City of St. Helena
Planning Department
1480 Main Street, St. Helena, CA 94574
(707) 967-2792

INITIAL STUDY OF ENVIRONMENTAL SIGNIFICANCE

PROJECT NAME: Redmon Ranch Winery

CITY FILE NUMBER: PL15-051

SITE ADDRESS: 867 Dowdell Lane

APN: 009-580-009

GENERAL PLAN: Industrial

ZONING: Industrial

APPLICANT: Tom Redmon
1620 Sylvaner
St. Helena, CA 94574
(707) 326 2838

PROJECT DESCRIPTION

Overview. The proposed project includes the construction of two new structures, the conversion of existing buildings, including the conversion of an historic barn, as well as on and off-site infrastructure improvements to accommodate a 24,000 gallon per year production winery at the Redmon Ranch, located on the south side of Dowdell Lane east of Main Street (State Route 29) at 867 Dowdell Lane. The site contains approximately 0.84 acres of land and is located in the (I) Industrial zoning district. Proposed improvements would include renovating the on-site barn and converting it to a production winery in a manner consistent with the U.S. Secretary of Interior standards for the rehabilitation of a historic structure. No tastings or tours are proposed as part of project operations. A commercial kitchen is also proposed on the site and would be leased by a licensed catering company catering company which would be separate from the proposed winery operation. Two existing non-conforming dwellings on the site would remain.

Other proposed improvements would include street improvements along the south side of Dowdell Lane, a new paved parking lot on the east side of the project site, on-site water quality features and utility extensions from Dowdell Lane (water and wastewater) to serve proposed uses.

Approval of a Demolition Permit and Design Review is required to construct the proposed project and approval of a Use Permit by the City of St. Helena is required to operate the proposed winery. The proposed commercial kitchen space is a permitted use.

Proposed buildings and uses. The applicant is proposing to convert an existing 2,915 square foot barn built in the 1890 to 1900 era to a barrel storage warehouse associated with the proposed winery. Other winery improvements would include a new 6,619 square foot, single story fermentation structure to be located on the south side of the site. A 2,436 square foot crush pad, fermentation and outdoor work area would be constructed just to the north of the fermentation structure. During wine processing, a temporary tent structure would be erected above the crush pad. Due to the historic character of the barn, the historic architect's review finds that the otherwise standard requirement for a covered crush pad area may be waived in favor of a temporary canvas cover during harvest and automatic diversion valves for directing water away from critical drainage paths.

Separate from the winery, the existing garage is would be demolished in order to make way for the proposed 2,381 square foot commercial kitchen on the southeast corner of the site. The commercial kitchen would be for the preparation

of catered foods to be sold off-site or served to the public off-site. There will be no customers for consuming food on the project site.

An existing main dwelling and a secondary dwelling on the site generally fronting on Dowdell Lane, would remain on the site and may be occupied by the owners, by employees of the winery or commercial kitchen workers or any other residential dweller.

Two other non-historic storage sheds would be relocated on the site and used for dry storage. A number of existing accessory structures on the site would be repurposed to support future winery and/or commercial kitchen uses. The total amount of building area included in the project would be 15,916 square feet.

Parking and Access. Seven parking spaces would be provided on the site, including two handicapped-accessible spaces. Parking lots would be constructed according to City standards and could be include a mix of surfaces, including gravel, asphalt or concrete. Four driveways would be constructed along Dowdell Lane to allow for employees and service trucks to support proposed uses.

A public sidewalk would be constructed along the south side of Dowell Lane, consistent with City design standards.

The City of St. Helena will require the installation of on-site bicycle racks.

Site operations*.* The proposed Redmon Winery would be limited to wine production, bottling, a laboratory space, office, employee lounge and storage. No public tastings, tours or similar events would be allowed. During harvest, the winery would generally operate from 6 am to 6 pm. Hours would be reduced during the non-harvest period. It is anticipated that the winery would have two full-time and two part-time employees plus administrative staff.

The on-site commercial kitchen would be used by a licensed catering company and would be a separate entity not associated with the proposed winery. Hours of operation of the kitchen would be from 6 a.m. to 6 p.m most months of the year.

Existing on-site dwellings could be occupied by live-work units, similar to any other residential use.

Building design features. The existing historic barn on the site would be restored pursuant to Secretary of Interior Standards for the rehabilitation of a historic structure and reused as a barrel storage building. The barn would be refinished with a combination of horizontal lap and board and batten siding, a rusticated corrugated metal roof and would be approximately 26 feet in height. Although interior seismic retrofitting would be undertaken to meet California Building Code standards, these upgrades would not be visible outside of the building. The commercial kitchen would be finished with board and batten siding with a stone veneer base, a composition shingle roof and would be approximately 21 feet in height. The fermentation structure would be open on all sides and supported by a steel frame with steel columns. No significant design changes are proposed to the two existing dwellings on the site, although interior improvements may be made to allow a live-work occupancy.

Landscaping. The applicant proposes to maintain the existing landscape plantings on the site and to maintain a number of ornamental trees on the site, including a number of olive trees. All existing trees would remain. Existing planter areas along the south side of Dowdell Lane would be retained as would a number of turf areas on the site. Large un-built portions of the site would be graveled. Future on-site plantings would be drip-irrigated with remote automatic controllers to minimize water use and evaporation. Planting beds would also be mulched for the same purpose. The project would be conditioned on meeting the State of California Model Water Efficient Landscape Ordinance.

Signs and lighting. One or more small business identification signs would be installed along the Dowdell Lane street frontage. Similarly, building and parking lot lighting would be installed for safety. The number, type, location and design of future signs and lighting fixtures will be subject to City requirements and the Use Permit and Design Review process. Approval; of a Sign Permit by the City is also required.

Utility services. Potable water service to support on-site residential, commercial kitchen and non-winery uses would be provided by the City of St. Helena. Similarly, wastewater service would to be extended to the project site by the City of St. Helena. Water to support wine production and associated uses would be provided by a private on-site well. Wastewater would be piped to the City's wastewater treatment plant southeast of the site. Wastewater will not be permitted to contain wine production byproducts and a sewer sampling manhole will be installed at or near the unit cleanout per City Standards. The project is anticipated to generate approximately 2,066 gallons of wastewater per day and the applicant will be required to obtain a Wastewater Discharge Permit from the Department of Public Works as specified in St Helena Municipal Code Section 13.24.50.

The project applicant will be required by the City to ensure that stormwater runoff is collected and transported off of the site in a manner consistent with City of St. Helena engineering standards and requirements. The project applicant will also be required to comply with City of St. Helena surface water quality requirements during building demolition, grading and construction through implementation of an erosion control plan. Long-term water quality features would also be installed as required by the City of St. Helena.

Requested Land Use Entitlements. The applicant has requested approval of a Demolition Permit, Use Permit, and Design Review by the City of St. Helena Planning Commission. These applications will be considered at a public hearing by the Commission.

The project site is also required to be annexed to the St. Helena Municipal Sewer District No. 1.

ENVIRONMENTAL SETTING

The project site contains 0.84 acres of land located on the south side of Dowdell Lane in the southern portion of St. Helena, east of the intersection of Main Street (State Route 29) and Dowdell Lane. The street address for the site is 867 Dowdell Lane and the Assessor's Parcel Number is 009-580-009.

Exhibit 1 depicts the location of the project site in context with nearby features, including nearby roadways.

The site contains several older structures, including a main and secondary dwelling unit, a historic barn structure containing approximately 2,752 square feet, a garage and other smaller out buildings. The site is known as the "Redmon Ranch."

Surrounding properties have been developed for a variety of uses, including commercial and light industrial uses to the north and west (including an automotive repair shop and Crocker & Starr winery); agriculture land planted to vineyards to the east; and a combination of vineyards and light industrial uses to the south.

GENERAL PLAN AND ZONING

The City of St. Helena General Plan provides the vision for the community's natural and built environment through a series of goals and policies. To ensure that this desired vision is realized, the General Plan has been designed to be internally consistent and cross-referenced with other documents, including the City's Zoning Ordinance which guides, controls and regulates future growth and development in a sound and orderly manner.

The project site is designated for Industrial uses in the St. Helena General Plan and is zoned as "(I): Industrial."

REQUIRED DISCRETIONARY ACTIONS

Approval of the proposed project will require the following discretionary actions:

Demolition Permit, Use Permit and Design Review by the St Helena Planning Commission.

OTHER PUBLIC AGENCY REVIEW

In addition to the required City entitlements identified above, there are no other agencies that have discretionary authority to undertake or approve all or some portion of the proposed project (and which are considered Responsible Agencies under CEQA).

An encroachment permit would be required for work with the Dowdell Lane right-of-way from the St. Helena Public Works Department. The City has requested that the project site be annexed into the St. Helena Municipal Sewer District No. 1. This action would be accomplished by the City and would not require action by the Napa County Local Agency Formation Commission.

The Napa County Planning, Building and Environmental Services Department would be required to approve the commercial kitchen.

DOCUMENTS INCORPORATED BY REFERENCE

CEQA Guidelines Section 15150 recognizes the desirability of reducing the volume of documentation necessary for environmental review and authorizes incorporation by reference any portion of relevant documents that provide general background to the environmental document. As such, this Initial Study incorporates the following documents, which were reviewed as part of the analysis of certain topical sections provided herein:

- City of St. Helena, General Plan Policy Document (1993 and amendments through 2015).
- City of St. Helena, Zoning Ordinance (1994 and amendments through 2016).

Additional documents not reflected in this section are identified and analyzed within the Initial Study. These documents are available for review at the City of St. Helena Planning Department, 1480 Main Street, St. Helena, CA 94574 (707) 967-2792.

PURPOSE OF INITIAL STUDY

The fundamental premise on which CEQA is based is that environmental protection can be achieved through informing decision-makers and the public about a project's potential environmental effects and identifying ways to reduce them. As a public disclosure document, an Initial Study must identify all effects on the environment resulting from a project and indicate the manner in which these effects can be mitigated or avoided to a less-than-significant level. Where it is uncertain that a significant effect on the environment may occur, or where a significant effect is found to exist but cannot be mitigated to a less-than-significant level, an Environmental Impact Report (EIR) must be prepared.

ENVIRONMENTAL PROCEDURES AND CHECKLIST

This Initial Study presents a preliminary evaluation of the potential environmental impacts resulting from the project. The Initial Study was prepared in accordance with the California Environmental Quality Act (Public Resources Code Section 21000-21178.1) and the Guidelines for Implementation of the California Environmental Quality Act (Chapter 3, Title 14, California Code of Regulations (*CEQA Guidelines*)). This Initial Study considers all aspects of the proposed project, as required by Section 15063(a) (1) of the CEQA Guidelines[1].

The Environmental Checklist provided below, as contained in Appendix G of the CEQA Guidelines, was utilized to focus this Initial Study on the environmental factors that may be impacted or further impacted by implementation of the proposed project. Following each of the topical areas presented in the Environmental Checklist, a brief discussion is presented regarding the topical environment setting, the relevance of the proposed project to the topical environment setting, any and all potential impacts within the topical area and, as appropriate and mitigation measures necessary to reduce potentially significant impacts to a less-than-significant level.

SUMMARY OF ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below identify "Potentially Significant Impacts" affected by this project, as indicated by the checklist on the following pages. However, as demonstrated in this Initial Study in the applicable topical sections mitigations

[1] Section 15063(a) (1) of the CEQA Guidelines requires that all phases of project planning, implementation, and operation must be considered in the Initial Study of the project.

are proposed for incorporation into the project that will reduce or eliminate these impacts to "Less Than Significant" or "No Impact."

[X] Aesthetics	[ ] Agricultural/Forestry Resources	[X] Air Quality
[ ] Biological Resources	[X] Cultural Resources	[X] Geology/Soils
[X] Hazards & Hazardous Materials	[X] Hydrology/Water Quality	[ ] Land Use/Planning
[ ] Mineral Resources	[ ] Noise	[ ] Population/Housing
[ ] Public Services	[ ] Recreation	[ ] Transportation/Traffic
[X] Utilities/Service Systems	[ ] Mandatory Findings of Significance	

DETERMINATION:

On the basis of information found in this initial evaluation, the City of St. Helena finds that:

[ ] The proposed project COULD NOT have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared.

[✓] Although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because revisions in the project have been made or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

[ ] The proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

[ ] The proposed project MAY have a significant effect(s) on the environment, but at least one effect: 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards; and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

[ ] Although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

A Notice of Mitigated Negative Declaration has been prepared and posted for the period of August 12 – September 1, 2016.

[ ] DE MINIMIS IMPACT FINDING: finds that there is no evidence before the City that the proposed project will have the potential for an adverse effect on wildlife resources or the habitat upon which wildlife depends; therefore, on the basis of substantial evidence, the presumption of adverse effect is rebutted. A Certificate of Fee Exemption will be completed and filed with the Notice of Determination for the project.

[ ] Based on the information in this Initial Study, wildlife resources or the habitat upon which they depend may be impacted; therefore, even if the environmental effect is satisfactorily mitigated, the project is subject to the California Department of Fish and Wildlife Environmental Fee.

Noah Housh, Planning Director
City St. Helena

Date: August 12, 2016

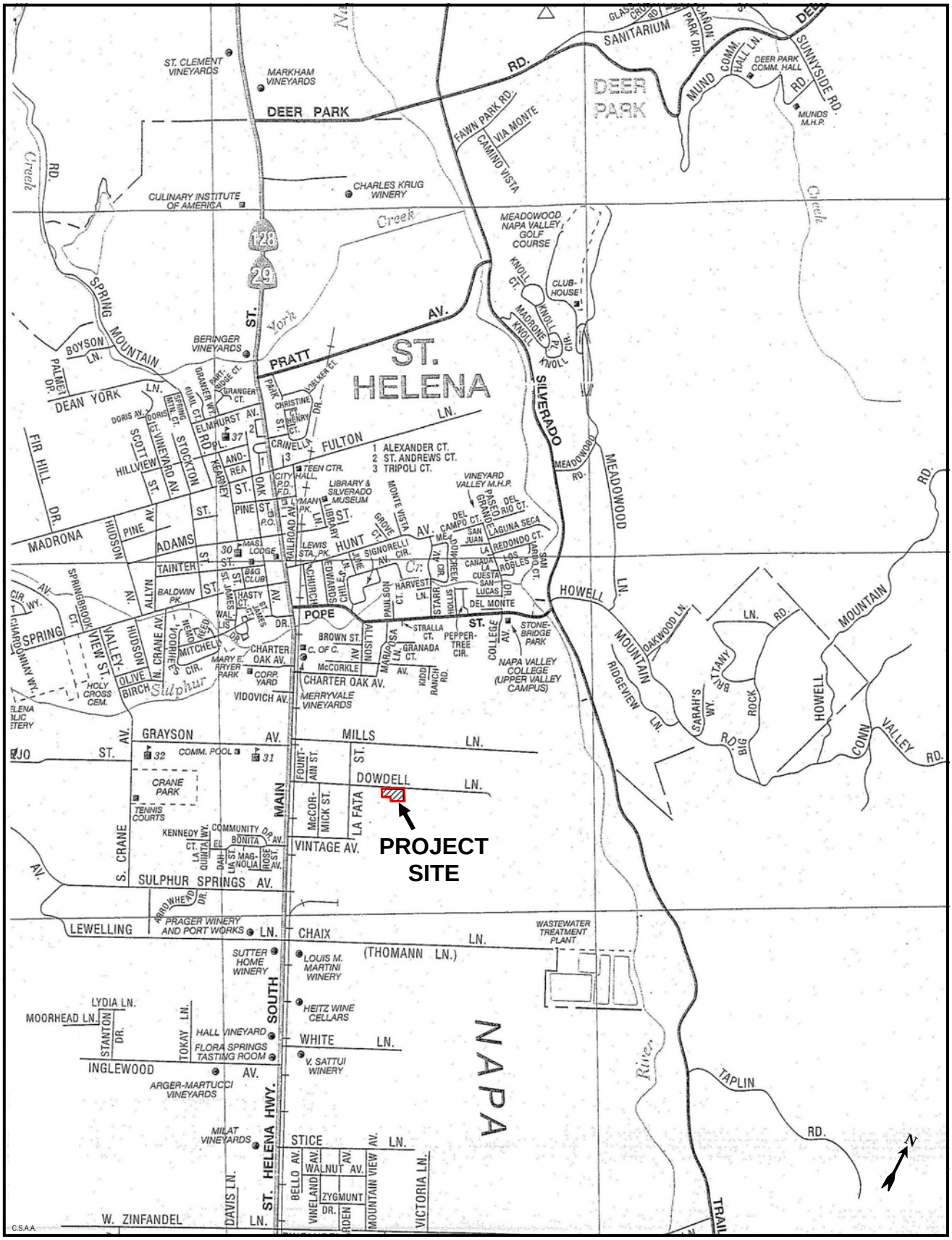


Exhibit 1

PROJECT LOCATION

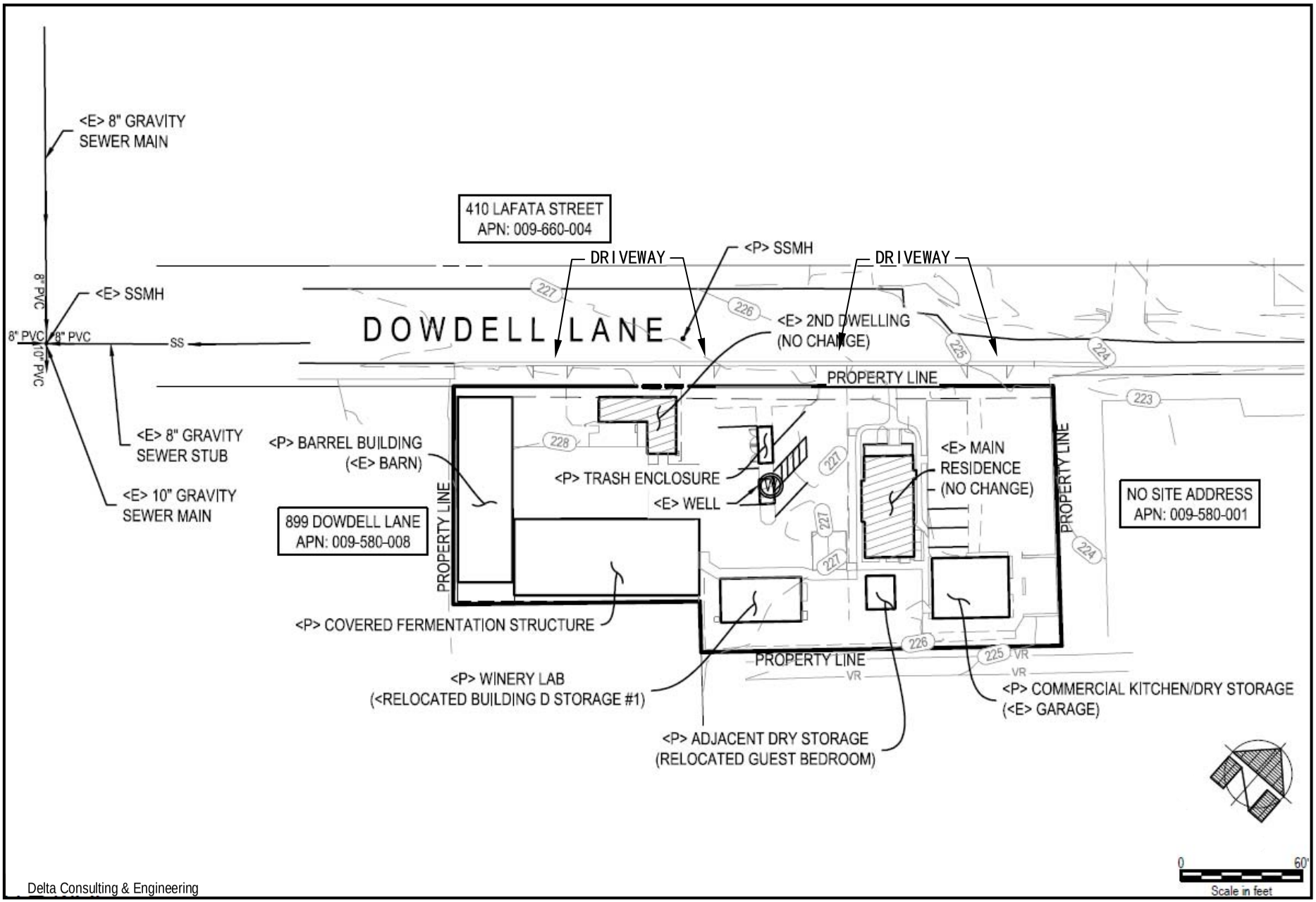


Exhibit 2

PROPOSED SITE PLAN

ENVIRONMENTAL CHECKLIST

This Environmental Checklist Form has been provided to assist in the analysis of the environmental issues associated with the project. The following standard rules, generated from the CEQA Guidelines, apply when completing and reviewing the Environmental Checklist Form:

