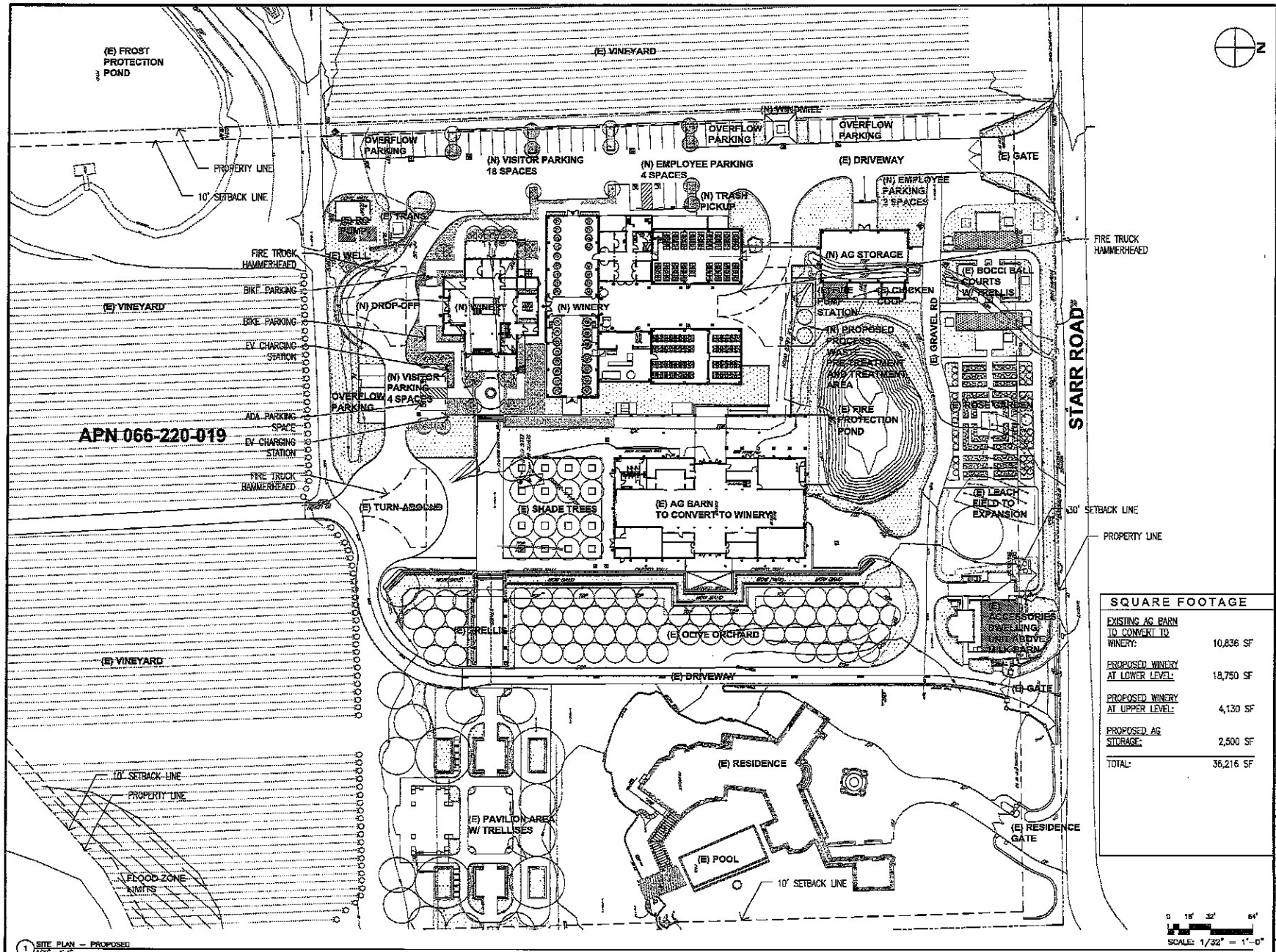

1 SITE PLAN – PROPOSED
1/32" = 1'-0"

SQUARE FOOTAGE

EXISTING AG BARN TO CONVERT TO WINERY:	10,636 SF
PROPOSED WINERY AT LOWER LEVEL:	18,750 SF
PROPOSED WINERY AT UPPER LEVEL:	4,130 SF
PROPOSED AG STORAGE:	2,500 SF
TOTAL:	36,216 SF

0 16' 32' 64'
SCALE: 1/32" = 1'-0"

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PROJECT NO: 1739
CAD DWG FILE: 1739-UP-102 SITE PLAN – PROPOSED.DWG
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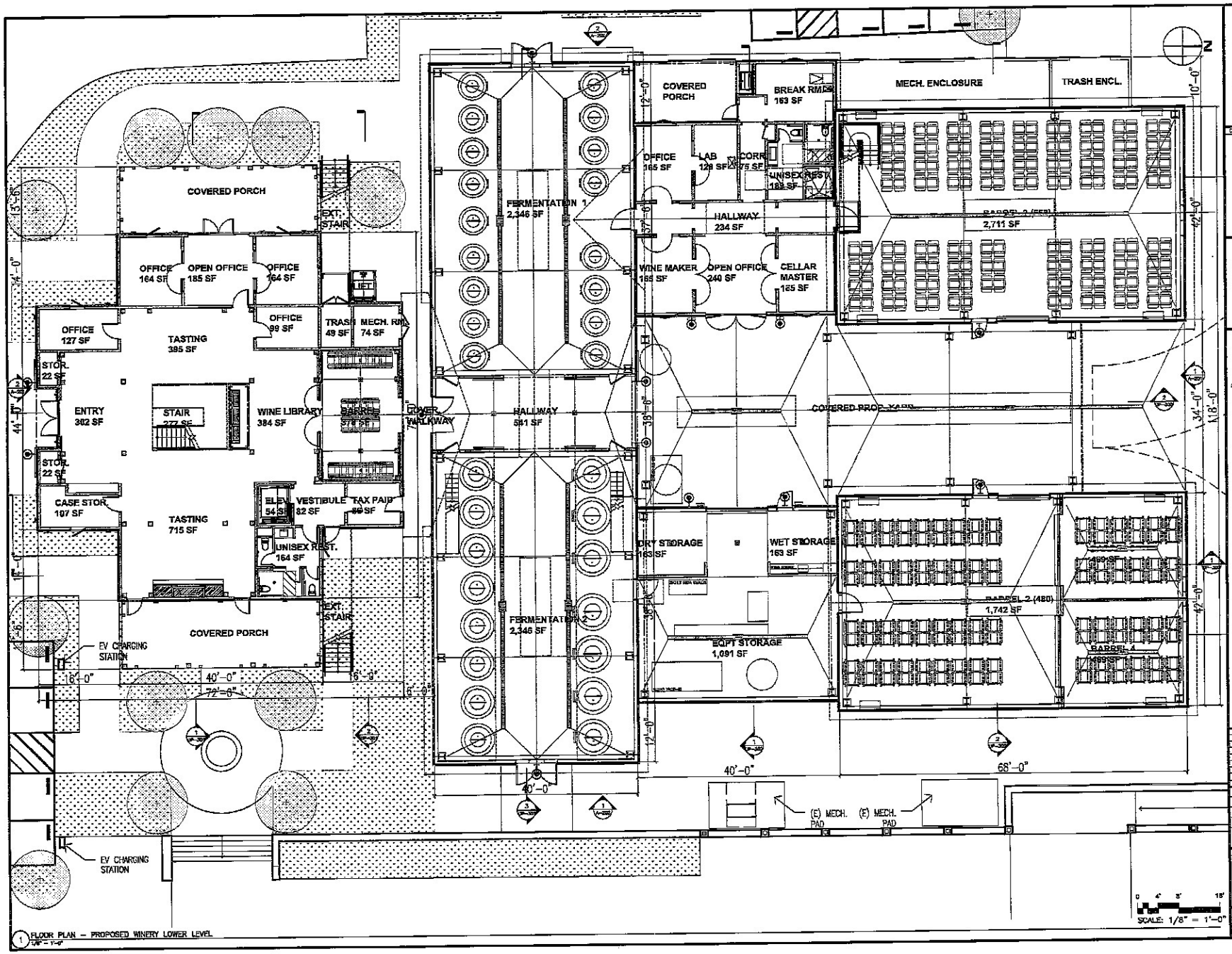
SITE PLAN - PROPOSED

UP-102

SHEET – OF –



1 FLOOR PLAN – PROPOSED WINERY LOWER LEVEL
1/8" = 1'-0"

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PROJECT NO: 1738
CAD DWG FILE: 1738-UP-100 FLOOR PLAN – PROPOSED WINERY LOWER LEVEL
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SHEET TITLE
FLOOR PLAN - PROPOSED WINERY LOWER LEVEL

UP-103

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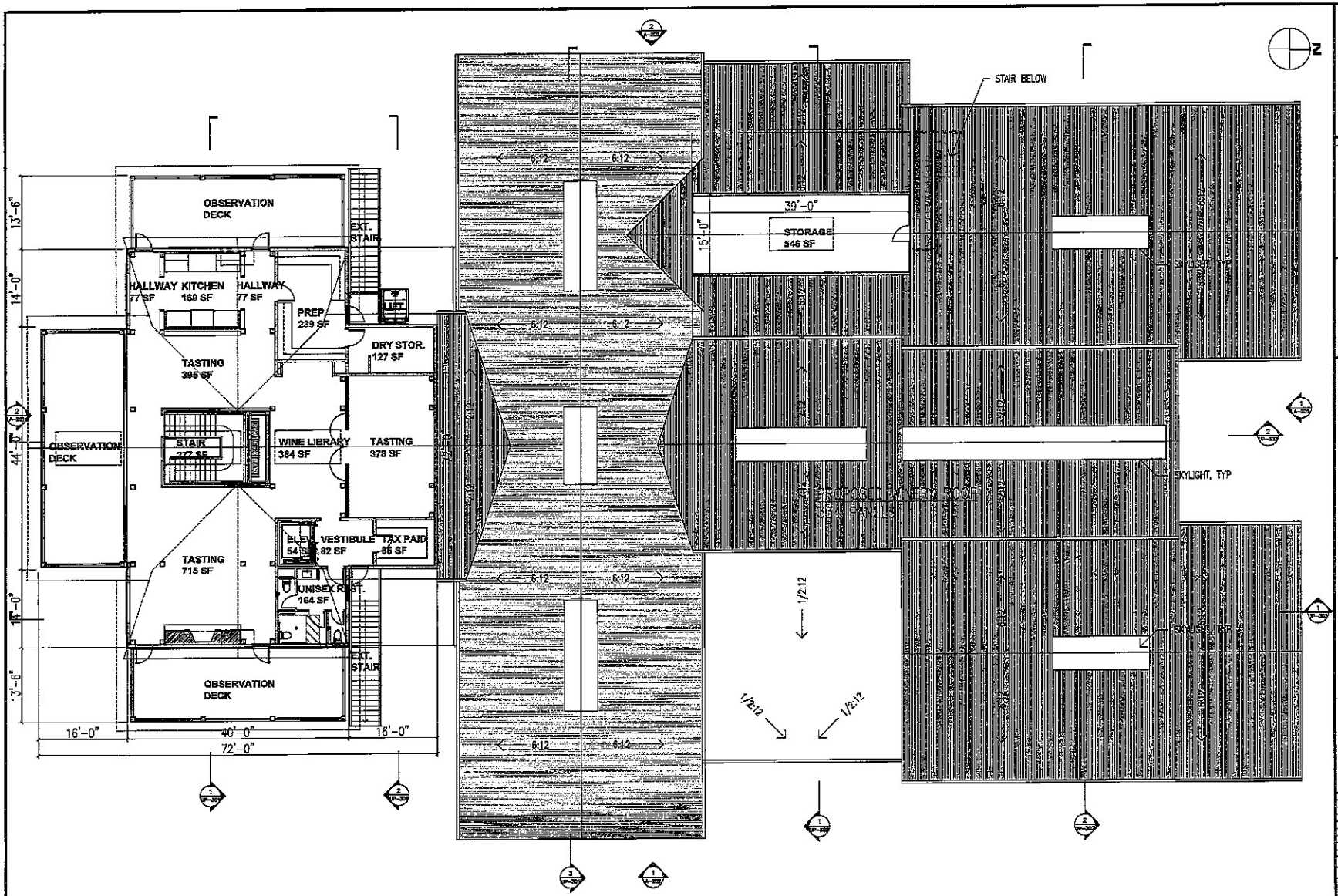

1 FLOOR PLAN – PROPOSED WINERY UPPER LEVEL
1/8" = 1'-0"

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PROJECT NO: 1709
CAD DWG FILE: 1709-UP-104 FLOOR PLAN – PROPOSED WINERY UPPER LEVEL.DWG
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SHEET TITLE
FLOOR PLAN - PROPOSED WINERY UPPER LEVEL

UP-104

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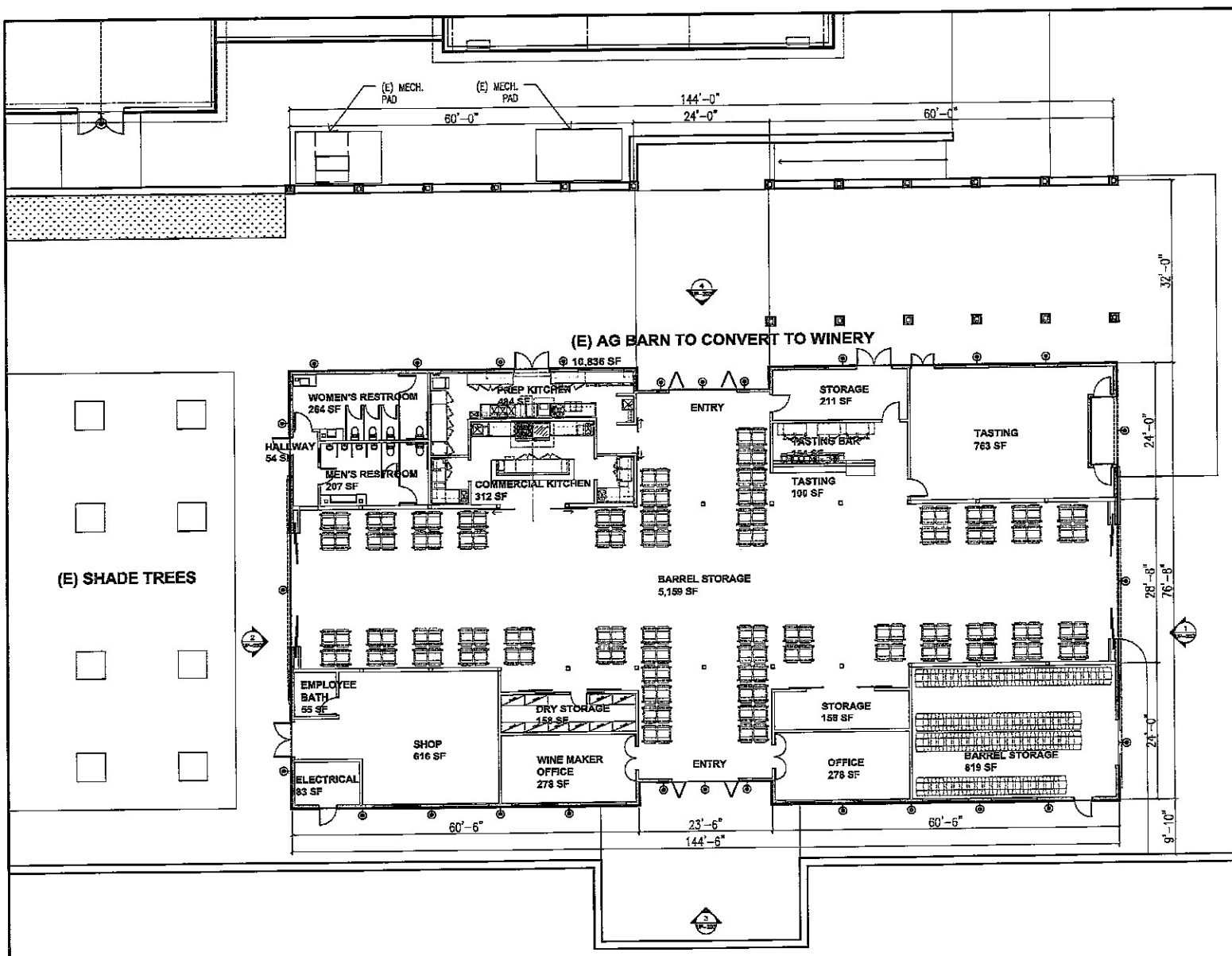

1 FLOOR PLAN – EXISTING AG BARN
1/8" = 1'-0"

SCALE: 1/8" = 1'-0"

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PROJECT NO: 1735
CAD DWG FILE: 1735-UP-105 FLOOR PLAN – EXISTING AG BARN TO WINERY
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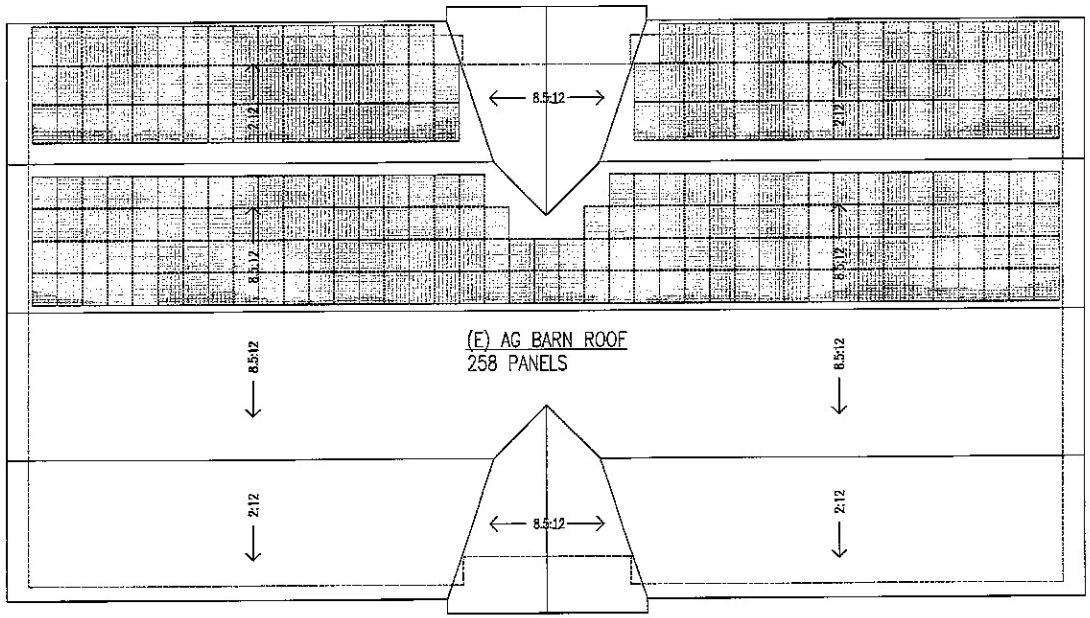
SHEET TITLE
FLOOR PLAN - EXISTING AG BARN TO CONVERT TO WINERY

UP-105

SHEET – OF –



1 PHOTOVOLTAIC LAYOUT — EXISTING AG BARN
1/8" = 1'-0"

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

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PROJECT NO: 1708
CAD DWG FILE: 1708 UP-111 PHOTOVOLTAIC — EXISTING AG BARN TO CONVERT TO WINERY
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PHOTOVOLTAIC - EXISTING AG BARN TO CONVERT TO WINERY

UP-111

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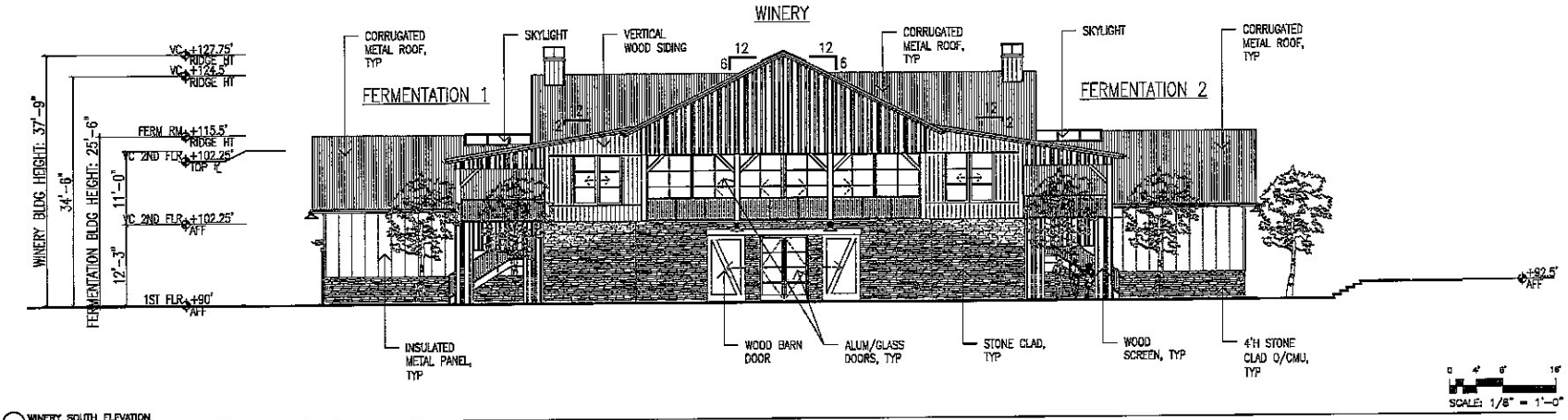
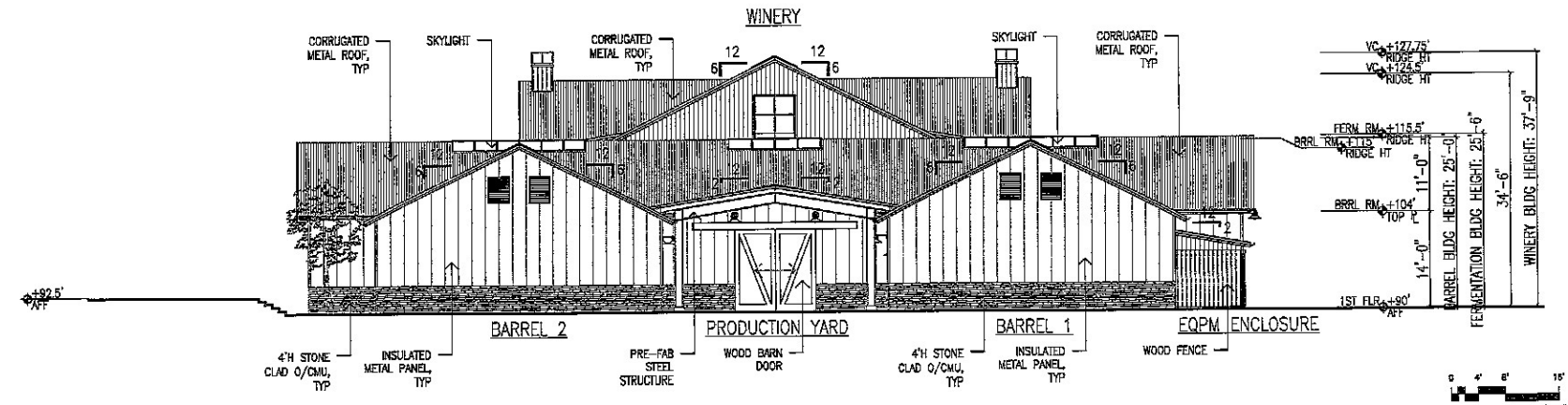


2 WINERY SOUTH ELEVATION
1/8" = 1'-0"



1 WINERY NORTH ELEVATION
1/8" = 1'-0"

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ELEVATIONS - PROPOSED WINERY

UP-201

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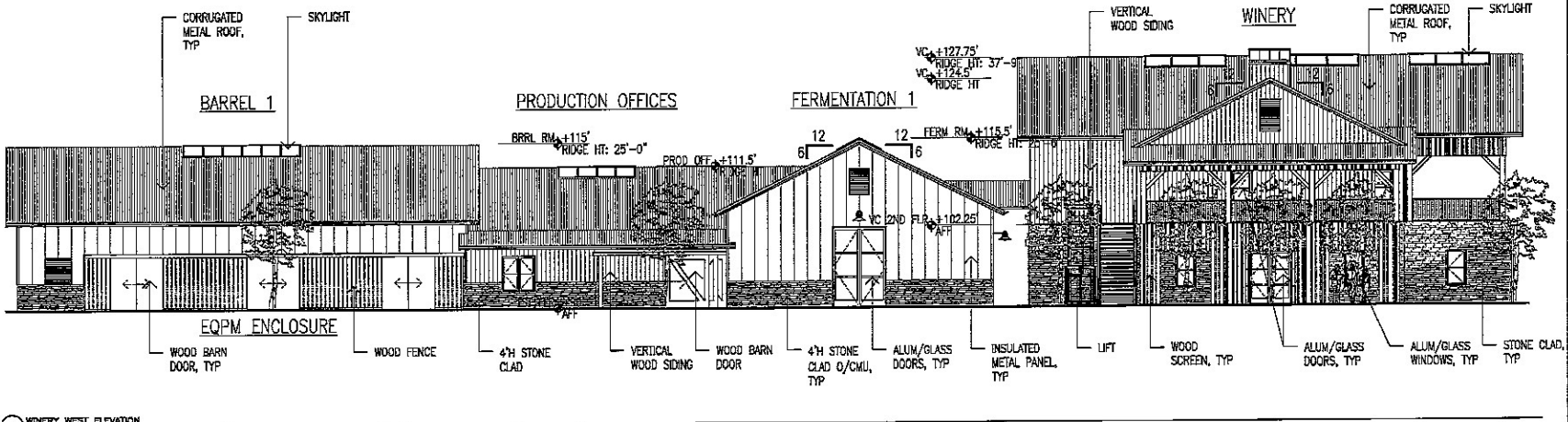
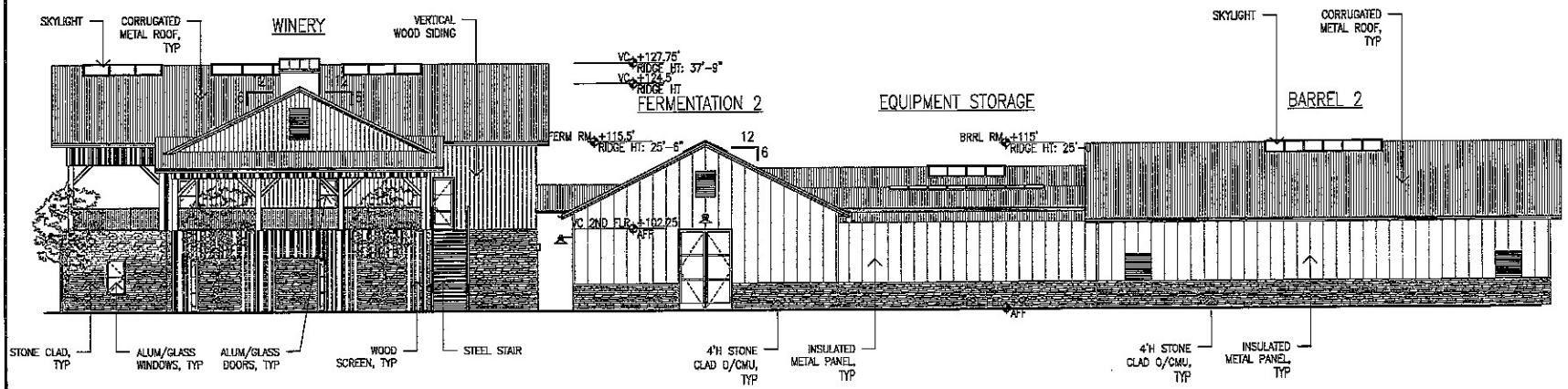


2 WINERY WEST ELEVATION
1/8" = 1'-0"



1 WINERY EAST ELEVATION
1/8" = 1'-0"

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ELEVATIONS - PROPOSED WINERY

UP-202

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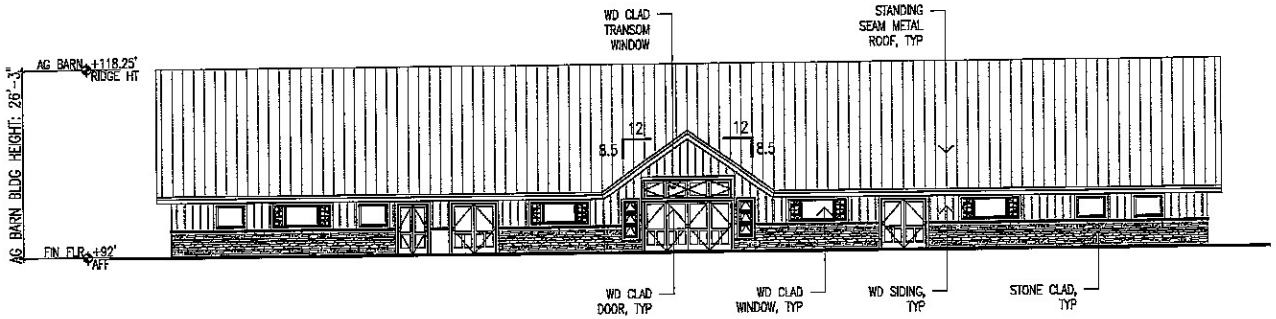
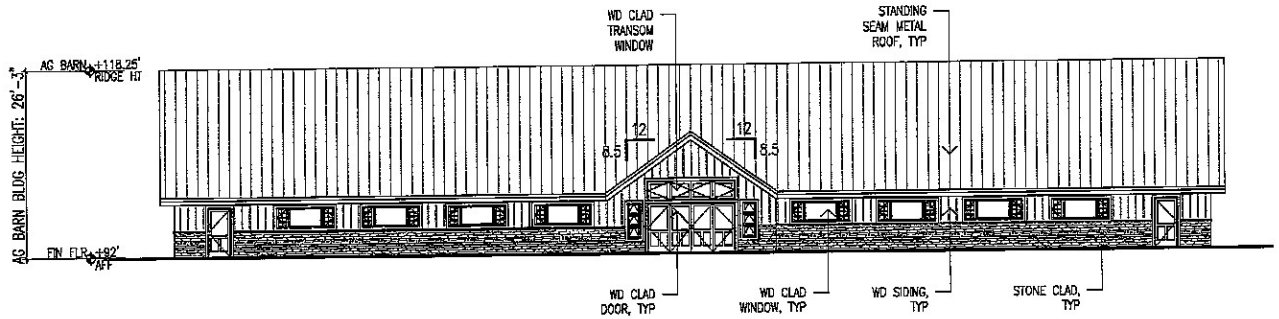
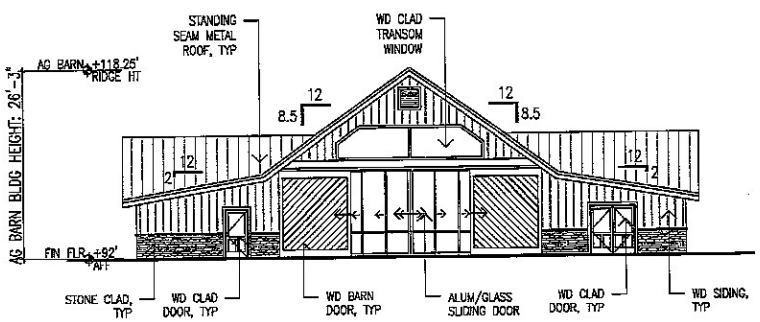


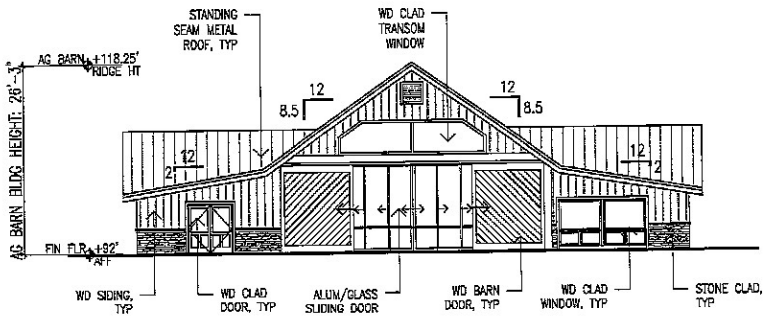
4 EXISTING AG BARN WEST ELEVATION
1/8" = 1'-0"



3 EXISTING AG BARN EAST ELEVATION
1/8" = 1'-0"



2 EXISTING AG BARN SOUTH ELEVATION
1/8" = 1'-0"



1 EXISTING AG BARN NORTH ELEVATION
1/8" = 1'-0"

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PROJECT NO: 1738

CAD DWG FILE: 1738-UP-203 ELEVATIONS - EXISTING AG BARN TO CONVERT TO WINERY.DWG

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ELEVATIONS - EXISTING AG BARN TO CONVERT TO WINERY

UP-203

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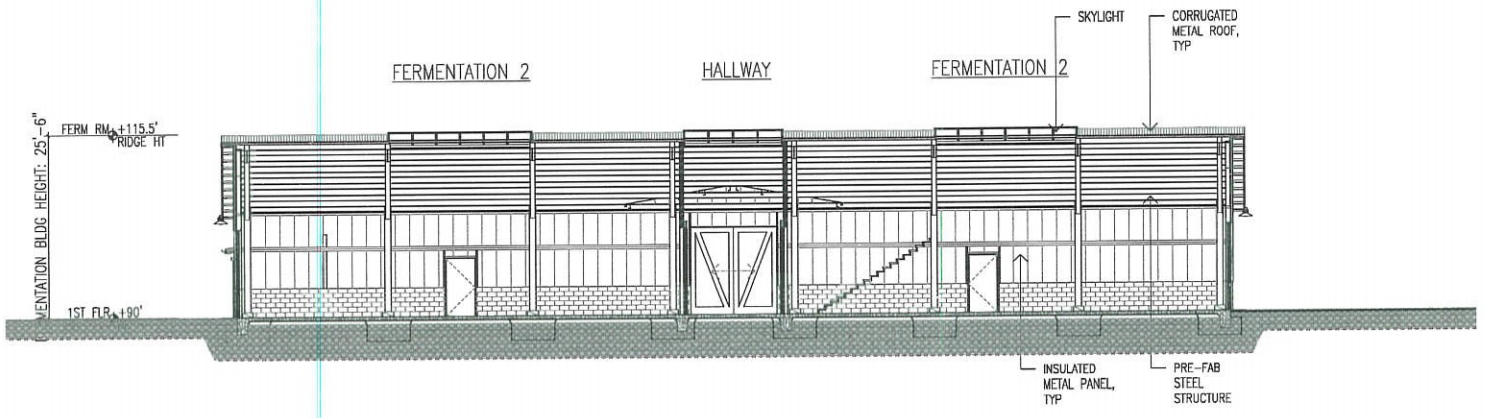
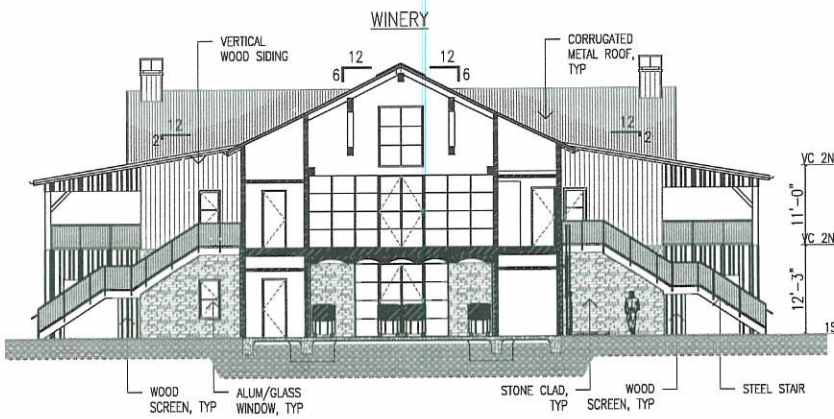


3 WINERY SECTION 3-3
1/8" = 1'-0"



2 WINERY SECTION 2-2
1/8" = 1'-0"

1 WINERY SECTION 1-1
1/8" = 1'-0"

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

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CAD DWG FILE: 1738-UP-301 SECTIONS - PROPOSED WINERY.DWG
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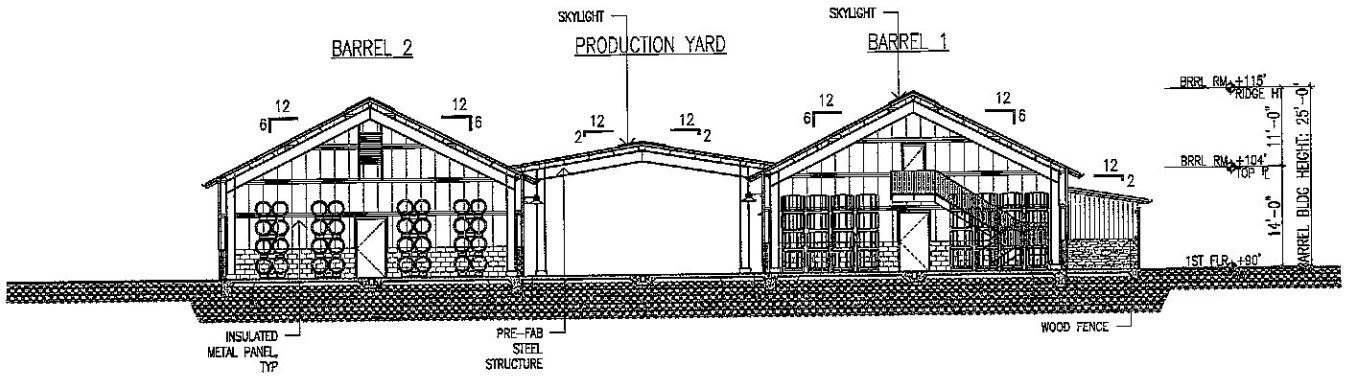
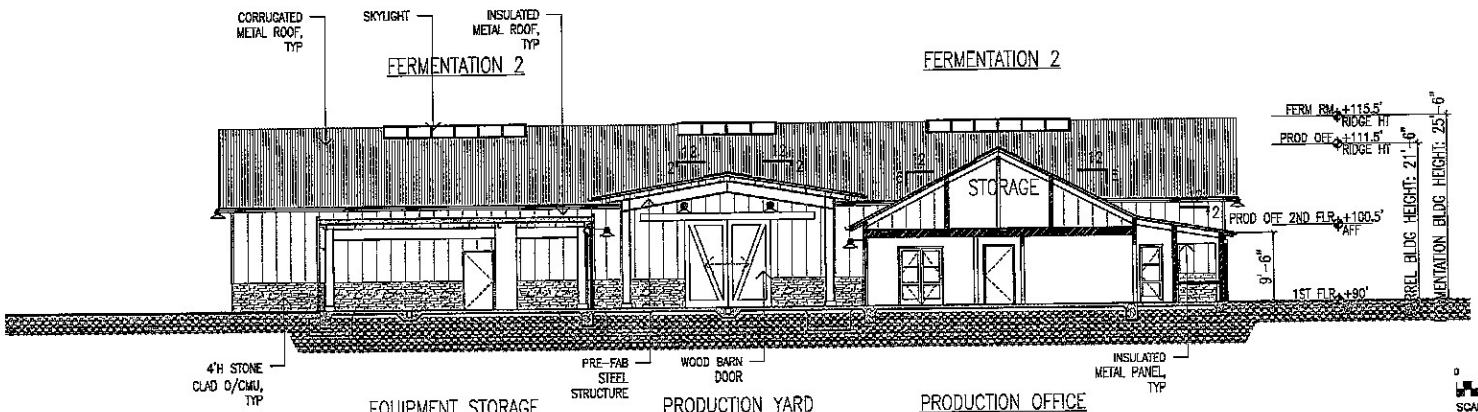
SECTIONS - PROPOSED WINERY

UP-301
SHEET - OF -



2 WINERY SECTION 5-5
1/8" = 1'-0"



1 WINERY SECTION 4-4
1/8" = 1'-0"

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11.06.17 1ST PERMIT SUBMITTAL

MARK DATE DESCRIPTION

PROJECT NO: 1738
CAD DWG FILE: 1738-UP-302 SECTIONS - PROPOSED WINERY.DWG
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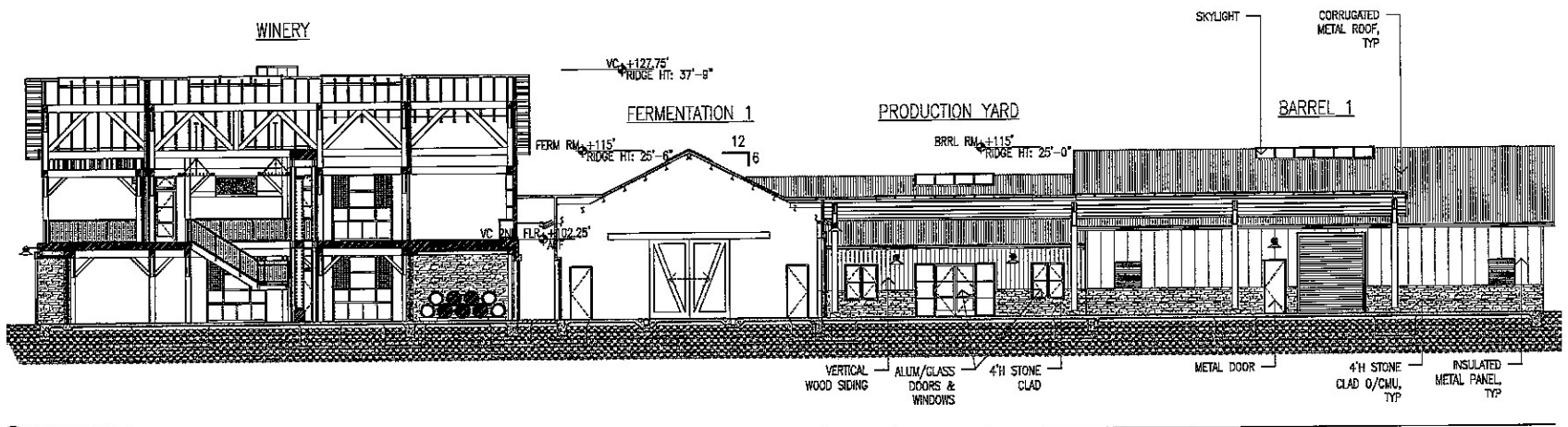
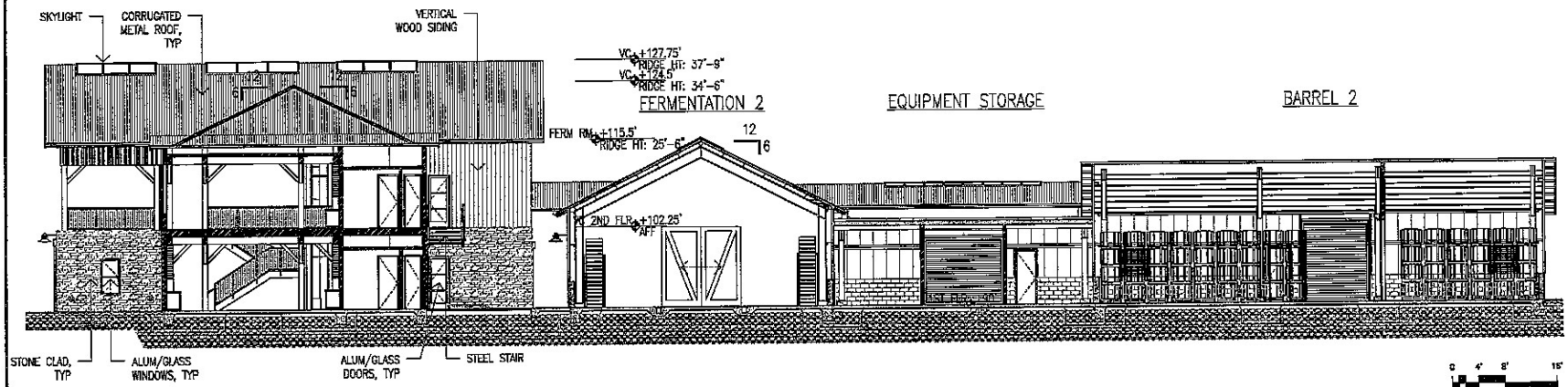
SECTIONS - PROPOSED WINERY

UP-302

SHEET - OF -



2 WINERY SECTION B–B
1/8" = 1'-0"



1 WINERY SECTION A–A
1/8" = 1'-0"

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

MG+CO

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San Francisco
California 94107
mgandco.com
415.777.2101

CONSULTANTS

BRICOLEUR VINEYARDS WINERY

7390/7394 STARR ROAD
WINDSOR, CALIFORNIA 95492

OWNER
STARR HOLDINGS, LLC
7394 Starr Road
Windsor, California 95492

MARK	DATE	DESCRIPTION
	11.06.17	USE PERMIT SUBMITTAL

PROJECT NO: 1706
CAD DWG FILE: 1706-UP-303 SECTIONS - PROPOSED WINERY.DWG
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CHK'D BY: –
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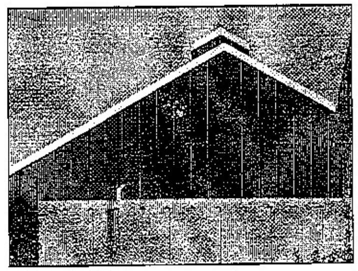
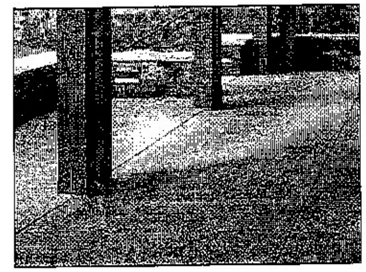
SHEET TITLE
SECTIONS - PROPOSED WINERY

UP-303

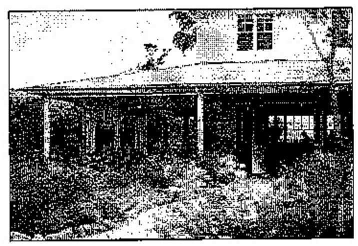
SHEET – OF –



(8) VERTICAL INSULATED METAL PANEL
PHOTO FROM COMPLETED PROJECT, FINAL COLOR TBD.

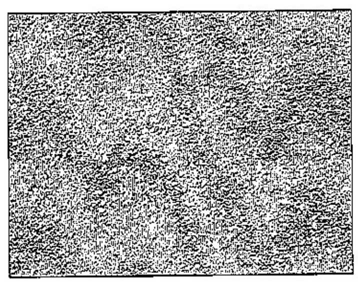


(4) COLORED CONCRETE FLOOR
PHOTO FROM COMPLETED PROJECT, FINAL COLOR TBD.

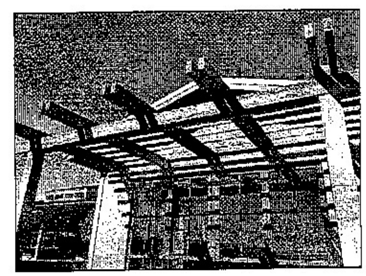


(7) CORRUGATED GALVALUME METAL ROOF
PHOTO FROM COMPLETED PROJECT, FINAL COLOR TBD.

(3) CORRUGATED CORTEN METAL ROOF
PHOTO FROM COMPLETED PROJECT, FINAL COLOR TBD.

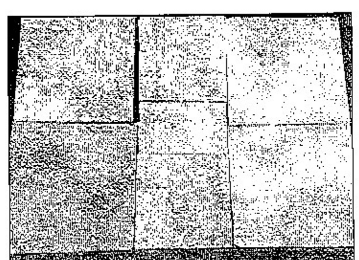


(6) DRIVEWAY PAVING

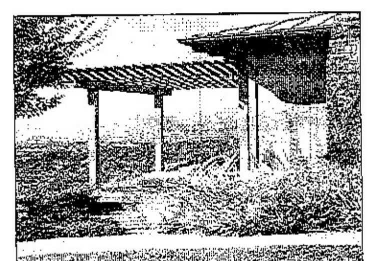


(2) ALUMINUM AND GLASS DOOR AND WINDOW
PHOTO FROM COMPLETED PROJECT, FINAL DESIGN AND COLOR TBD.

(9) STONE VENEER
NATURAL STONE ([illegible]), PHOTO FROM COMPLETED PROJECT, FINAL SPECIES AND COLOR TBD.



(5) STONE PAVING
PHOTO FROM COMPLETED PROJECT, FINAL TYPE AND COLOR TBD.



(1) VERTICAL WOOD SIDING
PHOTO FROM COMPLETED PROJECT, FINAL DESIGN AND COLOR TBD.

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OWNER

STARR HOLDINGS, LLC
7394 Starr Road
Windsor, California 95492

MARK	DATE	DESCRIPTION
	11.06.17	USE PERMIT SUBMITTAL

PROJECT NO:	1758
CAD DWG FILE:	1758-UP-401 MATERIALS BOARD.DWG
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SHEET TITLE

MATERIALS BOARD

UP-401

SHEET – OF –

Project Information

Project Site Address:	7390 STARR ROAD WINDSOR, CA 95492
Owner:	STARR HOLDINGS, LLC c/o MARK HANSON 2269 CHESTNUT STREET, #450 SAN FRANCISCO, CA 94123 (415) 205-8859
Architect:	MICHAEL GUTHRIE MG+CO ARCHITECTS 601 4TH ST, SUITE 110 SAN FRANCISCO CA, 94107 (415) 777-2101
Civil Engineer:	MATTHEW R. MACHI, P.E. ATTERBURY & ASSOCIATES, INC. 16190 HEALDSBURG AVE, SUITE D HEALDSBURG, CA 95448 (707) 433-0134
Surveyor:	BRELJE & RACE CONSULTING ENGINEERS 475 AVIATION BLVD, SUITE 120 SANTA ROSA, CA. 95403 TEL: (707) 576-1322
Acres:	18.93 ACRES

Project Purpose Statement

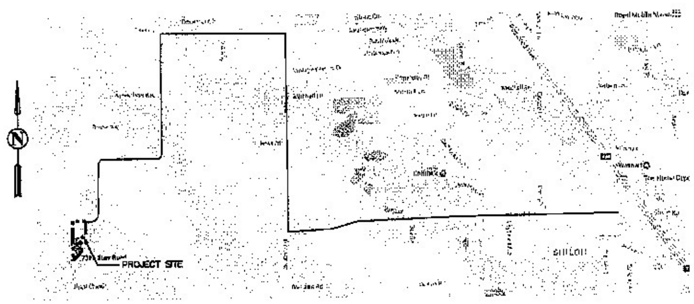
THE PURPOSE OF THIS PROJECT IS TO IMPROVE ONSITE DRAINAGE FACILITIES IN ORDER TO REDUCE ONSITE AND UPSTREAM FLOODING, THROUGH IMPROVED SITE GRADING AND ENGINEERED DRAINAGE SYSTEMS. THE SPECIFIC IMPROVEMENTS INCLUDE A NEW WINERY AND TASTING ROOM, WITH IMPROVED PARKING LOT AND EXTERIOR FLATWORK.

Legend

PROPOSED EDGE OF AC
LIMITS OF DISTURBED AREA
GRADING DAYLIGHT LINE
EXISTING PROPERTY LINE

Abbreviations

AB	AGGREGATE BASE	F.F.	FINISHED FLOOR
AC	ASPHALT CONCRETE	F.G.	FINISHED GRADE
APN	ASSESSOR'S PARCEL NUMBER	F.L.	FLOW LINE
B.C.	BEGIN HORIZONTAL CURVE	HP	HIGH POINT
BSL	BUILDING SETBACK LINE	INV.	INVERT
BW	BOTTOM OF WALL FINISH GRADE	L.F.	LINEAR FEET
BLDG	BUILDING	MAX.	MAXIMUM
℄	CENTERLINE	MIN.	MINIMUM
CL	CLASS	N.T.S.	NOT TO SCALE
C.P.P.	CORRUGATED PLASTIC PIPE	PL	PROPERTY LINE
CONC.	CONCRETE	R.C.	RELATIVE COMPACTION
C.Y.	CUBIC YARD	R/W	RIGHT-OF-WAY
DI	DROP INLET	S	SLOPE
DIA.	DIAMETER	S.C.	SPIRAL CURVE
DWGS.	DRAWINGS	SD	STORM DRAIN
E.C.	END HORIZONTAL CURVE	S.G.	SUBGRADE
E.G.	EXISTING GROUND	SL	SAMPLE LINE
E.P.	EDGE OF PAVEMENT	STA.	STATION
EX.	EXISTING	TW	TOP OF WALL
		TYP.	TYPICAL
		V.C.	VERTICAL CURVE



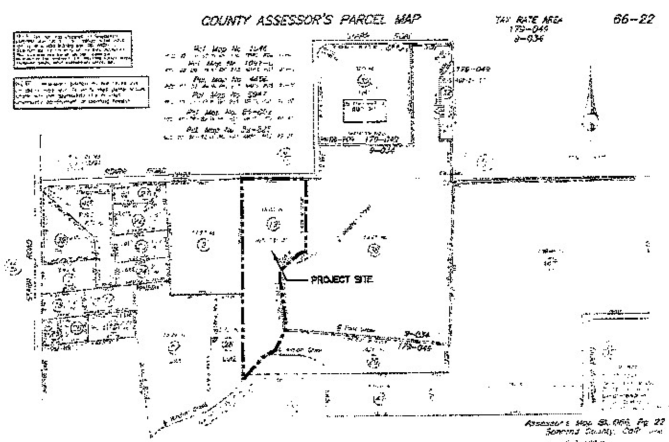
Vicinity / Location Map
NTS

Earthwork Summary

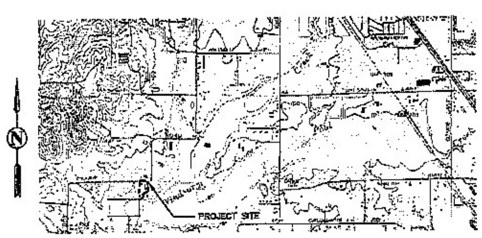
CUT = 95 CY
FILL = 95 CY
NET = BALANCED
DISTURBED AREA = 5.19 ACRES
SURFACE GRADING ONLY. DOES NOT INCLUDE DRIVEWAY STRUCTURAL SECTION, FOUNDATIONS, SELECT FILL, AND COMPACTION/EXPANSION.
CONTRACTOR RESPONSIBLE FOR HIS/HER OWN EARTHWORK QUANTITIES

Benchmark and Datum Note

TOPOGRAPHIC SURVEY PER MAP PROVIDED BY: BRELJE AND RACE
ELEVATION = 92.46' (ASSUMED)
VERTICAL DATUM IS BASED ON CONTROL POINT # 100, SET 50D SPIKE IN POND ISLAND



Assessor's Parcel Map
NTS



USGS Exhibit
NTS

MG+CO

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OWNER
STARR HOLDINGS, LLC
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Windsor, California 95492

MARK	DATE	DESCRIPTION

PROJECT NO: 1730
CAD DWG FILE: 16-110-PRELIM_GPS.DWG
DRAWN BY: TA/CC
CHK'D BY: -

SHEET TITLE
COVER SHEET

C-1
SHEET 1 OF 4

GENERAL CONSTRUCTION NOTES

1. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNITY AND HOLD OWNER AND ATTERBURY & ASSOCIATES, INC. HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.
2. THE ENGINEER ASSUMES NO RESPONSIBILITY OTHER THAN FOR THE ADEQUACY OF THE DESIGN CONTAINED HEREIN.
3. ALL MATERIALS TO BE USED ARE TO BE APPROVED BY THE ENGINEER PRIOR TO THEIR PLACEMENT. ANY MATERIALS INSTALLED PRIOR TO APPROVAL ARE SUBJECT TO REMOVAL.
4. AFTER COMPLETION OF WORK, WORK AREAS SHALL BE RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR.
5. LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES SHOWN ON PLANS ARE APPROXIMATE ONLY. CONTRACTOR SHALL ASSUME RESPONSIBILITY OF SAID UTILITIES SAFETY DURING CONSTRUCTION AND IF DAMAGED CONTRACTOR SHALL RESTORE SERVICES AT HIS EXPENSE. THE OWNER, THE ENGINEER AND THE COUNTY OF SONOMA ASSUME NO RESPONSIBILITY FOR ANY OBSTRUCTIONS EITHER SHOWN OR NOT SHOWN ON THESE PLANS.
6. CONTRACTOR SHALL PERFORM TRENCH WORK IN ACCORDANCE WITH THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY. SAID WORK SHALL CONFORM TO ALL APPLICABLE OCCUPATIONAL SAFETY AND HEALTH STANDARDS, RULES, REGULATIONS AND ORDERS ESTABLISHED BY THE STATE OF CALIFORNIA AND THE SONOMA COUNTY WELL & SEPTIC DIVISION OF THE PERMIT & RESOURCE MANAGEMENT DEPT.
7. THE CONTRACTOR SHALL OBTAIN A TRENCH (D.I.S. PERMIT) FROM THE CALIFORNIA DIVISION OF INDUSTRIAL SAFETY PRIOR TO EXCAVATION OF ANY TRENCH. A COPY OF THIS PERMIT MUST BE ON FILE IN THE SONOMA COUNTY PERMIT AND RESOURCE MANAGEMENT DEPARTMENT (SCPRMD) PRIOR TO THE COMMENCEMENT OF WORK.
8. BEFORE ANY EXCAVATION, CALL UNDERGROUND SERVICE ALERT. TOLL FREE AT (800) 642-2444 OR (800) 227-2600.
9. THE CONTRACTOR SHALL DO NO EXCAVATION UNTIL ALL EXISTING UTILITIES HAVE BEEN MARKED IN THE FIELD BY THE APPLICABLE ENTITY RESPONSIBLE FOR THAT PARTICULAR UTILITY. THE CONTRACTOR SHALL NOTIFY EACH UTILITY COMPANY AT LEAST 48 HOURS PRIOR TO STARTING WORK.
10. ALL GRADING ON-SITE SHALL NOT INHIBIT OFF-SITE DRAINAGE. STRIPPING AND CLEARING OF SITE SHALL BE CONFINED TO ONLY AREAS TO BE IMPROVED. STOCKPILE STRIPPING MATERIAL AS AUTHORIZED BY THE OWNER. EQUIPMENT AND MATERIAL STORAGE AREAS SHALL BE APPROVED BY THE OWNER.
11. THE GEOTECHNICAL ENGINEER SHALL VERIFY THE DEPTH OF CUT AND FILL EXCAVATION AND OF FILL KEYWAYS AND PERFORM PERIODIC COMPACTION TESTING. CONTRACTOR SHALL VERIFY SUBGRADE ELEVATIONS AND ASSUME RESPONSIBILITY FOR THE PROJECT AT COMMENCEMENT OF CONSTRUCTION.
12. A GRADING PERMIT SHALL BE OBTAINED FROM THE SONOMA COUNTY PERMIT & RESOURCE MANAGEMENT DEPARTMENT PRIOR TO ANY GRADING WORK.
13. OWNER SHALL PROVIDE ONE SET OF CONSTRUCTION STAKES. OBLITERATED OR DISTURBED STAKES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WRITTEN APPROVALS AND INSPECTIONS FROM ALL PERTINENT PUBLIC AGENCIES AND GEOTECH-ICAL INSPECTIONS DURING THE COURSE OF CONSTRUCTION. PROJECT SHALL BE FINALED BY ACCEPTANCE OF CONSTRUCTION BY THE OWNER AND PUBLIC AGENCIES.

GRADING AND DRAINAGE INSPECTION NOTES

1. THE PERMITTEE AND THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR THE WORK TO BE PERFORMED IN COMPLIANCE WITH THE APPROVED PLANS AND SPECIFICATIONS, CHAPTER 11 AND 11A OF THE SONOMA COUNTY CODE (SCC), AND ANY PERMIT CONDITIONS. WORK SHALL BE SUBJECT TO INSPECTION AS REQUIRED BY THE SONOMA COUNTY PERMIT AND RESOURCE MANAGEMENT DEPARTMENT (PRMD) TO VERIFY COMPLIANCE. THE CONTRACTOR SHALL CONSULT THE PROJECT JOB CARD FOR COORDINATION OF INSPECTION REQUESTS.
2. PRIOR TO THE START OF ANY GRADING OR DRAINAGE WORK, THE PERMITTEE SHALL HAVE A PRE-CONSTRUCTION CONSULTATION WITH PRMD STAFF TO DISCUSS THE SCOPE OF THE PROJECT, PERMIT CONDITIONS, REQUIRED INSPECTIONS, APPROPRIATE APPLICATION OF BEST MANAGEMENT PRACTICES (BMP'S) AND ANY OTHER CONSTRUCTION ISSUES.
3. INSPECTION REQUESTS SHALL BE MADE THROUGH THE SONOMA COUNTY AUTOMATED INSPECTION REQUEST SYSTEM (SELECTRON), AT PHONE NUMBER (707) 565-3551.
4. PRMD MAY REQUIRE PROFESSIONAL INSPECTIONS AND CERTIFICATIONS TO VERIFY PROPER COMPLETION OF THE WORK. WHERE THE USE OF PROFESSIONAL PERSONNEL IS REQUIRED. THESE PERSONNEL SHALL IMMEDIATELY REPORT IN WRITING TO PRMD AND THE PERMITTEE ANY INSTANCE OF WORK NOT IN COMPLIANCE WITH THE APPROVED PLANS, SPECIFICATIONS, OR ANY PERMIT CONDITIONS. IF PROFESSIONAL PERSONNEL IS CHANGED DURING THE COURSE OF THE WORK, THE WORK SHALL BE STOPPED UNTIL THE REPLACEMENT INDIVIDUAL HAS NOTIFIED PRMD IN WRITING OF THEIR AGREEMENT TO ACCEPT RESPONSIBILITY FOR APPROVAL OF THE COMPLETED WORK WITHIN THE AREA OF THEIR TECHNICAL COMPETENCE.
5. PRMD SHALL FINAL A PERMIT WHEN ALL WORK, INCLUDING THE INSTALLATION OF ALL DRAINAGE IMPROVEMENTS AND THEIR PROTECTIVE DEVICES, AND ALL STORM WATER BMP'S, HAVE BEEN COMPLETED IN COMPLIANCE WITH THE APPROVED PLANS AND SPECIFICATIONS, AND ALL FINAL REPORTS REQUIRED BY SCC 11.14.040.A HAVE BEEN SUBMITTED AND ACCEPTED. FINAL REPORTS MAY INCLUDE: AS-BUILT PLANS, TESTING RECORDS, PROFESSIONAL OPINIONS, AND DECLARATIONS ABOUT COMPLETED WORK FROM PROFESSIONAL PERSONNEL. SIMILAR REPORTS MAY BE REQUIRED AT OTHER STAGES OF THE WORK.
6. THE PERMITTEE SHALL PROVIDE ADEQUATE AND SAFE ACCESS TO THE PROJECT SITE FOR INSPECTION DURING THE PERFORMANCE OF ALL WORK.
7. DURING CONSTRUCTION ACTIVITIES, THE PROJECT SITE ADDRESS SHALL BE POSTED AS FOLLOWS:
   (1) THE STREET NUMBERS MUST BE AT LEAST FOUR INCHES TALL, WITH A REFLECTIVE SURFACE.
   (2) THE ADDRESS MUST BE VISIBLE FROM BOTH DIRECTIONS ALONG THE ROAD.
   (3) THE ADDRESS MUST BE POSTED AT ALL FORKS IN ANY ACCESS ROAD AND AT THE PROJECT SITE.

GRADING AND DRAINAGE NOTES

1. PERFORM GRADING AND DRAINAGE IMPROVEMENTS IN ACCORDANCE WITH CHAPTER 11 AND 11A OF THE SONOMA COUNTY CODE (SCC), APPLICABLE SONOMA COUNTY REGULATIONS AND, IF APPLICABLE, TO THE RECOMMENDATIONS OF THE SOILS REPORT PREPARED BY BAUER ASSOCIATES AND DATED 05/27/15 AND A SUPPLEMENTARY REPORT DATED 3/21/2017.
2. ALL WORK SHALL BE DONE IN COMPLIANCE WITH THE APPROVED PLANS AND SPECIFICATIONS. THE APPROVED PLANS AND SPECIFICATIONS SHALL NOT BE CHANGED WITHOUT THE WRITTEN APPROVAL OF THE SONOMA COUNTY PERMIT AND RESOURCE MANAGEMENT DEPARTMENT (PRMD). PROPOSED MODIFICATIONS TO THE APPROVED PLANS AND SPECIFICATIONS SHALL BE SUBMITTED TO PRMD IN WRITING, TOGETHER WITH ALL NECESSARY TECHNICAL INFORMATION AND DESIGN DETAILS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROPERTY OWNER AND ENGINEER OF RECORD, IF APPLICABLE, UPON DISCOVERING DISCREPANCIES, ERRORS, OR OMISSIONS IN THE APPROVED PLANS. PRIOR TO PROCEEDING, THE PROPERTY OWNER SHALL HAVE THE APPROVED PLANS REVISED TO CLARIFY IDENTIFIED DISCREPANCIES, ERRORS, OR OMISSIONS. PRMD MAY REQUIRE UNAUTHORIZED WORK TO BE REDONE OR REMOVED TO VERIFY COMPLIANCE WITH SCC. PRMD MAY INITIATE ENFORCEMENT ACTION AND SEEK THE IMPOSITION OF CIVIL PENALTIES FOR VIOLATIONS OF SCC.
3. THE GRADING OR DRAINAGE PERMIT AND A COPY OF THE APPROVED PLANS SHALL BE MAINTAINED ON THE PROJECT SITE THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES.
4. PRMD MAY ORDER THAT ANY WORK STOP IMMEDIATELY IF IT IS PERFORMED CONTRARY TO CHAPTER 11 AND 11A OF THE SCC, THE APPROVED PLANS AND SPECIFICATIONS, PERMIT CONDITIONS, OR ANY WORK THAT HAS BECOME HAZARDOUS TO PROPERTY OR THE PUBLIC. A GRADING OR DRAINAGE PERMIT MAY BE SUSPENDED, REVOKED, OR MODIFIED BY PRMD IN ACCORDANCE WITH SCC 11.24.080.
5. ISSUANCE OF A GRADING OR DRAINAGE PERMIT BY PRMD DOES NOT ELIMINATE THE RESPONSIBILITY OF THE PROPERTY OWNER TO SECURE PERMITS FROM OTHER AGENCIES WITH REGULATORY RESPONSIBILITIES FOR THE USES AND CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE WORK SHOWN ON THE APPROVED PLANS. FAILURE TO OBTAIN ALL REQUIRED PERMITS MAY RESULT IN FINES FROM OTHER AGENCIES.
6. EXISTING DRAINAGE COURSES RECEIVING WATERS FROM THE PROJECT SITE AND LOCATED THROUGHOUT THE PROJECT SITE SHALL REMAIN OPEN AND CLEAR OF DEBRIS TO PROPERLY CONVEY STORM WATER. IF EXISTING DRAINAGE COURSES RECEIVING WATERS FROM THE PROJECT SITE ARE LOCATED IN THE COUNTY RIGHT-OF-WAY AND NEED MAINTENANCE, CONTACT THE DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS AT (707) 565-2231 FOR FURTHER ASSISTANCE. IN ANY EVENT, THE PROPERTY OWNER AND/OR CONTRACTOR SHALL BE HELD LIABLE FOR ANY DAMAGE DUE TO OBSTRUCTING NATURAL DRAINAGE PATTERNS.
7. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND SERVICE ALERT (USA), AT 811, AT LEAST TWO WORKING DAYS, BUT NOT MORE THAN 14 CALENDAR DAYS, PRIOR TO EXCAVATION. THE CONTRACTOR SHALL UNCOVER RELEVANT UTILITIES TO VERIFY THEIR LOCATION AND ELEVATION. IF UNEXPECTED OR CONFLICTING UTILITIES ARE ENCOUNTERED DURING EXCAVATION, NOTIFY USA, THE UTILITY OWNER, AND/OR THE ENGINEER OF RECORD, IF APPLICABLE, IMMEDIATELY. UTILITIES INCLUDE BUT ARE NOT LIMITED TO WATER, SEWER, ELECTRICAL, GAS, TELEPHONE, AND CABLE/TV. THE EXCAVATOR SHALL DELINEATE WITH PAINT OR OTHER SUITABLE MARKINGS THE AREA TO BE EXCAVATED.
8. IN THE EVENT CULTURAL RESOURCES (SUCH AS HISTORICAL, ARCHAEOLOGICAL, AND PALEONTOLOGICAL RESOURCES, AND HUMAN REMAINS) ARE DISCOVERED DURING GRADING OR OTHER CONSTRUCTION ACTIVITIES, WORK SHALL IMMEDIATELY BE HALTED WITHIN THE VICINITY OF THE FIND. THE NORTHWEST INFORMATION CENTER SHALL BE NOTIFIED AT (707) 588-8455. A QUALIFIED ARCHEOLOGIST SHALL BE CONSULTED FOR AN ON-SITE EVALUATION. ADDITIONAL MITIGATION MAY BE REQUIRED BY THE COUNTY PER THE ARCHEOLOGIST'S RECOMMENDATIONS AND SCC 11.16.050. IF HUMAN BURIALS OR HUMAN REMAINS ARE ENCOUNTERED, THE CONTRACTOR SHALL ALSO NOTIFY THE COUNTY CORONER AT (707) 565-5070.
9. SHOULD GRADING OPERATIONS ENCOUNTER HAZARDOUS MATERIALS, OR WHAT APPEAR TO BE HAZARDOUS MATERIALS, STOP WORK IMMEDIATELY IN THE CONTAMINATED AREA AND CONTACT 911 OR THE APPROPRIATE AGENCY FOR FURTHER INSTRUCTION.
10. RETAINING WALLS, UNLESS EXEMPTED PER SCC 7.13(A)(3)4. ARE NOT APPROVED UNDER A GRADING PERMIT. A SEPARATE BUILDING PERMIT IS REQUIRED.
11. EQUIPMENT SHALL NOT CROSS OR DISTURB CHANNELS OF ACTIVELY FLOWING STREAMS WITHOUT A PRMD APPROVED ROILING PERMIT AND BEST MANAGEMENT PRACTICES (SCC 23.1 AND 11.16.060.D).
12. GRADING AND DRAINAGE IMPROVEMENTS SHALL BE SET BACK FROM LAKES, PONDS, STREAMS, AND WETLANDS IN COMPLIANCE WITH THE REQUIREMENTS OF SCC 11.16.100, 11.16.120, AND 11.16.130. EXISTING VEGETATION SHALL BE RETAINED IN STREAM SETBACK AREAS TO FILTER SOIL AND OTHER POLLUTANTS CARRIED IN STORM WATER.
13. EXCESS SOIL SHALL BE REMOVED FROM THE PROJECT SITE UNLESS DEPICTED TO REMAIN ON SITE PER THE APPROVED PLAN. THE SITE RECEIVING SOIL MAY REQUIRE A GRADING PERMIT UNLESS EXEMPTED BY SCC 11.04.010.C.
14. CONTOURS, ELEVATIONS, AND SHAPES OF FINISHED SURFACES SHALL BE BLENDED WITH ADJACENT NATURAL TERRAIN TO ACHIEVE A CONSISTENT GRADE AND NATURAL APPEARANCE. BORDERS OF CUT SLOPES AND FILLS SHALL BE ROUNDED OFF TO A MINIMUM RADIUS OF FIVE FEET TO BLEND WITH THE NATURAL TERRAIN.
15. FILL MATERIAL SHALL NOT INCLUDE ORGANIC, FROZEN, OR OTHER DELETERIOUS MATERIALS. NO ROCK OR SIMILAR IRREDUCIBLE MATERIAL GREATER THAN SIX INCHES IN ANY DIMENSION SHALL BE INCLUDED IN FILLS EXCEPT WHERE APPROVED BY THE SOILS ENGINEER. FILLS SHALL BE CONSTRUCTED IN LIFTS NOT EXCEEDING EIGHT INCHES IN DEPTH. COMPLETED FILLS SHALL BE STABLE, WELL-INTEGRATED, AND BONDED TO ADJACENT MATERIALS AND THE MATERIALS ON WHICH THEY REST. FILLS SHALL BE COMPETENT TO SUPPORT ANTICIPATED LOADS AND BE STABLE AT THE DESIGN SLOPES SHOWN ON THE APPROVED PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE SOILS ENGINEER.
16. GROUND SURFACES SHALL BE PREPARED TO RECEIVE FILL BY REMOVING VEGETATION, TOPSOIL, AND OTHER UNSUITABLE MATERIALS, AND SCARIFYING THE GROUND TO PROVIDE A BOND WITH THE FILL MATERIAL.
17. FILL SHALL NOT BE PLACED ON NATURAL SLOPES STEEPER THAN 2H:1V (50 PERCENT).
18. FILLS INTENDED TO SUPPORT STRUCTURES OR SURCHARGES SHALL BE COMPACTED TO A MINIMUM OF 90 PERCENT OF MAXIMUM DRY DENSITY, AS DETERMINED BY ASTM D 1557, MODIFIED PROCTOR. A HIGHER COMPACTION PERCENTAGE MAY BE REQUIRED BY THE SOILS ENGINEER.
19. FILLS NOT INTENDED TO SUPPORT STRUCTURES OR SURCHARGES SHALL BE COMPACTED AS FOLLOWS:
   (1) FILL GREATER THAN THREE FEET IN DEPTH SHALL BE COMPACTED TO THE DENSITY SPECIFIED BY THE SOILS ENGINEER.
   (2) FILLS NO GREATER THAN THREE FEET

IN DEPTH SHALL BE COMPACTED TO THE DENSITY NECESSARY FOR THE INTENDED USE OR AS DIRECTED BY THE SOILS ENGINEER.

EROSION PREVENTION & SEDIMENT CONTROL NOTES

1. PERFORM EROSION PREVENTION AND SEDIMENT CONTROL IN ACCORDANCE WITH CHAPTER 11 AND 11A OF THE SONOMA COUNTY CODE (SCC).
2. THE APPROVED PLANS SHALL CONFORM TO THE PERMIT AND RESOURCE MANAGEMENT DEPARTMENT'S (PRMD) EROSION PREVENTION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMP'S) GUIDE AS POSTED ON THE PRMD WEBSITE.
3. THE PROPERTY OWNER IS RESPONSIBLE FOR PREVENTING STORM WATER POLLUTION GENERATED FROM THE CONSTRUCTION SITE YEAR ROUND. WORK SITES WITH INADEQUATE EROSION PREVENTION AND/OR SEDIMENT CONTROL MAY BE SUBJECT TO A STOP WORK ORDER AND/OR ADDITIONAL INSPECTION FEES TO VERIFY COMPLIANCE WITH SCC.
4. IF DISCREPANCIES OCCUR BETWEEN THESE NOTES, MATERIAL REFERENCED ON THE APPROVED PLANS OR MANUFACTURER'S RECOMMENDATIONS, THEN THE MOST PROTECTIVE SHALL APPLY.
5. AT ALL TIMES THE PROPERTY OWNER IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH THE STATE OF CALIFORNIA NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBING ACTIVITIES SUCH AS CLEARING, GRADING, EXCAVATION, STOCKPILING, AND RECONSTRUCTION OF EXISTING FACILITIES INVOLVING REMOVAL AND REPLACEMENT.
6. THE PROPERTY OWNER MUST IMPLEMENT AN EFFECTIVE COMBINATION OF EROSION PREVENTION AND SEDIMENT CONTROL ON ALL DISTURBED AREAS DURING THE RAINY SEASON (OCTOBER 1 – APRIL 30). GRADING AND DRAINAGE IMPROVEMENT SHALL BE PERMITTED DURING THE RAINY SEASON ONLY WHEN ON-SITE SOIL CONDITIONS PERMIT THE WORK TO BE PERFORMED IN COMPLIANCE WITH SCC.
7. DURING THE RAINY SEASON, STORM WATER BMP'S REFERENCED OR DETAILED IN PRMD'S BMP GUIDE SHALL BE IMPLEMENTED AND FUNCTIONAL ON THE SITE AT ALL TIMES AND THE AREA OF ERODIBLE LAND EXPOSED AT ANY ONE TIME DURING THE WORK SHALL NOT EXCEED ONE ACRE OR 20 PERCENT OF THE PERMITTED WORK AREA, WHICHEVER IS GREATER, AND THE TIME OF EXPOSURE SHALL BE MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE.
8. DURING THE NON-RAINY SEASON, ON ANY DAY WHEN THE NATIONAL WEATHER SERVICE FORECAST IS A CHANCE OF RAIN OF 30 PERCENT OR GREATER WITHIN THE NEXT 24 HOURS, STORM WATER BMP'S REFERENCED OR DETAILED IN PRMD'S BMP GUIDE SHALL BE IMPLEMENTED AND FUNCTIONAL ON THE SITE TO PREVENT SOIL AND OTHER POLLUTANT DISCHARGES. AT ALL OTHER TIMES, BMP'S SHOULD BE STORED ON SITE IN PREPARATION FOR INSTALLATION PRIOR TO RAIN EVENTS.
9. EROSION PREVENTION AND SEDIMENT CONTROL BMP'S SHALL BE INSPECTED BY THE PROPERTY OWNER BEFORE FORECASTED STORM EVENTS AND AFTER STORM EVENTS TO ENSURE BMP'S ARE FUNCTIONING PROPERLY. EROSION PREVENTION AND SEDIMENT CONTROL BMP'S THAT HAVE FAILED OR ARE NO LONGER EFFECTIVE SHALL BE PROMPTLY REPLACED. EROSION PREVENTION AND SEDIMENT CONTROL BMP'S SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED.
10. THE LIMITS OF GRADING SHALL BE DEFINED AND MARKED ON SITE TO PREVENT DAMAGE TO SURROUNDING TREES AND OTHER VEGETATION. PRESERVATION OF EXISTING VEGETATION SHALL OCCUR TO THE MAXIMUM EXTENT PRACTICABLE. ANY EXISTING VEGETATION WITHIN THE LIMITS OF GRADING THAT IS TO REMAIN UNDISTURBED BY THE WORK SHALL BE IDENTIFIED AND PROTECTED FROM DAMAGE BY MARKING, FENCING, OR OTHER MEASURES.
11. CHANGES TO THE EROSION PREVENTION AND SEDIMENT CONTROL PLAN MAY BE MADE TO RESPOND TO FIELD CONDITIONS IF THE ALTERNATIVE BMP'S ARE EQUIVALENT OR MORE PROTECTIVE THAN THE BMP'S SHOWN ON THE APPROVED PLANS. ALTERNATIVE BMP'S ARE SUBJECT TO REVIEW AND APPROVAL BY PRMD STAFF.
12. DISCHARGES OF POTENTIAL POLLUTANTS FROM CONSTRUCTION SITES SHALL BE PREVENTED USING SOURCE CONTROLS TO THE MAXIMUM EXTENT PRACTICABLE. POTENTIAL POLLUTANTS INCLUDE BUT ARE NOT LIMITED TO: SEDIMENT, TRASH, NUTRIENTS, PATHOGENS, PETROLEUM HYDROCARBONS, METALS, CONCRETE, CEMENT, ASPHALT, LIME, PAINT, STAINS, GLUES, WOOD PRODUCTS, PESTICIDES, HERBICIDES, CHEMICALS, HAZARDOUS WASTE, SANITARY WASTE, VEHICLE OR EQUIPMENT WASH WATER, AND CHLORINATED WATER.
13. ENTRANCE(S) TO THE CONSTRUCTION SITE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF POTENTIAL POLLUTANTS OFFSITE. POTENTIAL POLLUTANTS DEPOSITED ON PAVED AREAS WITHIN THE COUNTY RIGHT-OF-WAY, SUCH AS ROADWAYS AND SIDEWALKS, SHALL BE PROPERLY DISPOSED OF AT THE END OF EACH WORKING DAY OR MORE FREQUENTLY AS NECESSARY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING CONSTRUCTION VEHICLES LEAVING THE SITE ON A DAILY BASIS TO PREVENT DUST, SILT, AND DIRT FROM BEING RELEASED OR TRACKED OFFSITE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AT THE END OF EACH WORKING DAY OR MORE OFTEN, AS NECESSARY.
14. ALL DISTURBED AREAS SHALL BE PROTECTED BY USING EROSION PREVENTION BMP'S TO THE MAXIMUM EXTENT PRACTICABLE SUCH AS ESTABLISHING VEGETATION COVERAGE, HYDROSEEDING, STRAW MULCH, GEOTEXTILES, PLASTIC COVERS, BLANKETS, OR MATS. TEMPORARY REVEGETATION SHALL BE INSTALLED AS SOON AS PRACTICAL AFTER VEGETATION REMOVAL, BUT IN ALL CASES PRIOR TO OCTOBER 1. PERMANENT REVEGETATION OR LANDSCAPING SHALL BE INSTALLED PRIOR TO FINAL INSPECTION.
15. WHENEVER IT IS NOT POSSIBLE TO USE EROSION PREVENTION BMP'S ON EXPOSED SLOPES, SEDIMENT CONTROL BMP'S SUCH AS FIBER ROLLS AND SILT FENCES SHALL BE INSTALLED TO PREVENT SEDIMENT MIGRATION. FIBER ROLLS AND SILT FENCES SHALL BE TRENCHED AND KEYED INTO THE SOIL AND INSTALLED ON CONTOUR. SILT FENCES SHALL BE INSTALLED APPROXIMATELY 2 TO 5 FEET FROM TOE OF SLOPE.
16. HYDROSEEDING SHALL BE CONDUCTED IN A THREE STEP PROCESS. FIRST, EVENLY APPLY SEED MIX AND FERTILIZER TO THE EXPOSED SLOPE. SECOND, EVENLY APPLY MULCH OVER THE SEED AND FERTILIZER. THIRD, STABILIZE THE MULCH IN PLACE. AN EQUIVALENT SINGLE STEP PROCESS, WITH SEED, FERTILIZER, WATER, AND BONDED FIBERS IS ACCEPTABLE.