1. *A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).*

2. *All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*

3. *Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.*

4. *"Negative Declaration: Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section 17, "Earlier Analysis," may be cross-referenced).*

5. *Earlier analysis may be used where an effect has been adequately analyzed in an earlier EIR or Negative Declaration. In this case, a brief discussion should identify the following:*
   a. *Earlier Analysis Used. Identify and state where they are available for review.*
   b. *Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.*
   c. *Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.*

6. *Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.*

7. *Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.*

8. *This checklist is only a suggested form, and lead agencies are free to use different formats. However, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.*

9. *The analysis of each issue should identify: (a) the significance criteria or threshold used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to a level of less-than-significant.*

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
1. AESTHETICS. *Would the project:*				
a. Have a substantial adverse effect on a scenic vista?				✓
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?				✓
c. Substantially degrade the existing visual character or quality of the site and its surroundings?				✓
d. Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?		✓		

Discussion:

a. No parks, playgrounds, scenic vistas or other public gathering places are located on the project site that provide views of nearby vineyards, hillsides or other scenic features. No impacts would occur with respect to this topic.

b) No officially designated state scenic highways are located adjacent to or in the vicinity of the project site. State Route 29 (Main Street), is considered an eligible state scenic highway (it is not officially designated) and is located approximately 800 to 1000 feet west of the project site (http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/). No impacts would result with respect to this topic.

c. The site is in a designated industrial area currently developed with two dwellings, a large historic barn building, a garage and other small ancillary buildings. Uses to the north and west of the project site include light industrial and a winery complex under construction. Proposed improvements on the property to create a winery and commercial kitchen would include construction of a crush pad, relocation of small buildings on the site and demolition of one small building. However, proposed uses would generally be located in existing buildings that have been repurposed to accommodate proposed uses. The visual character and quality of the site would be consistent and compatible with adjacent light industrial uses and would not be substantially changed as a result of the proposed project. No impact would occur with respect to this topic.

d. It is likely that new exterior lighting fixtures would be proposed for the winery complex. Lighting could result in increased light and glare for nearby properties, motorists on Dowdell Lane and others. Therefore, this impact is considered potentially significant.

Mitigation Measure:

1. Consistent with Municipal Code Section 17.124.060(D), new exterior light fixtures shall be equipped with cut-off-lenses and directed downward so as to minimize off-site light and glare from the site and shall not be more than 15 feet in height.

Conclusion:

The project would not change the visual character of the project site or significantly degrade the visual character or quality of the site, since it is located within a developed light industrial area of the community. With implementation of the Mitigation Measure listed above, impacts to aesthetics would be considered ***less-than-significant.***

2. AGRICULTURAL & FORESTRY RESOURCES. *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?				✓
b. Conflict with existing zoning for agricultural use or a Williamson Act Contract?				✓
c. Conflict with existing zoning for, or cause rezoning of forestland (as defined by PRC Sec. 12220(g), timberland (as defined in PRC Sec. 4526), or timberland zoned Timberland Production (as defined in PRC Sec. 51104 (g)?				✓
d. Result in the loss of forest land or conversion of forest land to non-forest use?				✓

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
e. Involve other changes in the existing environment that, due to their location or nature, could result in conversion of farmland to a non-agricultural use or conversion of forestland to a non-forest use?				✓

Discussion:

a. The site is located in a developed area designated for industrial uses and is not listed on the Napa County Important Farmlands Map as Prime farmland or as Farmland of Statewide Importance as published by the State Department of Conservation (2014); therefore, there is no impact.

b. The site is zoned for "Industrial" uses and is not under a Williamson Act contract. No impact would result.

c,d. The project site is located in a developed area designated for industrial uses and developed with a barn, residences and related accessory buildings. No significant stands of trees are present on the site. Approval and construction of the project would not result any impacts to zoning for forestland or timberland.

e. The project site is currently developed as documented above and approval and construction of the project would not result in conversion of farmland or timberland to either a non-agricultural or non-forest use.

Conclusion:

The proposed project will result in ***no impact*** on agricultural resources and no mitigation measures are required.

3. AIR QUALITY & GREENHOUSE GAS EMISSIONS. [Significance criteria established by the BAAQMD may be relied upon to make the following determinations] *Would the project:*				
a. Conflict with or obstruct implementation of the applicable air quality plan?				✓
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		✓		
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)?			✓	
d. Expose sensitive receptors to substantial pollutant concentrations?			✓	
e. Create objectionable odors or dust affecting a substantial number of people?			✓	
f. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment or conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			✓	

Discussion:

a. The City of St. Helena and other communities are located within the Bay Area Air Quality Management District (BAAQMD). The BAAQMD has adopted a regional Clean Air Plan to preserve and enhance regional air quality consistent with State and Federal air quality standards and requirements. The Clean Air Plan is based on build-out of the respective adopted general plans of each city and county on the District. Since no amendment to the existing Industrial General Plan land use designation has been requested, there would be no conflict with or obstruction of the applicable Clean Air Plan. No impact would result with respect to this topic.

b. A project will normally have a significant environmental effect if it will violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. The City of St. Helena is located within the greater San Francisco Bay Area air basin. The BAAQMD is responsible for administering provisions of Federal and State clean air requirements, which include ongoing monitoring, enforcement and policy and program development within the region. Pursuant to the BAAQMD Guidelines, total emissions that exceed the daily thresholds of significance shall be considered to have a potentially significant impact. The threshold of significance is defined as 80 lbs/day of Reactive Organic Gases (ROG), 80 lbs/day of Nitrogen Oxides

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

(NO_x), and 80 lbs/day of Small Particulate Matter (PM_{10}). Concern for regional air quality effects are addressed by monitoring these ROGs. One of the pollutants of greatest concern is carbon monoxide, which can be elevated as a result of increased levels of traffic and congestion along streets and at intersections associated with a proposed project.

General Air Quality Effects – The City of St. Helena has generally good air quality due to relatively limited development within much of the Napa Valley, minimal heavy industrial uses and due to breezes that flow through the valley in the summer evenings when air quality within the region is at its worst; however, the greater San Francisco Bay Area air basin is located in a Federally non-attainment status for 1-hour ozone and in a State non-attainment status for 1-hour ozone and particulate matter. Although the City of St. Helena is a minor contributor, it is an incremental contributor to the quality of the regional air basin and the proposed project's contributions are considered minor.

Traffic Related Emissions – The proposed project is not anticipated to generate a significant number of new vehicle trips. Any change in the level of carbon monoxide resulting from the additional vehicle trips would be minor (see Section 16 of this Initial Study) within the larger air basin and would be consistent with the industrial use envisioned in the City's General Plan and implementing ordinances, resulting in a less-than-significant impact.

Construction Generated Dust – The project could result in temporary, short-term air quality impacts from dust generated by equipment and vehicles operating on the site during construction. This is a potentially significant impact when considering the cumulative effect on the greater San Francisco Bay Area air basin. The effects of construction activities, particularly relating to graded soils to construct the recreational improvements, would result in increased settling of dust on horizontal surfaces and locally elevated PM_{10} (particulate matter) within or adjacent to the project site. The actual level of emissions from construction-related impacts could vary greatly depending on a number of factors. Therefore, the BAAQMD's approach to CEQA analyses of construction impacts emphasizes implementation of effective and comprehensive control measures, rather than detailed quantification of emissions. BAAQMD guidelines establish that, if the following recommended control measures are implemented, the cumulative impact on air pollutant emissions from construction activities would be considered less-than-significant on the greater air basin.

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard where transport of these materials occurs.
- Pave, apply water, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep adjacent public streets daily with water sweepers if visible soil material is carried onto streets.

These guidelines are recommended to be implemented as part of the project to minimize exposure to temporary, short-term construction-related pollutants. Consistent with the BAAQMD guidelines, the mitigation measures listed below are proposed to ensure maintenance of air quality standards, including PM_{10} in the atmosphere, and where implemented in this proposed project will result in a less-than-significant impact on the air quality within the region.

c. The size of the proposed project and the limited number of normal, operational vehicular trips to and from the site (as documented in Section 16 of this Initial Study) would not contribute a cumulatively considerable amount of air pollutants to the region. There would be no impact with respect to this topic.

d. The project site has been developed for service commercial/light industrial/residential uses for a number of years and the proposed expansion of the winery operation would represent a continuance of this type of use. The proposed use would include delivery of grapes and trucking of cases of wine by trucks, many of which would be diesel-powered. However, diesel truck operations would only occur during a portion of the year. Other winery production operations would be electrically powered. Therefore, this impact would be less-than-significant.

e. Although proposed winery operations, especially operation of the crush pad, would be located adjacent to a residential neighborhood to the west, actual fermentation and production operations would be conducted within an enclosed building to minimize odor effects on surrounding properties. It is anticipated that the cumulative effect of increased odors resulting from the proposed facility would blend with other winery operations the northern Napa County area so as to be less-than-significant.

f. Construction of the proposed project would add a number of additional vehicle trips to the site that would incrementally add to greenhouse gas emissions. However, Table 3-1 contained in the May 2011 Bay Area Air Quality Management District CEQA Guidelines demonstrates that light industrial uses under 121,000 square feet of floor area do not significantly contribute to greenhouse gas emissions. Although this methodology has been challenged in court, it is still the standard threshold hold commonly used by municipalities in practice. Since the proposed project contains would

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

contain square footage under this threshold, this impact would be less-than-significant**.**

Mitigation Measures:

1. All grading and construction equipment shall be shut down when not in use to ensure the project's contribution to maintaining existing ambient air quality within the vicinity of the project site and to avoid unnecessarily exposing people in the area to odors and fumes associated with such equipment.
2. Grading and excavation activities shall not occur during windy periods to avoid unnecessary exportation of dust and similar materials that can degrade air quality.
3. Exposed soil surfaces shall be sprinkled with non-potable water to retard dust and disturbed areas shall be fully landscaped upon completion of the project.
4. Any demolition materials and solid waste including broken asphalt and concrete, soils stockpiles, steel, wood and metal scraps materials, domestic waste, and similar materials shall be properly managed to prevent the accumulation of dust or similar materials that can degrade air quality. The site shall be cleaned daily and such materials shall be properly placed in dumpsters or removed from the project site and placed in a licensed landfill facility.
5. Grinding asphalt on the site, if applicable, shall be conducted in a manner that avoids degrading the ambient air quality in the area.
6. The collection of materials, such as construction debris and loose dirt, within the public right-of-way adjacent to the site shall be prohibited.
7. For the importing of materials for clean fill to the site, if needed,, trucks shall maintain adequate freeboard and their materials shall be covered to minimize release of materials into the air or on public rights-of-way.
8. To the extent practicable, reusable materials shall be recycled on site (examples: asphalt/concrete paving/etc.).

Conclusion:
Due to the fact that the project will involve minimal grading and with the above mitigation measures in place, potentially significant adverse effects on air quality resulting from this project would be reduced to a ***less-than-significant*** level.

4. BIOLOGICAL RESOURCES. *Would the proposal result in:*				
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 Game (CDFG) or U.S. Fish and Wildlife Service (USFWS)?				✓
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS?				✓
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, etc.) through direct removal, filling, hydrological interruption, or other means?				✓
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?			✓	
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				✓
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?				✓

Discussion:

a. The project site is located in a developed area designated for industrial uses and is fully developed with two residences, a barn other accessory buildings, parking areas and related improvements. Properties to the north and west are developed with light industrial land use. No special-status, candidate or sensitive species have been observed on this

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

site, nor does the site provide suitable habitat for such. No impact would result with respect to this topic.

b. No riparian habitat exists on the site since it has been developed with buildings, a parking lot and related improvements. No impacts would with respect to riparian habitat.

c. No wetlands exist on the project site and no impacts would occur with respect to this topic.

d. The project site is located in a developed area designated for industrial uses, however, it is bordered on the east and south by unfenced vineyards and no consistent fencing exists between the site and the adjacent vineyards. It is unlikely that a significant number of wildlife would traverse the site, since urban uses exist north and west of the site that would provide no continuity of wildlife corridors beyond the project site. No streams or watercourses are present on the site that would provide a fish corridor through the site. For these reasons, this impact is considered less-than-significant.

e. No significant stands of trees or other vegetation is located on the project site or proposed be removed as a result of this project. No impact would result.

f. The project site is not within the jurisdiction of any Habitat Conservation Plan or Natural Community Conservation Plan and would not impact any biological resources that would be covered by such a plan, therefore there is no impact.

Conclusion:
The proposed project will result in ***no impact*** on biological resources and no mitigation measures are required.

5. CULTURAL RESOURCES. *Would the project:*				
a. Cause a substantial adverse change in the significance of an historical resource as defined in Sec.15064.5?			✓	
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Sec. 15064.5?		✓		
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		✓		
d. Disturb any human remains, including those interred outside of formal cemeteries?		✓		

Discussion:

a. An existing barn on the project site has been deemed a historic resource by Juliana Inman, an historic architect located in Napa California. Ms. Inman prepared a report to assess the qualities of the barn building and proposed changes to incorporate the barn into the project as a barrel storage building. The Inman report is dated August 3, 2015 and is hereby incorporated by reference into this Initial Study. The Inman Report is attached as Attachment 1 to this Initial Study. The report notes that the barn was likely built between 1890 and 1900 and has been altered several times since construction. The barn retains integrity of location, setting, materials, design, feeling and association. It is therefore deemed that the barn remains a contributor to the historic fabric of the community. The relationship of the barn to the surrounding neighborhood have been deemed an important character defining aspect of the resource. The Inman report concludes that the proposed treatment of the barn, to remove more recent alterations to the structure, replace historic siding and other features where broken, lost or weathered with suitable building materials would ensure that there would be a less-than-significant impact with respect to this topic. Interior improvements would be made to add seismic retrofitting, but interior work would not be visible to passersby. All work will conform to the Secretary of the Interiors Standards for the treatment and rehabilitation of an historic structure, therefore, this impact is considered less-than-significant.

b. Although no archeological, cultural, historic or paleontological resources are known to exist on the site, there is a remote possibility that project grading and trenching activities could uncover such resources, therefore, this impact is considered potentially significant. However, with implementation of Mitigation Measure 1 below, this impact would be reduced to a less-than-significant level.

c. It remains a possibility that paleontological resources could be uncovered on the site during grading, trenching or construction, therefore, this impact is considered potentially significant. However, with implementation of Mitigation Measure 1 below, this impact would be reduced to a less-than-significant level.

d. There are no known burials present at the project site. However, the possibility exists that unknown buried remains could be uncovered during the construction phase of the project, therefore, this impact is considered potentially significant.

However, with implementation of Mitigation Measure 1 below, this impact would be reduced to a less-than-significant level.

Mitigation Measures:

1. In the event that previously unknown paleontological artifacts, human remains or archeological resources are unearthed during excavation or grading, all work within 50 feet of the discovery area shall be immediately halted pursuant to CEQA Guidelines 15064.5 (5)(e) and (f) and barricades installed surrounding the area until a qualified archeologist approved by the City is consulted to evaluate the material or object. The consultant shall determine appropriate avoidance measures to lessen the impacts in accordance with State and Federal guidelines. The developer shall comply with all recommendations of the qualified archeologist prior to commencing work in the discovery area and shall be responsible for all costs associated with these activities. In the event human remains are found, the St. Helena Police Department, County Coroner and Native American Tribal Commission shall be contacted immediately. This wording shall be included on grading and construction plans.

Conclusion:
With implementation of this mitigation measure, potential adverse effects on cultural resources resulting from this project would be reduced to a ***less-than-significant*** level.