   APPLICATIONS SHALL BE BROADCASTED MECHANICALLY OR MANUALLY AT THE RATES SPECIFIED BELOW. SEED MIX AND FERTILIZER SHALL BE WORKED INTO THE SOIL BY ROLLING OR TAMPING. IF STRAW IS USED AS MULCH, STRAW SHALL BE DERIVED FROM WHEAT, RICE, OR BARLEY AND BE APPROXIMATELY SIX TO EIGHT INCHES IN LENGTH. STABILIZATION OF MULCH SHALL BE DONE HYDRAULICALLY BY APPLYING AN EMULSION OR MECHANICALLY BY CRIMPING OR PUNCHING THE MULCH INTO THE SOIL. EQUIVALENT METHODS AND MATERIALS MAY BE USED ONLY IF THEY ADEQUATELY PROMOTE VEGETATION GROWTH AND PROTECT EXPOSED SLOPES.

MATERIALS	APPLICATION RATE (POUNDS PER ACRE)
SEED MIX Bromus mollis (BLANDO BROME)	40
Trifolium hirtum (HYKON ROSE CLOVER)	20
FERTILIZER 16-20-0 & 15% SULPHUR	500
MULCH STRAW	4000
HYDRAULIC STABILIZING* M-BINDER OR SENTINEL	75-100
EQUIVALENT MATERIAL	PER MANUFACTURER
*NON-ASPHALTIC, DERIVED FROM PLANTS	

17. DUST CONTROL SHALL BE PROVIDED BY CONTRACTOR DURING ALL PHASES OF CONSTRUCTION.
18. STORM DRAIN INLETS SHALL BE PROTECTED FROM POTENTIAL POLLUTANTS UNTIL DRAINAGE CONVEYANCE SYSTEMS ARE FUNCTIONAL AND CONSTRUCTION IS COMPLETE.
19. ENERGY DISSIPATERS SHALL BE INSTALLED AT STORM DRAIN OUTLETS WHICH MAY CONVEY EROSIVE STORM WATER FLOW.
20. SOIL MATERIAL STOCKPILES, AND FERTILIZING MATERIAL SHALL BE PROPERLY PROTECTED WITH PLASTIC COVERS OR EQUIVALENT BMP'S TO MINIMIZE SEDIMENT AND POLLUTANT TRANSPORT FROM THE CONSTRUCTION SITE.
21. SOLID WASTE, SUCH AS TRASH, DISCARDED BUILDING MATERIALS AND DEBRIS, SHALL BE PLACED IN DESIGNATED COLLECTION AREAS OR CONTAINERS. THE CONSTRUCTION SITE SHALL BE CLEARED OF SOLID WASTE DAILY OR AS NECESSARY. REGULAR REMOVAL AND PROPER DISPOSAL SHALL BE COORDINATED BY THE CONTRACTOR.
22. A CONCRETE WASHOUT AREA SHALL BE DESIGNATED TO CLEAN CONCRETE TRUCKS AND TOOLS. AT NO TIME SHALL CONCRETE PRODUCTS AND WASTE BE ALLOWED TO ENTER COUNTY WATERWAYS SUCH AS CREEKS OR STORM DRAINS. NO WASHOUT OF CONCRETE, MORTAR MIXERS, OR TRUCKS SHALL BE ALLOWED ON SOIL. CONCRETE WASTE SHALL BE PROPERLY DISPOSED.
23. PROPER APPLICATION, CLEANING, AND STORAGE OF POTENTIALLY HAZARDOUS MATERIALS, SUCH AS PAINTS AND CHEMICALS, SHALL BE CONDUCTED TO PREVENT THE DISCHARGE OF POLLUTANTS.
24. TEMPORARY RESTROOMS AND SANITARY FACILITIES SHALL BE LOCATED AND MAINTAINED DURING CONSTRUCTION ACTIVITIES TO PREVENT THE DISCHARGE OF POLLUTANTS.
25. APPROPRIATE VEHICLE STORAGE, FUELING, MAINTENANCE, AND CLEANING AREAS SHALL BE DESIGNATED AND MAINTAINED TO PREVENT DISCHARGE OF POLLUTANTS.

CONSTRUCTION NOTES:

1. ON-SITE AC DRIVEWAY DEMOLITION: RESTORE SURFACE TO ORIGINAL GRADES. DISK TOP 2", SEED AND STRAW WHEN COMPLETE.

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BRICOLEUR VINEYARD WINERY
7390/7394 STARR ROAD
WINDSOR, CALIFORNIA 95492

OWNER
STARR HOLDINGS, LLC
7394 Starr Road
Windsor, California 95492

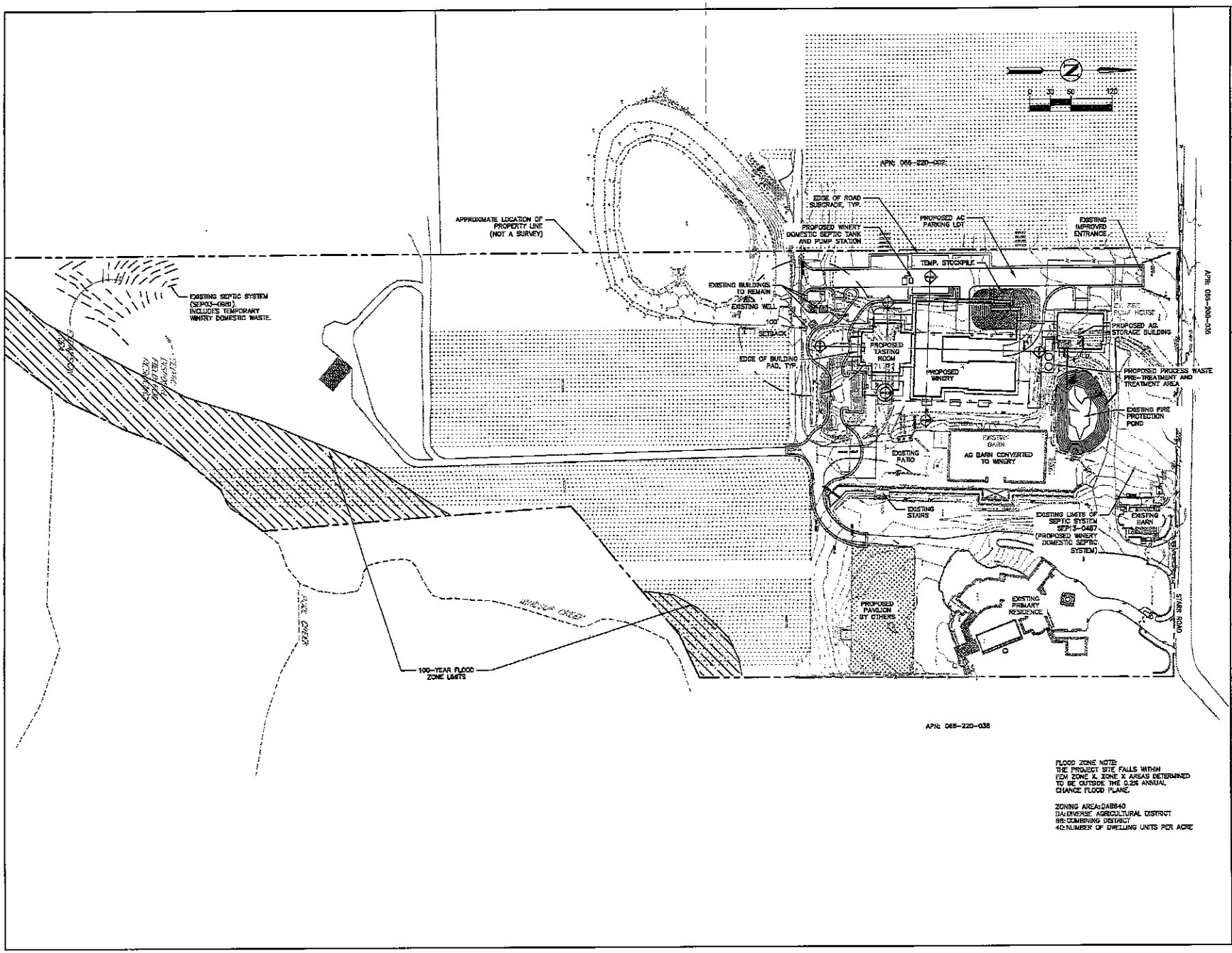
MARK	DATE	DESCRIPTION

PROJECT NO: 1735
CAD DWG FILE: 18-110-PRELIM_GRADING
DRAWN BY: TA/CC
CHK'D BY: –

SHEET TITLE
CONSTRUCTION NOTES

C-2

SHEET 2 OF 4



FLOOD ZONE NOTE:
THE PROJECT SITE FALLS WITHIN FEM ZONE X. ZONE X AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLANE.

ZONING AREA: DA:B40
DA: DIVERSE AGRICULTURAL DISTRICT
B: COMBINING DISTRICT
40: NUMBER OF DWELLING UNITS PER ACRE

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OWNER
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7394 Starr Road
Windsor, California 95492

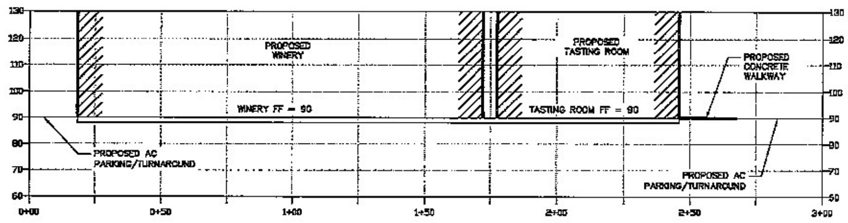
MARK	DATE	DESCRIPTION

PROJECT NO: 1728
CAD DWG FILE: 16-110-PRELIM_GRADING
DRAWN BY: TA/CC
CHKD BY: -

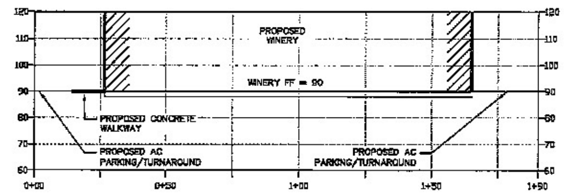
SHEET TITLE
PRELIMINARY GRADING SITE PLAN

C-3

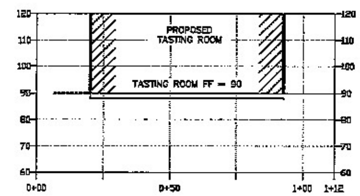
SHEET 3 OF 4



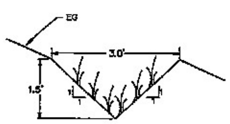
A–A



B–B

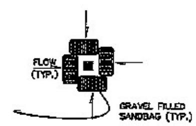


C–C



TYPICAL SWALE SECTION

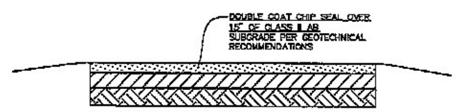
NTS



NOTE:
USE AT ALL DROP INLETS AND TRENCH DRAINS UNTIL PAVING OR GRASS/LANDSCAPING INSTALLED.

TYPICAL GRAVEL FILLED SANDBAG PLACEMENT AT DROP INLETS

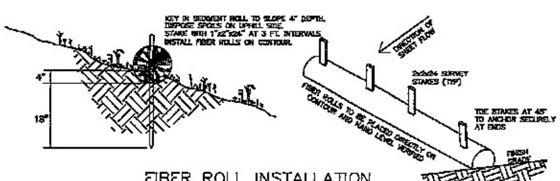
NTS



*PAVEMENT SECTIONS ARE FOR REFERENCE ONLY. PLEASE REFER TO THE ALL WRITTEN GEOTECHNICAL REPORTS AND THE RECOMENDTIONS OF THE SITE GEOTECHNICAL ENGINEER FOR FINAL SECTIONS. ALL SECTIONS ASSUME A TI=5.0.

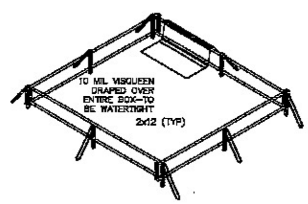
TYPICAL PAVEMENT SECTION

NTS



FIBER ROLL INSTALLATION

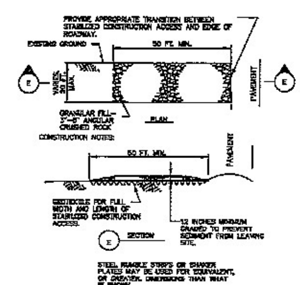
NTS



CONTRACTOR TO ADJUST SIZE AND STAKING TO JOB QUANTITY AND FREQUENCY OF POURS.

2. NO SHARP OBJECTS, NAIL ENDS, ROCKS, ETC ON INSIDE OF BOX
3. AFTER COMPLETION OF WORK, BOX AREAS SHALL BE RESTORED TO THE ORIGINAL CONDITION, OR TO THE SPECIFIED FINISH ON THE DWGS. BY THE CONTRACTOR.

CONCRETE WASHOUT BOX



STEEL RUMBLE STRIPS OR SHAKER PLATES MAY BE USED FOR EQUIVALENT, OR GREATER, DIMENSIONS THAN WHAT IS SHOWN.

STABILIZED CONSTRUCTION ENTRANCE

NTS

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WINDSOR, CALIFORNIA 95492

OWNER
STARR HOLDINGS, LLC
7394 Starr Road
Windsor, California 95492

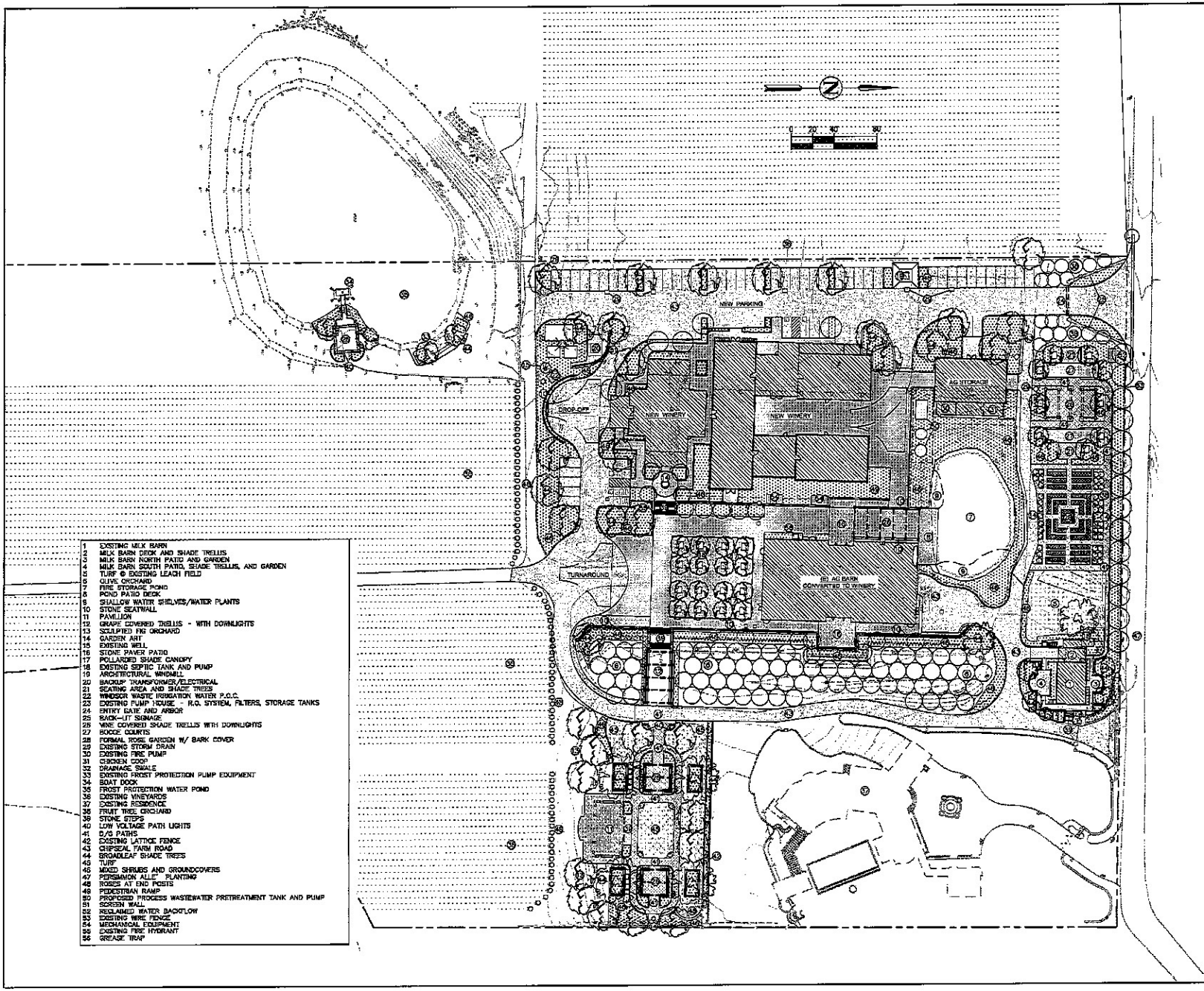
MARK	DATE	DESCRIPTION

PROJECT NO: 1738
CAD DWG FILE: 18-113-PRELIM_GRD.DWG
DRAWN BY: TJ/CC
CHK'D BY: –

SHEET TITLE

PRELIMINARY GRADING SECTIONS AND DETAILS

C-4



1 EXISTING MILK BARN
2 MILK BARN DECK AND SHADE TRELLIS
3 MILK BARN NORTH PATIO AND GARDEN
4 MILK BARN SOUTH PATIO, SHADE TRELLIS, AND GARDEN
5 TURF @ EXISTING LEACH FIELD
6 OLIVE ORCHARD
7 FIRE STORAGE POND
8 POND PATIO DECK
9 SHALLOW WATER SHELVES/WATER PLANTS
10 STONE SEATWALL
11 PAVILLION
12 GRAPE COVERED TRELLIS - WITH DOWNLIGHTS
13 SCULPTED FIG ORCHARD
14 GARDEN ART
15 EXISTING WELL
16 STONE PAVER PATIO
17 POLLARDED SHADE CANOPY
18 EXISTING SEPTIC TANK AND PUMP
19 ARCHITECTURAL WINDMILL
20 BACKUP TRANSFORMER/ELECTRICAL
21 SEATING AREA AND SHADE TREES
22 WINDSOR WASTE IRRIGATION WATER P.O.C.
23 EXISTING PUMP HOUSE - R.O. SYSTEM, FILTERS, STORAGE TANKS
24 ENTRY GATE AND ARBOR
25 BACK-LIT SIGNAGE
26 WINE COVERED SHADE TRELLIS WITH DOWNLIGHTS
27 BOCCE COURTS
28 FORMAL ROSE GARDEN W/ BARK COVER
29 EXISTING STORM DRAIN
30 EXISTING FIRE PUMP
31 CHICKEN COOP
32 DRAINAGE SWALE
33 EXISTING FROST PROTECTION PUMP EQUIPMENT
34 BOAT DOCK
35 FROST PROTECTION WATER POND
36 EXISTING VINEYARDS
37 EXISTING RESIDENCE
38 FRUIT TREE ORCHARD
39 STONE STEPS
40 LOW VOLTAGE PATH LIGHTS
41 D/G PATHS
42 EXISTING LATTICE FENCE
43 CHIPSEAL FARM ROAD
44 BROADLEAF SHADE TREES
45 TURF
46 MIXED SHRUBS AND GROUNDCOVERS
47 PERSIMMON ALLEE PLANTING
48 ROSES AT END POSTS
49 PEDESTRIAN RAMP
50 PROPOSED PROCESS WASTEWATER PRETREATMENT TANK AND PUMP
51 SCREEN WALL
52 RECLAIMED WATER BACKFLOW
53 EXISTING WIRE FENCE
54 MECHANICAL EQUIPMENT
55 EXISTING FIRE HYDRANT
56 GREASE TRAP

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MARK	DATE	DESCRIPTION
PROJECT NO:		1705
CAD DWG FILE:		LANDSCAPE DRAWING MASTER PLAN.DWG
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CHECK BY:		-
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SHEET TITLE

PRELIMINARY LANDSCAPING PLAN

L-1

SHEET 1 OF 1

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

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Paula J. Whealen
David H. Peterson, CEG, CHG
David P. Lounsbury, P.E.
David Houston, P.E.
Vincent Maples, P.E.
Patrick W. Ervin, P.E.
Martin Berber, P.E.
Ryan E. Stolfus

James C. Hanson, P.E.
Henry S. Matsunaga

February 26, 2018

Mr. Mark Hanson
Starr Holdings LLC
2269 Chestnut Street, Suite 450
San Francisco, California 94123

RE: Groundwater Availability Study
Use Permit Application for New Winery
Application No. UPE-17-0053
7390 Starr Road (APN 066-220-019)
Windsor, California

Dear Mr. Hanson:

This report presents the groundwater availability study performed as part of a use permit application for construction of a new 40,000-case capacity winery on the Starr Holdings LLC property at 7390 Starr Road in Windsor, California. The property is on the south side of Starr Road and west of Windsor, as shown on the *Location Map*, Figure 1.

BACKGROUND

Project Description

We previously performed a groundwater availability study for a Use Permit application to convert use of the Ag Barn on the property (PRMD File No. UPE17-0018). The findings were summarized in a July 17, 2017 report. The geologic and groundwater information presented in that study, including estimates of local water use and recharge were used in this current report. We understand that Use Permit application UPE17-0018 has been withdrawn.

We understand you plan to construct an approximately 29,000 square foot winery north of the existing Ag Barn, in the area of a current equestrian arena. Annual wine production is estimated at 40,000 cases, which will include crushing of the grapes, fermentation, wine production and barrel cleaning. Other related uses include public tours and tastings, and a specific list of agricultural promotional events. As described in an undated *Proposal Statement* by Atterbury & Associates, project civil engineers, the existing Ag Barn would be converted to a winery building

utilized for barrel aging and storage with a commercial kitchen, bathrooms, conference room and employee offices. The tasting room would be in this building, at least until construction of a new tasting room is warranted.

The winery, tasting room and vineyard operations are expected to require 10 full time employees. Temporary employees will be added as necessary during the harvest/crush season. The tasting room will operate seven days a week. The winery expects a maximum of 30 visitors to the tasting room per day.

A total of 25 special events are proposed annually (Wine Club member events, industry and agricultural promotional events, etc.). As described in the *Proposal Statement*, these events will be attended by between 100 and 200 persons. Portable restrooms will be rented for all events with 100 people or more, so sanitary wastewater generation would be limited.

As designated in the Sonoma County General Plan 2020, most of the property lies within Groundwater Availability Area Zone 1, a "major groundwater basin." As defined in the Water Resources Element of the General Plan, a groundwater availability study would not be required for these areas. However, County Policy and Procedure No 8-1-15 (2017) has expanded the requirements for these studies to include priority groundwater basins, as defined by California Department of Water Resources (DWR). The project lies at the northern margin of the Santa Rosa Valley, Santa Rosa Plain Subbasin, which is designated by DWR as a medium priority basin.

Project Water Demand

We understand that water for site landscape and vineyard irrigation is obtained from treated wastewater provided by the Town of Windsor. Groundwater pumping is limited to potable water use for the onsite residences and facilities.

Based on the *Project Proposal* for UPE 17-0053, Atterbury & Associates calculates that the annual wastewater flows generated for this project will be as follows:

Special Events	19,000 gallons per year (gpy)
Tasting Room	19,500 gpy
Winery Staff	39,000 gpy
Winery Staff during crush	12,600 gpy
Winery Process Wastewater	288,000 gpy
Annual Project Water Use:	378,100 gallons or1.2 acre-feet

The maximum domestic wastewater flow per day is estimated at 785 gallons. Average daily flows during crush are estimated at 1,600 gallons, with a peak flow during crush of 2,400 gallons.

All water supply for the above-listed uses will be from groundwater. Therefore, based on this estimate, the additional cumulative impact associated with development of the project is estimated at 1.2 acre-feet of groundwater use per year.

Scope of Study

The water availability study was performed to generally follow the guidelines outlined in the Sonoma County *Procedures for Groundwater Analysis and Hydrogeologic Reports* (February 23, 2017). The scope of the evaluation consisted of reviewing available geologic and groundwater reports and aerial photography for the site and vicinity; performing a property and area reconnaissance by a certified engineering geologist/hydrogeologist; analyzing the data obtained; and preparing this report. The information reviewed is listed in the attached References. Subsurface investigation or well testing were not performed for this study, although we reviewed available well completion reports for the onsite wells.

Cumulative Impact Area (CIA)

The subject property and project water supply well are located in a rural area with low development density (40 acres/unit) and within Groundwater Availability Zone 1. In this setting, the estimated additional cumulative impact of 1.2 acre-feet of groundwater pumping appeared to be relatively small. In addition, we estimated that the lateral extent of pumping drawdown from the well would be limited, with less than about one foot of drawdown at a distance of 150 feet from the well. In prior discussions with PRMD staff , a Cumulative Impact Area (CIA) extending a distance of 1,000 feet from the project well was selected.

<u>Cumulative Groundwater Demand in CIA</u>
As shown on the *Vicinity Map*, Figure 1, the CIA is an area extending 1,000 feet from the project well and consists of about 72 acres. The CIA includes all or portions of thirteen parcels, ranging from 1.94 to 98.90 acres. The area is shown on County zoning maps as Land Intensive Agriculture, with a minimum development density of 40 acres per unit. From review of land use on aerial photography, it appeared that only very small portions of three parcels (066-200-009, 066-200-034 and 066-220-027) fall within the CIA and residential construction in these areas (close to property lines) seemed unlikely. In our analysis of potential water demand at "buildout," the remaining ten parcels were considered. Based on the local zoning density, it appears that a total of 10 residences could be developed within the area defined as the CIA at "buildout."

Prior groundwater studies performed by Kleinfelder (2003) for the County of Sonoma for several water-scarce areas cited an average annual household water demand of about 0.5 to 1 acre-foot per year. Therefore, the annual residential groundwater demand for the 10 projected residences in the CIA at buildout (including the subject property) is estimated at about 10 acre feet. Our estimate assumes all residential water supply is from groundwater; other sources of water (recycled water, reservoirs or surface runoff) were not included.

As discussed, onsite water use for vineyards and landscaping is from the Town of Windsor's recycled wastewater. Review of Town of Windsor mapping (2012) indicates that vineyards and open land to the east also receive recycled water. The only vineyard areas found within the ACI that might be irrigated by groundwater are a 0.7-acre portion of a vineyard at APN 066-200-009 and about 3.8 acres on APN 066-220-040. Undeveloped parcels lie immediately north of Starr

Road and their future use is unknown. However, given that a recycled water pipeline is located in Starr Road, it seems likely that if developed for vineyards, they would also be irrigated with recycled water.

In prior discussions with vineyard operators in the County, we understand vineyard irrigation can vary from about 0.15 acre-ft per acre per year in cooler, coastal areas, to about 0.5 acre-ft per acre per year for warmer inland valleys. We previously estimated average vineyard water demand for the years 2010 (average year) through 2013 (dry year) for areas throughout the Upper Russian River Valley area. Our studies found that in the Windsor-Healdsburg area, average vineyard water demand ranged from about 0.2 acre-feet per acre in 2010 (average year), to about 0.41 to 0.49 acre-feet in the drier years of 2012-2013. Using the higher, more conservative end of these estimates (0.5 acre-ft/acre/year), the annual water demand by the possible groundwater-irrigated vineyards falling within the CIA would be about 2.3 acre-feet (4.5 acres x 0.5 acre-ft/acre).

Based on the assumptions discussed above, the estimated annual cumulative groundwater demand for the CIA at buildout, without the current proposed winery project, would be about 12.3 acre-feet (10.0 residential, 2.3 vineyard irrigation). With the estimated additional cumulative demand of 1.2 acre-feet for the project, total annual demand would be about 13.5 acre-feet.

HYDROGEOLOGIC SETTING

Local Setting

The geologic setting of the area is shown on the *Vicinity Geologic Map*, Figure 2. Published geologic mapping (Delattre, 2011) indicates the oldest bedrock units in the vicinity are exposed several miles west of the subject property and consist of deformed igneous and sedimentary rocks of the Jurassic to Cretaceous-age Franciscan Complex (map symbol KJfm) and Great Valley Sequence (symbol KJgvs). These units are not exposed at the surface in the site vicinity. Although the Franciscan Complex or Great Valley bedrock units may underlie the site at depth, they are not anticipated to be a source of groundwater to the project well.

The low hills in the vicinity of the property are mapped as underlain at the surface by weakly consolidated gravel, tuffaceous sand (i.e., sand containing decomposed volcanic ash debris), silt, clay, and reworked tuff. Previous geologic maps have grouped these strata with the late-Tertiary age Glen Ellen formation (Cardwell, 1958; Huffman and Armstrong, 1980). On the most recent mapping by Delattre (2011), the unit is referred to as "Unnamed fluvial deposits." This designation was used by Delattre, due to unreliable lithologic and age criteria and correlation to the type localities for the Glen Ellen formation.

The Glen Ellen formation/unnamed fluvial deposits are described as composed of a heterogeneous mixture of crudely bedded clay, silt, sand, and gravel strata, with locally interbedded tuff. Individual strata typically can grade over short lateral distances from coarse gravels to clays (Cardwell, 1958; Ford, 1975). Cardwell (1958) notes that north and west of Santa Rosa, the Glen

Ellen formation strata are difficult to distinguish from older terrace deposits along the Russian River.

Published groundwater reports (Cardwell, 1958; Ford, 1975; and Hauge and Mitchell, 1983) indicate that the water-yielding capability in the Glen Ellen formation can vary widely. The permeability of the formation is typically low and larger yields are generally obtained by penetrating a thick section of the formation. In the Healdsburg and Dry Creek Valley region, well yields in the Glen Ellen formation vary widely, producing from 1 to over 100 gallons per minute (gpm), although in the Windsor area, deeper wells in the Glen Ellen formation are reported to yield "upwards of 500 gpm" (Ford, 1975). Specific capacities in the vicinity (the yield in gallons per minute, per foot of drawdown) are reported to range from 0.05 to 1.5 gpm per foot of drawdown (Ford, 1975).

Review of the log for the project water well (DWR Well Completion Report e0305588; see Attachments) indicates that it was drilled to a total depth of 400 feet. The well penetrated layers of clay, gravel, and sand to a depth of 275 feet, including relatively coarse-grained deposits of gravel, coarse sand and gravel from a depth of 110 to 160 feet and from 203 to 230 feet. At greater depth, "green sandstone with streaks of shale" is logged, although it is not known if this deeper unit is part of the Unnamed fluvial deposits or Glen Ellen formation strata. A yield of 400 gallons per minute (gpm) was noted during air-lift development of the well.

Area Reconnaissance

We performed a site/area review on June 30, 2017, to observe the exposed geologic conditions, review the onsite well locations and to note locations of other nearby water wells. The well locations noted in our site review and PRMD file review are shown on Figure 1. During the area review, a water well was observed on the adjacent property to the west, at 6900 Starr Road. As estimated on aerial photography, this well is about 160 feet from the project well and appears to be the closest offsite well.

The site is located in low rolling hills west of Windsor. During our site review, we noted that where exposed in graded areas, soil/bedrock units consisted of light gray-brown clayey and tuffaceous gravel-sand mixtures typical of weathered Glen Ellen formation. The two onsite wells were observed, an older well reportedly drilled in 1960 and the planned project well, drilled in 2016. A water level of about 59 feet was measured in the project well; we could not access the older well to obtain a measurement.

Groundwater Occurrence and Storage

Groundwater in the weakly consolidated sedimentary strata in the site vicinity occurs in pore spaces between soil particles. Porosity in saturated alluvial materials is variable, although typically ranges from about 10 to 25 percent in sand and gravel mixes (Driscoll, 1986). Review of the well log for the project well and our onsite measurements indicate that groundwater occurs at a depth of about 59 feet. Review of the log indicates that below a depth of 59 feet, the well encountered

201 feet of gravel and sand layers and 140 feet of clay and gravelly-clay mixtures. Assuming 20 percent porosity for the sands and gravels (201 ft x 0.2 porosity), about 40.2 acre feet of groundwater would be in storage per acre in the more granular, porous strata, to the depth of the onsite well. Over the 72-acre area of the CIA, this would equate to about 2,900 acre-feet of water in storage to a depth of 400 feet.

The nearest monitored well found in our review is State Well No. 8N/9W-22R1 located about ½-mile southwest (see Figure 2). Review of the hydrograph for this well indicates that over the monitoring period of November 1989 to December 2011, water levels have generally been rising. Water levels typically fluctuated about 3 to 5 feet annually, but appeared to recover seasonally

The water level in the onsite project well was measured at 60 feet deep when drilled in March 2016 and at a similar depth (about 59 feet) on June 30, 2017. There is insufficient data to assess changes in aquifer storage over time, although little change was noted in the onsite water level after a year of higher-than-average rainfall.

COMMENTS ON WATER BALANCE

Precipitation

Mean seasonal precipitation maps from Sonoma County Water Agency (Revised January 2005) indicate the mean annual rainfall in the site vicinity is about 35 inches, which would be about 2.9 acre-feet of rain falling per acre, or 209 acre-feet over the area of the CIA. In our prior discussions with PRMD, we understand they have adopted the criteria for evaluating drought conditions for these studies at 50% of normal precipitation for a period of three years.

Evapotranspiration

Maps of Reference Evapotranspiration prepared by California Irrigation Management Information System (CIMIS) show the subject property near the boundary of "Zone 5 – Northern Inland Valleys" with an annual reference evapotranspiration of 43.9 inches and "Zone 8 - Inland San Francisco Bay Area" with a reference evapotranspiration of 49.4 inches. The map indicates that the highest rates of evapotranspiration would probably occur from about May to August. In the Santa Rosa Plain, Nishikawa (2013) indicates that these amounts represent "potential" evapotranspiration (PET), and that actual evapotranspiration is less, on the order of about 40% of PET.

Groundwater Recharge

Published data for Mediterranean-type climates (receiving almost no precipitation for half the year) indicates that ground-water recharge is on the order of 10 to 20 percent of long-term precipitation (Bouwer, ASCE, 2003). Using the Sonoma County (SCWA, 2005) rainfall data, this would be equivalent to about 3.5 to 7.0 inches of the annual recharge, or about 0.29 to 0.58 acre-

feet of recharge per acre in the vicinity of the CIA. Over the area of the 72-acre CIA, this would be about 21 to 42 acre feet of recharge annually from precipitation.

As a check on the general published range given above, we estimated recharge using the water table fluctuation method described by the U.S. Geological Survey (http://water.usgs.gov/ogw/gwrp/methods/wtf/). In this method, the annual change in water level from the seasonal low (typically in the fall) to the seasonal high (in spring), as measured in well hydrographs, is multiplied by the specific yield of the geologic formation, to calculate the approximate amount of water that recharged the aquifer.

Review of published references about the hydrogeology of the Santa Rosa Plain Subbasin (DWR, 2004; Nishikawa, 2013) cite a specific yield of 3 to 7 percent for the Glen Ellen formation and 8 to 17 percent for overlying alluvial deposits. Based on this information and the relatively high yield reported on the log of the project well, we assumed that the specific yield locally was in the middle of the published range, at about 10 percent.

Well hydrographs presented in the Santa Rosa Plan Groundwater Management Plan (2014; Figure 2-13D) generally show rising water levels in the vicinity. Review of online groundwater data sources (DWR *Water Data Library* and *Interactive Groundwater Map Application*) show relatively few sites with ongoing water level monitoring near the project. The nearest well location, State Well 8N/9W-22R1 was noted to have water level variations of about 3.2 to 4.2 feet in "average" rainfall years, with an average fluctuation of 3.7 feet. At a specific yield of 10 percent, this would equate to about 0.37 feet of water recharged annually (3.7 ft water rise x 0.1), or an average local recharge of about 13 percent (0.37 ft recharge/2.9 ft precipitation), which falls in the general range of the published values.

Adjacent and east of the subject property, a 69.26-acre parcel (APN 066-022-038) is owned by the Town of Windsor and is also used for disposal of excess recycled wastewater, applied to "pasture, fodder, and other crops" (Town of Windsor, *Reclamation Water Use Areas* map, June 2012). From discussions with the Town of Windsor, we understand this area is generally only used during wetter years, when capacity of the wastewater ponds is reached. In years when applications occur, some amount of the applied water would likely contribute additional recharge from infiltration (i.e. return flows). The Town of Windsor also indicated that about 11.95 acre-feet of recycled water was used in 2016 on the two Starr Holdings properties, although the amount of potential return flows was not estimated.

ESTIMATED WELL PUMPING INFLUENCE

To evaluate potential well pumping impacts to surface water bodies or wells on other properties, the potential lateral extent of pumping from the planned project well was estimated. Using general relationships discussed in Driscoll (1986) and notes from the Groundwater Resources Association's *Low Yield Aquifer Testing* (2004) short course**,** we estimated the lateral pumping influence using information on the Well Completion Report and pump information provided by Weeks Drilling and Pump Company. Using the method in Driscoll (1986), an approximate

relationship between specific capacity calculated from the well log and aquifer transmissivity was used, based on "typical" pump test values. Transmissivity was estimated assuming a confined aquifer, using the relationship of Specific Capacity (yield/drawdown) x 2,000. To develop the slope of the drawdown curve from the pumping well, the value of Δs (drawdown over one log graph cycle) was calculated for a distance-drawdown relationship, where $T = 528Q/\Delta s$ (Driscoll,1986, Equation 9.11)

Other assumptions in the estimate include adjusting the drawdown for the efficiency of the well. Frictional losses due to well screen size and sand pack can lead to reduced efficiency of the well (i.e., the water level in the formation outside of the well bore is higher than the level measured in the well). A properly designed, constructed, and developed well generally has an efficiency in the range of 70 to 80 percent (Driscoll, 1986; Rosco Moss Company, undated). Since the project well is newer, we assumed a higher efficiency of 80 percent.

The analysis is shown on the attached semi-log plot. As estimated, pumping the project well at 13 gpm (the average reported pumping rate provided by Weeks) for four hours (the duration of pumping on the well log) might result in a zone of pumping influence extending somewhat over 600 feet from the well. However, at a distance of 140 to 150 feet from the well, the pumping drawdown is estimated to be less than about one foot. Two neighboring wells were identified within the potential area of pumping of influence. The well at 6900 Starr Road (see Figure 1) is about 160 feet from the project well. From review of PRMD files, a second well (not verified) may be located at 7050 Starr Road, about 290 feet to the southwest.

The nearest surface water is Windsor Creek, about 1,400 feet southeast. As discussed, the daily peak project water demand is about 3,185 gallons (785 domestic and 2,400 winery process), which would require about 245 minutes of pumping, similar to the duration of pumping on the well log and used in our calculations. Therefore, based on our calculation, the creek appears to lie beyond the area of well pumping influence.