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
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 Pub. 42)			✓	
ii) Strong seismic ground shaking?			✓	
iii) Seismic-related ground failure, including liquefaction?			✓	
iv) Landslides?				✓
b. Result in substantial soil erosion or the loss of topsoil?		✓		
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)?				✓
d. Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial risks to life or property?				✓
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				✓

Discussion:

a. The project would upgrade existing structures and add a covered fermentation structure and other small buildings that would be subject to moderate to severe ground shaking in the event of seismic event on a regional fault. The City of St. Helena is located in the greater San Francisco Bay Area, an area known for frequent seismic activity. St. Helena is surrounded by the following earthquake faults; Rodgers Creek, Maacama, West Napa, Concord-Green Valley, Cordelia and the Hunting Creek-Berryessa Faults. Geologic hazards on the proposed site are primarily limited to those caused by violent shaking from active faults which generate ground motion. The site is not located within an Alquist-Priolo Earthquake Fault Zone. Future construction will be required to meet the most current California Building Code to reduce the effects of ground shaking to a less-than-significant level. The project site and surrounding properties are relatively flat, so no impacts would result with respect to landslides.

b. Grading and trenching associated with the project could cause or accelerate soil erosion or the loss of topsoil on the project site. The effects of construction activities, including soil excavated or graded areas could result in exposed earth

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

during construction. If these conditions are not properly designed and/or monitored, this would result in a potentially significant impact. To address these issues, short-term (during construction) and long-term erosion control (after construction) methods must be in place. Mitigation to address short-term impacts include minimizing erosion of exposed soil during construction through use of approved and appropriately implemented best management practices (BMPs). Long-term water quality protection would include filtration of storm water runoff and permanent erosion control measures as required by the City of St. Helena. With implementation of the mitigation measure described below, this impact is considered less-than-significant.

c. As part of the normal and customary development process, the City of St. Helena will require the project developer to obtain a soils and geotechnical report from a California-registered geologist or recognized equivalent professional. Building and site improvements will then be required to confirm with specific recommendations included in the report to ensure no significant impacts to soil hazards will result.

d. See item "c," above.

e. The applicant proposes to connect to the City's municipal wastewater system, so there would not be any remaining use of septic systems and no impact would result.

Mitigation Measures:

1. Temporary erosion control measures, as approved by the City of St. Helena shall be placed adjacent to graded areas or stockpiled material.
2. Unless otherwise approved by the City, the project applicant shall ensure that grading or excavation activities shall be limited to the period between April 15 and October 15. No such grading or excavation shall be performed except in accordance with the approved plan and schedule. Modifications to the construction time frame may be imposed/ approved by the City based on weather and site conditions.

Conclusion:
With implementation of these mitigation measures, the effect on geology and soils is reduced to a ***less-than-significant*** level.

7. Hazards and Hazardous Materials				
a. Create a significant hazard to the public or the environment through the routing, transport, use or disposal of hazardous materials?				✓
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?		✓		
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				✓
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?				✓
e. For a project located within an airport land use plan, would the project result in a safety hazard for people residing or working in the project area?				✓
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				✓
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				✓
h. Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are				✓

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
intermixed with wild lands?				

Discussion:

a. The proposed project use would not require the transportation, use, handing or disposal of substantial quantities hazardous materials during its operational phase. Minor amounts and customary quantities of hazardous materials would likely be used during project construction, including but not limited to solvents, fuels for construction equipment, paints and similar products. However, the project contractor will be required to follow all applicable local, State, and Federal regulations to ensure the safe handling and disposal of hazardous materials and no significant hazards to the public would occur; therefore, no impact would result.

b. The project would include major updating and improvement to the historic barn structure and demolition of one or more small structures on the site. Remodeling and demolition of older buildings could release lead based paint particles and/or asbestos containing material into the atmosphere. This could be a potentially significant impact and would be reduced to a less-than-significant impact with adherence to the mitigation measure below.

c. Refer to (a) above.

d. The project site is not listed as a hazardous materials site (see: http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm) so there would be no impact with respect to this topic.

e. The project site is not within the area of an airport land use plan or within two miles of a public airport or public use airport. No impact would occur with respect to this topic.

f. The project site is not within the vicinity of a private airstrip and no impact would occur.

g. The project would not interfere with an adopted emergency response plan or emergency evacuation plan since all improvements would be located on private property owned by the applicant and no blockage of public roads or other rights-of-way would occur. Therefore, there is no impact.

h. The project site is located adjacent to an urbanized and cultivated portion of St. Helena with no significant wildlands located on or near the site that could result in a major fire hazard. Therefore, there is no impact.

Mitigation Measure:

Prior to demolition of any structure on the site, a licensed contractor shall determine the presence or absence of lead based paints or asbestos material on the site. If found in quantities at or above actionable levels as determined by the St. Helena Building Department or authorized agent, these materials shall be safely removed consistent with the Occupational Safety and Health Administration (OSHA) and other applicable standards and disposed of in an appropriate location. Necessary permits and approvals shall be secured from appropriate regulatory agencies for the activities described above.

Conclusion:

The proposed project will result in ***less-than-significant impact*** with respect to hazards or hazardous materials with adherence to the above mitigation measure.

8. HYDROLOGY AND WATER QUALITY. *Would the project:*				
a) Violate any water quality standards or waste discharge requirements?			✓	
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?		✓		
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?		✓		
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream				✓

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?				
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?		✓		
f) Otherwise substantially degrade water quality?				✓
g) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				✓
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?			✓	
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?				✓
j) Inundation by seiche, tsunami, or mudflow?				✓

Discussion:

a. The applicant proposes to remove the current septic wastewater system currently on the site and connect to the City's municipal wastewater system. Based on a project-specific technical report ("Septic Feasibility Report for the Redmon Ranch Winery" prepared by Delta Engineering dated 8/28/15), Typically, wastewater sourced from wine production is considered high-strength and disposal of winery waste into the City's system could result in a violation of the City's Waste Discharge Permit from the Regional Water Quality Control Board. This would normally be a potentially significant impact however, the St. Helena Public Works Department has indicated that the project approval would be required to comply with stringent requirements on effluent generated by the project (S. Palmer, City Engineer, 4/14/16). The proposed conditions of approval would require limitations on discharges into the sewer system, obtain a Wastewater Discharge Permit from the City, limit the quality of constituent effluents entering the wastewater system, conduct monthly sampling of effluents and a number of similar requirements intended to limit impacts of winery wastewater on the municipal system. With adherence to the conditions of approval, this impact would be less-than-significant.

b. The project would include pumping of existing groundwater supplies as the source of process water for the proposed winery from an on-site, approved well. Domestic water to support winery employee use and the proposed commercial kitchen would be supplied by the City of St. Helena.

In terms of potable water use, the applicant has submitted an analysis of historic and proposed water use for the facility ("Theoretical Water Use Report, for the Redmon Ranch Winery" by Delta Consulting Engineers dated August 28, 2015. This report hereby incorporated by reference into this Initial Study and is available for review at the St. Helena Planning Department during normal business hours.) The Delta report notes the applicant proposes to continue to use an existing, approved water well for winery process water and for exterior yard landscaping.

To minimize potable interior water use, the applicant proposes to install high-efficiency toilets within the facility, low-flow faucets and high-efficiency dishwashers. The Delta report determined that at full build-out of interior winery improvements, the commercial kitchen and continued use of existing on-site residences would require an estimated 641 gallons per day, which would result in a net reduction of 109 gallons per day. Therefore the proposed project would be "water neutral" as required by the City of St. Helena and use of potable water would be less-than-significant. According to City staff, monthly use by all water customers in the City is closely monitored to ensure that proposed water use would be significantly exceed historic water use for each customer. This impact would be less-than-significant.

In terms of proposed use of groundwater, the applicant is relying on a recent wastewater analysis for a nearby project west of this project site ("Septic Feasibility Report for the Davies Use Permit Modification, prepared by Delta Consulting Engineers, dated September 27, 2014.") This report is hereby incorporated by reference into this Initial Study and is available for review at the St. Helena Planning Department during normal business hours. This earlier report notes that water used for wine production would range from 640 to 1,000 gallons per year, depending on methodology used. Use of the approved water well would draw from the local aquifer as from the other project. A recent report prepared for the Napa County Groundwater Resources Committee (GRAC) by the firm of Luhdorff & Scalmanini entitled "Napa County Groundwater Conditions and Groundwater Monitoring" dated February 2012 found that the aquifer under St. Helena has proven to be stable over time. Although the aquifer does experience draw-down during the late summer and fall months as much as 25 feet, it is generally recharged during winter months. Since St. Helena remains in a serious drought,

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

despite the recent El Nino condition, use of pumped groundwater, although generally stable, is considered a potentially significant impact. The project developer shall be required to adhere to Mitigation Measures 1 through10 listed below to minimize groundwater use. Implementation of these mitigation measures would reduce this impact to a less-than-significant level.

c. The project site is currently developed with buildings, paved surfaces and landscaped areas. No significant changes are proposed to impervious surfaces on the site. No creeks, streams or other bodies of water are located on or adjacent to the site that would be impacted by the proposed development. No impacts would result with this topic.

d. Refer to (c) above. The project does not involve the alteration of any stream or river since no streams or rivers exist on or adjacent to the project site. There would be no impact with respect to this topic.

e. Refer to the discussion under (c) above.

f. Refer to (c) above.

g. The project does not include a significant housing component. No changes are proposed to the two dwellings on the site and no impact would result.

h. The project site lies outside of a 100-year flood hazard area. No impacts would occur with respect to this topic.

i. According to inundation maps on record with the City's Public Works Department, the project site would not be affected in the result of any dam and/or levee structures, therefore, there is no impact.

j. Due to its location (approximately 30 miles north of the San Francisco Bay) the project site would not be affected by seiche or tsunami. The site and surrounding properties are relatively flat so that no impact would result with respect to mudflow.

Although the impacts resulting from the project on hydrology and water quality are considered to be less than significant, the following mitigations are provided as precautionary measures to address construction-related impacts on water quality:

Mitigation Measures:

1. Prior to the issuance of a building permit, the applicant shall submit a study by a qualified hydrogeologist, or equivalent professional, to ascertain the potential effects of the proposed well on the Napa Valley Floor-St. Helena Subarea groundwater basin or upon existing wells in the immediate vicinity of the subject well; and a Groundwater Reduction Plan to the St. Helena Public Works Department demonstrating specific methods to result in a 10% reduction in peak groundwater use from the Industry Standard Method of calculating winery process water. The Plan shall include annual monitoring and reporting to the City to ensure that the amount of groundwater is minimized into the future. The Owner shall submit an annual fee with the annual report to pay for City costs to administer and review.
2. The applicant shall ensure that no construction materials (e.g., concrete, paint, sediment) are conveyed into the storm drain system. The developer shall pay for any required cleanup, testing and City administrative costs resulting from consequence of construction materials entering into the storm water drainage system.
4. All materials that could cause water pollution (i.e., motor oil, fuels, paints, etc.) shall be stored and used in a manner that will not cause any pollution. All discarded material and any accidental spills shall be removed and disposed of at an approved disposal site. All spills shall be brought to the attention of the Public Works Department.
5. All construction activities shall be performed in a manner that minimizes, to the maximum extent practicable, any pollutants entering directly or indirectly the storm water system or waters of the State. The applicant shall pay for any required cleanup, testing and City administrative costs resulting from consequence of construction materials into the storm water drainage system.
6. The applicant shall meet the requirements of the City of St. Helena's construction and post-construction standards and comply with all applicable State and Federal laws.
7. The applicant shall mark all new drain inlets with permanent markings, which state "No Dumping—Flows to River." This work shall be shown on improvement plans.
8. Demolition materials and solid waste, including broken asphalt and concrete, soils stockpiles, steel, wood and metal scraps, domestic waste, and similar materials, shall be properly managed to prevent the accumulation of dust or similar materials that can degrade water quality. The site shall be cleaned daily and such materials shall be properly placed in dumpsters or removed from the project site and placed in a licensed landfill facility.
9. The collection of materials, such as construction debris and dirt, within the public right-of-ways adjacent to the site shall be prohibited.

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
10. Drainage shall be designed as required by adopted City standards and shall not impede any natural existing drainage from or substantially change drainage to adjacent parcels. Conclusion: The potential for adverse effects on hydrology and water quality would be reduced to a ***less-than-significant impact*** with implementation of the mitigation measures listed above.				
9. LAND USE AND PLANNING. *Would the project:*				
a. Physically divide an established community?				✓
b. Conflict with any applicable land use plan, policy, or resolution 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?				✓
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?				✓
Discussion: a. The project would not physically divide an established community since the project would represent a continuation of light industrial and related uses on the property, consistent with surrounding properties. There would be no impact with respect to this topic. b. The project site is designated as Industrial in the General Plan and is also zoned as Industrial. No changes are proposed for these designations. Similarly, no changes are proposed to other City land use regulations governing environmental protections. No impact would occur with respect to this topic. c. No habitat conservation plan or natural community conservation plan applies to the project site and no impact would result. Conclusion: The proposed project would have ***no impact*** on land use and planning related issues, and therefore no mitigations are required.				
10. 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?				✓
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?				✓
Discussion: a. The St. Helena General Plan does not identify the presence of mineral resources on the project site. b. No locally important mineral resources are located on the site as identified in the General Plan. Conclusion: The proposed project will result in ***no impact*** on mineral resources and no mitigations are required.				
11. NOISE. *Would the project result in:*				
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?			✓	
b. Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?				✓

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project			✓	
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			✓	
e. For a project located within an airport land use plan, would the project expose people residing or working in the project area to excessive noise levels?				✓

Discussion:

a. Under CEQA Guidelines and City standards, a project would normally have a significant environmental effect if it substantially increases the ambient noise levels in the project area area. The City of St. Helena General Plan defines significance criteria as an increase in the noise environment of 5 dBA, constituting a noise impact. Land uses north and west of the site are industrial uses and do not constitute sensitive noise receptors. Uses to the east and south of the project site include vineyards. No residences, schools, parks, hospitals or other sensitive noise receptors are located in the vicinity of the site. The proposed winery could generate high levels of noise during the harvest season when the winery would operate earlier in the morning (starting approximately 6 a.m). However, it is anticipated that no nearby uses or activities would be subject to significant noise impacts.

The future winery will be required to comply with the City's exterior maximum noise exposure level of 80 decibels (Ldn or CNEL noise scales). By comparison, a single-family residential area is limited to an exterior noise exposure level of 60 decibels on either the Ldn or CNEL scale. Operation of the proposed winery and commercial kitchen will be required to comply with City exterior noise levels. For these reasons, this impact is deemed to be less-than-significant.

b. A review of the project plans indicate that the project would be built using normal and customary construction techniques that would not involve significant boring, pile driving or similar activities that would generate substantial groundborne vibration or noise levels. Therefore, there would be no impact with respect to ground borne vibration or noise.

c. See item "a," above.

d. No sensitive noise receptors are located in close proximity to the project site that would be impacted by short-term construction noise or winery operations during peak season, therefore there would be a less-than-significant impact with respect to this topic area.

e. The project is not located within an airport land use plan, so there would be no impacts with respect to this topic.

Conclusion:
As described above, no significant impacts would result from the proposed project with respect to noise. Therefore, impacts related to this topic area are considered ***less-than-significant***.

12. 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 and other infrastructure)?				✓
b. Displacing substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				✓
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				✓

Discussion:
a. No changes are proposed to on-site housing that would include a population increase in the community. No impacts would result with respect to this impact.

b. The project site is occupied by dwellings, a vacant barn structure and various outbuildings. No housing would be displaced by the project and no impact would result.

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
c. Refer to (b) above Conclusion: This project would have ***no impact*** on population and housing.				
13. PUBLIC SERVICES. *Would the project:*				
a. 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 ratios, response times or other performance objectives for any of the public services including:				
i) Fire Protection?				✓
ii) Police Protection?				✓
iii) Schools?				✓
iv) Parks?				✓
v) Other Public Facilities?				✓
Discussion: i. Based on discussions with the St. Helena Fire Department, no new or expanded Fire Department facilities would be needed to serve this proposed project and there would be no impact with respect to this topic (source: Jim Capponi, St. Helena Fire Department, 5/16/16), ii. Based on discussions with the St. Helena Police Department, no new or expanded Police Department facilities would be needed to serve the proposed project (source: William Imboden, St. Helena Police Department, 4/14/6). iii, No new school-aged children would be generated as a result of project construction since no additional new dwellings would be constructed. iv. The proposed project would be a combination commercial/industrial and residential (no new residences constructed) use and would not increase the local population that would use community and regional parks v. No significant impacts are anticipated to other local public services, including but not limited to roads and general governmental services. Conclusion: For the reasons provided above, this project would have ***no impact*** on public services.				
14. RECREATION. *Would the project:*				
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that a substantial physical deterioration of the facility would occur or be accelerated?				✓
b. Does the project include recreational facilities or require the construction or expansion or recreational facilities which might have an adverse physical effect on the environment?				✓
Discussion: a. The project would involve conversion of an existing barn structure into a winery and construction of a commercial kitchen. Two existing residences would remain on the site as part of the project. The operation of the project would be largely industrial/commercial in nature and would not result in any increases in the use of local or regional recreation facilities or the deterioration of an existing park facility. Therefore, there would be no impact.				

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
b. The proposed project does not include a significant residential component or recreational component, therefore, no impacts would result with respect to this topic. Conclusion: This project would have ***no impact*** on the demand for recreation resources.				
15. TRANSPORTATION/TRAFFIC. *Would the project:*				
a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			✓	
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			✓	
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?				✓
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersection) or incompatible uses (e.g., farm equipment)?			✓	
e. Result in inadequate emergency access?				✓
f. Conflict with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				✓

Discussion:

a. This analysis is based on a traffic impact analysis prepared by the firm of Omni Means Transportation Engineers and Planners dated April, 2016. The Omni Means report is attached to this Initial Study as Attachment 1. A summary of the report as follows:

Existing Traffic Conditions: Existing nearby public streets and roads that serve the proposed winery site include Main Street (also State Route 29/128) to the west of the site. This road provides regional access for St. Helena through the Napa Valley and is also the center for the main business district, located northwest of the project site. Dowdell Lane extends east from SR-29 for approximately 0.95 miles and provides access to commercial-retail, light-industrial, residential, and agricultural areas. A two-lane street, the roadway is paved for approximately the first 0.30 mile segment to just east of the proposed project site and is about 38-40 feet wide. This segment provides access primarily to commercial and light-industrial areas and parking is allowed on both sides of the street. Once past the project site, the roadway narrows significantly (10-20 feet) and is unimproved. Vintage Avenue is located south of the project site and extends in an easterly direction from SR-29 for approximately 0.25 miles. A two-lane street, Vintage Avenue provides access to light-industrial and commercial areas with vehicle parking on both sides of the street. Mills Lane is located north of the project site and extends in an easterly direction from SR-29 for approximately 0.83 miles. The roadway is paved to La Fata Street with unimproved sections further east adjacent to agricultural and residential areas. The roadway width is narrow (approximately 15-feet) and does not readily accommodate two-way traffic flow. However, roadway shoulders are not improved and vehicles can pull to the side to allow passing traffic.