DISCUSSION AND CONCLUSIONS

The assumptions used in estimating groundwater recharge for this study are based mainly on published regional studies and are approximate. However, based on the calculated water demand, published precipitation and recharge data, and the well hydrograph estimate, annual groundwater recharge is sufficient to meet the groundwater demand for the vicinity during both average rainfall and drought years. The hydrographs reviewed do not indicate long-term declines in water levels. Using the County's criteria of 50 percent rainfall during drought years, it is possible that some water level decline could occur during future dry years. However, the available data indicate that temporary declines in water levels during periods of drought have subsequently recovered in more normal rainfall years.

Given the relatively small water demand for the planned project, the location of the project water supply well in a major groundwater basin, and proximity to recycled water disposal areas, it seems

unlikely that the additional cumulative impact associated with the proposed project would lead to overdraft of the aquifer.

Neighboring wells were identified during our review that fall within the estimated radius of well pumping influence from the project well, with, the nearest offsite well found about 160 feet to the west, at 6900 Starr Road. The calculated drawdown at that well appears to be quite small, on the order of less than one foot.

We trust this report provides the information you require. Please call if you have questions about our evaluation, or if we can provide additional information.

Very truly yours,

WAGNER & BONSIGNORE
CONSULTING CIVIL ENGINEERS

ATTACHMENTS

Location Map, Figure 1
Vicinity Geologic Map, Figure 2
Log of Planned Project Well – WCR No. e0305588
Well Pumping Influence Estimate for Project Well
Recharge Estimate from Hydrograph of Well 8N/9W-22R1

REFERENCES

Blake, M.C. Jr., Graymer, R.W., and Stamski, R.R., 2002, Geologic Map and Map Database of Western Sonoma, Northernmost Marin, and Southernmost Mendocino Counties, California: U.S. Geological Survey Misc. Field Studies Map MF-2402, Version 1.0, Scale 1:100,000.

Bouwer, H., 2003, Integrated Water Management for the 21st Century, Problems and Solutions in Perspectives in Civil Engineering, Commemorating the 150th Anniversary of the American Society of Civil Engineers: J.S. Russell, Ed., ASCE 150th Anniversary Paper, p. 79-88.

California Department of Water Resources, 1999, California Irrigation Management Information System (CIMIS, Reference Evapotranspiration, Scale1:1,805,000, web site address :http://wwwcimis.water.ca.gov/cimis.

California Department of Water Resources, 2004, Santa Rosa Valley, Santa Rosa Plain Subbasin in California's Groundwater: Bulletin 118, February 27, 2004 Update, 5p.

California Department of Water Resources, 2017, Water Data Library (http://www.water.ca.gov/waterdatalibrary/).

California Department of Water Resources, 2017, Groundwater Information Center Interactive Map Application (https://gis.water.ca.gov/app/gicima/).

Cardwell, G.T., 1958, Geology and Ground Water in the Santa Rosa and Petaluma Valley Areas, Sonoma County, California: U.S. Geological Survey Water-Supply Paper 1427, 273p., with illutrations.

Delattre, M.P., 2011, Preliminary Geologic Map of the Healdsburg 7.5' Quadrangle, Sonoma County, California, A Digital Database: California Geological Survey Preliminary Geologic Map Series, Version 1.0, original scale 1:24,000.

Driscoll, F.G., 1986, Groundwater and Wells: Second Edition, published by Johnson Division, St. Paul Minnesota, 1089p.

Ford, R.S., 1975, Evaluation of Ground Water Resources: Sonoma County, Volume 1: Geologic and Hydrologic Data: California Department of Water Resources, Bulletin No. 118-4, 177p.

Google Earth, 2017, Historical aerial photography (color and black and white), 1993 to 2016, www.googleearth.com.

Groundwater Resources Association, 2004, Low Yield Aquifer Testing Seminar: notes from short course presented April 26, 2004, Walnut Creek, CA.

Huffman, M.E. and Armstrong, C.F., 1980, Geology for Planning in Sonoma County: California Division of Mines and Geology Special Report 120.

Kleinfelder, 2003, Pilot Study of Groundwater Conditions in the Joy Road, Mark West Springs, and Bennett Valley Areas of Sonoma County, California: unpublished consultant's report to the Sonoma County Permit and Resource Management Department, dated September 17, 2003, 46p, with plates, figures, and appendices.

Nishikawa, T., Editor, 2013, Hydrologic and Geochemical Characterization of the Santa Rosa Plain Watershed, Sonoma County, California: U.S. Geological Survey Scientific Investigations Report 2013-5118, 199p. with illustrations.

Rosco Moss Company, undated, Case Study; a Comparison of Well Efficiency and Aquifer Test Results Louvered Screen vs. Continuous Wire-Wrapped Screen, Big Pine, California: Technical Memorandum 004-1, 5p.

Santa Rosa Plain Basin Advisory Panel, 2014, Santa Rosa Plain Watershed, Groundwater Management Plan: 335 p., with illustrations.

Sonoma County Water Agency, Revised January 2005, Sonoma County Mean Seasonal Precipitation in Flood Control Design Criteria manual: Plate No. B-3.

Sonoma County Planning Department, 2008, Sonoma County General Plan 2020, Water Resources Element, Groundwater Basins and Sub-basins, Figure WR-2, Adopted September 28, 2008.

Sonoma County Permit and Resource Management Department, 2017, Procedures for Groundwater Analysis and Hydrogeologic Reports: Policy and Procedure No. 8-1- 14, dated February 23, 2017, 7p.

Town of Windsor, 2012, Water Reclamation System, Water Reclamation Use Areas: Prepared by Brelje and Race Consulting Engineers, June 2012, Figure 4, Scale 1"=2,400'.

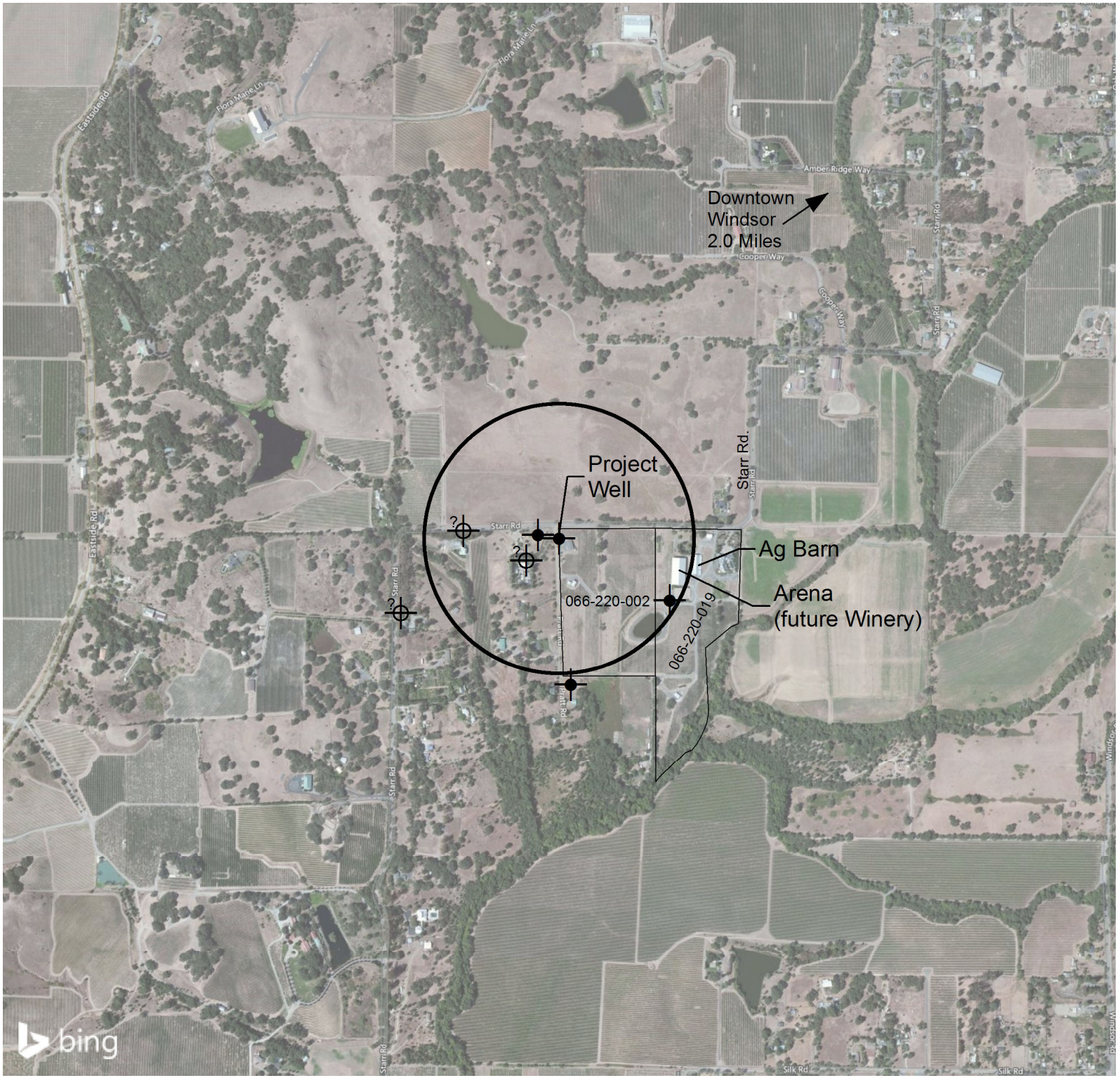


FIGURE 1

Star Holdings, LLC.
7390 Starr Road

Location Map

Sonoma County, California

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

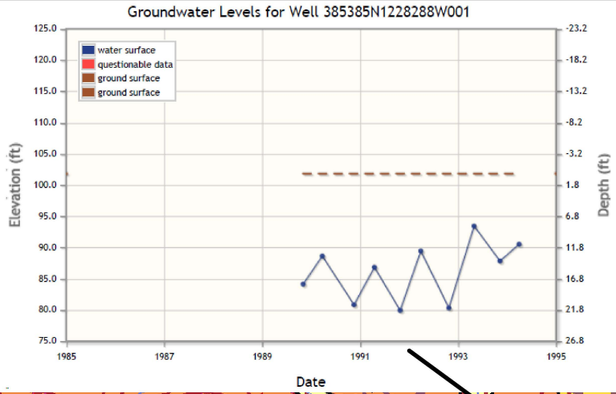
February 2018

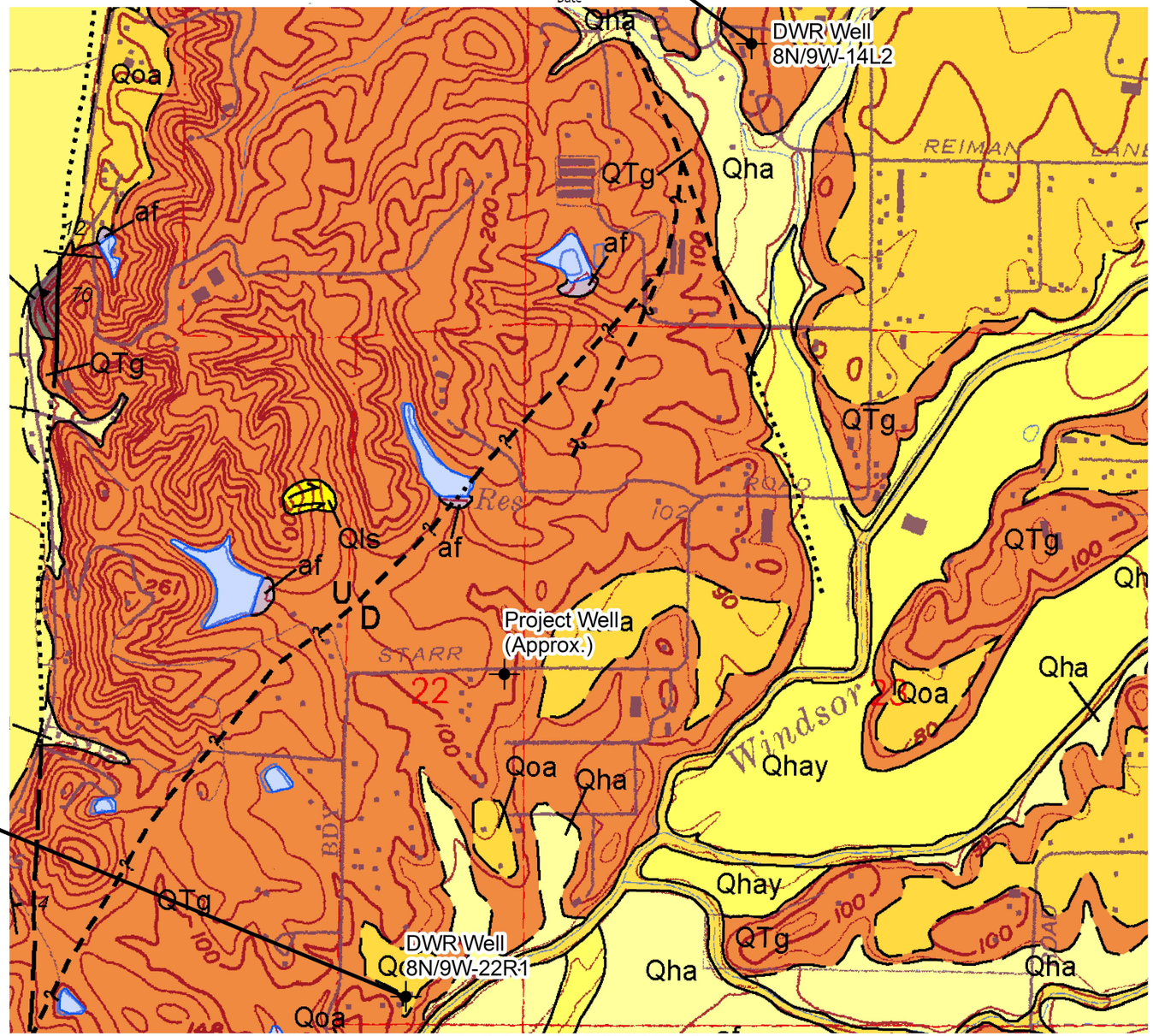
Q:\Drawings\Starr Holding LLC-3821\Water Availability Study\GIS\FIGURE 1 - Location Map.mxd

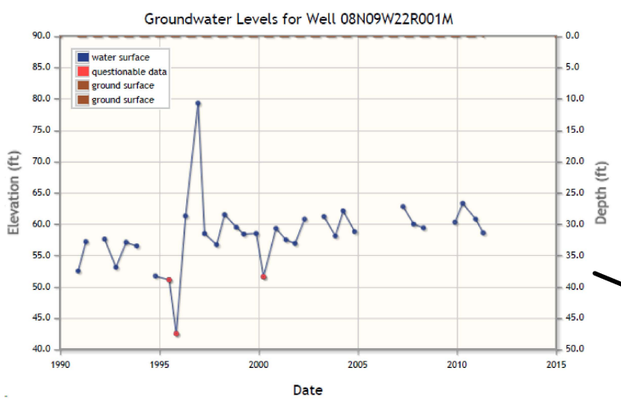
N

0 500 1,000 2,000

Feet







Well

Explanation

- Qhay - Alluvium (latest Holocene)
- Qha - Alluvium (Holocene)
- Qoa - Older alluvium
- QTg - Unnamed fluvial deposits
- Contact
- Fault, inferred
- Fault, concealed

Source: Delattre, M.P. 2011. Preliminary Geologic Map of the Healdsburg 7.5' Quadrangle, Sonoma County, California: A Digital Database.

FIGURE 2

Star Holdings, LLC.
7390 Starr Road

Vicinity Geologic Map

Sonoma County, California

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

July 2017

Q:\Drawings\Starr Holding LLC-3821\Water Availability Study\GIS\FIGURE 2 - Vicinity Geologic Map - 11x17.mxd

File Original with DWR

State of California

Well Completion Report

No. e0305588

Page 1 of 2

Owner's Well Number Well 1

Date Work Began 03/08/2016 Date Work Ended 3/23/2016

Local Permit Agency Sonoma County PRMD

Permit Number WEL16-0060 Permit Date 3/7/16

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Direct Rotary Drilling Fluid Polymer mud

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	8	Tan stiff clay
8	36	Tan clay, some gravel
36	39	Tan coarse sand
39	44	Blue coarse sand
44	58	Blue clay
58	74	Crumbly blue clay
74	78	Green sandstone
78	110	Crumbly green clay
110	115	Gravel
115	120	Coarse sand and gravel
120	126	Sand
126	140	Sand and gravel
140	154	Clay with some gravel
154	160	Coarse sand
160	194	Green clay, trace of gravel
194	198	Sand and gravel
198	203	Clay and gravel
203	218	Green sand
218	230	Sand and gravel
230	236	Clay and gravel
236	245	Green clay
245	251	Clay and gravel
251	256	Green clay
256	270	Green clay with gravel
270	275	Green sand
275	400	Green sandstone with streaks of shale

Total Depth of Boring 400 Feet

Total Depth of Completed Well 400 Feet

Well Owner

Name

Mailing Address

City State Zip

Well Location

Address 7220 Starr Road

City Windsor County Sonoma

Latitude 38 Deg. 31 Min. 515 Sec. N Longitude 122 Deg. 50 Min. 141 Sec. W

Datum Decimal Lat. Decimal Long.

APN Book 066 Page 220 Parcel 002

Township 8N Range 9W Section 22

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North / West / East / South

Illustrate or describe distance of well from roads, buildings, fences rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity

◉ New Well

○ Modification/Repair
- ○ Deepen
- ○ Other

○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

◉ Water Supply
- ☑ Domestic ☐ Public
- ☑ Irrigation ☐ Industrial

○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other

Water Level and Yield of Completed Well

Depth to first water (Feet below surface)

Depth to Static Water Level 60 (Feet) Date Measured 03/23/2016

Estimated Yield * 400 (GPM) Test Type Air Lift

Test Length 4.0 (Hours) Total Drawdown 240 (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	280	14 1/4						
280	400	13 1/2						
0	220		Blank	PVC Sch. 40	SDR21	8		
220	240		Screen	PVC Sch. 40	SDR21	8	Milled Slots	0.032
240	300		Blank	PVC Sch. 40	SDR21	8		
300	340		Screen	PVC Sch. 40	SDR21	8	Milled Slots	0.032

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	51	Cement	
51	56	Bentonite	
56	190	Filter Pack	3/8 Pea Gravel
190	200	Bentonite	
200	260	Filter Pack	12x20 Sand
260	270	Bentonite	

Attachments

- ☐ Geologic Log
- ☐ Well Construction Diagram
- ☐ Geophysical Log(s)
- ☐ Soil/Water Chemical Analyses
- ☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Weeks Drilling & Pump Co.
Person, Firm or Corporation

P.O. Box 176 Address | Sebastopol City | CA State | 95473 Zip

Signed C-57 Licensed Water Well Contractor | 3/30/16 Date Signed | 177681 C-57 License Number

WR 188 REV. 1/2006

File Original with DWR

State of California

Well Completion Report

No. e0305588

Page 2 of 2

Owner's Well Number Well 1

Date Work Began 03/08/2016 Date Work Ended 3/23/2016

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APN Book 066 Page 220 Parcel 002

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Activity

◉ New Well

○ Modification/Repair

○ Deepen

○ Other

○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

◉ Water Supply

☑ Domestic ☐ Public

☑ Irrigation ☐ Industrial

○ Cathodic Protection

○ Dewatering

○ Heat Exchange

○ Injection

○ Monitoring

○ Remediation

○ Sparging

○ Test Well

○ Vapor Extraction

○ Other

Water Level and Yield of Completed Well

Depth to first water (Feet below surface)

Depth to Static Water Level 60 (Feet) Date Measured 03/23/2016

Estimated Yield * 400 (GPM) Test Type Air Lift

Test Length 4.0 (Hours) Total Drawdown 240 (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
340	360		Blank	PVC Sch. 40	SDR21	8		
360	400		Screen	PVC Sch. 40	SDR21	8	Milled Slots	0.032

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
270	400	Filter Pack	12x20 Sand

Attachments

☐ Geologic Log

☐ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other

Attach additional information, if it exists.

Certification Statement

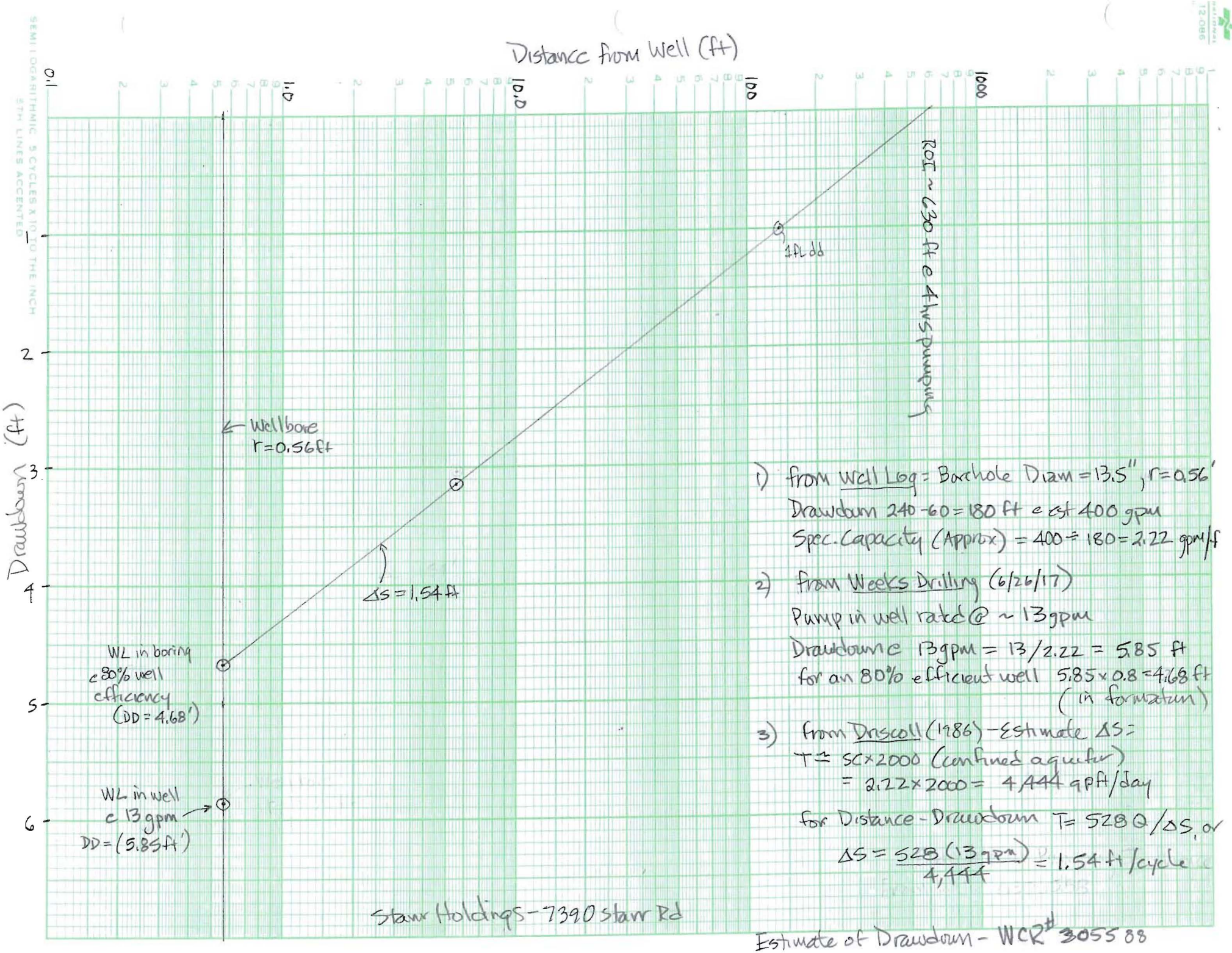
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Weeks Drilling & Pump Co.
Person, Firm or Corporation

P.O. Box 176 (Address) Sebastopol (City) CA (State) 95473 (Zip)

Signed (C-57 Licensed Water Well Contractor) 3/30/16 (Date Signed) 177681 (C-57 License Number)

DWR 188 REV. 1/2006



1) from Well Log = Borehole Diam = 13.5", r = 0.56'
Drawdown 240 - 60 = 180 ft @ est 400 gpm
Spec. Capacity (Approx) = 400 ÷ 180 = 2.22 gpm/ft

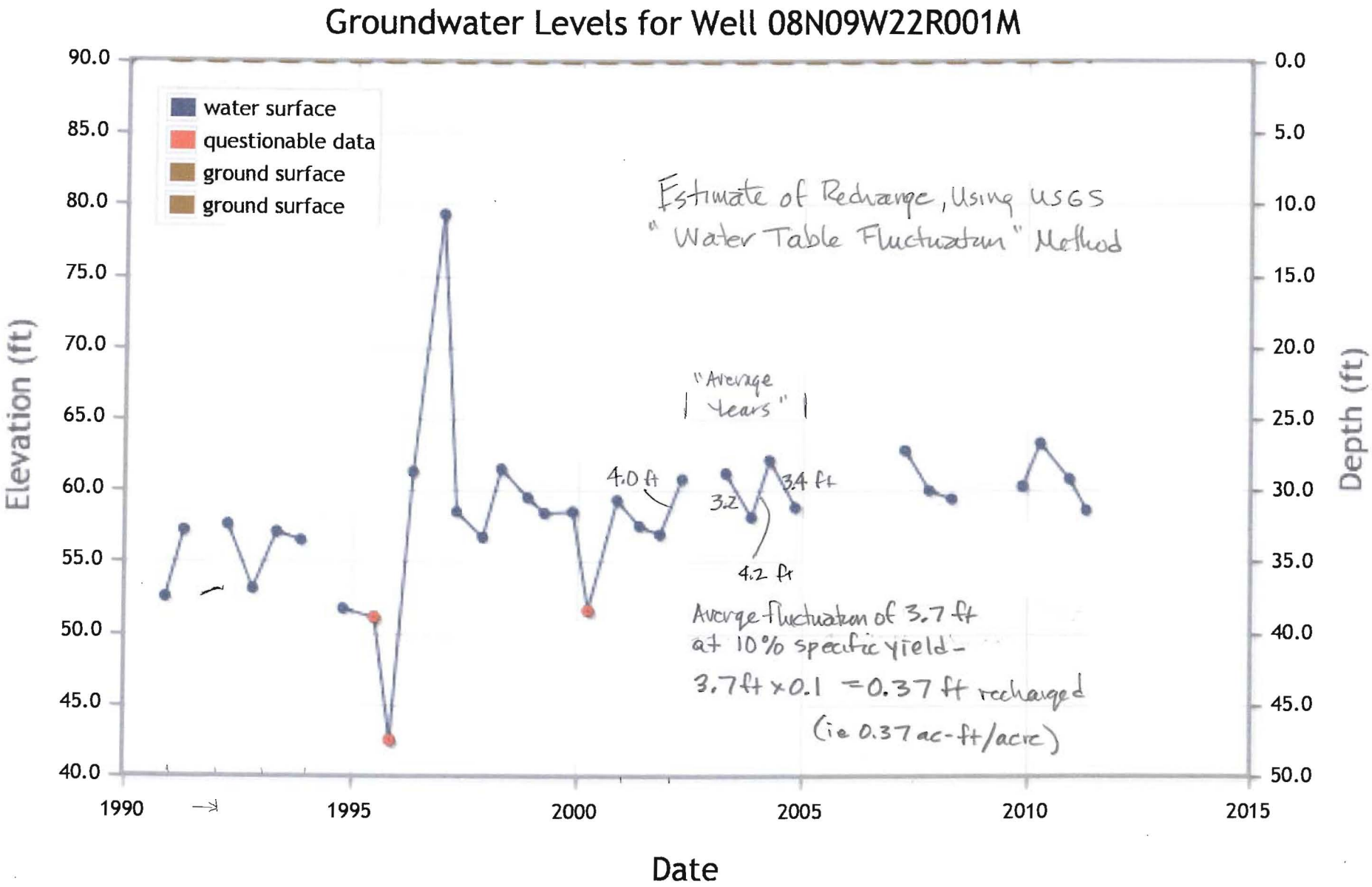
2) from Weeks Drilling (6/26/17)
Pump in well rated @ ~ 13 gpm
Drawdown @ 13 gpm = 13 / 2.22 = 5.85 ft
for an 80% efficient well 5.85 × 0.8 = 4.68 ft
(in formation)

3) from Driscoll (1986) - Estimate Δs:
T ≈ SC × 2000 (confined aquifer)
= 2.22 × 2000 = 4,444 gpd/ft/day

for Distance - Drawdown T = 528 Q / Δs, or

$$\Delta s = \frac{528\,(13\ \text{gpm})}{4{,}444} = 1.54\ \text{ft/cycle}$$

Estimate of Drawdown - WCR# 305588


Groundwater Levels for Well 08N09W22R001M
water surface
questionable data
ground surface
ground surface
Estimate of Recharge, Using USGS
"Water Table Fluctuation" Method
"Average
Years"
4.0 ft
3.2
3.4 ft
4.2 ft
Avergefluctuation of 3.7 ft
at 10% specific yield -
3.7ft x 0.1 = 0.37 ft recharged
(ie 0.37 ac-ft/acre)
Elevation (ft)
Depth (ft)
Date
90.0
85.0
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
1990
1995
2000
2005
2010
2015

Request for Well and Septic Service

WLS-006

PURPOSE: This form is used to request a paid service from the Well & Septic Division of the Permit and Resource Management Department (PRMD) related to an existing or proposed septic system. **A permit application may be required following the requested service.**

1/31/17
Date of Request

7390 Starr Road
Site Address

Windsor, CA
City/Town Zip

Applicant Name

Mailing Address State/Zip

707-542-6559
Day Phone

SEV Number

Cross Street

066-220-019
Assessor's Parcel Number

Starr Holdings LLC
Property Owner's Name

2269 Chestnut Street Suite 450
Mailing Address State/Zip

San Francisco, CA
Day Phone

Service Requested:

Findings Report in association with BLD16-6355

DO NOT WRITE BELOW THIS LINE - To Be Completed by PRMD Staff

Code Enforcement Violation Yes ☐ No ☐ Violation # _____

Status _____

Staff Comments/Notations

SECURITY FEATURES INCLUDE TRUE WATERMARK PAPER, HEAT SENSITIVE ICON AND FOIL HOLOGRAM.

STARR HOLDINGS LLC
AG ACCOUNT
2269 CHESTNUT STREET SUITE 450
SAN FRANCISCO, CA 94123

1190
11-8166/3210
02

DATE 1/31/17

CHECK ARMOR FRAUD PROTECTION

PAY TO THE ORDER OF County of Sonoma PRMD $ 142.00

One hundred and forty-two dollars DOLLARS

FIRST REPUBLIC BANK
640 3rd Street
Santa Rosa, CA 95404
Ph (707) 544-8881 / (800) 392-1407 (24hr Cust Serv)

FOR _____

Mark S Waxman MP

HEAT SENSITIVE

⑈001190⑈ ⑆321081669⑆ 8000334316 7⑈

Details on Back. Security Features Included

Sonoma County Permit and Resource Management Department
2550 Ventura Avenue ❖ Santa Rosa, CA ❖ 95403-2829 ❖ (707) 565-1900 ❖ Fax (707) 565-1399

Huffman Engineering & Surveying

537 COLLEGE AVENUE, STE. A, SANTA ROSA, CA 95404

Transmittal

Ph (707) 542-6559

Fax (707) 521-0411

Date:
1/30/17

Job 17-003

To:

PRMD
2550 Ventura Ave
Santa Rosa, CA
95403

Findings Report
7390 Starr Road
Windsor, CA
APN 066-220-019
BLD16-06355

Copies	Date	Description
1	1/30/17	Findings Report
1	1/30/17	Sewage Disposal System Exhibit

Please review the attached findings report for the suitability of the existing sewage disposal system for the revised usage of existing barn.

HUFFMAN ENGINEERING & SURVEYING

537 College Avenue, Suite A, Santa Rosa, CA 95404

707-542-6559 www.huffmanengineering.net

January 30, 2017

PRMD
Well and Septic Department
2550 Ventura Avenue
Santa Rosa, CA 95403

RE: 7390 Starr Road, Windsor, CA
APN 066-220-019
BLD16-6355

Dear District Specialist,
We are pleased to provide the following analysis for a change in use for the above referenced property. Since your parcel was created prior to October 1971 only a 100% reserve area is required for residential use. There is a 200% reserve area required for any commercial uses. This report evaluates the existing capacity of the based upon an 8 bedroom home with the required 100% reserve. Since we are combining the effluent for both uses, we have calculated the area required for reserve using 100% reserve for the residential use and 200% reserve for the commercial use.

Current use:
The current use on the property is mixed residential and commercial with a 4 bedroom residence, a 1 bedroom agricultural worker house and a horse arena with associated uses. The existing sewage disposal system for the equivalent of 8 bedrooms was installed under permit number SEP03-0981. This system is a pumped standard type sewage disposal system with equal distribution. With the use of low flow fixtures within the residence, a 20% reduction in daily flow rate can be used in the quantity calculations.

Proposed use:
Based upon our telephone conversation, the proposed use will be a 4 bedroom main residence, a 1 bedroom agricultural worker house and offices and workers associated with vineyard uses.

The following chart indicates the projected daily flow rates of each use:

Unit	# of Employees/Bedrooms	Gallons per Day per Employee/Bedroom	Gallons per Day Total
Main House	4	120	480
Ag House	1	120	120
Office Workers*	4-6	15	60-90
Seasonal Workers*	8-10	15	120-150
*Commercial use, requires 200% reserve area.			
Total of estimated gallons per day commercial and residential: 780-840 Gallons/Day Average			

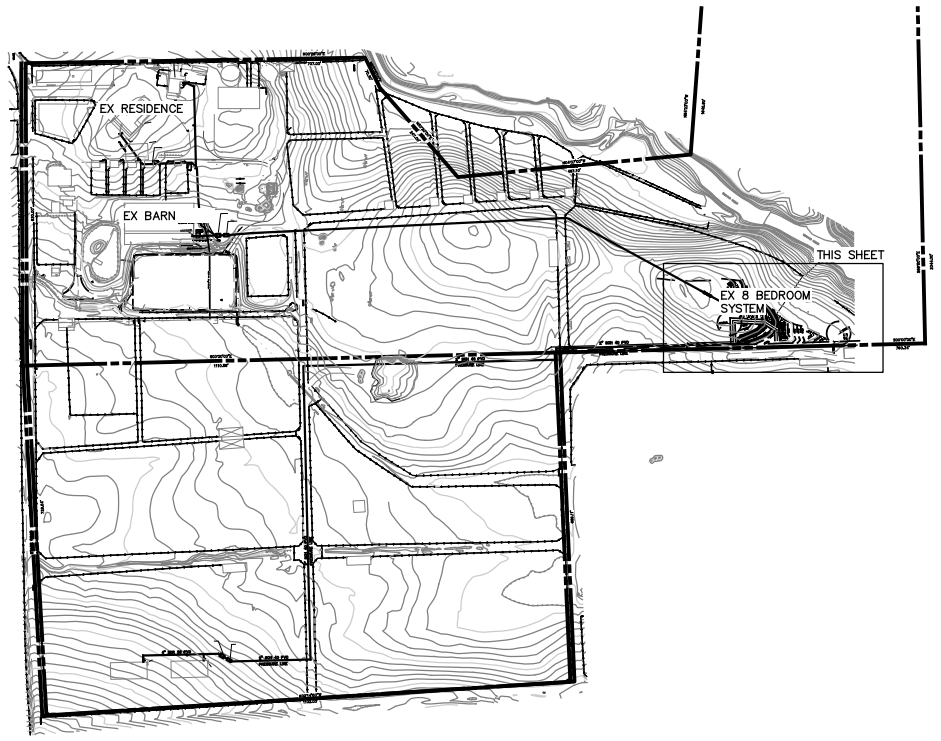
Septic System Sizing
Existing (per SEP03-0981)
Original system sized for 8 bedrooms at 150gallon/day/bedroom = 1,200 gpd
100% reserve for 8 bedrooms at 150 gallons/bedroom/day = 1,200 gpd
Proposed (with 20% credit for low flow fixtures)
Primary for 5 bedroom residential use at 120 gallons/day/bedroom = 600 gpd
100% reserve for 5 bedroom residential use = 600 gpd
Primary for peak commercial uses (16 employees at 15 gallons per day) = 240 gpd
200% Reserve for peak commercial use = 480 gpd
Primary required for commercial and residential uses = 840 gpd
Reserved required for commercial and residential uses = 1080 gpd

Conclusion:
Based on these calculations the system can support the peak flows of the new uses associated with the proposed vineyard operation and office facility. The proposed vineyard operation and offices will generate 240 gallons per day and the residential use will generate 600 gallons per day for a total peak daily flow of 840 gallons per day. The original system was designed for 1,200 gallons per day. The residential uses will remain the same and with the use of low flow fixtures a 20% reduction in flows can be credited and a 100% reserve required. The commercial uses will require a 200% reserve area, and the calculations show that this condition can be satisfied in the existing reserve area.

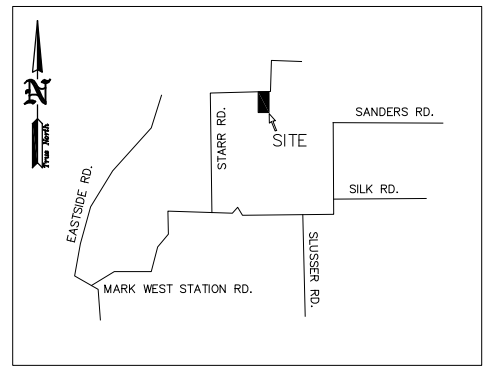
If you have any questions, please call us at 707-542-6559.

Sincerely,

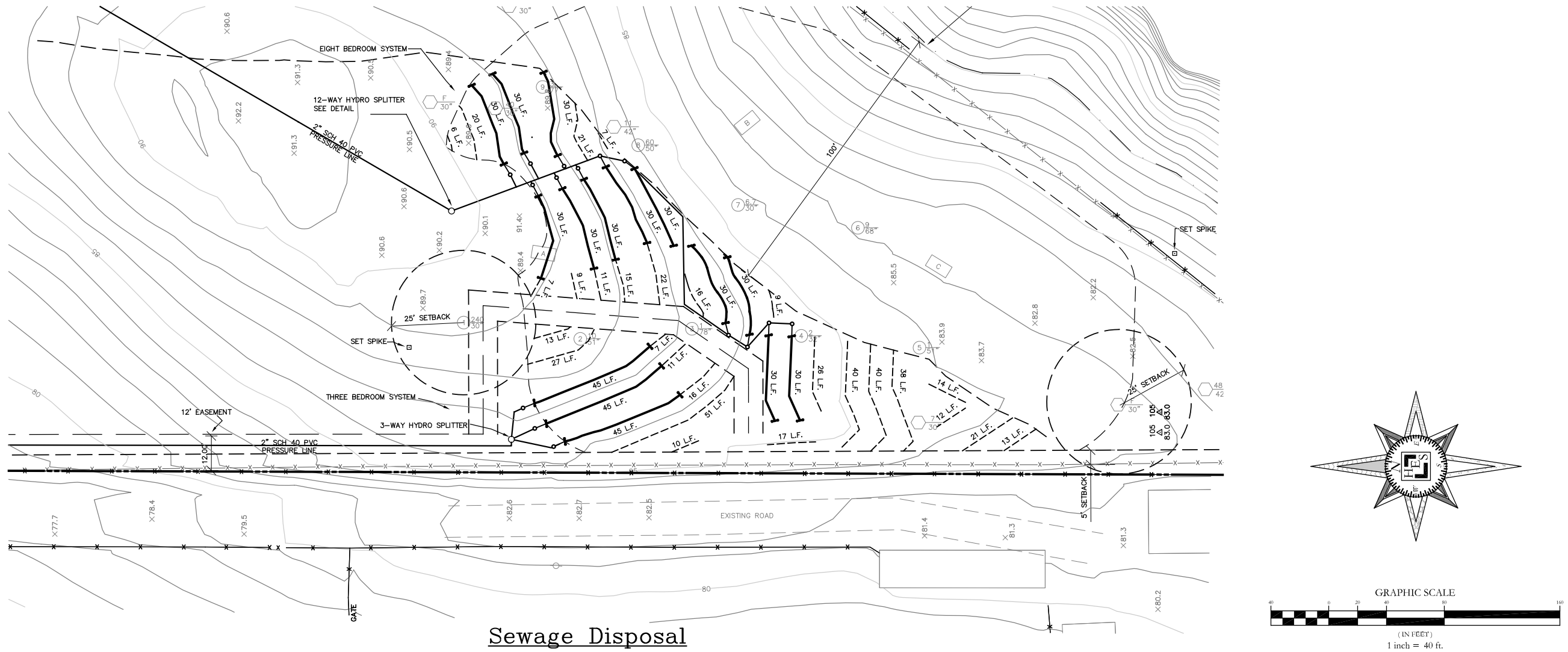
Rob Huffman, PE
Professional Engineer
RH:sa
17-003



Site Map
Scale 1"=400'



Vicinity Map
N.T.S.