Railroad tracks parallel SR-29 approximately 25 feet east of the highway crossing over Dowdell Lane in the project study area. The rail crossing is controlled by automated gates and flashing red lights. This single-track rail line serves the Napa Valley Wine Train. Based on discussions with Wine Train staff, there is one (1) train per day on weekdays and two (2) trains per day on weekends travelling through the study area between St. Helena and points south.

Caltrans is currently constructing the Highway 29 St. Helena Lane Channelization project in the study area. Specifically, the project will “rehabilitate the pavement, widen the shoulders, construct a two-way-left-turn-lane, and improve the bicycle/railroad crossing at Whitehall Lane.” The project limits extend between Mee Lane and Charter Oak Avenue. Work on the project is expected to be completed in early 2017. This project is noted in that one of the staging areas for construction equipment and workers is in a field directly north of Dowdell Lane extending to Mills Avenue. The staging area can be accessed from Dowdell Lane (via Fountain Street). Temporary construction activities are adding traffic to existing volumes on Dowdell Lane and SR-29 in the project study area.

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

Traffic conditions along SR-29 (particularly south of Pope Street) are also influenced by northbound vehicle queues, which can extend from Pope Street beyond Mills Lane and Dowdell Lane. During these times, traffic flows reflect "stop-and-go" conditions with vehicle speeds below 25 mph. Field observations noted that traffic flows on SR-29 near Dowdell Lane fluctuated between relatively free-flow conditions and stop-and-go conditions dependent on day (weekday or weekend) and time period. In addition, Caltrans is continuing construction of the Highway 29 Channelization Project through Dowdell Lane. Construction hours tend to be concentrated on the weekdays between 9:00 am and 5:00 pm and these temporary construction activities are adding to overall vehicle delays and congestion along SR-29.

Intersection traffic operating conditions are measured by Level of Service (LOS), which applies a letter ranking to successive levels of intersection performance. LOS 'A' represents optimum conditions with free-flow travel and no congestion. LOS 'F' represents severe congestion with long delays at the approaches. The operating conditions were evaluated using the Highway Capacity Manual (*HCM 2010*) operations methodology for unsignalized intersections. Minor street stop-sign controlled intersection LOS (such as evaluated in this analysis) typically reflect delays experienced by the minor street approach. Level of service definitions are shown in Table 1.

Existing weekday and weekend peak hour LOS (adjusted for peak seasonal crush/harvest conditions) are shown in Table 2. As calculated, the SR-29/Dowdell Lane intersection is operating at LOS D (22.3-27.3 seconds of delay) during all three peak hour periods. The calculated LOS of D for the SR-29/Dowdell Lane intersection represents overall vehicle delay for the stop-sign controlled westbound left-turn *and* right-turn movements from Dowdell Lane onto SR-29. The remaining La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane intersections are both operating at LOS (8.6-9.1 seconds of delay) during the same three weekday and weekend time periods for the northbound and southbound stop-sign controlled movements.

Table 1. Existing Harvest (No Project) Conditions-Peak Hour Intersection Level of Service (LOS)

			Wkdy. AM		Wkdy. PM		Saturday Peak	
	Intersection	**Control Type**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
1	SR-29 /Dowdell Lane	TWSC	D	27.3	D	25.9	C	22.3
2	La Fata Street / Dowdell Lane	TWSC	A	9.1	A	9.1	A	8.7
3	Projection Driveway / Dowdell Lane	TWSC	A	0.1	A	8.6	A	8.6

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.
Source: Omni Means, 2016

In terms of traffic signal warrants, based on the California Manual on Uniform Traffic Control Devices (CAMUTCD) for peak hour signal warrant criteria, the SR-29/Dowdell Lane intersection was evaluated for signalization. The peak hour warrant is one of several standards to help determine if installation of a traffic signal may be appropriate. Qualifying for signalization using the peak hour warrant does not necessarily mean a signal should be installed. The SR-29/Dowdell Lane intersection qualifies for signalization under the peak hour warrant using existing PM peak hour volumes. As previously noted, construction traffic from the Highway 29 Channelization project is ongoing in the study area and uses both SR-29 and Dowdell Lane for access. For these reasons, overall peak hour volumes at the SR-29-/Dowdell Lane intersection contributing to signal warrant satisfaction are temporarily high at this time and likely do not reflect base traffic volumes. The La Fata Street/Dowdell Lane intersection does not qualify for peak hour signal warrant satisfaction under existing conditions.

Near-Term (No Project) Traffic Conditions: Near-term traffic conditions represent existing and other approved/pending development traffic that can reasonably be assumed to be generated in the short-term horizon. Based on previous development studies conducted in the City of St. Helena, the horizon year 2020 was established for near-term conditions. Weekday and weekend peak hour approved development trips were based on traffic projections provided for recently updated City of St. Helena General Plan Circulation Element and specific development projects as follows:

- Crocker-Star Winery: The winery is located just east of the project site on the north side of Dowdell Lane (700 Dowdell Lane). The winery is currently under construction and would produce up to 25,000 gallons per year. Tasting and visitation would be small with a maximum of 12 guests during a typical weekday and 16 guests on a Saturday. Employment would range from seven full-time and three part-time employees. Operation is

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

scheduled to begin in mid-summer (July-August 2016);

- Davies Winery: The winery is located north of the proposed project site on Main Street at northwest corner of Main Street/Grayson Avenue intersection (555 Main Street). The winery is currently being modified to produce 75,000 gallons per year. Tasting and visitation would consist of 160 guests per day weekday and weekend. Employment would range from 15 full-time employees with an additional 30 part-time employees (harvest season). Operation is scheduled to begin mid-summer (July 2016).

Larger development projects and other infill project traffic are contained within the General Plan update volume projections. The weekday and weekend peak hour approved/pending development trips were added to existing (seasonal) volumes at the study intersections.

In terms of planned local road improvements, Caltrans is currently constructing the Highway 29 St. Helena Lane Channelization project in the study area. A traffic signal is planned to be installed at the Main Street/Grayson Avenue intersection. Based on correspondence from City Public Works staff, the signal will be incorporated into the Highway 29 Channelization project. Anticipated completion is by summer (2016).

With near-term (no project) volumes, study intersection LOS have been calculated and are shown in Table 2. With planned circulation improvements on SR-29 the minor street, stop-sign controlled intersection of SR-29/Dowdell Lane would improve in overall operations. During the three peak periods, overall intersection operation would be LOS C. The creation of two-way-left-turn lane on SR-29 allows outbound vehicles from Dowdell Lane (turning left) to merge into through-traffic in a safer manor by allowing a “refuge” area. The remaining intersections of La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane would continue to operate at LOS A during all three time periods with near-term (no project) traffic.

Table 2. Near Term Harvest (No Project) Conditions-Peak Hour Intersection Level of Service (LOS)

	Intersection	Control Type	Wkdy. AM		Wkdy. PM		Saturday Peak	
			LOS	Delay	LOS	Delay	LOS	Delay
1	SR-29 /Dowdell Lane	TWSC	C	19.6	C	19.6	C	18.5
2	La Fata Street / Dowdell Lane	TWSC	A	9.2	A	9.1	A	8.7
3	Projection Driveway / Dowdell Lane	TWSC	A	0.1	A	8.7	A	8.6

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.
Source: Omni Means, 2016

Project Short Term Impacts: The proposed project’s weekday and weekend peak hour traffic volumes have been calculated and are shown in Table 4 of the full traffic analysis (see Attachment 1.) The trip generating components of the project are based on information supplied by the project applicant’s planning consultant (Project Statement) in combination with winery production and employment trip ratios research by Napa County (Napa County Planning, Building & Environmental Department Use Permit trip rates).

With the proposed winery and commercial kitchen have no visitation or marketing events, the project trip generation would represent just production, employment, and associated truck deliveries. Based on proposed project components, the following weekday AM and PM and weekend (Saturday) trip generation has been estimated:

Weekday:
AM Peak Hour: 9 trips (6 in, 3 out)
PM Peak Hour: 9 trips (3 in, 6 out)

Weekend (Saturday):
Saturday Mid-Day Peak Hour (non-Crush): 7 trips (4 in, 3 out)
Saturday PM Peak Hour (Crush): 12 trips (3 in, 9 out)

With proposed project traffic added to existing harvest season traffic, study intersection LOS was calculated and is

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

shown in Table 3. As calculated, the three study intersections would continue to operate at the same conditions under existing (no project) conditions with very slight increases in vehicle delay (less than one-second of delay at SR-29/Dowdell Lane). In addition, proposed project trips would represent less than one (1) percent of the overall peak hour volumes at the SR-29/Dowdell Lane intersection. As a conservative measure, proposed project trips accessing the project site to/from Dowdell Lane were assumed to use one project driveway.

Table 3. Existing Plus Project Conditions-Peak Hour Intersection Level of Service (LOS)

	Intersection	Control Type	Wkdy. AM		Wkdy. PM		Saturday Peak	
			LOS	Delay	LOS	Delay	LOS	Delay
1	SR-29 /Dowdell Lane	TWSC	D	28.3	D	26.8	C	23.7
2	La Fata Street / Dowdell Lane	TWSC	A	9.2	A	9.1	A	8.7
3	Projection Driveway / Dowdell Lane	TWSC	A	8.6	A	8.6	A	8.6

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.
Source: Omni Means, 2016

The above table shows proposed project trips added to near-term (no project) intersection volumes for the weekday AM and PM and weekend mid-day peak hours.

With near-term plus project volumes, study intersection LOS has been calculated and are shown in Table 4. With planned circulation improvements on SR-29, the minor street stop-sign controlled intersection of SR-29/Dowdell Lane would improve in overall operations. During the three peak periods, overall intersection operation would be continue at LOS C with proposed project trips adding less than one second of vehicle delay. As noted previously, the creation of a two-way-left-turn lane on SR-29 allows outbound vehicles from Dowdell Lane (turning left) to merge into through-traffic in a safer manor by allowing a “refuge” area. The remaining intersections of La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane would continue to operate at LOS A during all three time periods with near-term (no project) traffic. Proposed project trips would make up less than one (1) percent of overall traffic volumes at the SR-29/Dowdell Lane intersection and would not result in a significant impact.

Table 4. Near Term Plus Project Conditions-Peak Hour Intersection Level of Service (LOS)

	Intersection	Control Type	Wkdy. AM		Wkdy. PM		Saturday Peak	
			LOS	Delay	LOS	Delay	LOS	Delay
1	SR-29 /Dowdell Lane	TWSC	C	19.9	C	19.7	C	18.8
2	La Fata Street / Dowdell Lane	TWSC	A	9.2	A	9.2	A	8.8
3	Projection Driveway / Dowdell Lane	TWSC	A	8.7	A	8.7	A	8.7

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.
Source: Omni Means, 2016

Cumulative Project Impacts: The long-term cumulative year 2035 conditions were derived from traffic projections provided for the City of St. Helena General Plan update (Circulation Element). The Year 2035 volumes reflect projected traffic growth with buildout of the City’s General Plan. The long-term cumulative volumes include the Year 2020 harvest season volumes calculated for the near-term approved development scenario plus an added growth rate of 2.25 percent per year to year 2035 (15 years). It is noted that traffic growth related to General Plan buildout was applied to through-traffic volumes on SR-29. Future traffic growth on Dowdell Lane was generated from local approved/pending project-specific volumes.

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact

Under cumulative Year 2035 (no project) conditions, peak hour volumes are shown in Table 7. As calculated, the SR-29/Dowdell intersection would operate at LOS D during all three study periods for the Dowdell Lane outbound (westbound) approaches at SR-29. The two-way-left-turn lane on SR-29 would continue to allow outbound vehicles from Dowdell Lane (turning left) to merge into through-traffic in a safer manor by allowing a "refuge" area. The remaining intersections of La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane would operate at LOS A during all three time periods with cumulative (no project) traffic.

Conclusion: The proposed project would not generate traffic which is significant in relation to existing traffic load and the capacity of the local street system under short-term and cumulative conditions. No significant impacts would result with respect to the project and no mitigation measures are required.

b. See item "a," above.

c. The project would have no impact on air traffic patterns since it involves a commercial winery and restaurant project.

d. In terms of potential traffic hazards, sight distances for vehicles turning in/out of the winery driveways were evaluated in the traffic analysis (see Attachment 1). The desired vehicle visibility or "corner sight distance" is a function of the travel speeds on the primary street. Caltrans design standards indicate that for appropriate corner sight distance, "a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the cross road and the driver of an approaching vehicle in the right lane of the main highway. The speed limit on Dowdell Lane is 25 mph but traffic flows are generally unimpeded resulting in speeds of 25-30 mph.

Based on the Caltrans design standards, the Dowdell Lane project driveway(s) require a sight distance of about 250 feet. Visibility on Dowdell Lane to the east and west is approximately 600-800 feet, therefore the sight distance is adequate and no impacts would occur with respect to this topic.

e. Emergency access to and from the site would occur from multiple vehicular driveways along Dowdell Lane. The driveways would provide adequate access to the site during emergency conditions and no impacts would result.

f. The project would not conflict with any policies supporting alternative transportation and no impact would occur with respect to this topic.

Conclusion:
The project would have a ***less-than-significant*** impact on transportation and traffic conditions.

16. Utilities and Service Systems. *Would the project:*				
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			✓	
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?			✓	
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?				✓
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?		✓		
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?			✓	
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				✓

Environmental Issue Area	Potentially Significant Impact, Unmitigated	Potentially Significant Impact, Mitigated	Less Than Significant Impact	No Impact
g. Impact with Federal, State, and local statutes and regulations related to solid waste?				✓

Discussion:

a. The applicant's proposal to dispose of wastewater in the City's system. This could result in a significant impact as identified and discussed in Section 8, Hydrology and Water Quality. See the City of Hydrology and Water Quality section of this Initial Study to demonstrate how adherence to City conditions of approval would ensure this would will be less-than-significant.

b. The applicant proposes minor extension of below-grade sewer lines to connect to the municipal wastewater system. Proposed improvements would either be on-site or within public rights-of-way no impacts would result with respect to this topic.

c. The applicant proposes to construct an on-site stormwater retention pond to ensure that no significant impact would occur to the City's storm drain system.

d. Water for the project would be supplied by use of City potable water for winery employees and on-site residents. As documented in Section 8 of this Initial Study (Hydrology and Water Quality), on-site improvements and upgrades would be made to on-site plumbing systems to ensure that the project would be water neutral. Winery process and irrigation water would be provided by an approved on-site well. See the discussion in the Hydrology section regarding potential impacts on the local aquifer and mitigation measures to reduce this impact to a less-than-significant level.

e. See section 8, Hydrology and Water Quality, subsection "a" for a discussion of wastewater impacts of the proposed project.

f,g. The project would not create any additional significant landfill demands. Existing on-site uses currently generate solid waste and recyclable material and no significant increase of this material is anticipated. The project would not result in the violation or impact to any federal, state or local regulations dealing with solid waste and no impacts would result,.

Conclusion:
This project would have a ***less-than-significant*** impact on the demand for water resources and wastewater treatment capacity with adherence to mitigation measures set forth in the Hydrology and Water Quality section of this Initial Study.

XVII. 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?	No
b. Does the project have impacts which are individually limited, but cumulatively considerable? *("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in conjunction with the effects of past projects, the effects of other current projects and the effects of probable future projects.)*	No
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly	No

Initial Study Preparers

Jerry Haag, Urban Planner, project manager and principal author
Rob Tuma, report graphics

Agencies and Organizations Consulted

The following agencies and organizations were contacted in the course of this Initial Study:

City of St. Helena
Noah Housh, Planning Director
Aaron Hecock, Senior Planner
Steve Palmer, PE, City Engineer
Jim Capponi, Fire Department
William Imboden, Police Department

California Department of Transportation (CalTrans)
California Department of Toxic Substances Control (DTSC)

References

Municipal Code, City of St. Helena

St. Helena General Plan, updated through 1993

St. Helena General Plan Draft General Plan EIR, June 2016

Bay Area Air Quality Management District's Clean Air Plan, September 15, 2010

Napa County Groundwater Conditions and Groundwater Monitoring, Luhdorff & Scalmanini. February 2012

Theoretical Water Use Report for the Redmon Ranch Winery, Delta Consulting and Engineering, August 2015

Stormwater Control Plan for the Redmon Ranch Winery, Delta Consulting and Engineering, August 2015

Septic Feasibility Report for the Redmon Ranch Winery, Delta Consulting and Engineering, August 2015

Redmon Ranch Historical Review, Juliana Inman, August 2015

Focused Traffic Impact Analysis for the Redmon Winery and Commercial Kitchen, Omni Means Engineers, April 2016

Attachment 1
Historical Survey

Juliana Inman
ARCHITECT

3 August 2015

Aaron Hecock, Planner
Planning and Building Department
1480 Main Street
St. Helena, CA 94574

Re: Redmon Ranch
Historical Review
867 Dowdell Lane
St. Helena, CA
APN: 009-580-009

Via email to: aaronh@cityofsthelena.org

Dear Mr. Hecock,

I was requested to make a visit to the Redmon Ranch at 867 Dowdell Lane by Architect Paul Kelly to review plans for converting the barn and portion of the site to a winery use and whether those alterations meet the Secretary of the Interior's Standards. Below is a discussion of the Standards, the building and site "integrity", and the California Environmental Quality Act. I reviewed resources at the National Park Service, Northwest Information Center, Napa County Landmarks, Inc. (1978 Survey), and City of St. Helena Historic Resource Inventory and General Plans (Appendix A for the 1993 General Plan and Historical Resource Element for the current April 2015 Draft General Plan). In the current draft General Plan, the relevant policies include:

> HR1.3 Encourage the adaptive reuse, rehabilitation and retrofit of historic buildings in which the original use is no longer feasible.
>
> HR1.K Require that rehabilitation or restoration of historical resources be done according to the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Preservation, Rehabilitation, Restoration, Restoration, and Reconstruction of Historic Buildings.

I also reviewed drawings by Paul Kelley, Architect dated 7/17/15 showing planned alterations. I have included some photographs taken in July, 2015 in this report.