Sewage Disposal System Area
Scale 1"=40'

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

FOR REDUCED PLANS, THE ORIGINAL SCALE IS IN INCHES

Path: V:\Proj\17-003\Dwg\17-003.dwg Layout Name: -- Plot Date: January 31, 2017 at 12:30:36 PM by EJM

Huffman Engineering & Surveying
537 College Avenue, Suite A
Santa Rosa, Ca. 95404
P:(707) 542-6559
www.huffmanengineering.net

REVISIONS

#	Description	Date

Engineer: Rob Huffman P.E. 42293

ROBERT HUFFMAN PROFESSIONAL ENGINEER #042293 EXP. 3-31-18 Civil STATE OF CALIFORNIA

LANDS OF STARR HOLDINGS, LLC
8 BEDROOM SEWAGE DISPOSAL SYSTEM
7390 STARR ROAD
WINDSOR, CALIFORNIA
A.P.N.:066-220-019

Date: 01/30/17	Scale: 1" = 40'
File: 17-003	Sheet 1
Dwn: EJM	Of 1 Sheets
Job: 17-003	

BRICOLEUR WINERY
ENVIRONMENTAL NOISE ASSESSMENT

Windsor, Sonoma County, California

March 16, 2018

Prepared for:

Mark Hanson
Starr Holdings, LLC
2269 Chestnut Street, Suite 450
San Francisco, CA 94123

Prepared by:

Fred Svinth, INCE, Assoc. AIA

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
1 Willowbrook Court, Suite 120
Petaluma, CA 94954
(707) 794-0400

Job No.: 18-016

INTRODUCTION

This report provides an assessment of noise resulting from the operation and use of the proposed Bricoleur Winery project located in the unincorporated Windsor area of Sonoma County with regards to the regulatory criteria established by the Sonoma County General Plan Noise Element. This report includes a summary of applicable noise regulations, the results of a project level noise monitoring survey, and an assessment of noise impacts and mitigation measures necessary to meet the applicable County standards at adjacent noise sensitive land uses. Persons not familiar with environmental noise analysis are referred to Appendix A for additional discussion.

PROJECT DESCRIPTION

Bricoleur Winery will be located at 7390 Starr Road near the City of Windsor in unincorporated Sonoma County on lands currently developed for rural residential, agricultural, and vineyard use. Figure 1 shows the site vicinity, the approximate extents of the property, and the primary new use areas on the site. The project seeks a use permit for a 40,000-case winery which will include a tasting room with public tours and tastings and twenty-six (26) industry and agricultural related events.

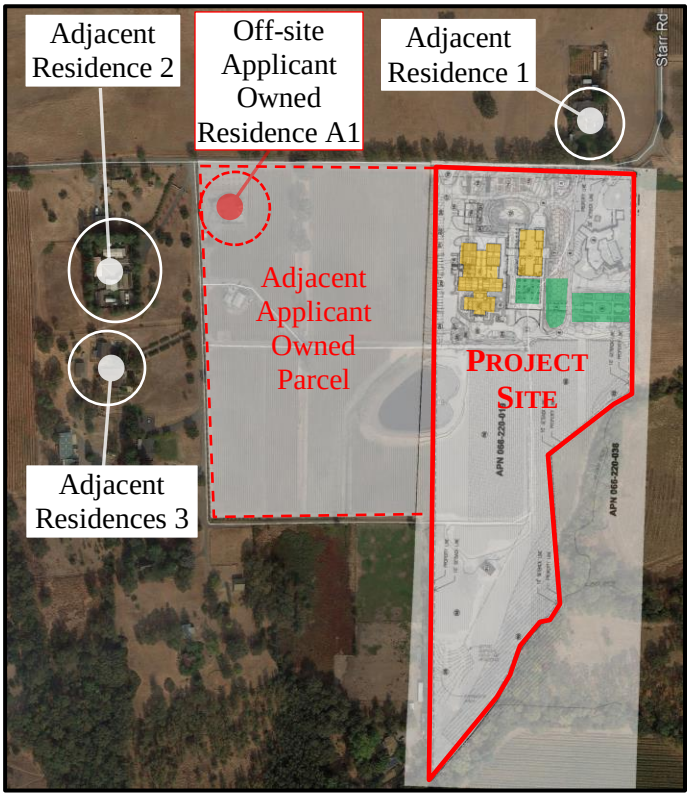


Figure 1: Project Site and Vicinity

The project would convert the existing Ag Barn on the site into a Winery Building used for barrel aging and storage along with a commercial kitchen, bathrooms, conference room and employee offices. The project would also construct a Production Building on the site of the existing 20,000 sq. ft. commercial equestrian arena. This Production Building will include barrel storage rooms, a covered crush pad, fermentation rooms, a tasting room, an office, a laboratory, and employee and visitor restrooms.

At full buildout (with the Production Building complete) the winery will engage in all phases of wine production, including crushing, fermenting, barrel aging and bottling. Bottling will be done a few times a year with mobile bottling truck located in the covered crush pad area. Grapes will be sourced from the 8 acres of existing vineyards on the property and an additional 13 acres on the applicant owned adjoining parcel to the west, and purchased from third party vineyards in Sonoma County.

However, until the Production Building is complete the actual crushing of the grapes, fermentation, wine production and barrel cleaning would continue to be performed at an off-site, third-party custom crush facility. The requested hours of operation for the winery are from 7:00 am to 6:00 pm, 5 days a week, except during harvest when operations will be conducted 7 days a week or as needed.

The Tasting Room will be in the Winery Building until a tasting room in the new Production Building is completed. The Tasting Room will sell olive oil, honey, vegetables, and other farm products grown on the property and from other local Sonoma County farms. The hours of

operation for the tasting room will be from 10:00 am to 5:30 pm, 7 days a week. The winery expects a maximum of 30 visitors to the tasting room per day.

A list of twenty-six (26) requested events as shown Table 1, below. These events will occur on the property either within the proposed winery buildings or outdoor garden areas. Live amplified music at events is requested, however live amplified music will only occur inside the winery buildings and no music be permitted after 9:30 pm.

Table 1: Requested Project Events

Event Description	Quantity	Dates Occurring	# Guests (max.)
Wine Club Member's Event[1]	4	March - October	150
Agricultural Promotional Events[2]	3	March - October	100
Industry-wide Events	4	March - October	100
Weddings, Non-Profit & Other Special Events	4	March - October	100
Agricultural Promotional Events[2]	3	March - October	200
Industry-wide Events	4	March - October	200
Weddings, Non-Profit & Other Special Events	4	March - October	200

Notes: 1. Wine Club Member events include Pick-up Weekend, Barrel Tasting Day, and other marketing activities to support and build the Wine Club list.
2. These promotional gatherings may include a vintner association lunch and seminar or other hospitality event for the promotion of the wines.

REGULATORY BACKGROUND

The Sonoma County Noise Element of the 2020 General Plan identifies a goal to:

"Protect people from the adverse effects of exposure to excessive noise and to achieve an environment in which people and land uses function without impairment from noise."

The following policies, which are applicable for use at the subject project, are intended to achieve this goal:

NE-1c: Control non-transportation related noise from new projects. The total noise level resulting from new sources shall not exceed the standards in Table NE-2 of the recommended revised policies as measured at the exterior property line of any adjacent noise sensitive land use. Limit exceptions to the following:

(1) If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level, up to a maximum of 5 dBA above the standard, provided that no measurable increase (i.e. +/- 1.5 dBA) shall be allowed.

(2) Reduce the applicable standards in Table NE-2 by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises, such as pile drivers and dog barking at kennels.

(3) Reduce the applicable standards in Table NE-2 by 5 decibels if the proposed use exceeds the ambient level by 10 or more decibels.

(4) For short-term noise sources, which are permitted to operate no more than six days per year, such as concerts or race events, the allowable noise exposures shown in Table NE-2 may be increased by 5 dB. These events shall be subject to a noise management plan including provisions for maximum noise level limits, noise monitoring, complaint response and allowable hours of operation. The plan shall address potential cumulative noise impacts from all events in the area.

(5) Noise levels may be measured at the location of the outdoor activity area of the noise sensitive land use, instead of at the exterior property line of the adjacent noise sensitive use where:

(a) The property on which the noise sensitive use is located has already been substantially developed pursuant to its existing zoning, and
(b) There is available open land on these noise sensitive lands for noise attenuation.
This exception may not be used for vacant properties, which are zoned to allow noise sensitive uses

Table 2: Maximum Allowable Noise Exposures for Non-transportation Sources (Table NE-2)

Hourly Noise Metric[1]	Maximum Exterior Noise Level Standards, dBA	
	Daytime: 7 AM to 10 PM	Nighttime: 10 PM to 7 AM
L_{50} (30 minutes in any hour)	50	45
L_{25} (15 minutes in any hour)	55	50
L_{08} (5 minutes in any hour)	60	55
L_{02} (1 minute in any hour)	65	60

1. The sound level exceeded n% of the time in any hour. For example, the L_{50} is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L_{02} is the sound level exceeded 1 minute in any hour.

EXISTING NOISE ENVIRONMENT

To quantify the existing noise levels near the property lines of the closest noise sensitive (residential) uses, an ambient noise monitoring survey consisting of one long-term noise measurement was conducted between 9 am on Tuesday, February 6th and 4pm on Monday, February 12th, 2018. The noise measurement was made using Larson-Davis Laboratories (LDL) precision Type 1 model meters fitted with a ½-inch pre-polarized condenser microphones and windscreens. The meter was calibrated before and after installation with an LDL acoustical calibrator. During the measurement period the weather was clear with no precipitation.

The long-term sound level measurement (LT-1) was made on the project property at a distance of 45 feet from the centerline of Starr Road on the project site as shown in Figure 2. This is the setback of the existing residence above the Milk Barn on the site and the approximate setback of

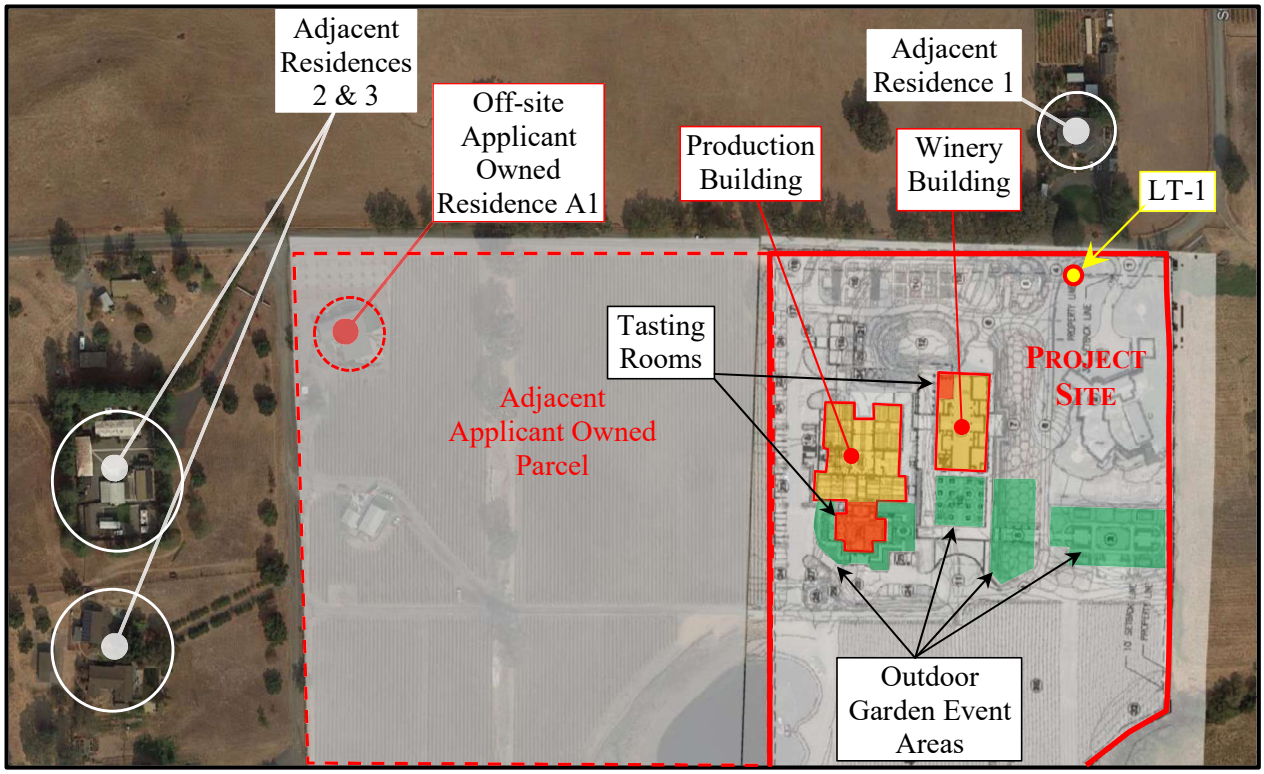
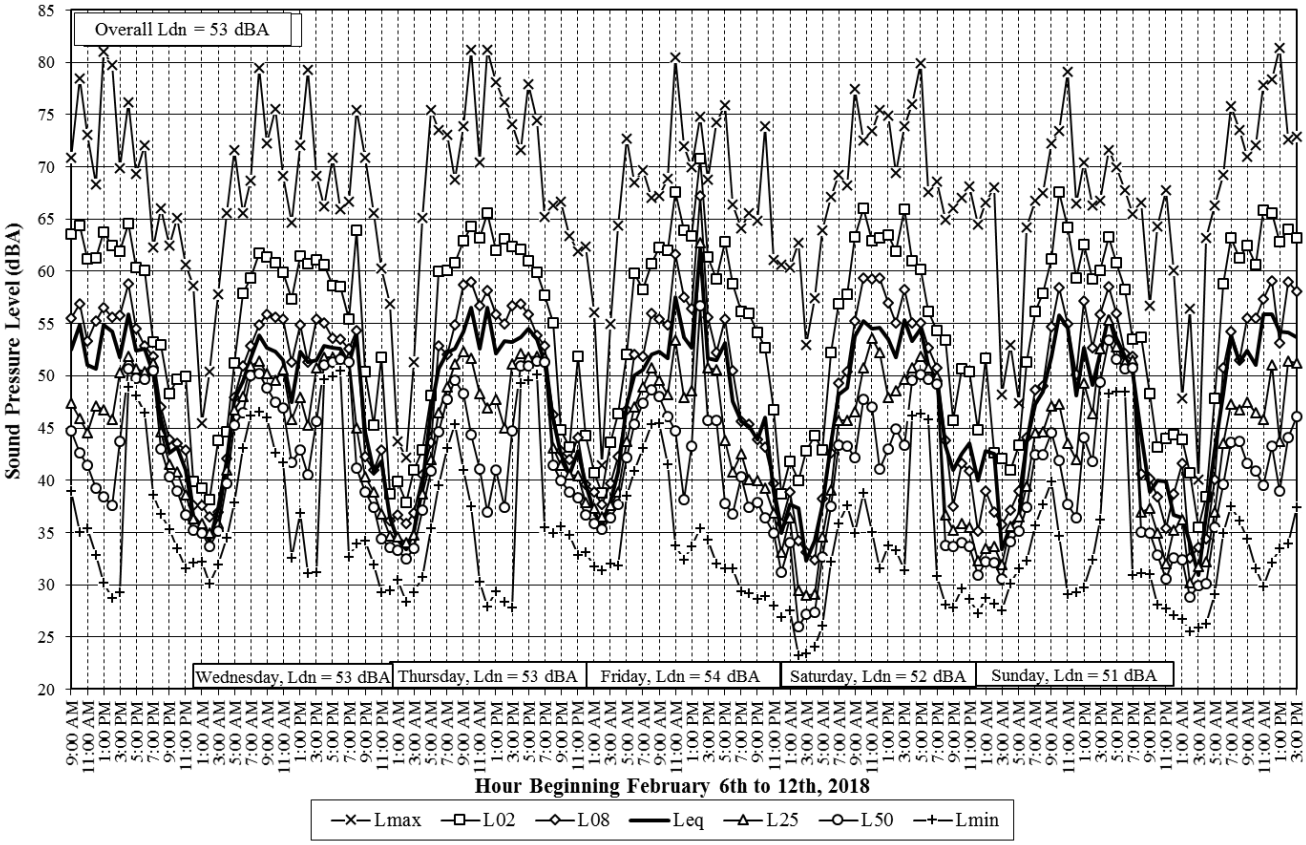


Figure 2: Close-up of Project Site, Sensitive Uses, and Measurement Location

the property line setback of the closest off-site residential use from Starr Road (Residence 1 in Figures 1& 2). Noise levels measured at this site were primarily produced by traffic on Starr Road, with aircraft overflights associated with the Sonoma County Airport, on-site landscaping work, dogs barking at Residence 1, and bird chirps, insects, and other noise associated with wooded rural areas also contributing to the ambient noise environment. The hourly trend in noise levels at this location, including the energy equivalent noise level (L_{eq}), maximum (L_{max}), minimum (L_{min}), and the noise levels exceeded 2, 8, 25, and 50 percent of the time (indicated as L_2, L_8, L_{25}, and L_{50}) are shown on Chart 1, following.

Chart 1: Measured Noise Levels at LT-1



A review of Chart 1 indicates that the average weekday noise levels ranged from 42 to 62 dBA L_{eq} during the day, and 33 to 51 dBA L_{eq} at night, and average weekend noise levels ranged from 38 to 56 dBA L_{eq} during the day and 32 to 44 dBA L_{eq} at night. The calculated average day/night noise level (L_{dn}) at this location was 53 dBA on weekdays and 52 dBA weekends. The overall L_{dn} at this location was found to be 53 dBA. The average, maximum, minimum levels measured for the daytime and nighttime periods for the entire LT-1 measurement along with the corresponding Sonoma County Table NE-2 Noise Standards are shown in Table 3, following.

Environmental sound levels at the outdoor use area of Residence A1 and the near property lines of Residences 2 and 3 (see Figures 1 &2) are also expected to be primarily produced by traffic on Starr Road. Considering this, and the increased distances of these areas from Starr Road, depending on the distance from the roadway, we expect the average weekday and weekend Sonoma County Table NE-2 Noise (L_2, L_8, L_{25}, and L_{50}) levels at these locations be to approximately equal to those measured at Residence 1 for weekend conditions.

Table 3: Weekday & Weekend noise measurement results at the property line of Residence 1[1] compared to Sonoma County Standards

Type of Level		Noise Level, dBA			
		L_{50}	L_{25}	L_8	L_2
Weekday Daytime Levels	NE-2 Noise Standard	50	55	60	65
	Average Measured Level	**45**	**49**	**54**	**60**
	Range (Min/Max)	*37/57*	*40/63*	*42/67*	*45/71*
Weekend Daytime Levels	NE-2 Noise Standard	50	55	60	65
	Average Measured Level	**44**	**47**	**53**	**59**
	Range (Min/Max)	*34/53*	*35/55*	*38/59*	*46/68*
Weekday Nighttime Levels	NE-2 Noise Standard	45	50	55	60
	Average Measured Level	**38**	**39**	**42**	**46**
	Range (Min/Max)	*33/47*	*34/48*	*36/53*	*38/60*
Weekend Nighttime Levels	NE-2 Noise Standard	45	50	55	60
	Average Measured Level	**32**	**34**	**38**	**45**
	Range (Min/Max)	*26/38*	*29/39*	*32/44*	*39/52*

Note: 1. Ambient average weekday and weekend levels at Residences A1, 2, and 3 are expected to be approximately equal to those at Residence 1 under weekend conditions

NOISE ASSESSMENT

The General Plan noise standards require evaluation of new noise impacts on sensitive receptors in the project vicinity. The closest noise sensitive receptors to the project site are the home on the applicant owned adjacent parcel identified as adjacent Residence A1 and the non-applicant owned home identified as adjacent Residence 1 in Figure 2. The next closest sensitive receptors are the non-applicant owned homes identified as adjacent Residences 2 and 3 in Figure 2. Though non-applicant owned Residences 1, 2, and 3 are positioned on their properties near the property lines closest to the project site, applicant owned Residence A1 is located on the far side of the lot away from the property line common with the project, with approximately 580 feet of plated vineyards between use areas of the home and the property line. Considering this large distance and in keeping with County standard NE-1c (5), which allows for noise to be evaluated at the location of the outdoor activity area of the noise sensitive land use instead of the exterior property line where; (a) the property on which the noise sensitive use is located has already been substantially developed pursuant to its existing zoning, and (b) there is available open land on these noise sensitive lands for noise attenuation, this analysis evaluates project generated noise at the closest outdoor use areas of Residence A1. However, considering the general absence of open area between homes and property lines at the lots of Residences 1, 2, and 3, project noise at these sensitive uses are evaluated at the property lines closest to the project site. Estimating the expected noise produced by, and impacts from, the proposed project at adjacent noise sensitive uses requires three elements; the first is an assessment of what noise producing operations are likely to occur, the second is typical noise source levels for those operations, and the third is to determine the temporal nature of the operations.

I. Identification of Noise Producing operations/uses

There are a number of operations associated with wine production and events at the proposed facility that will produce noise. These include:

1. Project Traffic,
2. Maintenance and forklift operations,
3. Winery operations and seasonal production activities, and
4. Promotional event noise.

II. Typical Noise Source Levels

To estimate the noise levels associated with project operations, some attention must be given to the temporal nature of the noise produced. Below each of the major winery related noise producing operations outlined above are discussed:

Project Traffic would produce the following type and range of traffic noise levels:

- Automobile and light vehicle traffic accessing the tasting room would occur during the daytime hours and noise produced is expected to include the sounds of vehicles accessing the site along with noise from engine starts and door slams in the parking areas. These noises typically produce maximum (L_{max}) sound levels of 53 dBA to 63 dBA at 50 feet, with average maximum sound level sound levels of 57 dBA. Automobile and light vehicle traffic traveling at constant speeds on the access driveway would be expected to produce a sound level of 56 dBA at 50 feet[1].
- The majority of truck traffic on the project site is expected to primarily access the winery buildings, though some truck traffic may also access other portions of the site. Noise levels generated by truck traffic are dependent on the size and speed of trucks, typical maximum noise levels generated by heavy duty (semi-tractor trailer type) trucks would be expected to range from 70 dBA when traveling at constant speeds to 75 dBA when stopping/starting and maneuvering at a distance of 50 feet. Typical maximum noise levels generated by medium (box type and delivery) trucks would be expected to range from 60 when traveling at constant speeds to 65 dBA when stopping/starting and maneuvering at a distance of 50 feet.

Winery and seasonal production operations would produce the following type and range of noise levels:

- Refrigeration equipment, as a maximum condition, is assumed operate under constant conditions day and night. Though the model, type and capacities of the cooling compressors for the facility are not specified, field measurements of such equipment shows that sound levels from such equipment can produce levels of between 50 dBA to 65 dBA at 50 feet, with L_{50} noise levels of 60 dBA at 50 feet.
- Air compressors, used for various processes in the facility, typically cycle on and off based on the need for compressed air. Though the model, type and capacities of the cooling compressors for the facility are not specified, from field measurements of cooling compressors at other wineries, we expect this equipment to produce L_{50} sound levels of 62 dBA at 50 feet.
- Bottling would be constant on an hourly basis although it is likely to occur for only a few weeks each year. Based on sound level measurements of mobile (truck based) bottling lines at other wineries, we would expect bottling operations to produce L_{50} sound levels of between 65 and 70 dBA at 50 feet.
- Crush activities typically occur for about two weeks each year. The majority of the noise sources associated with the crush include the operation of hoppers, presses, destemmers, separators, crushers, air compressors, forklifts, conveyors, etc. Average noise levels resulting from the crush are typically constant on an hourly basis. Individual pieces of crush-specific equipment such as the separators and destemmers are relatively quiet with sound levels of around 50 dBA L_{eq} at about 50 feet, however the composite crush activities at a small sized winery, such as the proposed 40,000 case capacity facility, typically generate noise levels of about 65 dBA L_{50}, at a distance of 50 feet from the center of operations.

[1] Reported sound levels are calculated considering a maximum driveway speed of 20 mph with the use of the California Vehicle Noise Reference Energy Mean Emissions Levels (REMELS) per Cal Trans Technical Advisory, Noise TAN 95-03, Page 2.

During the crush discrete maximum noise events, such as the setting of empty bins, may reach maximum levels of 70 to 80 dBA L_{max} and produce an L_{02} of up to 75 dBA at 50 feet from the center of operations.

Maintenance and forklift operations would produce intermittent noise depending on the exact nature of the operation. These would likely occur at a much less than a daily rate although operations may span several hours once initiated. Backup alarms (or beepers), which are repetitive and irritating by design, will also produce noise during these activities, and as with forklift operations themselves are expected to be intermittent by nature. Forklift use and associated backup alarms noise will be attenuated during crush related activities by structure of the fermentation building. Based on experience with other winery operations, we estimate that non-attenuated L_{25} noise levels from these operations may reach levels of 66 to 67 dBA at 50 feet.

Promotional Event Noise

The project requests up to a total of 26 events per year. These events would range in size from events with 100 to 200 guests. Table 4, following, summarizes typical noise levels generated by small-to-moderate sized events at distances of 50 feet from the source which have been developed from measurements conducted by Illingworth & Rodkin at actual wedding and non-concert celebration/party events in the North bay and throughout the Bay Area.[2]

Table 4: Typical Noise Source Levels for Special Events (A-Weighted L_{50} Levels)

Event or Activity	Typical Noise Level @ 50 ft.
Amplified Music*	72 dBA
Amplified Speech	70 dBA
Non-amplified (acoustic) Music	67 dBA
200 Guests in Raised Conversation with Background Music	68 dBA
150 Guests in Raised Conversation with Background Music	64 dBA
100 Guests in Raised Conversation with Background Music	60 dBA

*Amplified concert type music events are not proposed, such events would increase outdoor L_{50} sound levels to 80 dBA @ 50 feet.

III. Propagation of sound

The final step in estimating the project noise levels is assessing the propagation of sound to the sensitive receptors. To do this, it is necessary to assume some rate of sound attenuation between the operations and receiver locations. The most dominant physical effect is due to the spreading out of sound waves with distance. Depending on ground absorption conditions noise from traffic noise sources can be considered to attenuate at 3 to 4.5 dB per doubling of distance from the source while noise from fixed project source can be considered to attenuate at a rate of 6 to 7.5 dB per doubling of distance from the source. Considering the vineyard and other vegetative over much of the site, distance attenuation rates of 4.5 dB per distance doubling for traffic noise sources and 7.5 dB per distance doubling for fixed noise sources are used in this analysis. Other effects can modify these fall-off rates such as partial shielding from buildings or topography, atmospheric attenuation of sound, and meteorological effects. These effects almost always reduce the noise in addition to that due to sound divergence. As most of these effects will vary with time due to changing environmental conditions, it is most conservative to assume only attenuation due to divergence for outdoor activities, minimum terrain or building shielding

[2] These source levels have been used to analyze amplified music at non-concert type special events at over 30 winery projects since the current Sonoma County General Plan (2020) was adopted and have been also adopted by the Sonoma County Winery Event Working Group as typical noise levels for winery event activities.

factors (6 dBA) where intervening terrain or structures break the line of sight from source to receiver, and conservative (minimal) rate of structural attenuation (12 dBA) when operations are conducted within buildings, realizing that the actual noise level will be at or, most likely, below those predicted using these assumptions at any one time.

IMPACT ASSESSMENT

Impact 1: Traffic, Parking Lot and Truck Noise

Automobile parking and traffic

Based on a review of the development areas shown in the project site plan (see Figure 3) and distance information obtained via Goggle Earth, the primary visitor parking areas on the site could be situated as close as 600 feet from the outdoor use areas of applicant Residence A1 and 400, 760, and 820 feet from the respective property lines of Residences 1, 2 and 3. Considering this, maximum noise generated by automobile and light vehicle parking on the winery site would be 36 dBA at the outdoor use area of Residence A1, 40 dBA at the property line of Residence 1, and 33 dBA at the property lines of Residences 2 and 3.

A review of the project site development plan and distance information obtained via Goggle Earth also shows that the visitor access drive would be on the western side of the site as close as 620 feet from the outdoor use areas of applicant Residence A1 and 350, 780, and 800 feet from the respective property lines of Residences 1, 2 and 3. Considering these distances and that automobile speeds on the driveway would be expected to be 20 mph or less, the highest average noise generated by automobile and light vehicles on the access road would be 38 dBA at the outdoor use area of Residence A1, 43 dBA at the property line of Residence 1, 36 at the property line of Residence 2, and 35 dBA at the property line of Residence 3.

Given the expected visitor and employee use, these activities are expected to occur for less than 5 minutes out of an hour on a typical day and fall in the 5 minutes per hour or L_{25} NE-2 daytime category of 60 dBA (see Table 1). However, during events or on busy weekends, such activities may occur more frequently and fall in the 15 minutes per hour or L_{25} NE-2 daytime category of 55 dBA. Table 5 presents and summarizes the assessment of automobile noise in driveways and in parking lots at the identified noise sensitive uses versus County Noise Standards under weekend (quietest ambient) conditions.

Table 5: Visitor Passenger Vehicle L_{25} Noise Levels

	L_{25} (Noise Level Exceeded 15 Minutes in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 4**
Unadjusted Table NE-2 Daytime Limit	55	55	55	55
Daytime Ambient Noise Levels	47	47	47	47
Driveway/Parking Lot Noise at Receiver	**36/38**	**40/43**	**33/36**	**33/35**
Operations Exceed Ambient by 10 dBA?	No	No	No	No
NE-2 Adjustment	0	0	0	0
Adjusted Table NE-2 Daytime Limit	55	55	55	55
Driveway/Parking Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Considering the findings shown in Table 5, noise levels associated with automobiles and light vehicles using the project driveways and parking lots would not exceed the daytime NE-2 noise standards at the property lines of any adjacent noise sensitive residential uses.

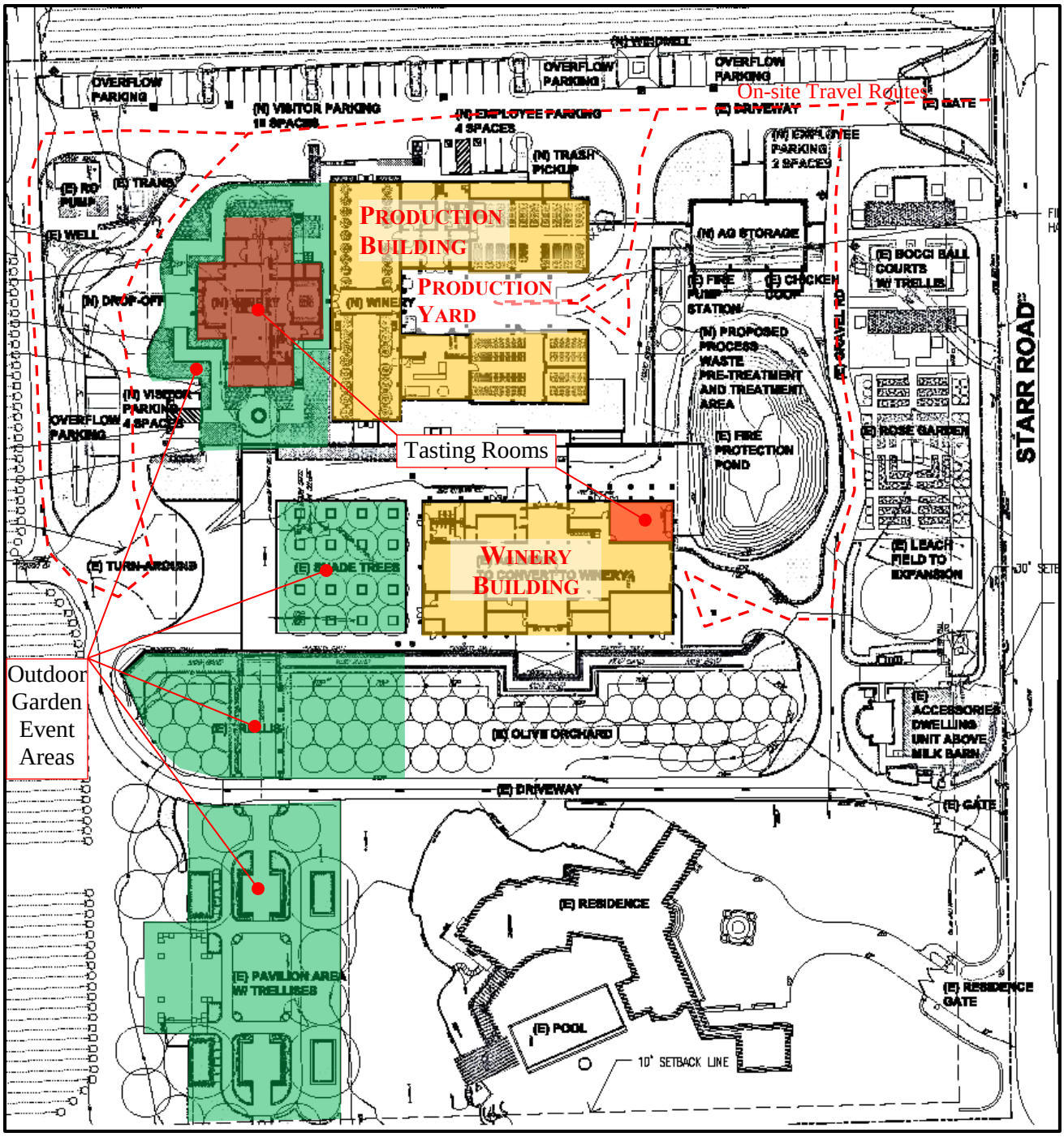


Figure 3: Site Development Plan

Truck traffic

Trucks visiting the winery site will also use the existing site driveways at the perimeter and traversing the northern portion of the site access road. This will take medium trucks as close as 620 feet from the outdoor use areas of applicant Residence A1 and 160, 780, and 800 feet from the respective property lines of Residences 1, 2 and 3, and heavy trucks as close as 620 feet from the outdoor use areas of applicant Residence A1 and 350, 780, and 800 feet from the respective property lines of Residences 1, 2 and 3. Considering these distances, and the highest average noise generated by medium and heavy trucks passing on the access road would, respectively, be

44 and 54 dBA at the outdoor use area of Residence A1, 52 and 57 dBA at the property line of Residence 1, and 42 and 52 dBA at the property lines of Residences 2 and 3.

Trucks maneuvering in and out of the production yard at the center of the Production Building will be within about 730 feet of the outdoor use areas of applicant Residence A1 and 400, 870, and 920 feet from the respective property lines of Residences 1, 2 and 3. Considering these distances, the highest average noise generated by maneuvering medium and heavy trucks would, respectively, be 36 and 46 dBA at the outdoor use area of Residence A1, 42 and 52 dBA at the property line of Residence 1, and 34 and 44 dBA at the property lines of Residences 2 and 3.

Based on the size of the proposed winery and its intent to use grapes from the property's vineyards, truck operations are expected occur on a basis of 5 minutes per hour or less, since it is unlikely that more than one truck would arrive and depart during any given hour. Thus, truck operations are judged to fall in the L_{08} NE-2 category at the adjacent residential uses. Table 6, below, present and summarizes the assessment of truck noise.

Table 6: Truck L_{08} Noise Levels

	L_{08} (Noise Level Exceeded 5 Minutes in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 3**
Unadjusted Table NE-2 Daytime Limit	60	60	60	60
Unadjusted Table NE-2 Nighttime Limit	55	55	55	55
Daytime Ambient Noise Levels	*59*	*59*	*59*	*59*
Nighttime Ambient Noise Levels	*45*	*45*	*45*	*45*
MT Trucks on Access Drive	44	52	42	42
HT Trucks on Access Drive	54	57	52	52
MT Trucks in Production Yard	36	42	34	34
HT Trucks in Production Yard	46	52	44	44
Operations Exceed Ambient by 10 dBA?	**No**	**Yes** (HT @ night)	**No**	**No**
NE-2 Adjustment	**0**	**0** (day HT&MT), **-5** (HT night)	**0**	**0**
Adjusted Table NE-2 Daytime Limit	60	60	60	60
Adjusted Table NE-2 Nighttime Limit	55	55(MT), 50 (HT)	55	55
Truck Noise Exceeds NE-2?	**No**	**Yes,** HT night. **No,** HT day, MT anytime	**No**	**No**

The findings shown in Table 6 indicate that noise associated with daytime heavy trucks and daytime or nighttime medium trucks on the project would not exceed the County NE-2 noise standards at the identified property lines or use areas of the nearby adjacent noise sensitive uses. However, the Table 6 findings also show that the nighttime use of heavy trucks on the site would exceed the nighttime NE-2 noise standards at the property line of Residence 1. Considering these findings, we offer the following noise mitigation measures;

Mitigation 1a:
Under normal use (non-harvest season) conditions heavy trucks should not be allowed to enter the site during nighttime hours (after 10 p.m. & before 7 a.m.).

Mitigation 1b:
During crush season the nighttime moratorium on heavy trucks should also be observed. However, in recognition of the immediacy of the grape harvest, trucks that arrive on-site before the nighttime (10 p.m.) restriction begins would be allowed to leave the facility during the nighttime hours (10 p.m. to 7 a.m.).

Impact 2: Mechanical Equipment Noise

The winery is expected to include noise-generating mechanical equipment such as air-cooled condensing units, pumps, and compressors within a mechanical enclosure at the Production Building, or on existing mechanical pads between the Winery and Production Buildings, as well as less significant sources of noise, such as air-conditioning systems and exhaust fans for the Tasting Rooms. Considering these possibilities and distance information obtained via Goggle Earth project mechanical equipment could be as close as 660 feet from the outdoor use areas of applicant Residence A1 and 360, 800, and 820 feet from the respective property lines of Residences 1, 2 and 3.

Using the source levels and a 7 ½ dB sound reduction for each doubling of the distance as discussed above, constant L_{50} noise levels from mechanical equipment outside of the winery could produce L_{50} levels of 32 to 34 dBA at the outdoor use area of Residence A1, 39 to 41 dBA at the property line of Residence 1, and 30 to 32 dBA at the property lines of Residences 2 and 3. Table 7, below, presents and summarizes the assessment of this worst case mechanical equipment noise versus County Noise Standards.

Table 7: Mechanical Equipment L_{50} Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 4**
Unadjusted Table NE-2 Daytime Limit	50	50	50	50
Unadjusted Table NE-2 Nighttime Limit	45	45	45	45
Daytime Ambient Noise Levels	44	44	44	44
Nighttime Ambient Noise Levels	32	32	32	32
Mechanical Equipment Noise at Receiver	**32 to 34**	**39 to 41**	**30 to 32**	**30 to 32**
Operations Exceed Ambient by 10 dBA?	No	No	No	No
NE-2 Adjustment	0	0	0	0
Adjusted Table NE-2 Daytime Limit	50	50	50	50
Adjusted Table NE-2 Nighttime Limit	45	45	45	45
Mechanical Equipment Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Considering the findings shown in Table 7, noise associated with outdoor mechanical equipment would not result in noise levels which exceed the daytime or nighttime NE-2 noise standard at the property line of the adjacent residences.

Mitigation 2: None needed

Impact 3: Crush Related Noise

Annual crush related activities are expected to take place in the covered production yard in the central area of the Production Building as shown in Figure 3. Based on a review of the project site plan and distance information obtained via Goggle Earth, the center of the covered production yard will be partially shielded by the building structure and will be as close as 730 feet from the outdoor use areas of applicant Residence A1 and 450, 870, and 890 feet from the respective property lines of Residences 1, 2 and 3.Using the source levels and a 7 ½ dB sound reduction for each doubling of the distance as discussed above, and considering a partial noise shielding factor of 6 dBA for noise attenuation from intervening structures, crush activities in the covered production yard could produce constant L_{50} levels of 30 dBA at the outdoor use area of Residence A1, 35 dBA at the property line of Residence 1, and 28 dBA at the property lines of Residences 2 and 3 and L_{02} levels (due to discrete maximum events) of 40 dBA at the outdoor use area of Residence A1, 45 dBA at the property line of Residence 1, and 38 dBA at the property lines of Residences 2 and 3. Tables 8a and 8b, below, present and summarizes the assessment of crush related noise versus County Noise Standards.

Table 8a: Crush Related Constant (L_{50}) Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 4**
Unadjusted Table NE-2 Daytime Limit	50	50	50	50
Unadjusted Table NE-2 Nighttime Limit	45	45	45	45
Daytime Ambient Noise Levels	*44*	*44*	*44*	*44*
Nighttime Ambient Noise Levels	*32*	*32*	*32*	*32*
Crush related Noise at Receiver	**30**	**35**	**28**	**28**
Operations Exceed Ambient by 10 dBA?	No	No	No	No
NE-2 Adjustment	0	0	0	0
Adjusted Table NE-2 Daytime Limit	50	50	50	50
Adjusted Table NE-2 Nighttime Limit	45	45	45	45
Crush related Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Table 8b: Crush Related Maximum Event (L_{02}) Noise Levels

	L_{02} (Noise Level Exceeded 1 Minute in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 4**
Unadjusted Table NE-2 Daytime Limit	65	65	65	65
Unadjusted Table NE-2 Nighttime Limit	60	60	60	60
Daytime Ambient Noise Levels	*59*	*59*	*59*	*59*
Nighttime Ambient Noise Levels	*45*	*45*	*45*	*45*
Crush related Noise at Receiver	**40**	**45**	**38**	**38**
Operations Exceed Ambient by 10 dBA?	No	No	No	No
NE-2 Adjustment	0	0	0	0
Adjusted Table NE-2 Daytime Limit	65	65	65	65
Adjusted Table NE-2 Nighttime Limit	55	60	60	60
Crush related Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Considering the findings shown in Tables 9a and 9b, constant and maximum event noise associated with crush activities would not result in noise levels which exceed the daytime or nighttime NE-2 noise standard at the property line of the adjacent residences.

Mitigation 3: None needed

Impact 4: Bottling Noise

Bottling at the winery is expected to occur on an infrequent (likely semi-annually) basis using a mobile bottling truck. The project description indicates that bottling will be done with a mobile bottling line in the Production Winery Building production yard. As with other noise in this area, bottling could be as close as 730 feet from the outdoor use areas of applicant Residence A1 and 450, 870, and 890 feet from the respective property lines of Residences 1, 2 and 3. Using the source levels and a 7 ½ dB sound reduction for each doubling of the distance as discussed above, and considering a partial noise shielding factor of 6 dBA for noise attenuation from intervening structures bottling would be expected to produce L_{50} levels of 35 dBA at the outdoor use area of Residence A1, 40 dBA at the property line of Residence 1, and 33 dBA at the property lines of Residences 2 and 3. Table 9, following, presents and summarizes the assessment of bottling related noise versus County Noise Standards.

Table 9: Bottling Related L_{50} Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 4**
Unadjusted Table NE-2 Daytime Limit	50	50	50	50
Unadjusted Table NE-2 Nighttime Limit	45	45	45	45
Daytime Ambient Noise Levels	*44*	*44*	*44*	*44*
Nighttime Ambient Noise Levels	*32*	*32*	*32*	*32*
Bottling related Noise at Receiver	**35**	**40**	**33**	**33**
Operations Exceed Ambient by 10 dBA?	No	No	No	No
NE-2 Adjustment	0	0	0	0
Adjusted Table NE-2 Daytime Limit	50	50	50	50
Adjusted Table NE-2 Nighttime Limit	45	45	45	45
Bottling related Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Considering the findings shown in Table 9, the noise associated with daytime or nighttime bottling would not result in noise levels which exceed the daytime or nighttime NE-2 noise standard at the property line of the adjacent residences.

Mitigation 4: None needed

Impact 5: Maintenance and Forklift Operational Noise

Forklift and maintenance operations would likely take place in the covered production area, and with the Production or Winery Buildings. Such activities within the Production Building would receive significant noise shielding from the building and are not analyzed here. Forklift and maintenance operations at the perimeter of the Production yard are considered a worst-case condition and are analyzed. Considering this, that activities at the northern perimeter of the covered production yard may not receive shielding from intervening structure and will be as close as 730 feet from the outdoor use areas of applicant Residence A1 and 400, 870, and 890 feet from the respective property lines of Residences 1, 2 and 3. In view of this forklift and maintenance operations would be expected to produce L_{25} levels of 38 dBA at the outdoor use area of Residence A1, 45 dBA at the property line of Residence 1, and 36 dBA at the property lines of Residences 2 and 3. Table 9, following, presents and summarizes the assessment of bottling related noise versus County Noise Standards.

Table 11: Forklift and Maintenance L_{25} Noise Levels

	L_{25} (Noise Level Exceeded 15 Minutes in any Hour), dBA			
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**
Unadjusted Table NE-2 Daytime Limit	55	55	55	55
Unadjusted Table NE-2 Nighttime Limit	50	50	50	50
Daytime Ambient Noise Levels	*47*	*47*	*47*	*47*
Nighttime Ambient Noise Levels	*34*	*34*	*34*	*34*
Forklift/maintenance noise at Receiver	**38**	**44**	**36**	**36**
Operations Exceed Ambient by 10 dBA?	No	Yes	No	No
NE-2 Adjustment	0	0 day, -5 night	0	0
Adjusted Table NE-2 Daytime Limit	55	55	55	55
Adjusted Table NE-2 Nighttime Limit	50	45	50	50
Forklift/maintenance Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Considering the findings shown in Table 10, the noise associated with daytime or nighttime bottling would not result in noise levels which exceed the daytime or nighttime NE-2 noise standard at the property line of the adjacent residences.

Mitigation 5: None needed

Impact 6: Promotional Event Noise

The winery requests up to a total of 26 events per year. Based on the project description these events would consist of 11 events with 200 guests, 4 events with 150 guests, and 11 events with 100 guests. The events would include weddings, wine club member, agricultural promotional, and industry wide events. The events will occur on the property either within the proposed winery buildings or in established outdoor garden areas in the southern portion of the site near the winery buildings and adjacent vineyards. Live amplified music at events is requested, however live amplified music will only occur inside the winery buildings and no music be permitted after 9:30 pm. A review of the development plan and distance information obtained via Goggle Earth indicates that the center of the outdoor garden areas identified in Figure 3 will be as close as 700 feet from the outdoor use areas of applicant Residence A1 and 400, 790, and 810 feet from the respective property lines of Residences 1, 2 and 3, and the winery buildings will be as close as 680 feet from the outdoor use areas of applicant Residence A1 and 250, 790, and 810 feet from the respective property lines of Residences 1, 2 and 3. Using these distances and the noise shielding considerations for outdoor and indoor events discussed above under the propagation of sound heading, the L_{50} sound levels for the typical noise source levels listed in Table 4 for outdoor and indoor events have been calculated at the outdoor use areas of applicant Residence A1 and the near property lines of Residences 1, 2 and 3. Tables 12a to 12b following present and summarize the assessment of promotional event related noise versus County Noise Standards.

Table 12a: Outdoor Event L_{50} Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 3**
Unadjusted Table NE-2 Daytime Limit	50	50	50	50
Daytime Ambient Noise Levels	*44*	*44*	*44*	*44*
NE-2 Adjustment for speech and music	-5	-5	-5	-5
Special Event L_{50} Noise Levels	**Res. A1**	**Res. 1**	**Res. 2**	**Res. 3**
Non-amplified (acoustic) Music	38	44	37	37
100 Guests: Raised Conversation w/Bkg. Music	31	37	30	30
150 Guests: Raised Conversation w/Bkg. Music	35	41	34	34
200 Guests: Raised Conversation w/Bkg. Music	39	45	38	38
Events Exceed Ambient by 10 dBA?	No (all)	No (all)	No (all)	No (all)
NE-2 Adjustment	0	0	0	0
Adjusted Table NE-2 Daytime Limit	45	45	45	45
Outdoor Event Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Table 12b: Indoor Event L_{50} Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA			
	Res. A1	**Res. 1**	**Res. 2**	**Res. 3**
Unadjusted Table NE-2 Daytime Limit	50	50	50	50
Daytime Ambient Noise Levels	*44*	*44*	*44*	*44*
NE-2 Adjustment for speech and music	-5	-5	-5	-5
Special Event L_{50} Noise Levels	**Res. A1**	**Res. 1**	**Res. 2**	**Res. 3**
Amplified Music	32	43	30	30
Amplified Speech	30	41	28	28
Non-amplified (acoustic) Music	27	38	25	25
100 Guests: Raised Conversation w/Bkg. Music	20	31	18	18
150 Guests: Raised Conversation w/Bkg. Music	24	35	22	22
200 Guests: Raised Conversation w/Bkg. Music	28	39	26	26
Events Exceed Ambient by 10 dBA?	No (all)	No (all)	No (all)	No (all)
NE-2 Adjustment	0	0	0	0
Adjusted Table NE-2 Daytime Limit	45	45	45	45
Indoor Event Noise Exceeds NE-2?	**No**	**No**	**No**	**No**

Based on the findings shown in Tables 13a and 13b the noise associated with daytime indoor or outdoor events would not result in noise levels which exceed the daytime or nighttime NE-2 noise standard at the property line of the adjacent residences.

Mitigation 6: None needed

APPENDIX A:
FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound may be caused by either its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1. There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2.

Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called Leq. The most common averaging period is hourly, but Leq can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Day/Night Average Sound Level, Ldn, is a measure of the cumulative noise exposure in a community, with a 10 dB penalty added to nighttime (10:00 pm - 7:00 am) noise levels. The Community Noise Equivalent Level, CNEL, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels.

Effects of Noise

Sleep and Speech Interference: The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity; above 35 dBA, and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.

Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA Ldn with open windows and 65-70 dBA Ldn if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need windows with special glass.

TERM	DEFINITIONS
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Definitions Of Acoustical Terms — **Table 1**

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Annoyance: Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA Ldn. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed.

At a Given Distance From Noise Source	A-Weighted Sound Level	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80		
Freeway (100')		In Kitchen With Garbage	
Vacuum Cleaner (10')	70	Disposal Running	Moderately Loud
	60	Data Processing Center	
Light Traffic (100')	50	Department Store	
Large Transformer (200')			
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		

Typical Sound Levels in the Environment & Industry | **Table 2**

ILLINGWORTH & RODKIN, INC./*Acoustical Engineers*

Traffic Impact Study for Bricoleur Winery Project

Prepared for the County of Sonoma

Submitted by
W-Trans

May 10, 2018

TRAFFIC ENGINEERING
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Executive Summary

The proposed Bricoleur Winery would produce up to 40,000 cases of wine annually, with a tasting room open to the public seven days a week. Participation in eight days of industry-wide promotional events is proposed as well as 16 site-specific agricultural promotion events annually having 100 to 200 persons in attendance, including seven events at up to 100 persons, four events at up to 150 persons, and seven events with a maximum of 200 persons. The winery is expected to have nine employees on a typical daily basis, with up to 14 during harvest.

Using the County's winery trip generation assumptions, the proposed project would be expected to generate an average of 75 trips per day during harvest conditions, including 18 weekday p.m. peak hour trips and 19 trips during the midday peak hour on weekends. The largest proposed agricultural promotional event of 200 attendees would be expected to generate 80 trip ends before and after the event on a weekend.

The study area included the three intersections of Starr Road/Reiman Lane, Windsor Road/Shiloh Road, and Mark West Station Road/Starr Road, all of which are currently operating acceptably at LOS A overall. Upon adding trips associated with the proposed project and events, the study intersections would be expected to continue operating at LOS A overall. Under Future volumes and with project and event traffic added, the study intersections are still expected to continue operating acceptably at LOS A or B overall.

While the study area lacks pedestrian facilities or transit service, given the rural nature of the area it is reasonable to assume there would not be any pedestrian travel or demand for transit service, and therefore, the lack of facilities is considered acceptable. Existing and planned future bicycle facilities, along with the proposed supply of 25 bicycle parking spaces on-site, provide adequate access for bicyclists.

The project fences obscure sight distances to the west and east of the project driveway. To provide adequate sight lines, the applicant has agreed to move the fences back. A left-turn lane is not warranted, and therefore not recommended, at the project's driveway on Starr Road.

The proposed 122-space parking supply, including 72 permanent spaces and 50 temporary spaces, is adequate to accommodate demand during the largest on-site marketing event.

Introduction

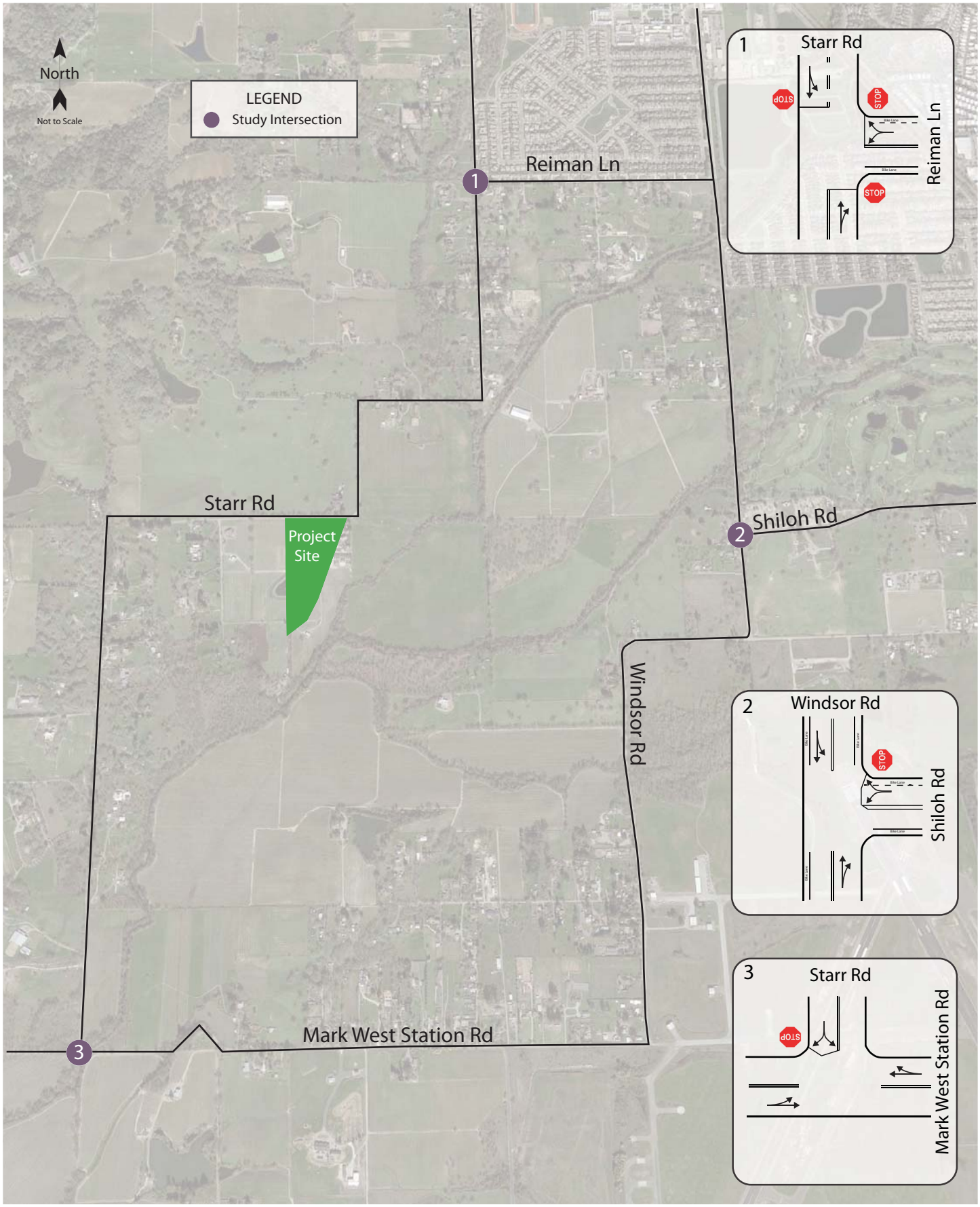
This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed winery to be located at 7390 and 7394 Starr Road in the County of Sonoma. The traffic study was completed in accordance with the criteria established by the County of Sonoma, reflects a scope of work approved by County staff, and is consistent with standard traffic engineering techniques.

Prelude

The purpose of a traffic impact study is to provide County of Sonoma staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required to mitigate these impacts to a level of insignificance as defined by the County of Sonoma's General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments. Impacts relative to access for pedestrians, bicyclists, and to transit are also addressed.

Project Profile

The proposed Bricoleur Vineyards project is a new family winery that could produce up to 40,000 cases of wine annually, with this level reached over time. The winery would have a tasting room open to the public seven days a week, and is proposing participation in eight days of industry-wide promotional events, as well as 18 site-specific agriculture promotional events annually having 100 to 200 persons in attendance, including seven events at up to 100 persons, four at up to 150 persons, and seven with a maximum of 200 persons. Nine employees are expected to be at the site on a typical daily basis, with up to 14 during harvest. The project location is shown in Figure 1.



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Traffic Impact Study for the Bricoleur Winery Project

Figure 1 – Study Area and Lane Configurations

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Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the following intersections:

1. Starr Road/Reiman Lane
2. Windsor Road/Shiloh Road
3. Mark West Station Road/Starr Road

Operating conditions during the weekday and weekend p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The weekday p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute. The weekend peak hour occurs between 1:00 and 4:00 p.m.

Study Intersections

Starr Road/Reiman Lane is an all-way stop controlled tee intersection. There are no crosswalks at any leg of intersection, but there are Class II bike lanes along both sides of Reiman Lane.

Windsor Road/Shiloh Road is a tee intersection stop-controlled at the westbound Shiloh Road approach. Class II bike lanes are marked on both sides of Windsor Road north of the intersection and on Shiloh Road.

Mark West Station Road/Starr Road is a tee intersection where the southbound Starr Road approach is stop-controlled. There is a private driveway on the south side of intersection.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2013 through December 31, 2017.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2013 Collision Data on California State Highways*, California Department of Transportation (Caltrans). One of the three study intersections experienced collisions at a rate higher than the statewide average. The collision rate calculations are provided in Appendix A.

Table 1 – Collision Rates at the Study Intersections			
Study Intersection	**Number of Collisions (2013-2017)**	**Calculated Collision Rate (c/mve)**	**Statewide Average Collision Rate (c/mve)**
1. Starr Road/Reiman Lane	1	0.29	0.36
2. Windsor Road/Shiloh Road	**4**	**0.29**	0.16
3. Mark West Station Road/Starr Road	0	0.00	0.16

Note: c/mve = collisions per million vehicles entering

Windsor Road/Shiloh Road has experienced collisions at a higher rate than the statewide average; however, it is noted that only 25.0 percent of these crashes resulted in injuries, while the statewide average injury incidence is 39.2 percent. Further, two of the four crashes involved single vehicles, so were intersection-related only in that the driver was negotiating the intersection and failed to slow sufficiently to avoid running off the road or hitting a nearby object. The other two collisions included a rear-end collision involving westbound traveling vehicles and a head-on collision between a southbound left-turning vehicle and a northbound vehicle on Windsor Road. Based on the limited number of crashes as well as the lack of any specific trend, no safety improvements appear warranted. The collision rate, while above average, therefore does not appear to indicate a safety concern.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. There are no pedestrian facilities in the immediate vicinity of the project site along Starr Road or the other roadways leading to the site. However, given the rural character of the area, pedestrian traffic would not be expected.

- **Starr Road** – In general, Starr Road is a narrow rural road that provides access to vineyards and agricultural land uses. Pedestrian facilities are not provided along Starr Road near the project site.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into three categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.

In the project area, there are existing Class II bike lanes along Reiman Lane, Starr Road, Windsor Road, and Shiloh Road and future bicycle facilities are planned for the Starr Creek and Windsor Creek Trails. Bicyclists ride in the roadway along all other streets within the project study area. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *2014 Windsor Bicycle and Pedestrian Master Plan*.

Table 2 – Bicycle Facility Summary				
Status **Facility**	**Class**	**Length (miles)**	**Begin Point**	**End Point**
Existing				
Reiman Lane	II	0.50	Starr Road	Windsor Road
Shiloh Road	II	1.25	Windsor Road	Caletti Avenue
Shiloh Road	II	0.35	Hembree Lane	Old Redwood Highway
Starr Road	III	0.76	Windsor River Road	Reiman Lane
Windsor Road	II	1.55	Windsor River Road	Shiloh Road
Planned				
Starr Creek Trail	I	1.07	Starr View Drive	Starr Road
Windsor Creek Trail	I	0.55	Windsor Road	SMART Trail
Windsor Creek Trail	I	0.14	Windsor Road	Windsor Creek Trail

Source: *Windsor Bicycle and Pedestrian Master Plan*, Sonoma County Transportation Authority, 2014

Transit Facilities

The Sonoma County Transit (SCT) provides fixed route bus service in Town of Windsor. There are no bus stops within a quarter-mile of the project site. The nearest bus stop is located one-and-a-half miles from the project site on Windsor Road, just north of the Windsor Road/Reiman Lane intersection.

Capacity Analysis

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2010. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersections with side-street stop controls, or those which are unsignalized and have one or two approaches stop controlled, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersections with stop signs on all approaches were analyzed using the "All-Way Stop-Controlled" Intersection methodology from the HCM. This methodology evaluates delay for each approach based on turning movements, opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection overall, and is then related to a Level of Service.

The ranges of delay associated with the various levels of service are indicated in Table 3.

Table 3 – Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	All-Way Stop-Controlled
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Upon stopping, drivers are immediately able to proceed.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 15 seconds. Drivers may wait for one or two vehicles to clear the intersection before proceeding from a stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 15 to 25 seconds. Drivers will enter a queue of one or two vehicles on the same approach, and wait for vehicle to clear from one or more approaches prior to entering the intersection.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 25 to 35 seconds. Queues of more than two vehicles are encountered on one or more approaches.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 35 to 50 seconds. Longer queues are encountered on more than one approach to the intersection.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 50 seconds. Drivers enter long queues on all approaches.

Reference: *Highway Capacity Manual,* Transportation Research Board, 2010

Traffic Operation Standards

Based on the most recent criteria published by the County of Sonoma in May 2016, the project would have a significant traffic impact if it results in any of the following conditions.

1. **On-site roads and frontage improvements** – Proposed on-site circulation and street frontage would not meet the County's minimum standards for roadway or driveway design, or potentially result in safety hazards, as determined by the County in consultation with a registered Traffic Engineer or Civil Engineer.

2. **Parking** – Proposed on-site parking supply does not meet County standards and does not adequately accommodate parking demand.

3. **Emergency Access** – The project site would have inadequate emergency access.

4. **Alternative Transportation** – The project provides inadequate facilities for alternative transportation modes (e.g., bus turnouts, bicycle racks, pedestrian pathways) and/or the project creates potential conflicts with the County's Complete Streets Policy, other adopted policies, plans, or programs supporting alternative transportation.

5. **Road Hazards** – Road design features that do not meet standards (e.g., sharp curves or skewed intersections) or any perceived incompatible uses (e.g., farm equipment, major bicycle route, rail or pedestrian crossings).

6. **Vehicle Queues** – Project causes or exacerbates 95th percentile turning movement queues exceeding available turn pocket capacity.

7. **Signal Warrants** – The addition of the project's vehicle or pedestrian traffic causes an intersection to meet or exceed Caltrans or CA-MUTCD signal warrant criteria.

8. **Turn Lanes** – The addition of project traffic causes an intersection to meet or exceed criteria for provision of a right or left turn lane on an intersection approach.

9. **Sight Lines** – The project constructs an unsignalized intersection (including driveways) and/or adds traffic to an existing unsignalized intersection approach that does not have adequate sight lines based upon Caltrans criteria for State highway intersections and AASHTO criteria for County roadway intersections.

10. **County Intersection Operations** – The County level of service standard for County intersection operations is to maintain a Level of Service D or better pursuant to General Plan Policy CT-4.2. The project would have a significant traffic impact if the project's traffic would cause an intersection currently operating at an acceptable level of service (LOS D or better) to operate at an unacceptable level (LOS E or worse).

    If the intersection currently operates or is projected to operate below the County standard, the project's impact is considered significant and cumulatively considerable if it causes the average delay to increase by five seconds or more. The delay will be determined by comparing intersection operations with and without the project's traffic for both the existing baseline and projected future conditions.

    The above criterion applies to all controlled intersections except for driveways and minor side streets that have less than 30 vehicle trips per hour per approach or exclusive left turn movement.

11. **County Roadway Operations** – The County level of service standard for County roadway operations is to maintain a Level of Service C pursuant to General Plan Policy CT-4.1; or, for specific roadway segments, the level of service standard adopted in the General Plan Figure CT-3. The project would have a significant traffic

impact if the project's traffic would cause a road currently operating at an acceptable level of service (LOS C or better) to operate at an unacceptable level (LOS D or worse).

If a road segment currently operates or is projected to operate below the County standard, the project's impact is considered significant and cumulatively considerable if it causes the average speed to decrease by 2 mph for a roadway operating at LOS D without the project, 1 mph if existing operation is LOS E, and any reduction in travel speed is significant for a roadway operating at LOS F. The change will be determined by comparing roadway conditions with and without the project's traffic for both the existing baseline and projected future conditions.

12. **State Highways** – Caltrans' general level of service policy on State highways is to maintain the level of service at the transition between LOS C and LOS D. However, level of service goals for specific Caltrans facilities should be taken from transportation planning documents for that facility. A project would have a significant impact if the project traffic would cause the operation of a State highway to operate below LOS C. If a State highway currently operates or is projected to operate below the standard, the project's impact is considered significant and cumulatively considerable if it does not maintain the existing "measure of effectiveness." Measures of effectiveness are: (a) control delay per vehicle for signalized intersections; (b) average control delay per vehicle for unsignalized intersections; (c) average speed for two-lane highways, and (d) density for multi-lane highways.

13. **Mitigation Measures** – In order to reduce project impacts to levels of insignificance, the proposed mitigation measures must result in post-development affected intersections and roadways that have an LOS that is no worse than the County General Plan LOS standard for roadways and intersections, reduce safety impacts to insignificance by bringing the site up to Caltrans or AASHTO design standards, and provide adequate parking and alternative transportation facilities consistent with County plans and policies. The scope of the mitigation measures must reduce the project impacts below the identifiable thresholds mentioned.

    The payment of County wide traffic impact fees in and of itself may not be adequate to mitigate a project's local impacts if the existing facilities are already below standard, and the required improvements are not fully funded or programmed to be operational at the time of project completion. The timing of the mitigation measure implementation may require construction of off-site improvements by the developer using a Reimbursement Agreement to pay for any oversized facilities associated with the public share of the improvement pursuant to Section 26-670 of the Sonoma County Code. Traffic impact fees do not address specific impacts related to a particular project. Payment of the traffic impact fee only mitigates or addresses cumulative countywide impacts related to projects that are programmed or listed to be funded by the fees on file with DTPW.

    The project's contribution to cumulative impacts must also be addressed in proportion to the project's impact. A proportional fair share contribution to a traffic improvement related to a cumulative impact may be required based on the "Methodology for Calculating Equitable Mitigation Measures" included in Caltrans' *Guide for the Preparation of Traffic Impact Studies* as referenced above. Mitigation measures for both project impacts and cumulative impacts must be implemented prior to occurrence of the impact. An analysis of the timing, funding and responsibilities for implementation of mitigation measures should be included in the traffic study.

Town of Windsor Traffic Operation Standards

The study intersections of Starr Road/Reiman Lane and Windsor Road/Shiloh Road are under the jurisdiction of the Town of Windsor, so their operational standards were applied to these locations. The *Town of Windsor 2040 General Plan*, adopted April 4, 2018, contains the following policies applicable to the traffic impact study.

Policy M-3.16 – Level of Service Application. *The Town shall maintain level of service standards that define the minimum acceptable operating characteristics for intersections and streets. A level of service D (LOS D) is defined as the minimum acceptable level of congestion during the weekday morning and evening peak periods for high-volume facilities such as freeways, crosstown streets, and signalized or all-way stop-controlled intersections. This standard should apply at all these locations except the following intersections, which are regional gateways to the Town's commercial and civic areas, and where a Level of Service E is tolerated by the Town and considered acceptable:*

- *Old Redwood Highway/US 101 Northbound off ramp/Lakewood Drive*
- *Old Redwood Highway/US 101 Southbound ramps*
- *Old Redwood Highway/Conde Lane/Windsor River Road*

At side-street stop-controlled unsignalized intersections, levels of service shall be determined for both controlled movements and for the overall intersection. Controlled movements operating at LOS E or LOS F are allowable if: 1) the intersection is projected to operate at LOS C or better overall, and 2) the projected traffic volume on the controlled movement is 30 vehicles or less per hour on approaches with single lanes, or on multilane approaches, 30 vehicles or less per hour per lane. If an intersection is operating at LOS E or F without project-generated traffic added, the project's impact shall be considered less-than-significant if it does not cause operation to fall from LOS E to LOS F and it increases average delay for the intersection by 5 seconds or less. Level of service standards shall not apply to minor intersections comprised of only local streets.

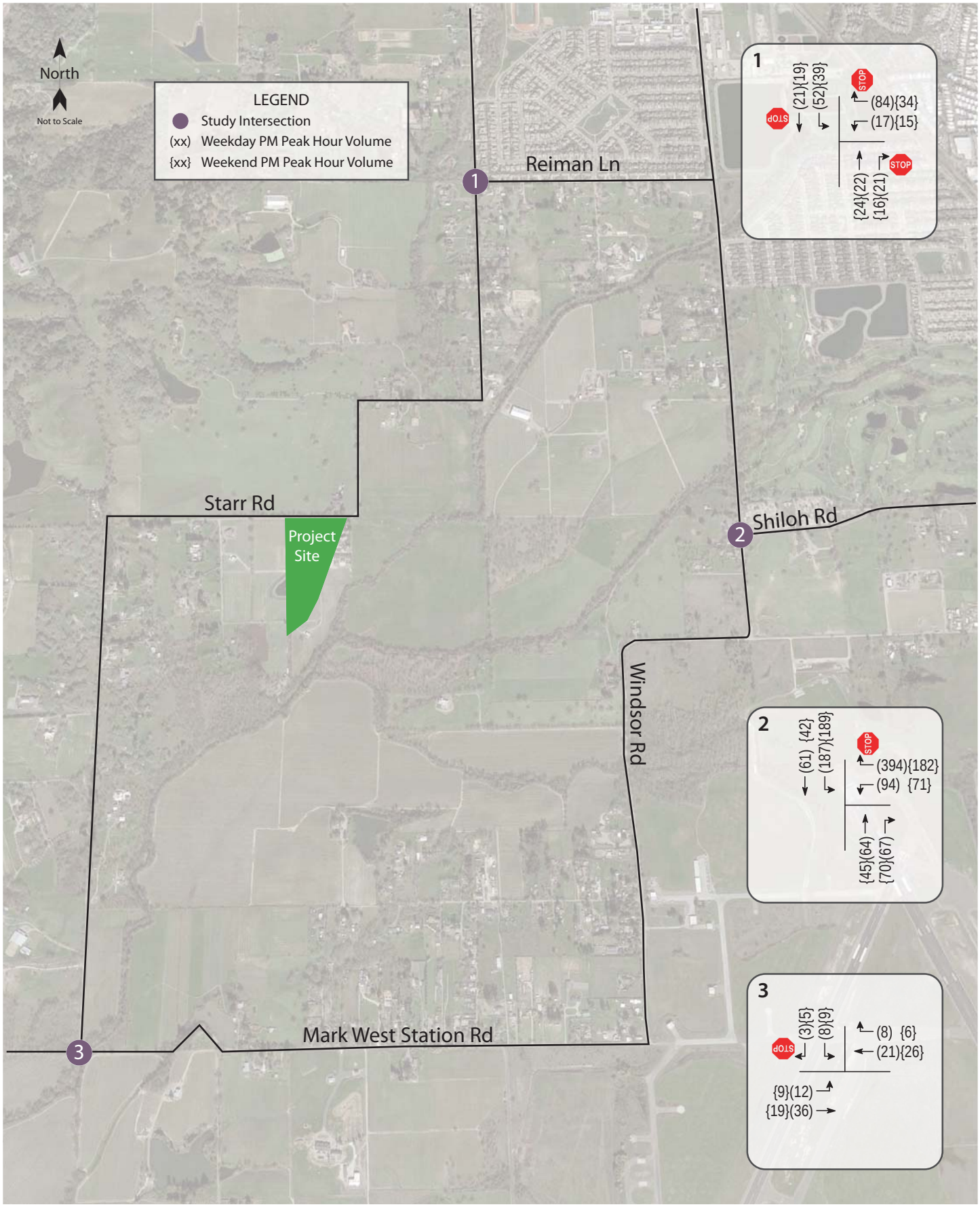
Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the weekday and weekend p.m. peak periods. This condition does not include project-generated traffic volumes. Because the County requires that traffic counts be obtained during the months of June through October for winery project analyses, and counts were obtained at the study intersections in March 2018, a seasonal adjustment factor was applied to the counts to obtain volumes representative of harvest season.

Segment volumes posted on the County of Sonoma Department of Transportation and Public Works' website indicate that volumes in the area are approximately 16 percent higher during harvest than non-harvest months so a seasonal factor of 1.16 was applied to the counts obtained in March. Additionally, peak hour factors (PHF's) were calculated based on the counts obtained and used in the analysis. Copies of the traffic counts are provided in Appendix B.

Intersection Levels of Service

Under existing conditions, all three study intersections are operating at acceptable LOS A or B overall and on the stop-controlled approaches during the weekday evening and weekend peak periods. The existing traffic volumes are shown in Figure 2. A summary of the intersection level of service calculations is contained in Table 4, and copies of the Level of Service calculations are provided in Appendix C.



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Traffic Impact Study for the Bricoleur Winery Project

Figure 2 – Existing Volumes

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Table 4 – Existing Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**Weekday PM Peak**		**Weekend PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	Starr Rd/Reiman Ln	7.4	A	7.3	A
2.	Windsor Rd/Shiloh Rd	8.4	A	6.9	A
	Westbound (Shiloh Rd) Approach	*12.0*	*B*	*10.6*	*B*
3.	Mark West Station Rd/Starr Rd	2.1	A	2.6	A
	Southbound (Starr Rd) Approach	*9.1*	*A*	*8.8*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Existing plus Approved Conditions

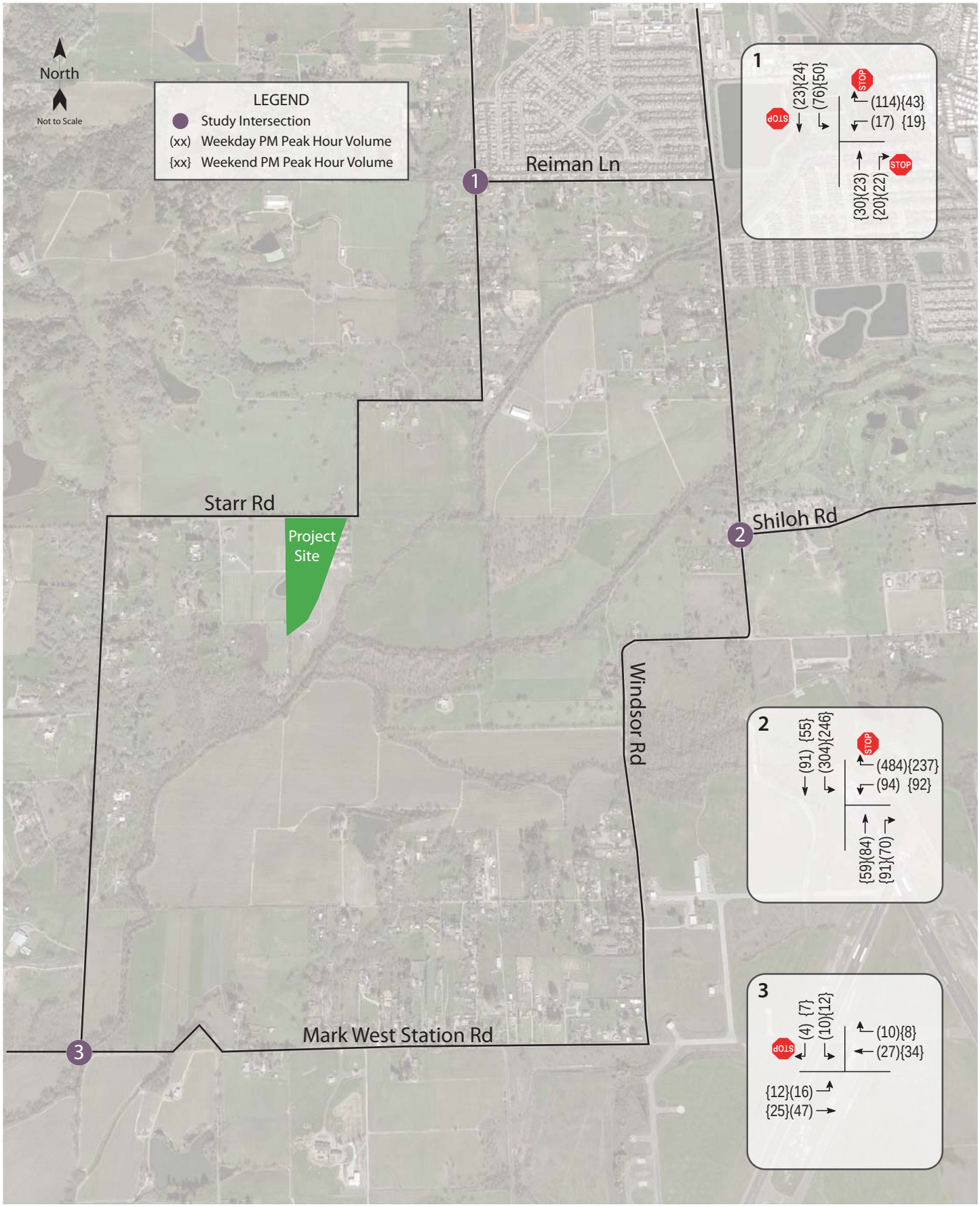
The Existing plus Approved traffic scenario reflects conditions with traffic from projects that the County deems likely to be constructed and generating traffic in a similar timeframe to opening of the proposed winery. A list of approved projects was received from the County in October 2017. Of the projects included in the list, only one project is sufficiently proximate to the proposed project to add traffic to the study intersections. La Crema Tasting Room & Winery is located at 3575 Slusser Road in the Town of Windsor, approximately 3.5 miles from the proposed Bricoleur Winery, and has a production of 5,000 cases of wine annually.

La Crema Tasting Room & Winery is currently in operation; therefore, the traffic it produces was included in the counts obtained and considered as part of existing conditions. No other approved projects were received from the County to be included in the analysis.

Future Conditions

Segment volumes for the horizon year of 2040 were obtained from the County's gravity demand model as maintained by the Sonoma County Transportation Authority (SCTA) and translated to turning movement volumes at the study intersection using the "Furness" method. The Furness method is an iterative process that employs existing turn movement data, existing link volumes, and future link volumes to project likely turning future movement volumes at intersections. Because the County's model does not include future volume projections for the weekend peak period, growth rates were calculated from the weekday evening projections and applied to the weekend peak hour counts.

Under the anticipated Future volumes, the study intersections are expected to continue operating acceptably at LOS A overall and at LOS A or B on the side street stop-controlled approaches. Future volumes are shown in Figure 3 and operating conditions are summarized in Table 5. A spreadsheet indicating derivation of the growth factors used to develop future volumes is provided in Appendix C.