The site of the Redmon Ranch is not identified in the 1993 survey. The main house was built circa 1890, and retains a finely detailed stick style porch. The stucco wall finish, french doors and many of the windows appear to be alterations. The proposed project does not include the main house. (See Figure 4.)

The main focus of the proposed project is the conversion of a very large two story wood-framed gable end barn to commercial winery use. The barn will be used for barrel storage. The barn appears to have been built in the 1890-1900 period, and altered several times since then. Its massive size is notable, and it accommodates large pieces of equipment. An open shed addition appears to be of a more recent construction date.

2133 FIRST STREET, NAPA, CALIFORNIA 94559 (707) 226-5304
email: juliaia@comcast.net

A heavily altered garage originally built in about the 1930's is not historic due to its lack of integrity. A second gable front bay was added, a shed addition at the back obscures the original single car gable front garage, and the entire structure was stuccoed. The project proposes demolition of this structure. (See Figure 5.)

Several small dwelling units built from the early to the mid-1900's are spaced between the large barn and the main house. These appear to have originally been employee housing, later converted to guest use.

The proposed project will replace the shed with an open fermentation “el” addition next to the barn, and a seasonal crush pad cover. This reviewer strongly recommends that a permanent crush pad cover not be constructed since it would obscure the long elevation of the barn and diminish its distinctive massing and scale. (See Figure 1.)

Figure 1. Side elevation of barn showing lean-to shed addition.

The single story shed attached to the main barn structure will be removed and replaced. (See Figures 1 and 2.)

Figure 2. Current shed.

Figure 3. Side elevation showing siding.

Siding and appearance of the main barn will be preserved. Interior seismic retrofitting will not be visible from the exterior. (See Figure 3.)

The front of the main house shows a finely detailed full-width porch. (See Figure 4.)

Figure 4. Front elevation, main house.

The garage has been altered from its original single bay, wood-sided appearance. (See Figures 5 and 6.)

Figure 5. Garage to be demolished, showing addition at rear.

A small non-historic storage building which appears to have been built in the past 30 years is proposed to be relocated. (See Figure 7).

Figure 6. Non-historic garage, front.

Figure 7. Non-historic storage shed to be relocated.

Supporting information

California Environmental Quality Act (CEQA):
The California Register regulations define "integrity" as "the authenticity of an historic resource's physical identity, evidenced by the survival of characteristics that existed during the resource's period of significance" (State Office of Historic Preservation, 1997). These regulations specify that integrity is a quality that applies to historic resources in seven ways: **location, design, setting, materials, workmanship, feeling and association**. A property must retain **most** of these qualities to possess integrity.

The barn retains integrity of **location, setting, materials, design, feeling and association.** The barn no longer retains integrity of **workmanship** due to deterioration. **Due to the strong visual presence of this large barn in its original location, it remains a contributor to the historic fabric of St. Helena. The relationship of the barn to the surrounding neighborhood are important character-defining aspects of the resource.**

The garage lacks integrity of **materials, design, feeling, association, and workmanship**. It retains integrity of **location and setting**. Overall the building lacks integrity.

According to current CEQA regulation:
Title 14. California Code of Regulations, Chapter 3. Guidelines for Implementation of the California Environmental Quality Act Article 5. Preliminary Review of Projects and Conduct of Initial Study, Section 15064.5. Determining the Significance of Impacts to Archeological and Historical Resources:

(3) Generally, a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (1995), Weeks and Grimmer, shall be considered as mitigated to a level of less than a significant impact on the historical resource.

Secretary of the Interior Standards:
The City of St. Helena references compliance with The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings, in the design review conditions and/or negative declaration for projects containing historic resources. St. Helena also references compliance with the Standards in the draft 2015 General Plan. Compliance with these guidelines avoids any negative impacts on the existing building.

Work proposed by the architect generally conforms to *The Secretary of the Interior's Standards and Guidelines for Rehabilitating Historic Buildings*. Included with the comment is a citation of the Standard or guideline language involved, and specific recommendations are in **boldface**:

1. ***Standard 1*** *A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.*

   Use will change from a commercial storage use to a commercial winery use. Character defining aspects of the barn, including location, setting, massing, scale, design, workmanship, and materials will remain.

2. ***Standard 2*** *The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.*

   The alteration of the building is described under Standard 9 below. Historical material will be retained.

3. ***Standard 3*** *Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.*

   No features from other buildings will be added. No conjectural features are proposed. New construction does not create a false sense of historical development. No inappropriate light fixtures, finishes or materials will be added.

4. ***Standard 4*** *Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.*

   Existing alterations that have become part of the historic fabric of the building will remain. Inappropriate and poor quality additions will be removed.

5. ***Standard 5*** *Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.*

   Distinctive features and finishes will be not be removed. Original wood siding, trim and windows will remain or be restored.

6. ***Standard 6*** *Deteriorated historic features shall be repaired rather than replaced. Where severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.*

   Replacement of historic materials will be done where original material has been broken, lost or weathered to an extent making repair infeasible. Replacement features will match the old in design, color, texture, visual qualities, and material.

7. ***Standard 7*** *Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.*

   No sand blasting or chemical treatments are proposed.

8. ***Standard 8*** *Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures must be taken*.

   St. Helena standard archeological mitigation measures should apply to all ground disturbing activities on the site.

9. ***Standard 9*** *New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, scale, and architectural features to protect the historic integrity of the property and its environment*.

   New construction should be respectful of the historic building, while at the same time avoiding creating a false sense of what is historic on the site. The standards and guidelines allow for a wide range of design options and styles.

   According to the Guidelines, "…additions should be designed and constructed so that the character-defining features of the historic building are not radically changed, obscured, damaged, or destroyed in the process of rehabilitation. New design should always be clearly differentiated so that the addition does not appear to be part of the historic resource." The Guidelines further recommend:

   - Constructing a new addition so that there is the least possible loss of historic materials and so that character-defining features are not obscured, damaged, or destroyed.

   - Designing new additions in a manner that makes clear what is historic and what is new.

   - Design for the new work may be contemporary or may reference design motifs from the historic building. In either case, it should always

be clearly differentiated from the historic building and be compatible in terms of mass, materials, relationship of solids to voids, and color.

- Placing new additions such as balconies and greenhouses on non-character-defining elevations and limiting and size and scale in relationship to the historic building.

The existing barn will remain in its historic setting and location. An open fermentation structure will be located at the rear of the property and next to the large barn. It's design is clearly contemporary, but similar in massing to the historic barn. **This reviewer agrees with the design of a removable crush pad cover that is used seasonally so that the large barn is not obscured by a permanent structure in this location.**

This reviewer recommends that all windows of the barn be repaired.

10. ***Standard 10*** *New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.*

Original material will remain on the building. No addition is attached to the historic barn. If the fermentation structure is removed in the future, there is no impact on the barn.

Relocation of the non-historic storage building and landscape structures does not affect the barn, the house or the site.

Conclusions:
Work in the proposed project and as recommended herein meets the Secretary of the Interior's Standards.

Regards,

Juliana Inman

Attachment 2
Traffic Analysis

Focused Traffic Impact Analysis for the Proposed:

Redmon Winery and Commercial Kitchen Project

City of St. Helena

Prepared for:

Jerry Haag, Urban Planner

Prepared by:

omni · means
ENGINEERING SOLUTIONS

PROPOSED REDMON WINERY & COMMERCIAL KITCHEN PROJECT

Prepared For:

MR. JERRY HAAG

2029 University Avenue

Berkeley, CA 94107

Prepared By:

Omni-Means, Ltd.

1901 Olympic Boulevard, Suite 120

Walnut Creek, CA 94596

925.935.2230

APRIL, 2016

35-3526-35 / 2152

R2152TIA001.docx

TABLE OF CONTENTS

1. Executive Summary 1

2. Introduction 2

3. Existing Conditions 4

Proposed Project Site 4
Roadways 4
Rail Activity 5
Construction Activity 5
Existing Volumes 5
Existing Intersection Operation 6
Signal Warrant 9

4. Near-Term Year 2020 (No Project) Conditions 10

Near-Term Methodology 10
Near-Term Roadway Improvements 10
Near-Term (No Project) Intersection Operation 11
Signal Warrant 11

5. Proposed Project Impacts 13

Project Components 14
Project Trip Generation 14
Project Trip Assignment 16
Existing plus Project Conditions 16
Near-Term plus Project Conditions 18

6. Cumulative Conditions 20

Cumulative Year 2035 Projections 20
Cumulative Year 2035 (No Project) Conditions 20
Cumulative Year 2035 Plus Project Conditions 20

7. Project Site Access, Circulation, and Design Parameters 23

Access/Onsite Circulation 23
Sight Distance 23

LIST OF FIGURES

Figure 1 Project Vicinity Map 3
Figure 2 Existing Weekday AM and PM and Weekend Mid-Day Peak Hour Volumes 7
Figure 3 Near-Term (No Project) Weekday AM, PM and Weekend Mid-Day Peak Hour Volumes 12
Figure 4 Existing plus Project Weekday AM, PM and Weekend Mid-Day Peak Hour Volumes 17
Figure 5 Near-Term plus Project Weekday AM, PM and Weekend Mid-Day Peak Hour Volumes 19
Figure 6 Cumulative Year 2035 (No Project) Weekday AM, PM and Weekend Mid-Day Peak Hour Volumes 21
Figure 7 Cumulative Year 2035 plus Project Weekday AM, PM and Weekend Mid-Day Peak Hour Volumes 22
Figure 8 Project Site Plan 24

LIST OF TABLES

Table 1 Intersection Level-Of-Service Definitiions 8

Table 2 Existing Harvest (No Project) Conditions: Peak Hour Intersection LOS 9

Table 3 Near-Term (No Project) Harvest Conditions: Peak Hour Intersection LOS 11

Table 4 Daily and Peak Hour Project Trip Generation: Proposed Redmon Winery and Commercial Kitchen Project 15

Table 5 Existing plus Project Harvest Conditions: Peak Hour Intersection LOS 18

Table 6 Near-Term plus Project Harvest Conditions: Peak Hour Intersection LOS 18

Table 7 Year 2035 No Project and plus Project Harvest Conditions: Peak Hour Intersection LOS 20

APPENDIX

Weekday AM and PM and Saturday Mid-Day Intersection Level-of-Service Calculation Sheets

Weekday Signal Warrant (PM Peak Hour)

1. Executive Summary

The proposed Redmon Winery and Commercial Kitchen would consist of a production winery (24,000 gpy) and small commercial kitchen located at 867 Dowdell Lane. There would no guest tasting, tours, or marketing events associated with the proposed project. The proposed project would generate 9 AM and 9 PM weekday peak hour trips and 12 Saturday peak hour trips. The project vehicle trips were added to existing, near-term, and cumulative background volumes. The SR-29/Dowdell Lane intersection would be operating at LOS D during the weekday AM and PM and weekend time periods with proposed project traffic. Proposed project traffic would add less than one (1) second of overall vehicle delay to the intersection and would make up less than one (1) percent of overall peak hour volumes at this intersection consistent with City of St. Helena significance thresholds for unsignalized intersections on Main Street (SR-29). There are two reasons for acceptable level-of-service (LOS) at the SR-29/Dowdell Lane intersection:

1. The completion of the St. Helena SR-29 Channelization Project (Summer—2017). The installation of a two-way-left-turn-lane on SR-29 at Dowdell Lane would greatly improve vehicle access to Dowdell Lane to/from SR-29 and reduce overall vehicle delays. The new two-way-left-turn-lane would allow stop-sign controlled outbound vehicles (making a left-turn) to merge more safely onto SR-29 by providing a refuge lane to merge into southbound through-traffic. Similarly, the TWLTL would also allow southbound motorists on SR-29 to make a left-turn (inbound) to Dowdell Lane without delaying through-traffic on the highway. Indirectly, the planned signal for the SR-29/Grayson Avenue intersection just north of Mills Lane would also benefit traffic at Dowdell Lane (at times) by providing more “gaps” in southbound traffic;

2. The proposed project description does not include any guest visitation or marketing events what-so-ever (just this fact alone greatly reduces the overall traffic generation). The project description focuses on employment and truck deliveries related to proposed winery production and commercial kitchen uses. Again, there would be no tastings, tours, or marketing events.

All remaining study intersections on Dowdell Lane at La Fata Street and proposed project driveway would continue to operate within accepted City of St. Helena LOS thresholds with proposed project traffic (LOS A during all three weekday and weekend time periods). Primary access to the proposed project site would be provided directly by Dowdell Lane through four (4) driveways along the project frontage. Vehicle sight distance to the east and west on Dowdell Lane from proposed project driveway(s) on Dowdell Lane meets the recommended sight distances of 150-200 feet based on vehicle speeds of 25-30 mph.

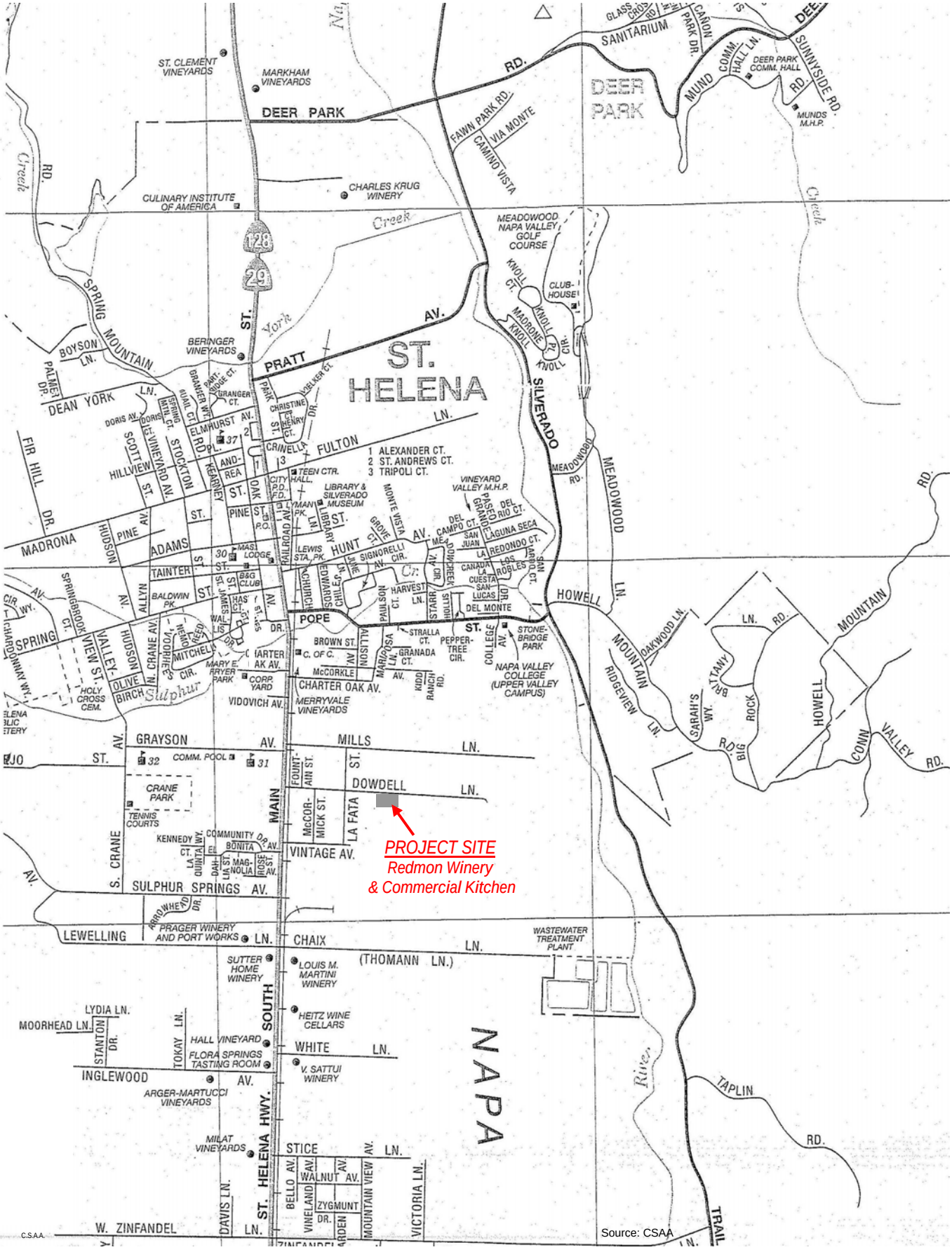
With regard to driveway access; given that multiple driveways would provide access to various winery production facilities it is recommended that truck deliveries use the first and third driveways (respectively). These driveways would be connected by an internal parking and circulation area. Trucks could enter one driveway and exit out the other driveway without having to turn around.

2. Introduction

The following report provides a focused traffic analysis for the proposed Redmon Winery and Commercial Kitchen project located at 867 Dowdell Lane in the City of St. Helena (see Figure 1—Project Vicinity Map). The proposed project would consist of converting 12,614 square feet of existing on-site structures to winery uses, accessory structures, and a commercial kitchen tenant space. Two existing residential structures on the property would make up 8,009 square feet. The total existing and proposed on-site development totals 20,754 square. Based on the project statement, the applicant proposes to convert (and move) an existing barn and convert it into a production winery producing 24,000 gallons per year. Winery related activities would include crush, fermentation, barrel storage, office, and lab facilities. Another on-site space would accommodate a commercial kitchen tenant and dry goods storage (the current structure is currently used for dry goods storage). The two existing residential structures include a primary residence and a guesthouse. These units will remain unchanged and will primarily serve as "live/work" areas.[1] One of key components of the proposed project as it relates to potential traffic generation; the applicant proposes no winery visitation and no marketing events for these facilities. Traffic generation would primarily consist of production, employment, and delivery components associated with the proposed winery and commercial kitchen uses as well as deliveries and seasonal activities related to the crush/harvest. This analysis is based on our discussions with you, winery information provided by the project applicant, and our familiarity with the study area in and around Dowdell Lane and State Route 29. Some of the key traffic issues related to proposed project development would be as follows:

- Existing and future traffic conditions at key study intersections along Dowdell Lane and SR-29 including proposed project driveway operations;
- Unique characteristics of proposed winery and commercial kitchen uses related to employees, hours of operation for different project components, deliveries, catering activities (if any), and lab operations;
- Proposed project daily and peak hour trip generation associated with proposed winery and commercial kitchen uses during the weekday and weekend peak periods;
- Project access and circulation from proposed (existing) driveways off Dowdell Lane;
- Future traffic projections and/or circulation improvements based on the Updated St. Helena General Plan Circulation Element.

[1] *Project Statement, Redmon Winery and Commercial Kitchen Space, APN 009-580-009, 867 Dowdell Lane, St. Helena, CA, March, 2016.*



Project Vicinity Map

omni-means

figure 1

3. Existing Conditions

Proposed Project Site

The proposed Redmon Winery and Commercial Kitchen project would be located at 867 Dowdell Lane on the south side of the roadway east of State Route 29 and just east of the La Fata Street/Dowdell Lane intersection. As noted, there are currently existing residential and outbuildings (including a barn) on the site that would be converted to proposed winery and commercial kitchen uses. The site is served by three existing driveways with a gravel base parking areas. The entire project frontage along Dowdell Lane extends for approximately 190 feet. On-street vehicle parking is allowed on Dowdell Lane (both sides) in the study area. Dowdell Lane is one of three parallel streets that extend east from SR-29 that provide direct and indirect access to the site. A description of both local and state roadway facilities in the project study area is provided as follows:

Roadways

Main Street (State Route 29/128), also referred to as the St. Helena Highway, is the primary north-south travel route through the Napa Valley and extends between St. Helena and Rutherford in the project area. Beyond the study area, SR 29 provides access north through the town of Calistoga and south through the towns of Yountville, Napa, and American Canyon. It is classified as a two-lane rural arterial road and in the immediate project area consists of two 12-foot wide travel lanes with small striped shoulder areas (2-4 feet) and no street parking is allowed. The speed limit on Main Street is 35 mph in the project area. It is noted that there is ongoing construction on SR-29 for the "Highway 29 Channelization Project" in the vicinity of Dowdell Lane. This "channelization" project will be discussed in detail in the Planned Circulation Improvements section.

Dowdell Lane extends east from SR-29 for approximately 0.95 miles and provides access to commercial-retail, light-industrial, residential, and agricultural areas. A two-lane street, the roadway is paved for approximately the first 0.30 mile segment to just east of the proposed project site and is about 38-40 feet wide. This segment provides access primarily to commercial and light-industrial areas and parking is allowed on both sides of the street. Once past the project site, the roadway narrows significantly (10-feet) and is unimproved. This segment provides access to agricultural and residential areas. The speed limit on Dowdell Lane is 25 mph and this roadway would provide direct access to the project site.

La Fata Street extends in a north-south direction between Mills Lane and Vintage Avenue approximately 200 feet west of the proposed project site. A two-lane street, La Fata Street provides access to commercial-retail and light-industrial areas. Similar to the improved segment of Dowdell Lane, La Fata Street is approximately 38-feet wide with parallel parking on both sides of the street. It is noted that at its intersection with Dowdell Lane, the north and south legs of La Fata Street is slightly off-set by approximately 18 feet. However, field observations indicate no significant operational issues given the low traffic volumes on the roadway. Access to the proposed project site can be gained indirectly via La Fata Street to Dowdell Lane using Mills Lane or Vintage Avenue.

Vintage Avenue is located south of the project site and extends in an easterly direction from SR-29 for approximately 0.25 miles. A two-lane street, Vintage Avenue provides access to light-industrial and commercial areas with vehicle parking on both sides of the street (38-foot width) and a 25 mph speed limit.

Mills Lane is located north of the project site and extends in an easterly direction from SR-29 for approximately 0.83 miles. The roadway is paved to La Fata Street with unimproved sections further east adjacent to agricultural and residential areas. The roadway width is narrow (approximately 15-feet) and does not readily accommodate two-way traffic flow. However, roadway shoulders are not improved and vehicles can pull to the side to allow passing traffic. Traffic calming measures (large boulders) have been placed at its intersection with La Fata Street to prevent large vehicles (trucks) from turning through the Mills Lane/La Fata Street intersection.

Rail Activity

Railroad tracks currently parallel SR-29 approximately 25 feet east of the highway crossing over Dowdell Lane in the project study area. The rail crossing is controlled by automated gates and flashing red lights. This single-track rail line serves the Napa Valley Wine Train. Based on discussions with Wine Train staff, there is one (1) train per day on weekdays and two (2) trains per day on weekends travelling through the study area between St. Helena and points south.

Construction Activity

Caltrans is currently constructing the Highway 29 St. Helena Lane Channelization project in the study area. Specifically, the project will "rehabilitate the pavement, widen the shoulders, construct a two-way-left-turn-lane, and improve the bicycle/railroad crossing at Whitehall Lane." The project limits extend between Mee Lane and Charter Oak Avenue. Work on the project is expected to be tentatively completed in early 2017. This project is noted in that one of the staging areas for construction equipment and workers is in a field directly north of Dowdell Lane extending to Mills Avenue. The staging area can be accessed from Dowdell Lane (via Fountain Street). Temporary construction activities are adding traffic to existing volumes on Dowdell Lane and SR-29 in the project study area.

Existing Volumes

For the purpose of this traffic analysis, new weekday and weekend peak period intersection counts were conducted at the following intersections:

	Intersection	*Control*
1.	SR-29/Dowdell Lane	Stop-Sign (Dowdell Ln.)
2.	La Fata Street/Dowdell Lane	Stop-Sign (La Fata St.)

The counts (conducted in February-March 2016) were adjusted upward to reflect peak harvest season conditions by comparing them to peak seasonal volumes identified in the Caltrans traffic volumes for SR-29. The peak periods during the weekday AM commute period (7:00-9:00 am), PM commute period (4:00-6:00 pm), and Saturday afternoon peak period (Noon-6:00 pm) were evaluated. From these peak period counts, the highest peak hour volumes were utilized for analysis: AM 7:45-8:45 am, PM 4:30-5:30 pm, and Saturday 2:00-3:00 pm. Similarly, the highest peak hour of project trips generated during the same periods were applied to the "plus project" conditions. To supplement the intersection turning volume counts, new driveway counts at the existing project site were conducted during the same peak hours as a part of this study.

Traffic conditions along SR-29 (particularly south of Pope Street) are also influenced by northbound vehicle queues, which can extend from Pope Street beyond Mills Lane and Dowdell Lane. During these times, traffic flows reflect "stop-and-go" conditions with vehicle speeds below 25 mph. Field observations noted that traffic flows on SR-29 near Dowdell Lane fluctuated

between relatively free-flow conditions and stop-and-go conditions dependent on day (weekday or weekend) and time period. In addition, Caltrans is continuing construction of the Highway 29 Channelization Project through Dowdell Lane. Construction hours tend to be concentrated on the weekdays between 9:00 am and 5:00 pm and these temporary construction activities are adding to overall vehicle delays and congestion along SR-29.

Existing peak period weekday and weekend counts conducted at the proposed project site driveways indicate very low activity at the site from existing businesses. Three (3) vehicle trips were observed (in/out) during the weekday AM peak hour with four (4) vehicle trips during PM peak hour. During the weekend mid-day peak hour, four (4) mid-day peak hour trips were observed.

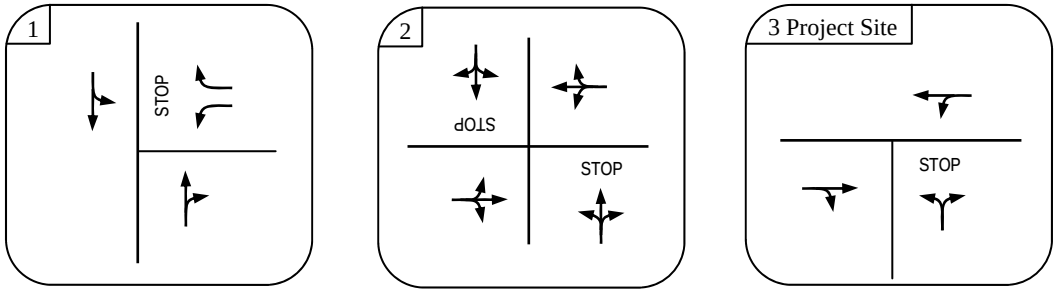
Existing weekday AM and PM and weekend mid-day intersection volumes are shown in Figure 2.

Existing Intersection Operation

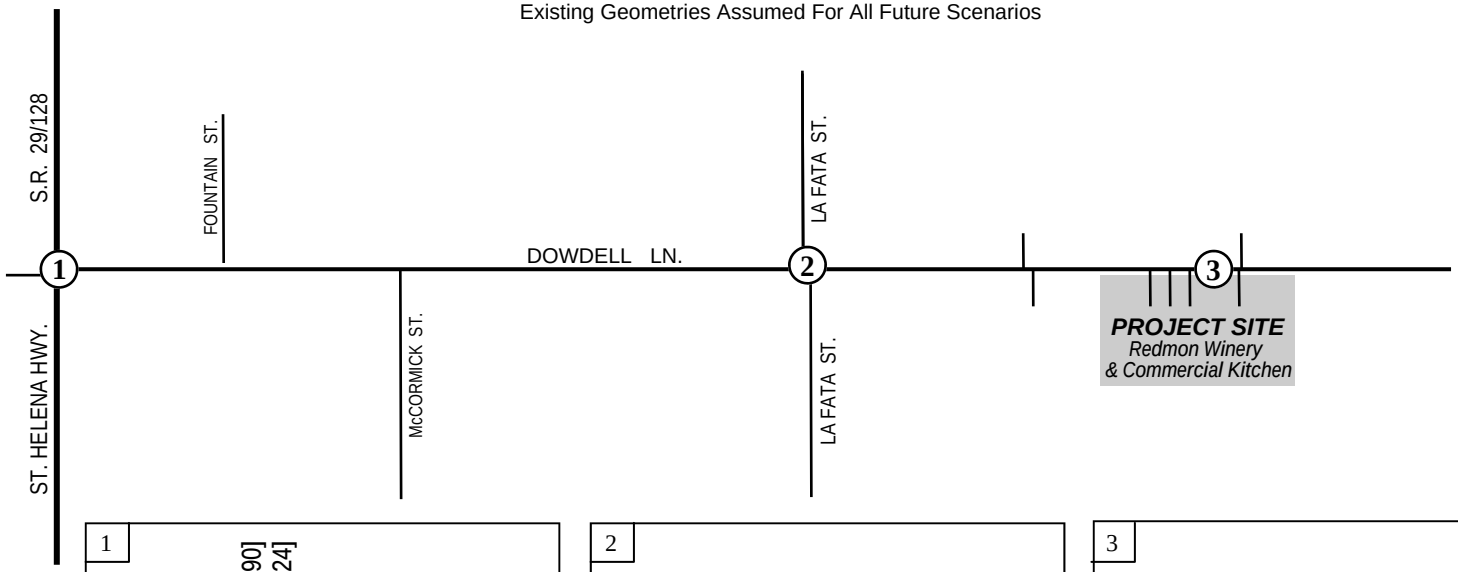
Intersection traffic operating conditions are measured by Level of Service (LOS), which applies a letter ranking to successive levels of intersection performance. LOS 'A' represents optimum conditions with free-flow travel and no congestion. LOS 'F' represents severe congestion with long delays at the approaches. The operating conditions were evaluated using the Highway Capacity Manual (*HCM 2010*) operations methodology for unsignalized intersections. Minor street stop-sign controlled intersection LOS (such as evaluated in this analysis) typically reflect delays experienced by the minor street approach. Level of service definitions are shown in Table 1.

Existing weekday and weekend peak hour LOS (adjusted for peak seasonal crush/harvest conditions) are shown in Table 2. As calculated, the SR-29/Dowdell Lane intersection is operating at LOS D (22.3-27.3 seconds of delay) during all three peak hour periods. The calculated LOS of D for the SR-29/Dowdell Lane intersection represents overall vehicle delay for the stop-sign controlled westbound left-turn *and* right-turn movements from Dowdell Lane onto SR-29. The remaining La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane intersections are both operating at LOS (8.6-9.1 seconds of delay) during the same three weekday and weekend time periods for the northbound and southbound stop-sign controlled movements.

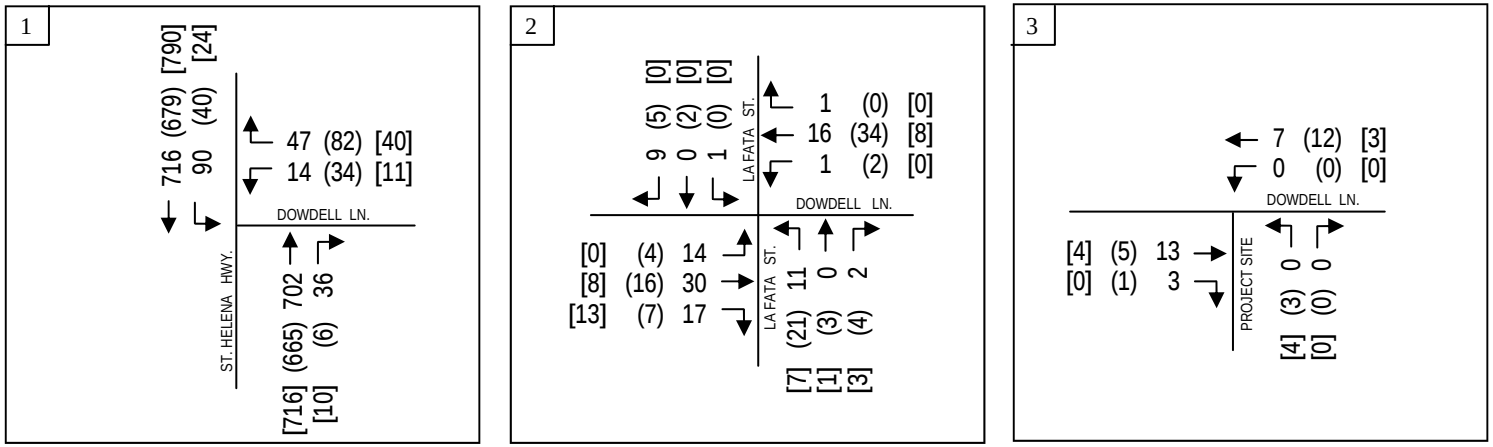
GEOMETRIES / CONTROLS:



Existing Geometries Assumed For All Future Scenarios



PEAK HOUR VOLUMES:



Existing Volumes: Weekday AM, (PM), and [Saturday] Peak Hours

North

omni-means

figure 2

TABLE 1
INTERSECTION LEVEL-OF-SERVICE DEFINITIIONS

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle (sec)	
				Signalized/ Roundabouts	Unsignalized/ All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	< 10.0	< 10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and < 20.0	>10.0 and < 15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	>20.0 and < 35.0	>15.0 and < 25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and < 55.0	>25.0 and < 35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and < 80.0	>35.0 and < 50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	> 80.0	> 50.0

References: 2010 Highway Capacity Manual

TABLE 2
EXISTING HARVEST (NO PROJECT) CONDITIONS: PEAK HOUR INTERSECTION LOS

	Intersection	Control Type	Wkdy. AM		Wkdy. PM		Saturday Peak	
			LOS	Delay	LOS	Delay	LOS	Delay
1	SR-29 /Dowdell Lane	TWSC	D	27.3	D	25.9	C	22.3
2	La Fata Street / Dowdell Lane	TWSC	A	9.1	A	9.1	A	8.7
3	Projection Driveway / Dowdell Lane	TWSC	A	0.1	A	8.6	A	8.6

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.

Signal Warrant

Based on the California Manual on Uniform Traffic Control Devices (CAMUTCD) for peak hour signal warrant criteria, the SR-29/Dowdell Lane intersection was evaluated for signalization.[2] The peak hour warrant is one of several standards to help determine if installation of a traffic signal may be appropriate. Qualifying for signalization using the peak hour warrant does not necessarily mean a signal should be installed. The SR-29/Dowdell Lane intersection qualifies for signalization under the peak hour warrant using existing PM peak hour volumes. As previously noted, construction traffic from the Highway 29 Channelization project is ongoing in the study area and uses both SR-29 and Dowdell Lane for access. For these reasons, overall peak hour volumes at the SR-29-/Dowdell Lane intersection contributing to signal warrant satisfaction are temporarily high at this time and likely do not reflect base traffic volumes. The La Fata Street/Dowdell Lane intersection does not qualify for peak hour signal warrant satisfaction under existing conditions.

[2] *California Manual on Uniform Traffic Control Devices (CAMUTCD), Chapter 4C, Peak hour signal warrant (#3), 2012.*

4. Near-Term Year 2020 (No Project) Conditions

Near-Term Methodology

Near-term traffic conditions represent existing and other approved/pending development traffic that can reasonably be assumed to be generated in the short-term horizon. Based on previous development studies conducted in the City of St. Helena, the horizon year 2020 was established for near-term conditions.[3] Weekday and weekend peak hour approved development trips were based on traffic projections provided for recently updated City of St. Helena General Plan Circulation Element and specific development projects as follows:

- Crocker-Star Winery: The winery will be located just east of the project site on the north side of Dowdell Lane (700 Dowdell Lane). The winery is currently under construction and would produce 25,000 gallons per year. Tasting and visitation would be small with a maximum of 12 guests during a typical weekday and 16 guests on a Saturday. Employment would range from seven full-time and three part-time employees. Operation is scheduled to begin in mid-summer (July-August 2016);

- Davies Winery: The winery will be located north of the proposed project site on Main Street at northwest corner of Main Street/Grayson Avenue intersection (555 Main Street). The winery is currently being modified to produce 75,000 gallons per year. Tasting and visitation would consist of 160 guests per day weekday and weekend. Employment would range from 15 full-time employees with an additional 30 part-time employees (harvest season). Operation is scheduled to begin mid-summer (July 2016).

Larger development projects and other infill project traffic are contained within the General Plan update volume projections. The weekday and weekend peak hour approved/pending development trips were added to existing (seasonal) volumes at the study intersections. The forecast weekday AM, PM, and Saturday peak hour near-term traffic volumes are shown in Figure 3.