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Traffic Impact Study for the Bricoleur Winery Project

Figure 3 – Future Volumes

W-Trans

Table 5 – Future Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**Weekday PM Peak**		**Weekend PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	Starr Rd/Reiman Ln	7.6	A	7.4	A
2.	Windsor Rd/Shiloh Rd	9.6	A	7.6	A
	Westbound (Shiloh Rd) Approach	*14.4*	*B*	*11.9*	*B*
3.	Mark West Station Rd/Starr Rd	2.2	A	2.6	A
	Southbound (Starr Rd) Approach	*9.3*	*A*	*9.0*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Project Description

The Bricoleur Vineyards family winery would produce up to 40,000 cases of wine annually. The winery would have a tasting room open to the public seven days a week, and is proposing participation in eight days of industry-wide promotional events, as well as 18 site-specific agriculture promotional events annually having 100 to 200 persons in attendance, including seven events at up to 100 persons, four at up to 150 persons, and seven with a maximum of 200 persons. Nine employees are expected to be at the site on a typical daily basis, with up to 14 during harvest. The proposed project site plan is shown in Figure 4.

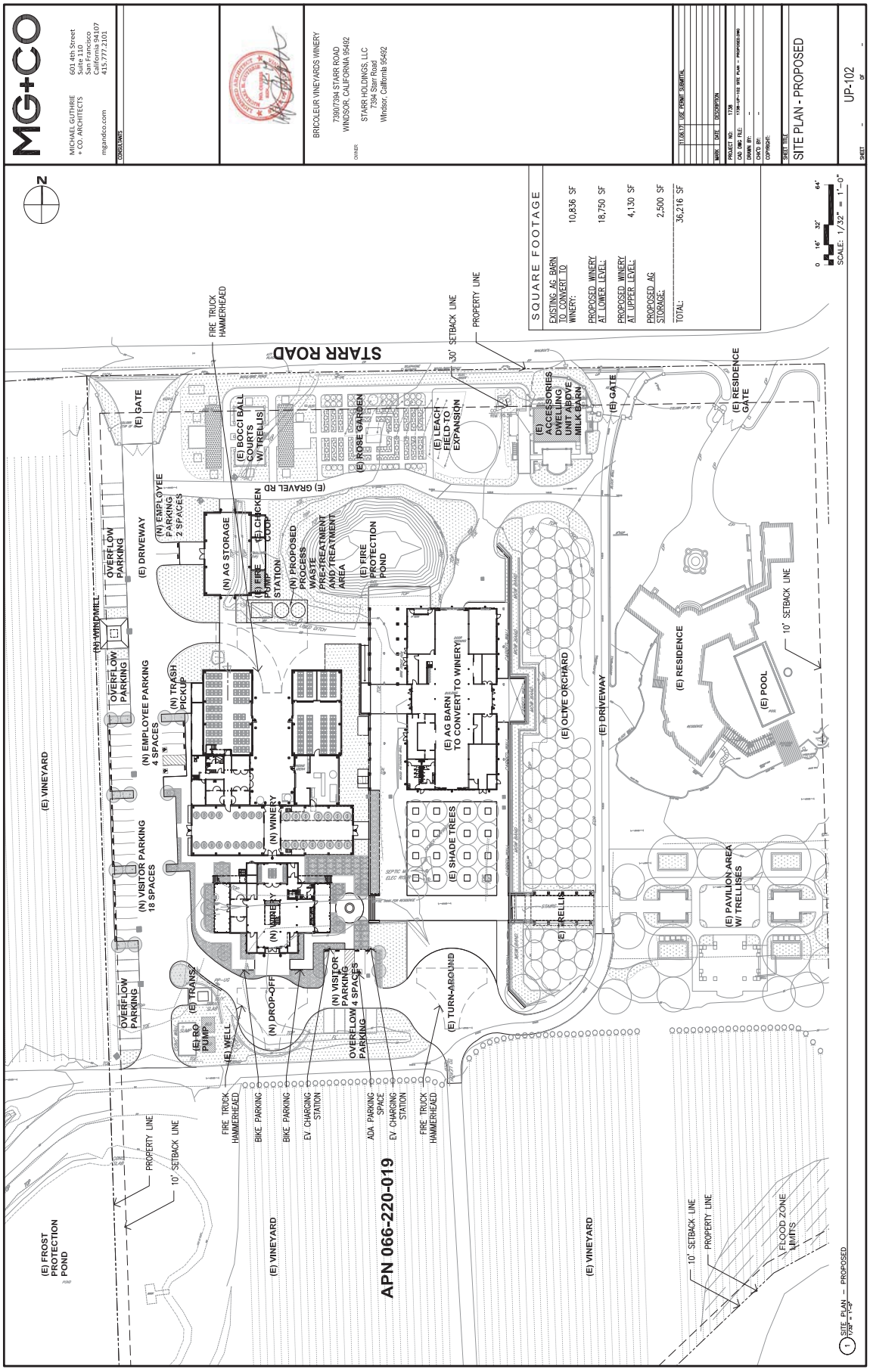
Trip Generation

Sonoma County's Winery Trip Generation form was used to determine the potential trip generation for the proposed conditions. For employees, an average of three trips per day were assumed, including one each during the morning and weekend peak hours.

Per County policy, assuming an average of 2.5 persons per vehicle, the tasting room operation would generate an average of 17 visitor trip ends daily for the 21 visitors on an average day. To estimate peak hour traffic on a typical day, it was assumed that 10 percent of visitor traffic would occur during the weekday p.m. peak hour and 12 percent would occur during the weekend peak hour.

The County of Sonoma's Winery Traffic Information/Trip Generation Sheet does not include guidance on inbound versus outbound trips, so it was assumed that two-thirds would be outbound during the weekday p.m. peak hour as customers and staff leave when the tasting room closes. For the weekend midday peak-hour it was assumed that inbound and outbound trips would be evenly split. The winery is expected to generate three truck trips daily; however, these trips were assumed to occur during off-peak periods.

There is currently some truck traffic related to pomace disposal and vineyard maintenance workers, but these existing activities generate less than one trip per day; this was not included in the trip generation tables. Based on application of these assumptions, the proposed project would be expected to generate an average of 47 trips daily with 11 trips during the evening peak hour and 12 trips during the Saturday midday peak hour. These results are summarized in Table 6.



Source: Michael Guthrie + Co. Architects 11/17 SOX630.ai 5/18

Traffic Impact Study for the Bricoleur Winery Project

Figure 4 – Site Plan

Table 6 – Trip Generation Summary – Non-Harvest									
Trip Generator	**Units**	**Daily**		**PM Peak Hour**			**MD Peak Hour**		
		Rate	**Trips**	**Trips**	**In**	**Out**	**Trips**	**In**	**Out**
Winery Employees	6	3	18	6	2	4	6	3	3
Tasting Room Employees	3	3	9	3	1	2	3	1	2
Tasting Room Visitors	21	0.8	17	2	1	1	3	2	1
Truck Traffic	n/a	n/a	3	0	0	0	0	0	0
Proposed Total			**47**	**11**	**4**	**7**	**12**	**6**	**6**

Note: Trip Generation does not include special events.

Traffic that would occur during harvest was also estimated, as shown in Table 7. A total of 75 daily trips are expected to occur during the peak season, including 18 trips during the weekday p.m. peak hour and 19 during the weekend midday peak hour.

Table 7 – Trip Generation Summary – Harvest									
Trip Generator	**Units**	**Daily**		**PM Peak Hour**			**MD Peak Hour**		
		Rate	**Trips**	**Trips**	**In**	**Out**	**Trips**	**In**	**Out**
Winery Employees	11	3	33	11	4	7	11	6	5
Tasting Room Employees	3	3	9	3	1	2	3	1	2
Tasting Room Visitors	30	0.8	24	3	1	2	4	2	2
Truck Traffic	n/a	n/a	9	1	0	1	1	1	0
Proposed Total			**75**	**18**	**6**	**12**	**19**	**10**	**9**

Note: Trip Generation does not include special events.

In addition to typical daily operations during non-harvest and harvest season, the anticipated trip generation for a 200-person event was estimated, as shown in Table 8. Using the County's standard occupancy rate of 2.5 persons per vehicle, an event of this size would be expected to generate 160 trip ends for guests. It was assumed all guests would arrive at the project site in the same p.m. peak hour. For the events on weekends, half of the total visitor trips are expected to occur in the same weekend midday peak hour, with 50 percent of those trips inbound and 50 percent outbound. Event employees would travel outside of the arrival and departure hours of the guests, as they would be expected to be on-site for set-up and clean-up and are therefore not included in the peak hour analysis.

Table 8 – Trip Generation Summary for 200-Person Events									
Event Size	**Units**	**Daily**		**PM Peak Hour**			**MD Peak Hour**		
Trip Generator		**Rate**	**Trips**	**Trips**	**In**	**Out**	**Trips**	**In**	**Out**
200-Person Event									
Event Visitors	200	0.8	160	80	80	0	80	40	40
Employees	10	2.0	20	0	0	0	0	0	0
200-Person Event Total			**180**	**80**	**80**	**0**	**80**	**40**	**40**

Trip Distribution

The pattern used to allocate new project trips to the street network was determined based on familiarity with the area and surrounding region as well as likely origins and destinations for patrons of the project. It is anticipated that 10 percent of trips would be to/from the central Windsor via Starr Road and the other 90 percent would travel to/from US 101 using Shiloh Road, Windsor Road, Reiman Lane and Starr Road.

Intersection Operation

Existing plus Project (Harvest) Conditions

Upon the addition of project-related traffic to the Existing volumes, the study intersections are expected to continue operating acceptably, at the same levels of service as without the project. These results are summarized in Table 9. Project traffic volumes and Existing plus Project volumes are provided in Figure 5.

Table 9 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection *Approach*	Existing Conditions				Existing plus Project			
	Weekday PM Peak		Weekend PM Peak		Weekday PM Peak		Weekend PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Starr Rd/Reiman Ln	7.4	A	7.3	A	7.4	A	7.3	A
2. Windsor Rd/Shiloh Rd	8.4	A	6.9	A	8.5	A	7.0	A
Westbound (Shiloh Rd) Approach	*12.0*	*B*	*10.6*	*B*	*12.1*	*B*	*10.6*	*B*
3. Mark West Station Rd/Starr Rd	2.1	A	2.6	A	2.1	A	2.6	A
Southbound (Starr Rd) Approach	*9.1*	*A*	*8.8*	*A*	*9.1*	*A*	*8.8*	*A*

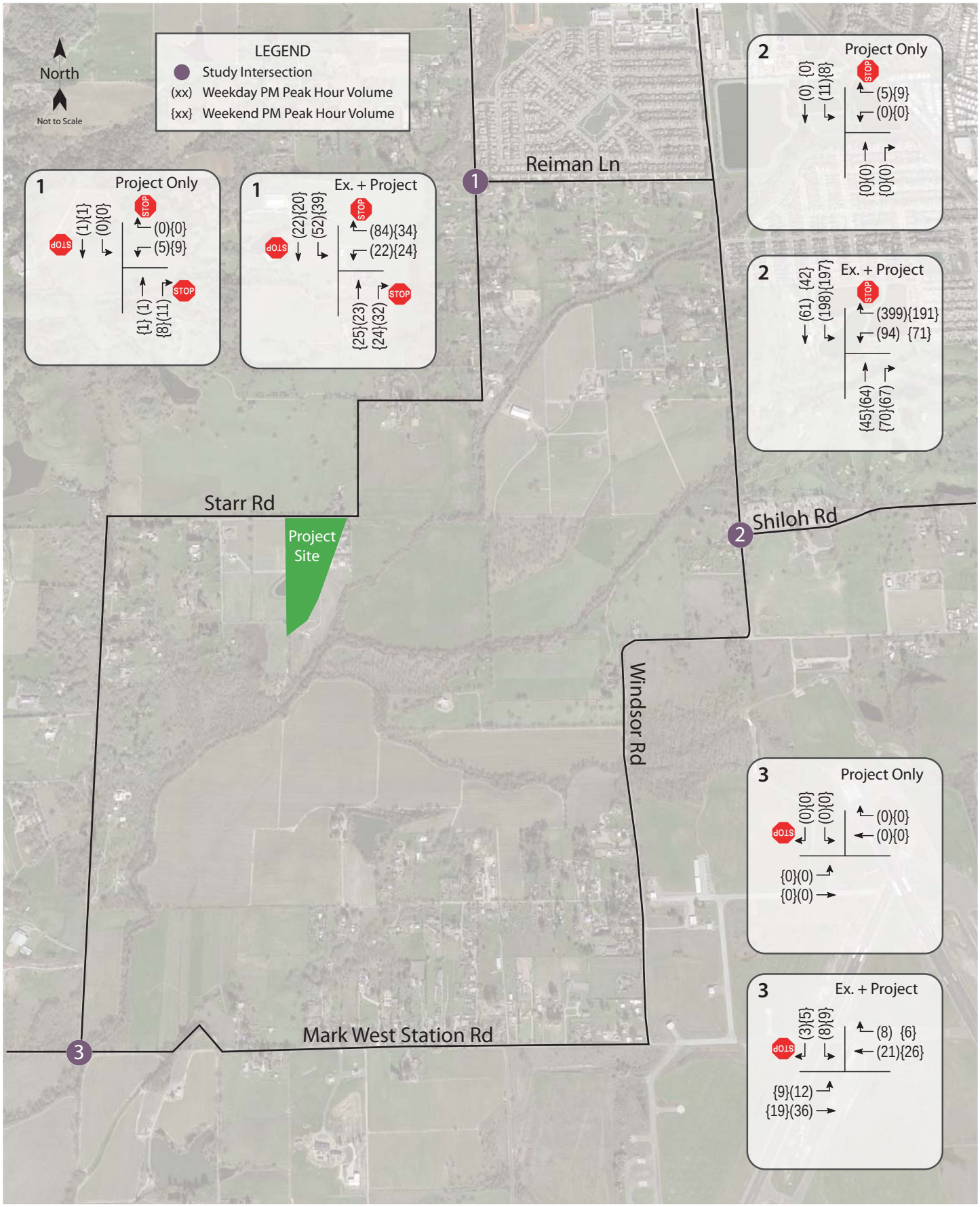
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding – The study intersections are expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic to existing volumes.

Existing plus Project (Harvest) plus 200-Person Event Conditions

Operation was also evaluated under the worst-case assumptions that an event would begin during the peak hour. For the weekday it was assumed that the event would begin during the p.m. peak hour, while for the weekend conditions were evaluated for both the start and end of an event, assuming all guests either arrive or depart during a single hour. The worst-case results between the two weekday and weekend day scenarios are presented.

Under the stated assumptions, all intersections are expected to continue operating at acceptable service levels A or B. These results are summarized in Table 10 and the volumes are shown in Figure 6.



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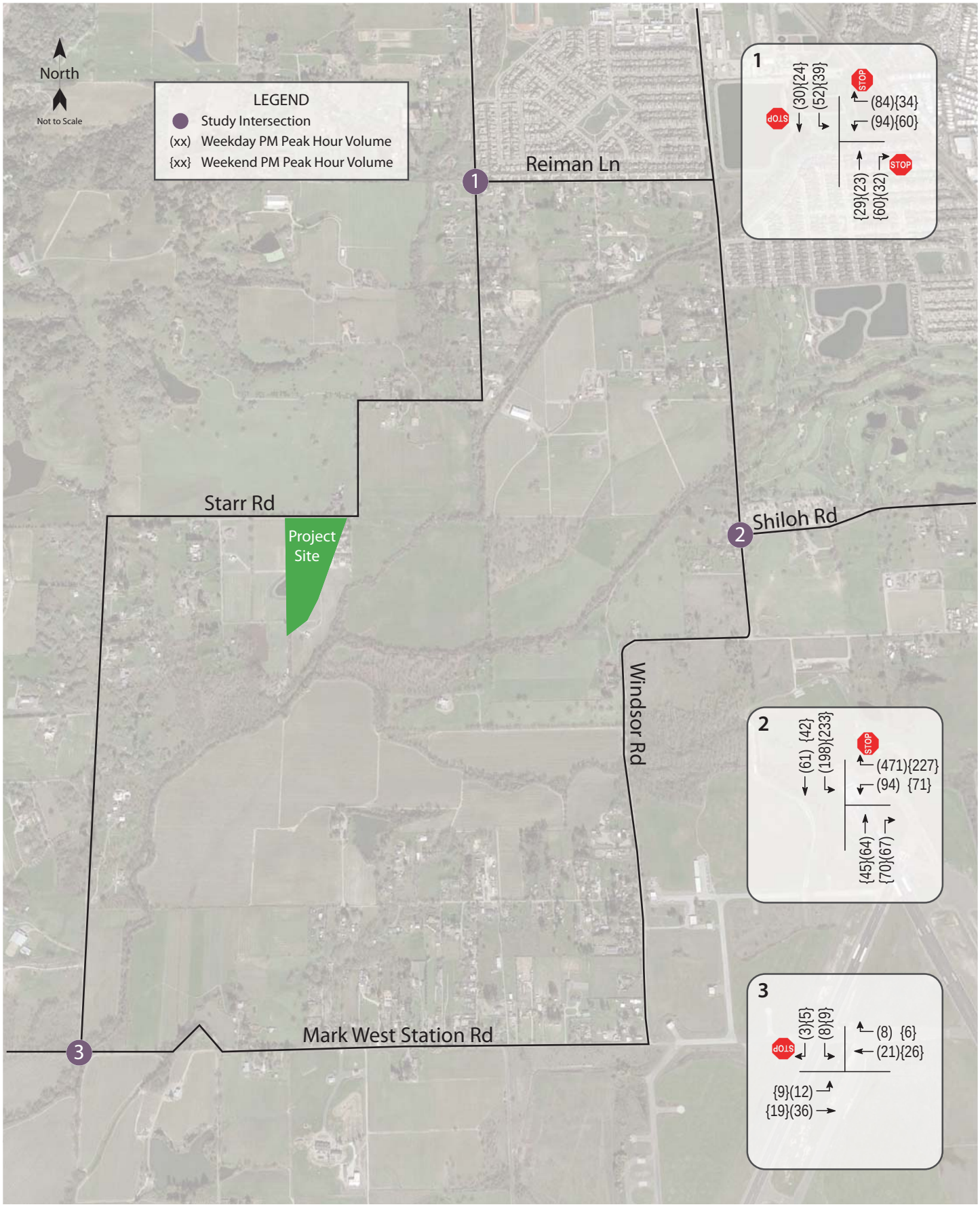
Traffic Impact Study for the Bricoleur Winery Project

Figure 5 – Project Only and Exisitng plus Project Volumes



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Traffic Impact Study for the Bricoleur Winery Project

Figure 6 – Existing plus Project plus Event Volumes

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Table 10 – Existing and Existing plus Project (Harvest) plus 200-Person Event Intersection Levels of

	Study Intersection *Approach*	Existing Conditions				Existing plus Project (Harvest) plus 200-Person Event			
		Weekday PM Peak		Weekend MD Peak		Weekday PM Peak		Weekend MD Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	Starr Rd/Reiman Ln	7.4	A	7.3	A	8.0	A	7.7	A
2.	Windsor Rd/Shiloh Rd	8.4	A	6.9	A	9.3	A	7.4	A
	Westbound (Shiloh Rd) Approach	*12.0*	*B*	*10.6*	*B*	*12.9*	*B*	*11.0*	*B*
3.	Mark West Station Rd/Starr Rd	2.1	A	2.6	A	2.1	A	2.6	A
	Southbound (Starr Rd) Approach	*9.1*	*A*	*8.8*	*A*	*9.1*	*A*	*8.8*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding – All three study intersections would be expected to continue operating acceptably, and at the same service levels, upon the addition of project and event-generated traffic to existing volumes.

Future plus Project (Harvest) Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, the study intersections are expected to operate acceptably. The Future plus Project volumes are shown in Figure 7, and operating conditions are summarized in Table 11.

Table 11 – Future and Future plus Project (Harvest) Peak Hour Levels of Service

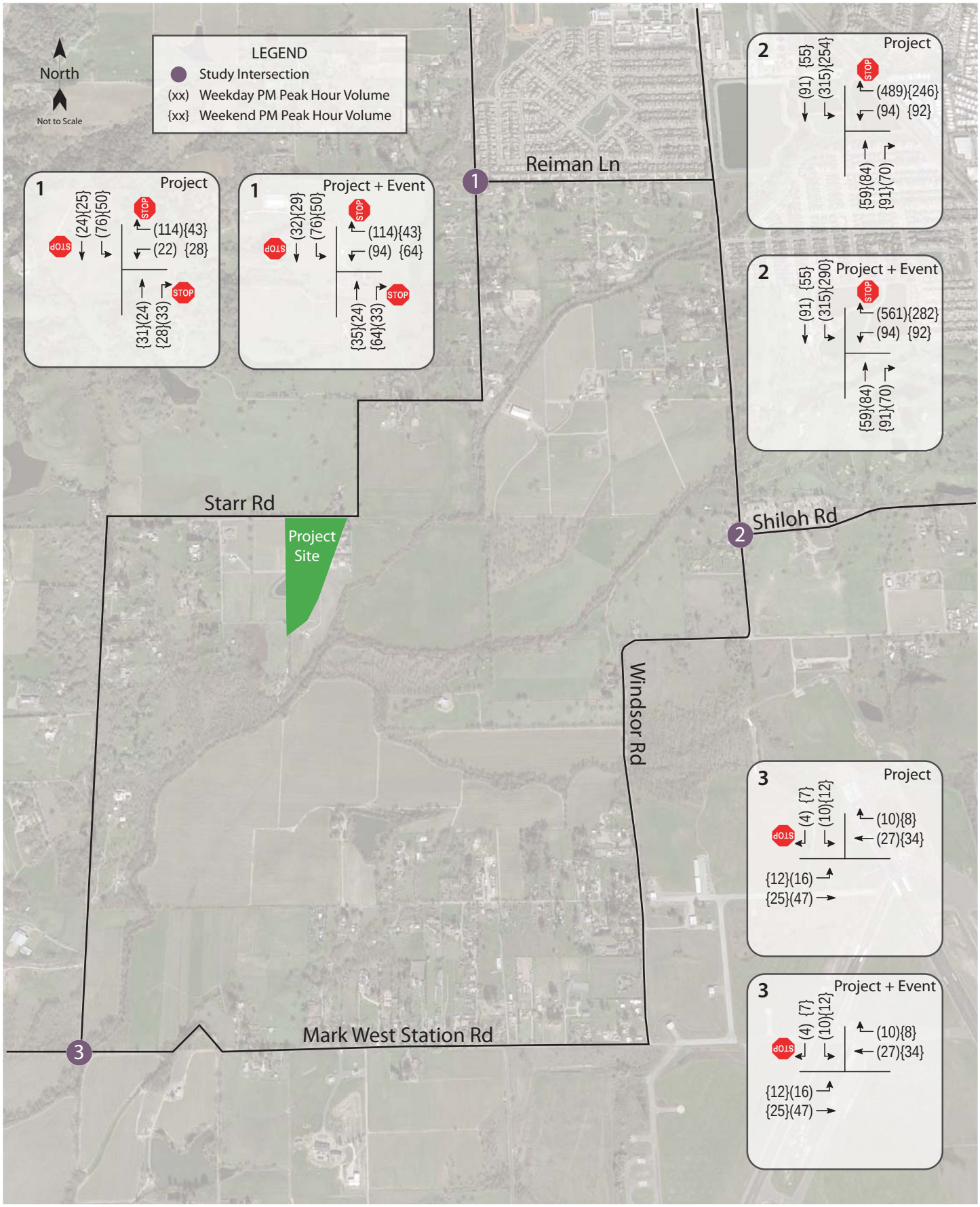
	Study Intersection *Approach*	Future Conditions				Future plus Project			
		Weekday PM Peak		Weekend PM Peak		Weekday PM Peak		Weekend PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	Starr Rd/Reiman Ln	7.6	A	7.4	A	7.7	A	7.5	A
2.	Windsor Rd/Shiloh Rd	9.6	A	7.6	A	9.7	A	7.7	A
	Westbound (Shiloh Rd) Approach	*14.4*	*B*	*11.9*	*B*	*14.6*	*B*	*12.0*	*B*
3.	Mark West Station Rd/Starr Rd	2.2	A	2.6	A	2.2	A	2.6	A
	Southbound (Starr Rd) Approach	*9.3*	*A*	*9.0*	*A*	*9.3*	*A*	*9.0*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding – The study intersections will continue operating acceptably with project traffic added to Future volumes, at the same Levels of Service as without it.

Future plus Project (Harvest) plus 200-Person Event Conditions

Conditions at the beginning and/or end of an event were evaluated for both peaks periods. As shown in Table 12, the study intersections are expected to continue operating acceptable at LOS C or better overall and on the minor street approaches. The volumes for this scenario are indicated in Figure 7.



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Traffic Impact Study for the Bricoleur Winery Project

Figure 7 – Future plus Project and Future plus Project plus Event Volumes

Table 12 – Future and Future plus Project (Harvest) plus 200-Person Event Intersection Levels of Service								
Study Intersection ***Approach***	**Future Conditions**				**Future plus Project (Harvest) plus 200-Person Event**			
	Weekday PM Peak		**Weekend MD Peak**		**Weekday PM Peak**		**Weekend MD Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Starr Rd/Reiman Ln	7.6	A	7.4	A	8.3	A	7.8	A
2. Windsor Rd/Shiloh Rd	9.6	A	7.6	A	10.8	B	8.1	A
Westbound (Shiloh Rd) Approach	*14.4*	*B*	*11.9*	*B*	*16.0*	*C*	*12.5*	*B*
3. Mark West Station Rd/Starr Rd	2.2	A	2.6	A	2.2	A	2.6	A
Southbound (Starr Rd) Approach	*9.3*	*A*	*9.0*	*A*	*9.3*	*A*	*9.0*	*A*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding – With the addition of project and event-generated traffic to Future volumes, all three study intersections are expected to operate at LOS A or B.

Queuing

None of the study intersections has a dedicated turn lane, so queuing was not reviewed.

Alternative Modes

Pedestrian and Bicycle Facilities

Given the proximity of agricultural land uses and limited residential or commercial uses, it is reasonable to assume that most winery visitors and employees will travel to and from the site by private automobile. Therefore, the winery site is expected to generate no pedestrian traffic.

Bicycle Facilities

Except for Starr Road, the roadways providing access to the project site, including Reiman Lane, Windsor Road and Shiloh Road, have Class II bike lanes. Combined with use of local streets by cyclists, adequate facilities exist for bicycle access to the project site, and would be improved upon completion of the proposed Starr Creek Trail.

Bicycle Storage

The County does not have specific bicycle parking requirements for wineries; however, the project should provide bicycle parking consistent with the requirements for the specific uses outlined in Article 86 of the County of Sonoma Code of Ordinances, which states that one bicycle parking space should be provided for every five required automobile parking spaces. With a proposed supply of 58 permanent vehicle parking spaces for normal daily visitation, parking for 12 bicycles is needed. As proposed, the project would provide bicycle parking for up to 25 bikes.

Finding – Due to the rural and agricultural nature of the study area, it is reasonable that there are no facilities providing pedestrian access to the site. There are also currently no formal bicycle facilities directly serving the project site; however, bicycle access is adequate and would be improved in the future with the implementation of the planned facilities. Parking facilities to secure up to 25 bicycles would be provided by the project and would be adequate to accommodate the current and future demand.

Transit

There are no transit facilities serving the site; however, there is limited potential demand for transit, so this is considered an acceptable condition.

Finding – While there are no transit facilities serving the project site, there is also no anticipated need for such service.

Access and Circulation

Site Access

The winery will be accessed via a new dedicated driveway at the northwest corner of the property. The existing driveway at the northeast corner, between the existing residence and the proposed winery, would be limited to use by employees.

Sight Distance

At driveways, a substantially clear line of sight should be maintained between the driver of a vehicle waiting on the driveway and the driver of an approaching vehicle. Sight distances along Starr Road at the project driveway were evaluated based on stopping sight distance criteria contained in *A Policy on Geometric Design on Highways and Streets* published by American Association of State Highway and Transportation Officials (AASHTO). Sight distance was measured from a 3.5-foot height at the location of the driver on the minor road to a 3.5-foot object height in the center of the approaching lane of the major road. Set-back on the crossroad was 14.5 feet, measured from the edge of the traveled way.

Based on a posted speed limit of 35 mph, the minimum stopping sight distance needed is 250 feet. There are existing fences that run along the property boundaries on both sides of the project driveway. A driver stopped at the project driveway and set back 14.5-feet from the edge of traveled way has a clear line of sight through the wire mesh fence, approximately 500 feet to the west where eastbound travelling vehicles would be driving down the sloping segment of Starr Road. It is noted that the project fence can obscure sight lines to the west where an eastbound approaching vehicle would be approximately 200 to 350 feet from the driveway; however, the approaching vehicle traveling on Starr Road would have clear sight lines to the driveway and of anyone exiting it.

Similarly, sight distance to the east from a 14.5-foot setback is obstructed by the project fence. The existing critical sight triangles are shown on an exhibit provided in Appendix D.

Finding – Sight distances from a 14.5-foot setback on the project driveway are obstructed by the project fence and are inadequate for the posted speed limit.

Recommendation – To improve sight distance from the driveway in both directions along Starr Road, the project fences should be moved back so that they do not interfere with the critical sight triangles. It is noted that the project applicant has agreed to move the fence line upon approval of the Use Permit.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on Starr Road at the project driveway was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as a more recent update of the methodology developed by the Washington State Department of Transportation. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes to determine the need for a left-turn pocket based on safety issues. Future plus Project plus Event weekday evening peak hour volumes as well as safety criteria were evaluated. Based on these conditions, which are representative of the highest number of project-generated trips and therefore worst-case conditions, a left-turn lane is not warranted on Starr Road at the project driveway. A copy of the warrant analysis is provided in Appendix E.

Site Circulation

The AutoTURN application of AutoCAD was used to evaluate the adequacy of on-site firetruck access for the proposed site plan layout. The results are provided in Appendix E.

Finding – Based on the review performed, it is anticipated that site circulation would operate acceptably.

Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient for the anticipated parking demand during harvest conditions and during events. The project site as proposed would provide 72 standard parking spaces for winery visitors and employees, six of which are ADA accessible spaces, and an additional 50 temporary parking spaces for a total of 122 marked spaces.

The maximum number of parking spaces that would be needed on-site to accommodate employees and visitors during a 200-person agriculture promotional event was estimated based on the County's standard vehicle occupancies of one employee or 2.5 visitors per vehicle. Based on these operational parameters, during a 200-person event, a total of 104 parking spaces would be needed, including 80 for guests, ten for event staff, and 14 for winery employees. Therefore, the total parking supply of 122 spaces at the winery is more than sufficient to meet the anticipated parking demand for the largest event.

Finding – The proposed parking supply is adequate for typical daily operation and for the anticipated peak demand during a 200-person event.

Conclusions and Recommendations

Conclusions

- The proposed project is expected to generate an average of 75 trips per day during harvest conditions, including 18 weekday p.m. peak hour trips and 19 trips during the midday peak hour on weekends.
- The largest proposed agricultural promotional event would have 200 attendees and would be expected to generate 80 trip-ends before and after the event.
- Under Existing conditions, the study intersections operate acceptably at LOS A during both peak periods and they would be expected to continue operating at these levels with the addition of project and event-generated traffic.
- Under anticipated future volumes, the study intersections are expected to continue operating acceptably at LOS A or B overall during both peak hours and upon the addition of project and event-related trips.
- There are currently no pedestrian facilities near the project site; however, due to the rural and agricultural nature of the study area, it would be reasonable to assume there would not be any pedestrian travel, and therefore, no facilities are needed.
- Similarly, the lack of transit service is not anticipated to result in a negative impact due to the lack of demand for such services.
- Existing Class II bike lanes on Reiman Lane, Windsor Road, and Shiloh Road along with planned future bicycle facilities would provide adequate bicycle access to the site.
- The proposed supply of 25 bicycle parking spaces is adequate.
- Sight distance from and to a 14.5-foot setback from the edge of traveled way at the project driveway along Starr Road is obstructed by the existing project fence. Despite this partial obstruction, sight lines are adequate at the project driveway to allow drivers to safely enter Starr Road.
- A left-turn lane is not warranted on Starr Road at the project driveway.
- The proposed parking supply of 72 permanent spaces and 50 temporary spaces is adequate to accommodate demand during typical daily activity and during the largest on-site agriculture promotional event.

Recommendations

- The project fences near the project driveway should be moved back to provide adequate sight distance to vehicles traveling on Starr Road.

Study Participants and References

Study Participants

Principal in Charge	Dalene J. Whitlock, PE, PTOE
Assistant Engineer	Kevin Rangel, EIT
Assistant Planner	Andre Huff
Graphics	Alex Scrobonia
Editing/Formatting	Hannah Yung-Boxdell
Report Review	Dalene J. Whitlock, PE, PTOE

References

2013 Collision Data on California State Highways, California Department of Transportation, 2016

A Policy on Geometric Design of Highways and Streets, 6th Edition, American Association of State Highway and Transportation Officials, 2011

California Manual on Uniform Traffic Control Devices for Streets and Highways, California Department of Transportation, 2014

Guide for the Preparation of Traffic Impact Studies, California Department of Transportation, 2002

Guidelines for Traffic Impact Studies, County of Sonoma, 2016

Highway Capacity Manual, Transportation Research Board, 2010

Highway Design Manual, 6th Edition, California Department of Transportation, 2017

Intersection Channelization Design Guide, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985

Sonoma County General Plan 2020, County of Sonoma, 2013

Sonoma County Municipal Code, Municipal Code Corporation, 2017

Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol, 2012-2017

Town of Windsor 2040 General Plan: Revised Public Review Draft, Town of Windsor, 2018

Windsor Bicycle & Pedestrian Master Plan, Sonoma County Transportation Authority, 2014

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Appendix A

Collision Rate Calculations

Intersection Collision Rate Calculations

Bricoleur Vineyards TIS

Intersection # 1: Starr Road & Reiman Lane

Date of Count: Tuesday, March 06, 2018

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
ADT: 1900
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Tee
Control Type: 4 Way Stop
Area: Rural

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{1 \times 1{,}000{,}000}{1{,}900 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.29 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.36 c/mve**	**12.5%**	**31.3%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 2: Windsor Road & Shiloh Road

Date of Count: Tuesday, March 06, 2018

Number of Collisions: 4
Number of Injuries: 1
Number of Fatalities: 0
ADT: 7500
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Rural

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{4 \times 1{,}000{,}000}{7{,}500 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.29 c/mve**	**0.0%**	**25.0%**
Statewide Average*	**0.16 c/mve**	**1.7%**	**39.2%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

Bricoleur Vineyards TIS

Intersection # 3: Mark West Station Road & Starr Road

Date of Count: Tuesday, March 06, 2018

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
ADT: 760
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Rural

$$\text{collision rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x 365 Days per Year x Number of Years}}$$

$$\text{collision rate} = \frac{0 \times 1{,}000{,}000}{760 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.16 c/mve**	**1.7%**	**39.2%**

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Appendix B

Intersection Turning Movement Counts

National Data & Surveying Services Intersection Turning Movement Count

Location: Starr Rd & Reiman Ln
City: Windsor
Control:

Project ID: 18-08082-001
Date: 3/6/2018

Total

NS/EW Streets:	Starr Rd				Starr Rd				Reiman Ln				Reiman Ln				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	5	2	0	9	5	0	0	0	0	0	0	2	0	13	0	36
4:15 PM	0	6	2	0	12	1	0	0	0	0	0	0	7	0	19	0	47
4:30 PM	0	6	4	0	11	6	0	0	0	0	0	0	3	0	18	0	48
4:45 PM	0	3	7	0	12	4	0	0	0	0	0	0	4	0	18	0	48
5:00 PM	0	6	3	0	13	4	0	0	0	0	0	0	5	0	12	0	43
5:15 PM	0	4	4	0	9	4	0	0	0	0	0	0	3	0	24	0	48
5:30 PM	0	2	1	0	15	2	0	0	0	0	0	0	4	0	17	0	41
5:45 PM	0	2	3	0	7	2	0	0	0	0	0	0	5	0	7	0	26
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	34	26	0	88	28	0	0	0	0	0	0	33	0	128	0	337
APPROACH %'s :	0.00%	56.67%	43.33%	0.00%	75.86%	24.14%	0.00%	0.00%					20.50%	0.00%	79.50%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	19	18	0	45	18	0	0	0	0	0	0	15	0	72	0	187
PEAK HR FACTOR :	0.000	0.792	0.643	0.000	0.865	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.750	0.000	0.974
		0.925				0.926									0.806		

National Data & Surveying Services Intersection Turning Movement Count

Location: Windsor Rd & Shiloh Rd
City: Windsor
Control:

Project ID: 18-08082-002
Date: 3/6/2018

Total

NS/EW Streets:	Windsor Rd				Windsor Rd				Shiloh Rd				Shiloh Rd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	17	18	0	47	10	0	0	0	0	0	0	23	0	68	0	183
4:15 PM	0	20	13	0	34	8	0	0	0	0	0	0	25	0	61	0	161
4:30 PM	0	29	29	0	36	9	0	0	0	0	0	0	19	0	59	0	181
4:45 PM	0	16	14	0	44	11	0	0	0	0	0	0	15	0	79	0	179
5:00 PM	0	15	18	0	27	10	0	0	0	0	0	0	18	0	81	0	169
5:15 PM	0	18	10	0	41	9	0	0	0	0	0	0	20	0	92	0	190
5:30 PM	0	13	19	0	45	21	0	0	0	0	0	0	16	0	80	0	194
5:45 PM	0	9	11	0	48	13	0	0	0	0	0	0	27	0	87	0	195
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	137	132	0	322	91	0	0	0	0	0	0	163	0	607	0	1452
APPROACH %'s :	0.00%	50.93%	49.07%	0.00%	77.97%	22.03%	0.00%	0.00%					21.17%	0.00%	78.83%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	55	58	0	161	53	0	0	0	0	0	0	81	0	340	0	748
PEAK HR FACTOR :	0.000	0.764	0.763	0.000	0.839	0.631	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.924	0.000	0.959
		0.856				0.811									0.923		

National Data & Surveying Services Intersection Turning Movement Count

Location: Starr Rd & Mark West Station Rd
City: Windsor
Control:

Project ID: 18-08082-003
Date: 3/6/2018

Total

NS/EW Streets:	Starr Rd				Starr Rd				Mark West Station Rd				Mark West Station Rd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	2	0	1	0	3	3	0	0	0	5	2	0	16
4:15 PM	0	0	0	0	1	0	0	0	4	11	0	0	0	11	1	0	28
4:30 PM	0	0	0	0	1	0	1	0	0	8	0	0	0	4	2	0	16
4:45 PM	0	0	0	0	4	0	0	0	2	4	0	0	0	0	2	0	12
5:00 PM	0	0	0	0	1	0	2	0	4	8	0	0	0	3	2	0	20
5:15 PM	0	0	0	0	1	0	3	0	1	5	0	0	0	3	0	0	13
5:30 PM	0	0	0	0	0	0	0	0	1	4	0	0	0	6	1	0	12
5:45 PM	0	0	0	0	1	0	1	0	2	3	0	0	0	3	3	0	13
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	11	0	8	0	17	46	0	0	0	35	13	0	130
APPROACH %'s :					57.89%	0.00%	42.11%	0.00%	26.98%	73.02%	0.00%	0.00%	0.00%	72.92%	27.08%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	7	0	3	0	10	31	0	0	0	18	7	0	76
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.438	0.000	0.375	0.000	0.625	0.705	0.000	0.000	0.000	0.409	0.875	0.000	0.679
						0.625				0.683				0.521			

National Data & Surveying Services Intersection Turning Movement Count

Location: Starr Rd & Reiman Ln
City: Windsor
Control:

Project ID: 18-08082-001
Date: 2018-03-10

Total

NS/EW Streets:	Starr Rd				Starr Rd				Reiman Ln				Reiman Ln				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
1:00 PM	0	1	2	0	9	2	0	0	0	0	0	0	3	0	7	0	24
1:15 PM	0	4	3	0	6	5	0	0	0	0	0	0	4	0	8	0	30
1:30 PM	0	7	4	0	9	2	0	0	0	0	0	0	1	0	5	0	28
1:45 PM	0	3	1	0	4	10	0	0	0	0	0	0	2	0	6	0	26
2:00 PM	0	2	2	0	11	2	0	0	0	0	0	0	4	0	8	0	29
2:15 PM	0	1	4	0	6	1	0	0	0	0	0	0	3	0	10	0	25
2:30 PM	0	1	0	0	5	2	0	0	0	0	0	0	2	0	7	0	17
2:45 PM	0	7	3	0	8	2	0	0	0	0	0	0	3	0	5	0	28
3:00 PM	0	5	6	0	10	5	0	0	0	0	0	0	6	0	5	0	37
3:15 PM	0	5	2	0	5	5	0	0	0	0	0	0	2	0	9	0	28
3:30 PM	0	4	3	0	11	4	0	0	0	0	0	0	2	0	10	0	34
3:45 PM	0	4	2	0	7	1	0	0	0	0	0	0	1	0	4	0	19
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	44	32	0	91	41	0	0	0	0	0	0	33	0	84	0	325
APPROACH %'s :	0.00%	57.89%	42.11%	0.00%	68.94%	31.06%	0.00%	0.00%					28.21%	0.00%	71.79%	0.00%	
PEAK HR :	02:45 PM - 03:45 PM																TOTAL
PEAK HR VOL :	0	21	14	0	34	16	0	0	0	0	0	0	13	0	29	0	127
PEAK HR FACTOR :	0.000	0.750	0.583	0.000	0.773	0.800	0.000	0.000	0.000	0.000	0.000	0.000	0.542	0.000	0.725	0.000	0.858
		0.795				0.833								0.875			

National Data & Surveying Services Intersection Turning Movement Count

Location: Windsor Rd & Shiloh Rd
City: Windsor
Control:

Project ID: 18-08082-002
Date: 2018-03-10

Total

NS/EW Streets:	Windsor Rd				Windsor Rd				Shiloh Rd				Shiloh Rd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
1:00 PM	0	6	14	0	39	11	0	0	0	0	0	0	13	0	39	0	122
1:15 PM	0	12	7	0	29	14	0	0	0	0	0	0	23	0	35	0	120
1:30 PM	0	10	12	0	42	9	0	0	0	0	0	0	17	0	40	0	130
1:45 PM	0	7	12	0	37	10	0	0	0	0	0	0	15	0	43	0	124
2:00 PM	0	7	21	0	40	7	0	0	0	0	0	0	17	0	36	0	128
2:15 PM	0	15	15	0	44	10	0	0	0	0	0	0	12	0	38	0	134
2:30 PM	0	6	15	0	33	7	0	0	0	0	0	0	13	0	30	0	104
2:45 PM	0	9	12	0	39	5	0	0	0	0	0	0	17	0	41	1	124
3:00 PM	0	9	13	0	39	7	0	0	0	0	0	0	19	0	42	0	129
3:15 PM	0	6	12	0	42	10	0	0	0	0	0	0	17	0	38	0	125
3:30 PM	0	7	12	0	30	7	0	0	0	0	0	0	12	0	44	0	112
3:45 PM	0	8	15	0	40	10	0	0	0	0	0	0	13	0	44	0	130
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	102	160	0	454	107	0	0	0	0	0	0	188	0	470	1	1482
APPROACH %'s :	0.00%	38.93%	61.07%	0.00%	80.93%	19.07%	0.00%	0.00%					28.53%	0.00%	71.32%	0.15%	
PEAK HR :	01:30 PM - 02:30 PM																TOTAL
PEAK HR VOL :	0	39	60	0	163	36	0	0	0	0	0	0	61	0	157	0	516
PEAK HR FACTOR :	0.000	0.650	0.714	0.000	0.926	0.900	0.000	0.000	0.000	0.000	0.000	0.000	0.897	0.000	0.913	0.000	0.963
		0.825				0.921								0.940			

National Data & Surveying Services Intersection Turning Movement Count

Location: Starr Rd & Mark West Station Rd
City: Windsor
Control:

Project ID: 18-08082-003
Date: 2018-03-10

Total

NS/EW Streets:	Starr Rd				Starr Rd				Mark West Station Rd				Mark West Station Rd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
1:00 PM	0	0	0	0	0	0	0	0	1	5	0	0	0	10	3	0	19
1:15 PM	0	0	0	0	0	0	1	0	5	3	0	0	0	6	1	0	16
1:30 PM	0	0	0	0	1	0	0	0	0	3	0	0	0	1	0	0	5
1:45 PM	0	0	0	0	2	0	3	0	1	2	0	0	0	6	2	0	16
2:00 PM	0	0	0	0	0	0	2	0	1	3	0	0	0	8	1	0	15
2:15 PM	0	0	0	0	0	0	2	0	3	1	0	0	0	8	0	0	14
2:30 PM	0	0	0	0	3	0	1	0	2	1	0	0	0	2	2	0	11
2:45 PM	0	0	0	0	1	0	1	0	2	2	0	0	0	6	2	0	14
3:00 PM	0	0	0	0	2	0	0	0	3	5	0	0	0	5	2	0	17
3:15 PM	0	0	0	0	1	0	2	0	1	4	0	0	0	7	2	0	17
3:30 PM	0	0	0	0	2	0	0	0	2	3	0	0	0	3	0	0	10
3:45 PM	0	0	0	0	3	0	2	0	2	4	0	0	0	7	1	0	19
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	15	0	14	0	23	36	0	0	0	69	16	0	173
APPROACH %'s :					51.72%	0.00%	48.28%	0.00%	38.98%	61.02%	0.00%	0.00%	0.00%	81.18%	18.82%	0.00%	
PEAK HR :	03:00 PM - 04:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	8	0	4	0	8	16	0	0	0	22	5	0	63
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.667	0.000	0.500	0.000	0.667	0.800	0.000	0.000	0.000	0.786	0.625	0.000	0.829
					0.600				0.750				0.750				

Appendix C

Intersection Level of Service Calculations

Generated with PTV VISTRO

Version 5.00-05

Intersection Level Of Service Report

Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.109

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	19	18	45	18	15	72
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	22	21	52	21	17	84
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	5	13	5	4	22
Total Analysis Volume [veh/h]	23	22	54	22	18	87
Pedestrian Volume [ped/h]	0		0		0	

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Version 5.00-05

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	916	832	964
Degree of Utilization, x	0.05	0.09	0.11

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.15	0.30	0.37
95th-Percentile Queue Length [ft]	3.87	7.52	9.14
Approach Delay [s/veh]	7.13	7.76	7.19
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.37		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	15.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.231

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	55	58	161	53	81	340
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	67	187	61	94	394
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	17	49	16	24	103
Total Analysis Volume [veh/h]	67	70	195	64	98	410
Pedestrian Volume [ped/h]	0		0		0	

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Version 5.00-05

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.13	0.00	0.23	0.43
d_M, Delay for Movement [s/veh]	0.00	0.00	7.88	0.00	15.79	11.06
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.44	0.44	2.21	2.21
95th-Percentile Queue Length [ft/ln]	0.00	0.00	11.10	11.10	55.17	55.17
d_A, Approach Delay [s/veh]	0.00		5.93		11.97	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	8.43					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.014

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	7	3	10	31	18	7
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	3	12	36	21	8
Peak Hour Factor	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	4	13	8	3
Total Analysis Volume [veh/h]	12	4	18	53	31	12
Pedestrian Volume [ped/h]	0		0		0	

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Version 5.00-05

Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.27	8.55	7.33	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.36	1.36	0.58	0.58	0.00	0.00
d_A, Approach Delay [s/veh]	9.09		1.86		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.13					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.079

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	21	14	34	16	13	29
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	16	39	19	15	34
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	5	11	6	4	10
Total Analysis Volume [veh/h]	28	19	45	22	17	40
Pedestrian Volume [ped/h]	0		0		0	

Generated with PTV VISTRO

Version 5.00-05

Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	929	852	944
Degree of Utilization, x	0.05	0.08	0.06

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.16	0.26	0.19
95th-Percentile Queue Length [ft]	3.99	6.39	4.81
Approach Delay [s/veh]	7.08	7.59	7.06
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.27		
Intersection LOS	A		

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4/27/2018

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Version 5.00-05

Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	13.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.167

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	39	60	163	36	61	157
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	70	189	42	71	182
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	18	49	11	18	47
Total Analysis Volume [veh/h]	47	73	197	44	74	190
Pedestrian Volume [ped/h]	0		0		0	

Generated with PTV VISTRO

Version 5.00-05

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.13	0.00	0.17	0.19
d_M, Delay for Movement [s/veh]	0.00	0.00	7.83	0.00	13.74	9.33
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.44	0.44	0.72	0.72
95th-Percentile Queue Length [ft/ln]	0.00	0.00	11.05	11.05	18.04	18.04
d_A, Approach Delay [s/veh]	0.00		6.40		10.57	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	6.93					
Intersection LOS	B					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	8	4	8	16	22	5
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	5	9	19	26	6
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	2	3	6	8	2
Total Analysis Volume [veh/h]	11	6	11	23	31	7
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.00	8.53	7.31	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.36	1.36	0.43	0.43	0.00	0.00
d_A, Approach Delay [s/veh]	8.83		2.36		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.59					
Intersection LOS	A					

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Future Volume Growth Factor Derivation

Bricoleur Winery TIS

Starr Road and Reiman Lane	Year	PM Volume
"Furnessed" Model Projections	2040	275
Adjusted Counts	2017	217
Growth Factor	1.27	

Peak Period: Weekend PM

Intersection: Starr Road/Reiman Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Existing	0	0	0	15	0	34	0	24	16	39	19	0
Volume Future	0	0	0	19	0	43	0	30	20	50	24	0

Windsor Road and Shiloh Road	Year	PM Volume
"Furnessed" Model Projections	2040	1127
Adjusted Counts	2017	867
Growth Factor	1.30	

Peak Period: Weekend PM

Intersection: Windsor Road/Shiloh Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Existing	0	0	0	71	0	182	0	45	70	189	42	0
Volume Future	0	0	0	92	0	237	0	59	91	246	55	0

Intersection: Starr Road/Mark West Station Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Wkdy PM Existing	12	36	0	0	21	8	0	0	0	8	0	3	
Wknd PM Existing	9	19	0	0	26	6	0	0	0	9	0	5	
Wkdy PM Future	16	47	0	0	27	10	0	0	0	10	0	4	*
Wknd PM Future	12	25	0	0	34	8	0	0	0	12	0	7	*

*Growth factor of 1.3 applied

Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.142

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	23	22	76	23	17	114
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	22	76	23	17	114
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	6	20	6	4	29
Total Analysis Volume [veh/h]	24	23	78	24	18	118
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	895	817	955
Degree of Utilization, x	0.05	0.12	0.14

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.17	0.43	0.50
95th-Percentile Queue Length [ft]	4.15	10.65	12.40
Approach Delay [s/veh]	7.25	8.04	7.40
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.60		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	23.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.390

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	84	70	304	91	94	484
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	84	70	304	91	94	484
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	18	79	24	24	126
Total Analysis Volume [veh/h]	88	73	317	95	98	504
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.22	0.00	0.39	0.54
d_M, Delay for Movement [s/veh]	0.00	0.00	8.27	0.00	23.12	12.70
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.81	0.81	3.40	3.40
95th-Percentile Queue Length [ft/ln]	0.00	0.00	20.35	20.35	84.96	84.96
d_A, Approach Delay [s/veh]	0.00		6.36		14.40	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	9.61					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	7	3	10	31	18	7
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	4	16	47	27	10
Peak Hour Factor	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	6	17	10	4
Total Analysis Volume [veh/h]	15	6	24	69	40	15
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.02	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.53	8.63	7.36	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.03	0.03	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.87	1.87	0.78	0.78	0.00	0.00
d_A, Approach Delay [s/veh]	9.27		1.90		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.20					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.102

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	21	14	34	16	13	29
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.27	1.27	1.27	1.27	1.27	1.27
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	20	50	24	19	43
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	6	15	7	6	13
Total Analysis Volume [veh/h]	35	23	58	28	22	50
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	916	842	926
Degree of Utilization, x	0.06	0.10	0.08

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.20	0.34	0.25
95th-Percentile Queue Length [ft]	5.06	8.50	6.31
Approach Delay [s/veh]	7.20	7.76	7.22
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.43		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	16.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.282

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	39	60	163	36	61	157
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	59	91	246	55	92	237
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	24	64	14	24	62
Total Analysis Volume [veh/h]	61	95	256	57	96	247
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.18	0.00	0.28	0.26
d_M, Delay for Movement [s/veh]	0.00	0.00	8.08	0.00	16.74	9.97
Movement LOS	A	A	A	A	C	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.62	0.62	1.17	1.17
95th-Percentile Queue Length [ft/ln]	0.00	0.00	15.60	15.60	29.15	29.15
d_A, Approach Delay [s/veh]	0.00		6.61		11.86	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.56					
Intersection LOS	C					

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Intersection Level Of Service Report

Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	8	4	8	16	22	5
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	7	12	25	34	8
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	2	4	8	10	2
Total Analysis Volume [veh/h]	14	8	14	30	41	10
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.16	8.61	7.34	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.81	1.81	0.58	0.58	0.00	0.00
d_A, Approach Delay [s/veh]	8.96		2.33		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.56					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.4
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.116

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	19	18	45	18	15	72
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	11	0	1	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	32	52	22	22	84
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	8	13	6	6	22
Total Analysis Volume [veh/h]	24	33	54	23	23	87
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	925	828	950
Degree of Utilization, x	0.06	0.09	0.12

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.20	0.31	0.39
95th-Percentile Queue Length [ft]	4.91	7.67	9.79
Approach Delay [s/veh]	7.15	7.80	7.29
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.42		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	16.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.241

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	55	58	161	53	81	340
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	11	0	0	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	67	198	61	94	399
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	17	52	16	24	104
Total Analysis Volume [veh/h]	67	70	206	64	98	416
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.14	0.00	0.24	0.44
d_M, Delay for Movement [s/veh]	0.00	0.00	7.90	0.00	16.19	11.12
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.47	0.47	2.26	2.26
95th-Percentile Queue Length [ft/ln]	0.00	0.00	11.85	11.85	56.55	56.55
d_A, Approach Delay [s/veh]	0.00		6.03		12.09	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	8.51					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.014

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	7	3	10	31	18	7
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	3	12	36	21	8
Peak Hour Factor	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	4	13	8	3
Total Analysis Volume [veh/h]	12	4	18	53	31	12
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.27	8.55	7.33	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.36	1.36	0.58	0.58	0.00	0.00
d_A, Approach Delay [s/veh]	9.09		1.86		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.13					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.081

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	21	14	34	16	13	29
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	8	0	1	9	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	24	39	20	24	34
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	7	11	6	7	10
Total Analysis Volume [veh/h]	29	28	45	23	28	40
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	935	844	916
Degree of Utilization, x	0.06	0.08	0.07

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.19	0.26	0.24
95th-Percentile Queue Length [ft]	4.86	6.55	6.00
Approach Delay [s/veh]	7.10	7.63	7.24
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.34		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	14.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.171

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	39	60	163	36	61	157
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	8	0	0	9
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	70	197	42	71	191
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	18	51	11	18	50
Total Analysis Volume [veh/h]	47	73	205	44	74	199
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.14	0.00	0.17	0.20
d_M, Delay for Movement [s/veh]	0.00	0.00	7.85	0.00	14.02	9.38
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.46	0.46	0.76	0.76
95th-Percentile Queue Length [ft/ln]	0.00	0.00	11.59	11.59	19.10	19.10
d_A, Approach Delay [s/veh]	0.00		6.46		10.63	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.03					
Intersection LOS	B					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	8	4	8	16	22	5
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	5	9	19	26	6
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	2	3	6	8	2
Total Analysis Volume [veh/h]	11	6	11	23	31	7
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.00	8.53	7.31	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.36	1.36	0.43	0.43	0.00	0.00
d_A, Approach Delay [s/veh]	8.83		2.36		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.59					
Intersection LOS	A					

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4/27/2018

Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	8.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.209

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	19	18	45	18	15	72
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	11	0	9	77	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	32	52	30	94	84
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	8	13	8	24	22
Total Analysis Volume [veh/h]	24	33	54	31	97	87
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	880	795	883
Degree of Utilization, x	0.06	0.11	0.21

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.21	0.36	0.78
95th-Percentile Queue Length [ft]	5.19	8.95	19.59
Approach Delay [s/veh]	7.38	8.07	8.15
Approach LOS	A	A	A
Intersection Delay [s/veh]	8.00		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	17.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.241

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	55	58	161	53	81	340
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	11	0	0	77
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	67	198	61	94	471
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	17	52	16	24	123
Total Analysis Volume [veh/h]	67	70	206	64	98	491
Pedestrian Volume [ped/h]	0		0		0	

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Version 5.00-05

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.14	0.00	0.24	0.52
d_M, Delay for Movement [s/veh]	0.00	0.00	7.90	0.00	17.14	12.07
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.47	0.47	3.05	3.05
95th-Percentile Queue Length [ft/ln]	0.00	0.00	11.85	11.85	76.33	76.33
d_A, Approach Delay [s/veh]	0.00		6.03		12.92	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	9.27					
Intersection LOS	C					

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Intersection Level Of Service Report

Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.014

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	7	3	10	31	18	7
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	3	12	36	21	8
Peak Hour Factor	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	4	13	8	3
Total Analysis Volume [veh/h]	12	4	18	53	31	12
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.27	8.55	7.33	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.36	1.36	0.58	0.58	0.00	0.00
d_A, Approach Delay [s/veh]	9.09		1.86		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.13					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.7
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.129

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	21	14	34	16	13	29
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	44	0	5	45	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	60	39	24	60	34
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	17	11	7	17	10
Total Analysis Volume [veh/h]	34	70	45	28	70	40
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	934	818	854
Degree of Utilization, x	0.11	0.09	0.13

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.37	0.29	0.44
95th-Percentile Queue Length [ft]	9.37	7.33	11.04
Approach Delay [s/veh]	7.34	7.83	7.84
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.66		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	15.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.196

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	39	60	163	36	61	157
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	44	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	45	70	233	42	71	227
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	18	61	11	18	59
Total Analysis Volume [veh/h]	47	73	243	44	74	236
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.17	0.00	0.20	0.24
d_M, Delay for Movement [s/veh]	0.00	0.00	7.94	0.00	15.41	9.58
Movement LOS	A	A	A	A	C	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.56	0.56	0.95	0.95
95th-Percentile Queue Length [ft/ln]	0.00	0.00	14.10	14.10	23.74	23.74
d_A, Approach Delay [s/veh]	0.00		6.72		10.97	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.44					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.0
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	8	4	8	16	22	5
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	5	9	19	26	6
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	2	3	6	8	2
Total Analysis Volume [veh/h]	11	6	11	23	31	7
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.00	8.53	7.31	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.36	1.36	0.43	0.43	0.00	0.00
d_A, Approach Delay [s/veh]	8.83		2.36		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.59					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.150

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	23	22	76	23	17	114
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	11	0	1	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	33	76	24	22	114
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	9	20	6	6	29
Total Analysis Volume [veh/h]	25	34	78	25	23	118
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	903	813	942
Degree of Utilization, x	0.07	0.13	0.15

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.21	0.43	0.53
95th-Percentile Queue Length [ft]	5.23	10.83	13.14
Approach Delay [s/veh]	7.26	8.07	7.49
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.65		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	23.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.406

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	84	70	304	91	94	484
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	11	0	0	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	84	70	315	91	94	489
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	18	82	24	24	127
Total Analysis Volume [veh/h]	88	73	328	95	98	509
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.23	0.00	0.41	0.55
d_M, Delay for Movement [s/veh]	0.00	0.00	8.30	0.00	23.81	12.79
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.85	0.85	3.47	3.47
95th-Percentile Queue Length [ft/ln]	0.00	0.00	21.29	21.29	86.68	86.68
d_A, Approach Delay [s/veh]	0.00		6.44		14.57	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	9.71					
Intersection LOS	C					

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Intersection Level Of Service Report

Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	7	3	10	31	18	7
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	4	16	47	27	10
Peak Hour Factor	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	6	17	10	4
Total Analysis Volume [veh/h]	15	6	24	69	40	15
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.02	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.53	8.63	7.36	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.03	0.03	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.87	1.87	0.78	0.78	0.00	0.00
d_A, Approach Delay [s/veh]	9.27		1.90		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.20					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.104

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	21	14	34	16	13	29
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.27	1.27	1.27	1.27	1.27	1.27
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	8	0	1	9	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	31	28	50	25	28	43
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	8	15	7	8	13
Total Analysis Volume [veh/h]	36	33	58	29	33	50
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	920	836	903
Degree of Utilization, x	0.07	0.10	0.09

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.24	0.35	0.30
95th-Percentile Queue Length [ft]	6.07	8.69	7.57
Approach Delay [s/veh]	7.23	7.81	7.39
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.50		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	17.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.291

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	39	60	163	36	61	157
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	8	0	0	9
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	59	91	254	55	92	246
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	24	66	14	24	64
Total Analysis Volume [veh/h]	61	95	265	57	96	256
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.19	0.00	0.29	0.27
d_M, Delay for Movement [s/veh]	0.00	0.00	8.11	0.00	17.14	10.03
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.65	0.65	1.22	1.22
95th-Percentile Queue Length [ft/ln]	0.00	0.00	16.21	16.21	30.48	30.48
d_A, Approach Delay [s/veh]	0.00		6.67		11.97	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.66					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	8	4	8	16	22	5
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	7	12	25	34	8
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	2	4	8	10	2
Total Analysis Volume [veh/h]	14	8	14	30	41	10
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.16	8.61	7.34	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.81	1.81	0.58	0.58	0.00	0.00
d_A, Approach Delay [s/veh]	8.96		2.33		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.56					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	8.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.244

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	23	22	76	23	17	114
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	11	0	9	77	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	33	76	32	94	114
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	9	20	8	24	29
Total Analysis Volume [veh/h]	25	34	78	33	97	118
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	857	779	880
Degree of Utilization, x	0.07	0.14	0.24

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.22	0.50	0.96
95th-Percentile Queue Length [ft]	5.53	12.38	23.98
Approach Delay [s/veh]	7.51	8.38	8.41
Approach LOS	A	A	A
Intersection Delay [s/veh]	8.27		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	25.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.406

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	84	70	304	91	94	484
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	11	0	0	77
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	84	70	315	91	94	561
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	18	82	24	24	146
Total Analysis Volume [veh/h]	88	73	328	95	98	584
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.23	0.00	0.41	0.63
d_M, Delay for Movement [s/veh]	0.00	0.00	8.30	0.00	25.40	14.39
Movement LOS	A	A	A	A	D	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.85	0.85	4.68	4.68
95th-Percentile Queue Length [ft/ln]	0.00	0.00	21.29	21.29	117.04	117.04
d_A, Approach Delay [s/veh]	0.00		6.44		15.97	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	10.75					
Intersection LOS	D					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	7	3	10	31	18	7
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	4	16	47	27	10
Peak Hour Factor	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	6	17	10	4
Total Analysis Volume [veh/h]	15	6	24	69	40	15
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.01	0.02	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.53	8.63	7.36	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.03	0.03	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.87	1.87	0.78	0.78	0.00	0.00
d_A, Approach Delay [s/veh]	9.27		1.90		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.20					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 1: Starr Road/Reiman Lane

Control Type:	All-way stop	Delay (sec / veh):	7.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.146

Intersection Setup

Name	Starr Road		Starr Road		Reiman Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	10.00	10.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Starr Road		Reiman Lane	
Base Volume Input [veh/h]	21	14	34	16	13	29
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.27	1.27	1.27	1.27	1.27	1.27
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	44	0	5	45	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	64	50	29	64	43
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	19	15	8	19	13
Total Analysis Volume [veh/h]	41	74	58	34	74	50
Pedestrian Volume [ped/h]	0		0		0	

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Intersection Settings

Lanes

Capacity per Entry Lane [veh/h]	917	809	847
Degree of Utilization, x	0.13	0.11	0.15

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.43	0.38	0.51
95th-Percentile Queue Length [ft]	10.71	9.58	12.80
Approach Delay [s/veh]	7.49	8.02	7.98
Approach LOS	A	A	A
Intersection Delay [s/veh]	7.82		
Intersection LOS	A		

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Intersection Level Of Service Report
Intersection 2: Windsor Road/Shiloh Road

Control Type:	Two-way stop	Delay (sec / veh):	19.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.333

Intersection Setup

Name	Windsor Road		Windsor Road		Shiloh Road	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Windsor Road		Windsor Road		Shiloh Road	
Base Volume Input [veh/h]	39	60	163	36	61	157
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	44	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	59	91	290	55	92	282
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	24	76	14	24	73
Total Analysis Volume [veh/h]	61	95	302	57	96	294
Pedestrian Volume [ped/h]	0		0		0	

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Version 5.00-05

Intersection Settings

Priority Scheme	Free		Free		Stop	
Flared Lane					Yes	
Storage Area [veh]	0		0		5	
Two-Stage Gap Acceptance					No	
Number of Storage Spaces in Median	0		0		0	

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.21	0.00	0.33	0.31
d_M, Delay for Movement [s/veh]	0.00	0.00	8.21	0.00	19.02	10.34
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.76	0.76	1.48	1.48
95th-Percentile Queue Length [ft/ln]	0.00	0.00	19.08	19.08	36.89	36.89
d_A, Approach Delay [s/veh]	0.00		6.90		12.47	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	8.11					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 3: Starr Road/Mark West Station Road

Control Type:	Two-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	10.00	10.00	10.00	10.00	10.00	10.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Starr Road		Mark West Station Road		Mark West Station Road	
Base Volume Input [veh/h]	8	4	8	16	22	5
Base Volume Adjustment Factor	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.30	1.30	1.30	1.30	1.30	1.30
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	7	12	25	34	8
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	2	4	8	10	2
Total Analysis Volume [veh/h]	14	8	14	30	41	10
Pedestrian Volume [ped/h]	0		0		0	

Generated with PTV VISTRO
Version 5.00-05

Intersection Settings

Priority Scheme	Stop		Free		Free	
Flared Lane	No					
Storage Area [veh]	0		0		0	
Two-Stage Gap Acceptance	No					
Number of Storage Spaces in Median	0		0		0	

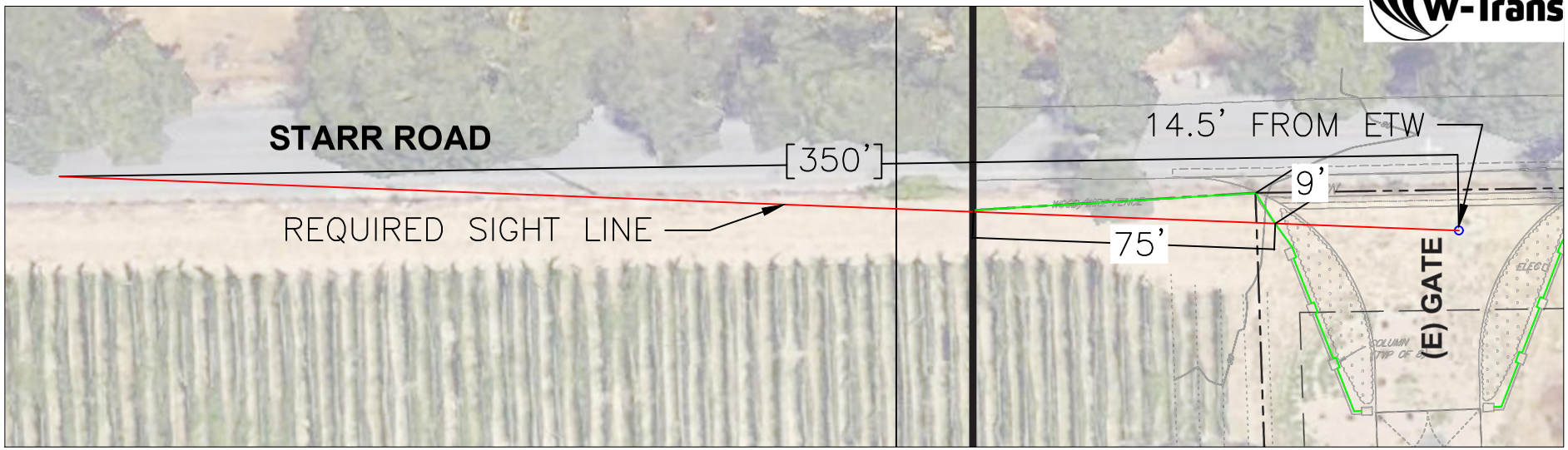
Movement, Approach, & Intersection Results

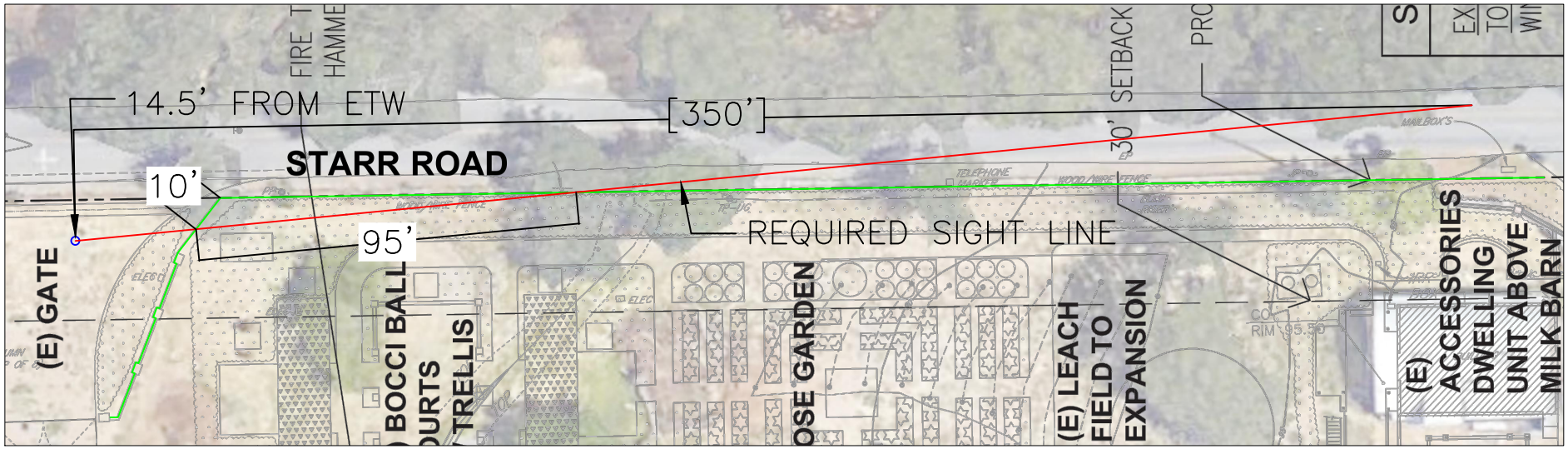
V/C, Movement V/C Ratio	0.02	0.01	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.16	8.61	7.34	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.81	1.81	0.58	0.58	0.00	0.00
d_A, Approach Delay [s/veh]	8.96		2.33		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.56					
Intersection LOS	A					

Bricoleur Winery TIS
Wknd PM F + P + 200-Person Event
W-Trans
4/27/2018

Appendix D

Sight Distance Exhibit


STARR ROAD
[350']
REQUIRED SIGHT LINE
14.5' FROM ETW
9'
75'
(E) GATE


14.5' FROM ETW
[350']
STARR ROAD
10'
95'
REQUIRED SIGHT LINE
30' SETBACK
(E) GATE
(E) LEACH FIELD TO EXPANSION
(E) ACCESSORIES DWELLING UNIT ABOVE MILK BARN

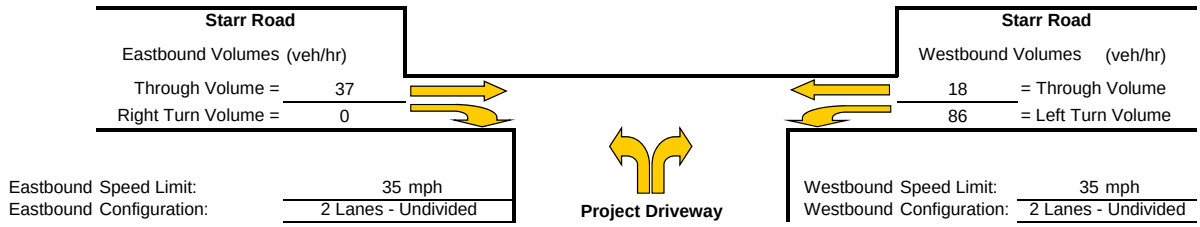
Appendix E

Left Turn Lane Warrants and AutoTURN Exhibit

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Starr Road/Project Driveway
Study Scenario: Weekday PM Future + Project + 200-Person Event

Direction of Analysis Street: East/West
Cross Street Intersects: From the South



Eastbound Speed Limit: 35 mph
Eastbound Configuration: 2 Lanes - Undivided

Westbound Speed Limit: 35 mph
Westbound Configuration: 2 Lanes - Undivided

Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	1050.1
Advancing Volume	Va =	37
If AV<Va then warrant is met		No

Right Turn Lane Warranted: **NO**

Eastbound Right Turn Taper Warrants
(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

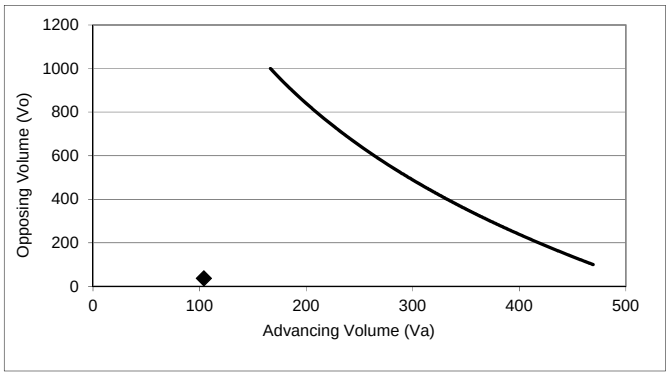
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	37
If AV<Va then warrant is met		-

Right Turn Taper Warranted: **NO**

Westbound Left Turn Lane Warrants

Percentage Left Turns	%lt	82.7 %
Advancing Volume Threshold	AV	505 veh/hr

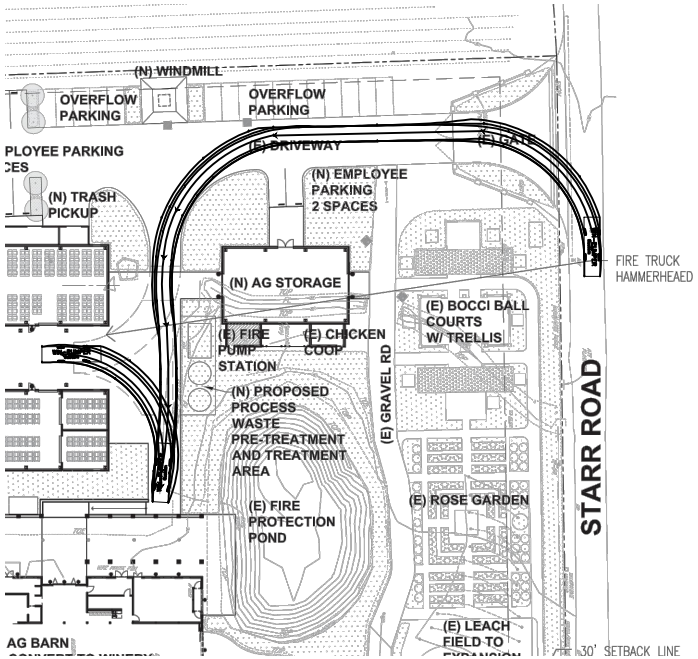
If AV<Va then warrant is met



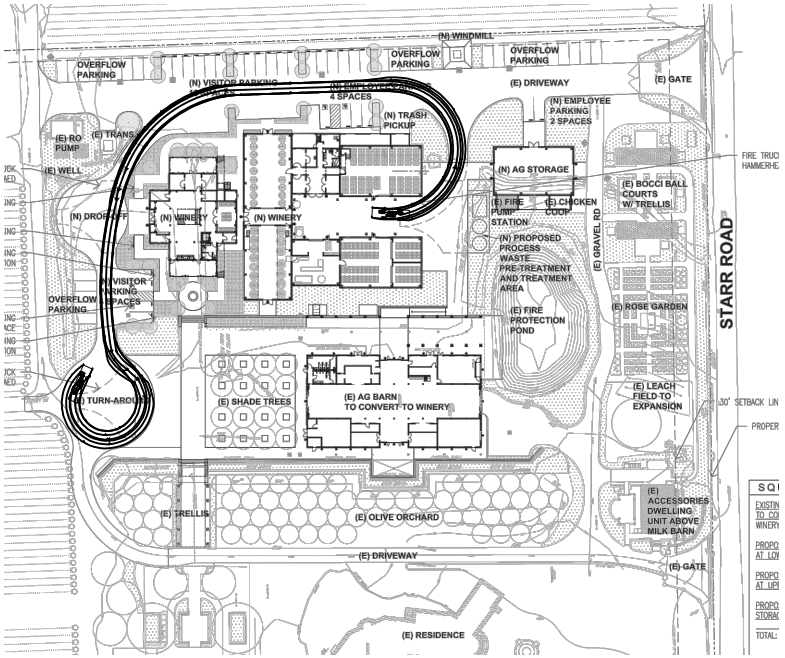
◆ Study Intersection
Two lane roadway warrant threshold for: 35 mph
Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

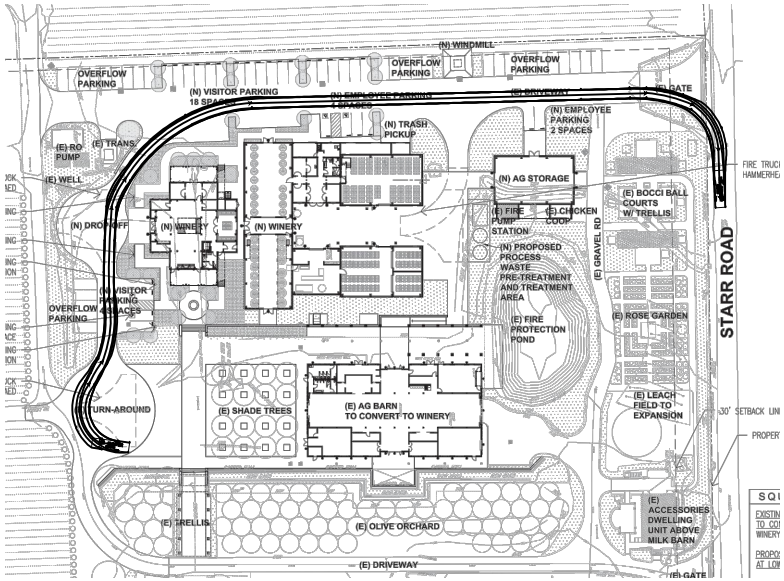
Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements* , January 1997.
The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.



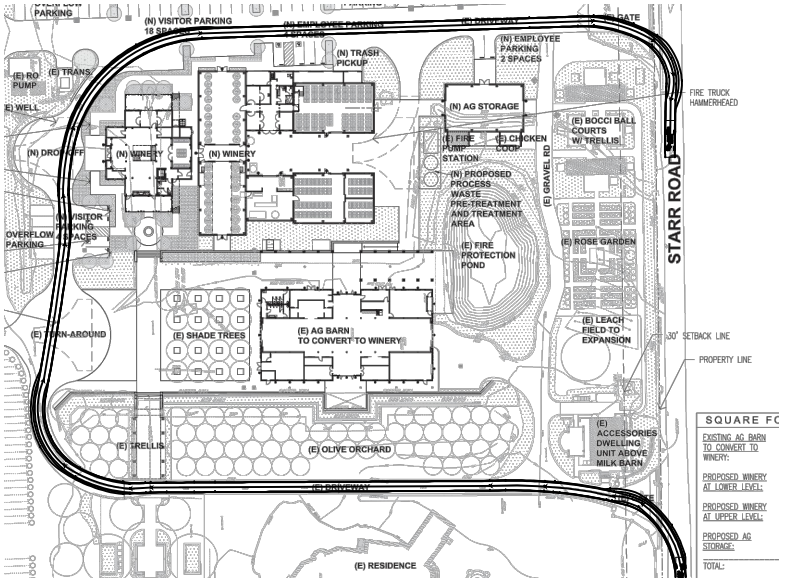
Inbound from Primary Gate



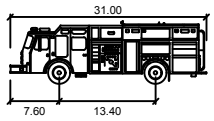
Fire Pump Station to Southeast Turn-Around



Outbound from Southeast Turn-Around



Inbound from Secondary Gate and Outbound to Primary Gate



WIN-PUMPER

	feet
Width	: 8.20
Track	: 8.20
Lock to Lock Time	: 6.0
Steering Angle	: 26.4

Bricoleur Winery TIS

AutoTURN Exhibit - Fire Truck Access

SOX630

4/11/18