Near-Term Roadway Improvements

Scheduled roadway and intersection circulation improvements in the study area include the St. Helena Highway 29 Channelization project and signal installation at the Main Street/Grayson Avenue intersection. A brief description and update on each follows:

As noted previously, Caltrans is currently constructing the Highway 29 St. Helena Lane Channelization project in the study area. Specifically, the project will "rehabilitate the pavement, widen the shoulders, construct a two-way-left-turn-lane, and improve the bicycle/railroad crossing at Whitehall Lane." The project limits extend between Mee Lane and Charter Oak Avenue. Work on the project is expected to be tentatively completed in early 2017. This project is noted in that one of the staging areas for construction equipment and workers is in a field directly north of Dowdell Lane extending to Mills Avenue. The staging area can be accessed

---

[3] *Omni-Means Engineering Solutions, Traffic Impact Analysis for the Proposed Davies Vineyards Winery Use Permit Modification, City of St. Helena, August 19, 2014.*

from Dowdell Lane (via Fountain Street). Temporary construction activities are adding traffic to existing volumes on Dowdell Lane and SR-29 in the project study area;

A new traffic signal will be installed at the Main Street/Grayson Avenue intersection. Based on correspondence from City Public Works staff, the signal will be incorporated into the Highway 29 Channelization project. Anticipated completion is by summer (2016).

The forecast weekday AM, PM, and Saturday mid-day peak hour near-term (no project) traffic volumes are shown in Figure 3.

Near-Term (No Project) Intersection Operation

With near-term (no project) volumes, study intersection LOS have been calculated and are shown in Table 3. With planned circulation improvements on SR-29 the minor street, stop-sign controlled intersection of SR-29/Dowdell Lane would improve in overall operations. During the three peak periods, overall intersection operation would be LOS C. The creation of two-way-left-turn lane on SR-29 allows outbound vehicles from Dowdell Lane (turning left) to merge into through-traffic in a safer manor by allowing a “refuge” area. The remaining intersections of La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane would continue to operate at LOS A during all three time periods with near-term (no project) traffic.

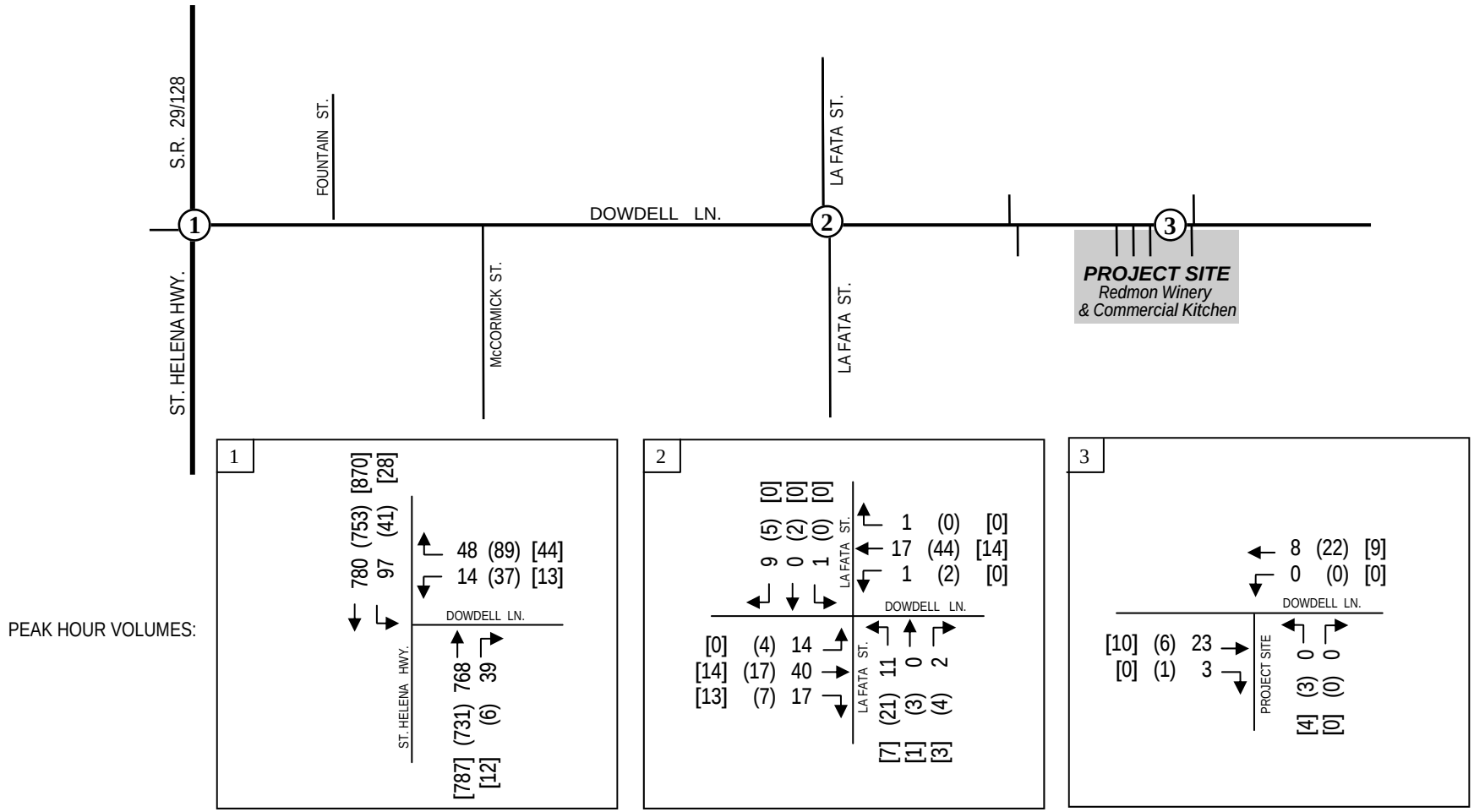
Signal Warrant

The SR-29/Dowdell Lane would continue to meet the peak hour signal warrant with near-term (no project) traffic volumes. However, in light of the current circulation improvements (two-way-left-turn-lane) being installed on SR-29 and improved operations at the stop-sign controlled intersection; a signal would not be recommended for this location at this time. In addition, a new signal is being installed at the SR-29/Grayson Avenue intersection approximately 550 feet north of Dowdell Lane. This new signal will provide “gaps” in southbound through-traffic on SR-29 allowing greater opportunity for outbound left-turning vehicles to merge into traffic. However, there would likely be additional northbound vehicle queuing on SR-29 during peak commute periods.

TABLE 3
NEAR-TERM (NO PROJECT) HARVEST CONDITIONS: PEAK HOUR INTERSECTION LOS

			Wkdy. AM		Wkdy. PM		Saturday Peak	
	Intersection	Control Type	LOS	Delay	LOS	Delay	LOS	Delay
1	SR-29 /Dowdell Lane	TWSC	C	19.6	C	19.6	C	18.5
2	La Fata Street / Dowdell Lane	TWSC	A	9.2	A	9.1	A	8.7
3	Projection Driveway / Dowdell Lane	TWSC	A	0.1	A	8.7	A	8.6

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.



Near Term Without Project Volumes
Weekday AM, (PM), and [Saturday] Peak Hours

omni-means

figure 3

5. Proposed Project Impacts

Significance Criteria

The significance criteria applied in this study are based on the City of St Helena's General Plan Circulation Element documentation for roadway and intersection operations. Based on this information, the significance criteria are provided as follows:

The City's current LOS standard is LOS D for signalized intersections on Main Street (SR 29/128) and LOS C elsewhere. Based on City of St. Helena and CEQA standards, a project's impact would be considered significant if any of the following conditions occur:

- If operating conditions at a signalized intersection on Main Street (SR 29/128) deteriorate from LOS D without the project to LOS E or F with the project.

- If operating conditions at a signalized intersection on Main Street (SR 29/128) operating at LOS E without the project deteriorate to LOS F with the project.

- If the average intersection delays at a signalized intersection operating at LOS E or F without the project increases by more than five seconds with the project.

- If operating conditions at an unsignalized intersection on Main Street (SR 29/128) operating at LOS D or better without the project degrade to LOS E or F with the project and the volumes would qualify for signalization under the Caltrans peak hour volume warrants for signalization. If operating conditions at an unsignalized intersection not on Main Street operating at LOS C or better without the project degrade to LOS D, E, or F with the project and the volumes would qualify for signalization under the Caltrans peak hour volume warrants for signalization.

- If average delay at an unsignalized intersection on Main Street (SR 29/128) operating at LOS E or F without the project increases by five or more seconds with the project and the volumes qualify for signalization under the Caltrans peak hour volume warrants for signalization. If average delay at an unsignalized intersection not on Main Street operating at LOS D, E, or F without the project increases by five or more seconds with the project and the volumes qualify for signalization under the Caltrans peak hour volume warrants for signalization.

- If traffic volumes at an unsignalized intersection meet the peak hour signal warrant thresholds, then a significant impact is considered if volumes increase by one percent with the project.

- For vehicle queuing, if the lane storage length sufficiently accommodates the 95th percentile vehicle queue length without the project and the vehicle queue length would increase to exceed the available storage with the project. If the 95th percentile queue length exceeds the available storage length without the project and the turning movement volume would increase by three percent or more with the project and increase the total intersection volume by one percent.

Project Components

The proposed Redmon Winery and Commercial Kitchen project would consist of wine production, employment, and associated truck deliveries. There would be absolutely no wine tasting, tours, or marketing events associated with the proposed use permit. Therefore, the proposed project would consist of the following vehicle trip generation components:

Proposed Winery:

- Winery production: 24,000 gallons per year;
- Employment: 2 full-time and 2 part-time employees during the weekday period (no weekend employment during non-crush periods). Harvest/crush activities would employ 2 full-time and 4 part-time employees (weekday/weekend) during the eight-week period;
- Trucks: 1 truck per day (non-crush periods). 3 trucks per day (harvest/crush period).

Commercial Kitchen:

- Employment; 2 full-time and 1 part-time employee (both weekdays and Saturday);
- Trucks: 2 trucks per day (weekdays and Saturday).

Project Trip Generation

The proposed project's weekday and weekend peak hour traffic volumes have been calculated and are shown in Table 4. The trip generating components of the project are based on information supplied by the project applicant's planning consultant (Project Statement) in combination with winery production and employment trip ratios research by Napa County (Napa County Conservation, Development, and Planning Department Use Permit trip rates).[4] [5]

With the proposed winery and commercial kitchen have no visitation or marketing events, the project trip generation would represent just production, employment, and associated truck deliveries. Based on proposed project components, the following weekday AM and PM and weekend (Saturday) trip generation has been estimated:

Weekday:

AM Peak Hour:	9 trips (6 in, 3 out)
PM Peak Hour:	9 trips (3 in, 6 out)

Weekend (Saturday):

Saturday Mid-Day Peak Hour (non-Crush):	7 trips (4 in, 3 out)
Saturday PM Peak Hour (Crush):	12 trips (3 in, 9 out)

---

[4] *Ms. Donna Oldford, Winery Entitlement Consultant/Planner, Redmon Winery and Commercial Kitchen, Project Statement, APN 009-580-009, 867 Dowdell Lane, St. Helena, March, 2016.*

[5] *County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Winery Traffic Information/Trip Generation Sheet (page 15), June 8, 2015.*

TABLE 4
DAILY AND PEAK HOUR PROJECT TRIP GENERATION:
PROPOSED REDMON WINERY AND COMMERCIAL KITCHEN PROJECT

Weekday Daily, AM & PM Peak Hour Traffic: Winery & Commercial Kitchen

Daily Trips:		
4 full time employees x 3.05 one-way trips:	=	12.2 daily trips
3 part-time employees x 1.90 one-way trips:	=	5.7 daily trips
24,000 gallons/1,000 x .009 daily trucks x 2 o-w trips	=	1 daily trips
2 daily trucks x 2 one-way trips (kitchen):	=	4 daily trips
Total Weekday Daily Trips	**=**	**22.9 daily trips**
Total AM and PM Peak Hour Trips:		
22.9 daily trips x 0.38% (65% in, 35% out—AM Peak)	=	**9 (6 in, 3 out)**
22.9 daily trips x 0.38% (35% in, 65% out—PM Peak)	=	**9 (3 in, 6 out)**

Weekend (Saturday) Daily and Mid-Day Peak Hour Traffic: Commercial Kitchen Only

Daily Trips:		
2 full time employees x 3.05 one-way trips	=	6.1 daily trips
1 part-time employees x 1.90 one-way trips	=	1.9 daily trips
2 daily trucks x 2 one-way trips	=	4 daily trips
Total Weekend (Saturday) Daily Trips	**=**	**12 daily trips**
Total Saturday Mid-Day Peak Hour Trips:		
12 daily trips x 0.57% (50% in, 50% out—M-D Peak)	=	**7 (4 in, 3 out)**

Weekend Crush (Saturday) Daily & PM Peak Hour Traffic: Winery & Commercial Kitchen

Daily Trips:		
4 full time employees x 3.05 one-way trips:	=	12.2 daily trips
4 part-time employees x 1.90 one-way trips:	=	9.5 daily trips
24,000 gallons/1,000 x .009 daily trucks x 2 o-w trips	=	1 daily trips
2 daily trucks x 2 one-way trips (kitchen):	=	4 daily trips
25 tons on-haul grapes x .11 truck trips x 2 o-w trips	=	5.5 daily trips
Total Crush Saturday Daily Trips	**=**	**32.2 daily trips**
Total Crush Saturday PM Peak Hour Trips:		
32.2 daily trips x 0.38% (25% in, 75% out- PM peak)	=	**12 (3 in, 9 out)**

Source: Production, employee, and truck data provided by Ms. Donna Oldford (Planning Consultant), March, 2016. Daily and peak hour calculations based on County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, June 2015.

Overall project trip generation compares favorably with total winery and kitchen employment for weekday and weekend (7 employees and 9 employees, respectively) and related trucks associated for each use. For the proposed commercial kitchen, there would be an average of two (2) trucks per day associated with catering and/or deliveries for weekday and weekend periods. For proposed winery uses there would be one (1) truck per day under normal (non-crush conditions). For crush activities, the winery would be producing 24,000 gallons of wine per year. Assuming 1,098 gallons per truck (standard), this would equate to 22 trucks or 44 truck trips over the course of the 8-week crush period. This production would result in approximately 5-6 truck trips per week. However, crush activities tend to a bell curve where production can occur slowly then reach a peak before beginning to ease down over the eight-week period. Therefore, a peak crush activity of three (3) trucks per day has been assumed for peak crush activities as a conservative measure. In addition, proposed project trip generation characteristics are driven by employment and truck deliveries and not visitation or marketing events. For this reason, proposed project traffic tends to peak during the weekday AM and PM and weekend mid-late afternoon hours when employees are either traveling to or from the site.

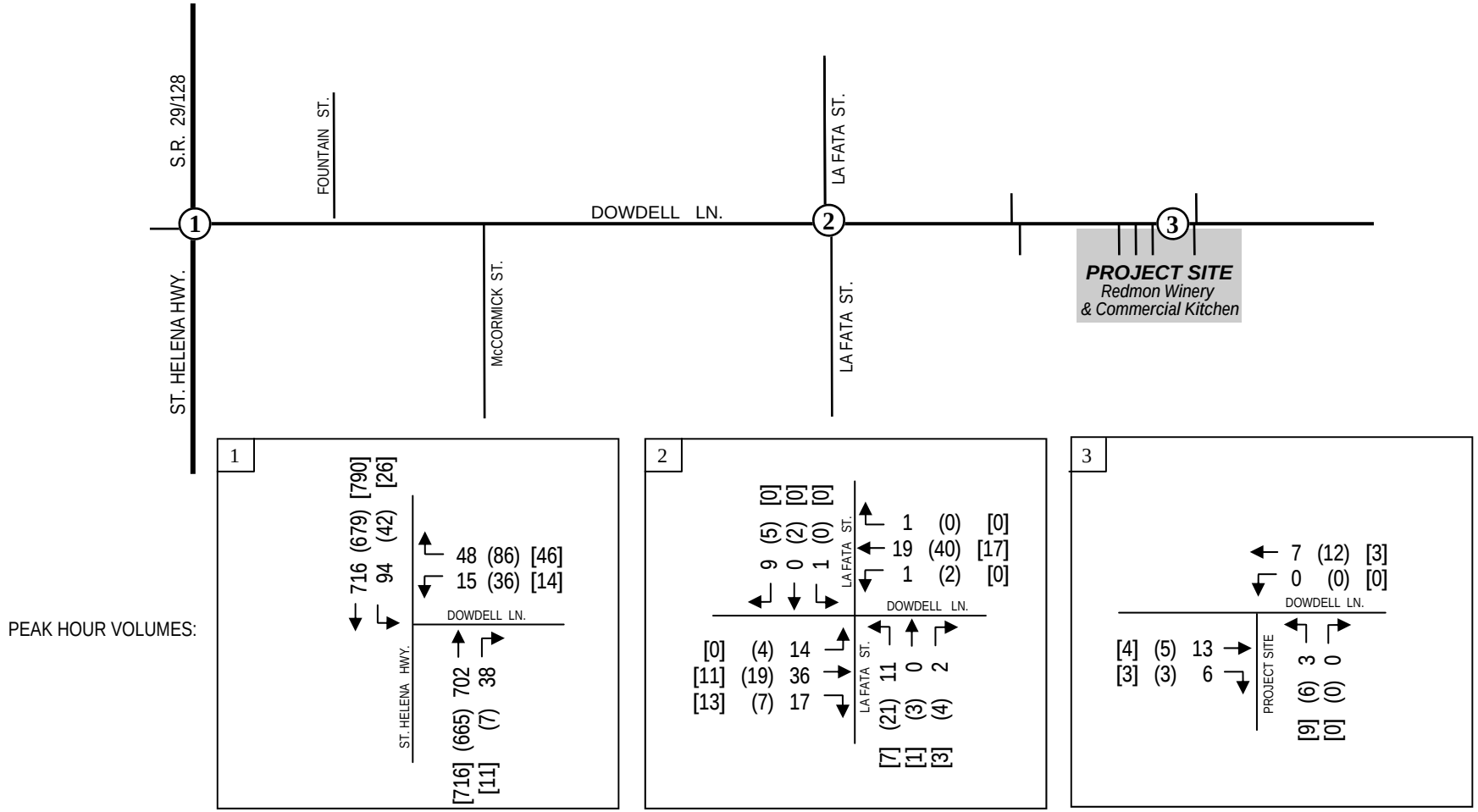
Project Trip Assignment

The proposed project would gain access directly from Dowdell Lane via four closely spaced gated driveways that currently serve existing site uses. The most direct route to/from the proposed project site is via Dowdell Lane to SR-29. However, indirect access to site can also be gain via La Fata Street using Mills Lane (to the north) or Vintage Avenue (to the south) to access SR-29. As a conservative measure, all project trips have been routed to/from SR-29 via Dowdell Lane with 70% to/from the north and 30% to/from the south on SR-29. Proposed project distribution is based on existing traffic flows at the SR-29/Dowdell Lane intersection, previous transportation studies, and the unique employee characteristics associated with the project (no guest visitation or marketing events).

Proposed weekday AM and PM and weekend peak hour (crush) project trips have been shown in Figure 4.

Existing plus Project Conditions

With proposed project traffic added to existing harvest season traffic, study intersection LOS was calculated and is shown in Table 5. As calculated, the three study intersections would continue to operate at the same conditions under existing (no project) conditions with very slight increases in vehicle delay (less than one-second of delay at SR-29/Dowdell Lane). In addition, proposed project trips would represent less than one (1) percent of the overall peak hour volumes at the SR-29/Dowdell Lane intersection. As a conservative measure, proposed project trips accessing the project site to/from Dowdell Lane were assumed to use one project driveway (please see Project Site Access for a discussion of driveway access).



Existing Plus Project Volumes
Weekday AM, (PM), and [Saturday] Peak Hours

omni-means

figure 4

TABLE 5
EXISTING PLUS PROJECT HARVEST CONDITIONS: PEAK HOUR INTERSECTION LOS

	Intersection	Control Type	Wkdy. AM		Wkdy. PM		Saturday Peak	
			LOS	Delay	LOS	Delay	LOS	Delay
1	SR-29 /Dowdell Lane	TWSC	D	28.3	D	26.8	C	23.7
2	La Fata Street / Dowdell Lane	TWSC	A	9.2	A	9.1	A	8.7
3	Projection Driveway / Dowdell Lane	TWSC	A	8.6	A	8.6	A	8.6

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.

Near-Term plus Project Conditions

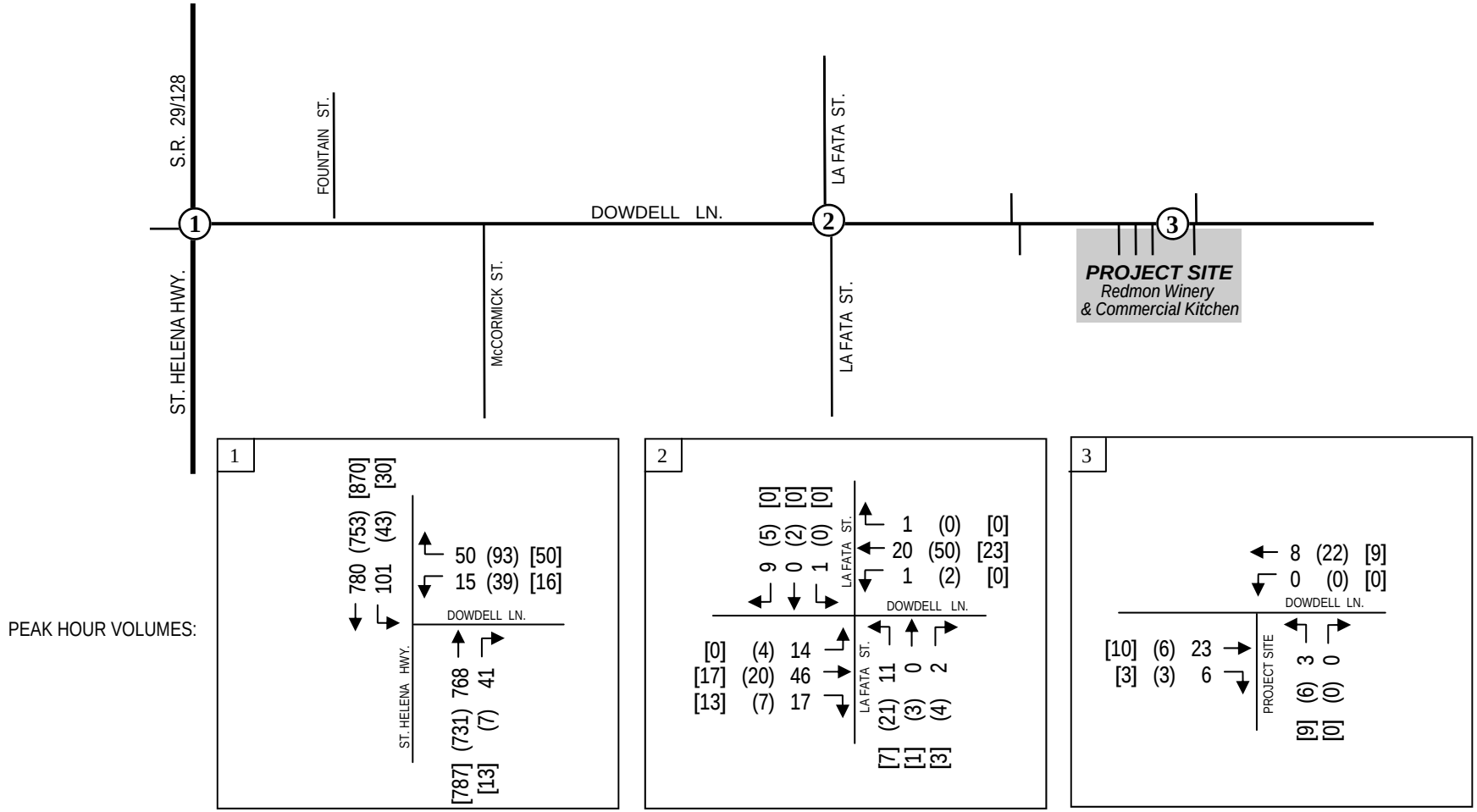
Proposed project trips were added to near-term (no project) intersection volumes for the weekday AM and PM and weekend mid-day peak hours and our shown in Figure 5.

With near-term plus project volumes, study intersection LOS has been calculated and are shown in Table 6. With planned circulation improvements on SR-29, the minor street stop-sign controlled intersection of SR-29/Dowdell Lane would improve in overall operations. During the three peak periods, overall intersection operation would be continue at LOS C with proposed project trips adding less than one second of vehicle delay. As noted previously, the creation of a two-way-left-turn lane on SR-29 allows outbound vehicles from Dowdell Lane (turning left) to merge into through-traffic in a safer manor by allowing a “refuge” area. The remaining intersections of La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane would continue to operate at LOS A during all three time periods with near-term (no project) traffic. Proposed project trips would make up less than one (1) percent of overall traffic volumes at the SR-29/Dowdell Lane intersection.

TABLE 6
NEAR-TERM PLUS PROJECT HARVEST CONDITIONS: PEAK HOUR INTERSECTION LOS

	Intersection	Control Type	Wkdy. AM		Wkdy. PM		Saturday Peak	
			LOS	Delay	LOS	Delay	LOS	Delay
1	SR-29 /Dowdell Lane	TWSC	C	19.9	C	19.7	C	18.8
2	La Fata Street / Dowdell Lane	TWSC	A	9.2	A	9.2	A	8.8
3	Projection Driveway / Dowdell Lane	TWSC	A	8.7	A	8.7	A	8.7

Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.



Near Term Plus Project Volumes
Weekday AM, (PM), and [Saturday] Peak Hours

North

omni-means

figure 5

6. Cumulative Conditions

Cumulative Year 2035 Projections

The long-term cumulative year 2035 conditions were derived from traffic projections provided for the City of St. Helena General Plan update (Circulation Element). The Year 2035 volumes reflect projected traffic growth with buildout of the City's General Plan. The long-term cumulative volumes include the Year 2020 harvest season volumes calculated for the near-term approved development scenario plus an added growth rate of 2.25 percent per year to year 2035 (15 years). It is noted that traffic growth related to General Plan buildout was applied to through-traffic volumes on SR-29. Future traffic growth on Dowdell Lane was generated from local approved/pending project-specific volumes.

Cumulative Year 2035 (No Project) Conditions

The cumulative Year 2035 (no project) peak hour volumes are shown in Figure 6 and the intersection LOS are shown in Table 7. As calculated, the SR-29/Dowdell intersection would operate at LOS D during all three study periods for the Dowdell Lane outbound (westbound) approaches at SR-29. The two-way-left-turn lane on SR-29 would continue to allow outbound vehicles from Dowdell Lane (turning left) to merge into through-traffic in a safer manor by allowing a "refuge" area. The remaining intersections of La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane would operate at LOS A during all three time periods with cumulative (no project) traffic.

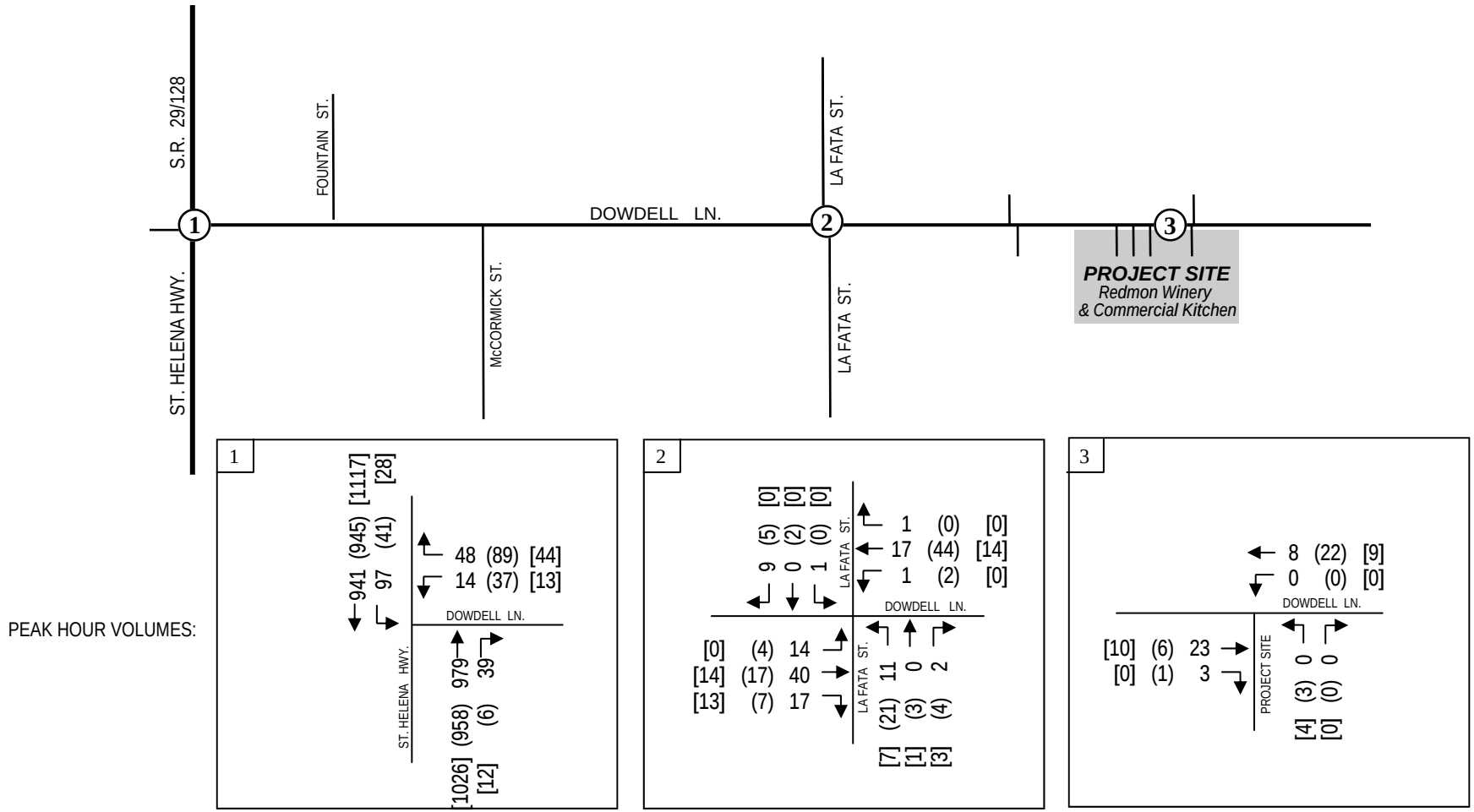
Cumulative Year 2035 plus Project Conditions

The Year 2035 plus project volumes are presented in Figure 7 and the calculated intersection LOS are listed in Table 7. The SR-29/Dowdell Lane intersection would continue to operate at LOS D' during the weekday AM and PM and Saturday peak hours, with delay increases of less than one second. The proposed project trips would not constitute a significant impact, as the delay increases would be less than the significance threshold of one second at the SR-29 (Main Street) intersection. The remaining study intersections of La Fata Street/Dowdell Lane and Project Driveway/Dowdell Lane would operate at LOS A with cum

TABLE 7
YEAR 2035 NO PROJECT AND PLUS PROJECT HARVEST CONDITIONS: PEAK HOUR INTERSECTION LOS

			Wkdy. AM		Wkdy. PM		Saturday Peak	
	Intersection	Control Type	2035 NP	2035 + Prj	2035 NP	2035 + Prj	2035 NP	2035 + Prj
1	SR-29 /Dowdell Lane	TWSC	D 26.5	D 27.3	D 28.1	D 28.7	D 25.1	D 25.9
2	La Fata Street / Dowdell Lane	TWSC	A 9.2	A 9.2	A 9.1	A 9.2	A 8.7	A 8.8
3	Projection Driveway / Dowdell Lane	TWSC	A 0.1	A 8.7	A 8.7	A 8.7	A 8.6	A 8.7

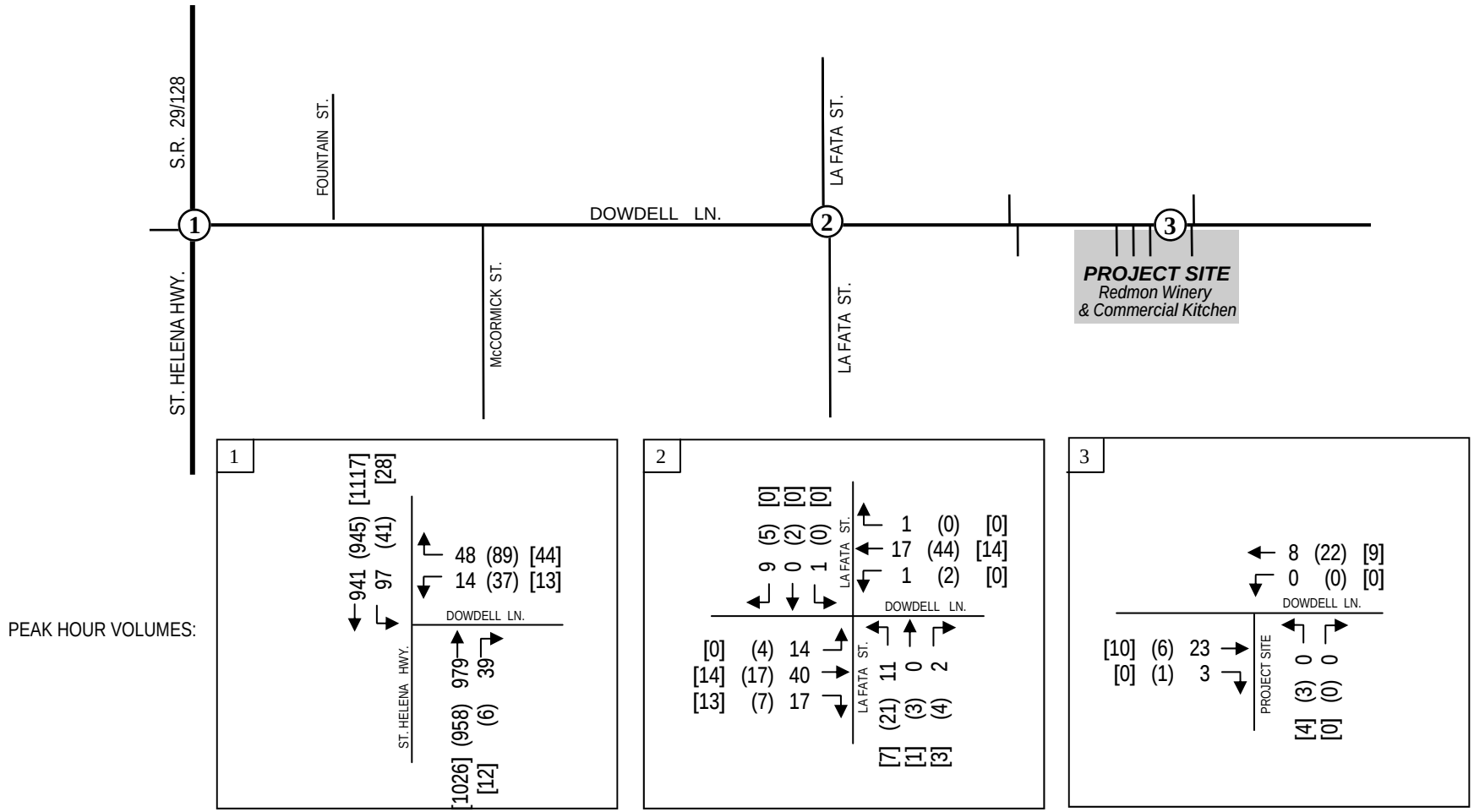
Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for unsignalized intersections and yields a vehicle delay in seconds.



Cumulative Without Project Volumes
Weekday AM, (PM), and [Saturday] Peak Hours

omni-means

figure 6



Cumulative Without Project Volumes
Weekday AM, (PM), and [Saturday] Peak Hours

omni-means

figure 6

7. Project Site Access, Circulation, and Design Parameters

Access/Onsite Circulation

The project site plan is illustrated in Figure 8. There would be a total of four driveways serving the site (as with current existing conditions) located directly off Dowdell Lane. All four driveways have gated control and can be easily opened or closed depending on current needs and/or truck access. The first project driveway is located approximately 225 feet east of La Fata Street. From this first access driveway, the remaining three project driveways are successively spaced about 75 feet apart continuing east on Dowdell Lane. On an internal basis, the first three driveways would all be interconnected through a common work/parking area for proposed winery uses. The fourth or eastern-most project driveway would serve proposed commercial kitchen and "live/work areas. Based on overall project trip generation by use, it is likely that employees and trucks associated with proposed winery production would use the first three driveways and employees/trucks associated with commercial kitchen uses would use the fourth project driveway. Actual peak period project trips at these driveways would be quite low with nine (9) vehicle trips to/from the site during the weekday AM and PM peak hours and 12 vehicle trips to/from the site during the weekend harvest/crush periods.

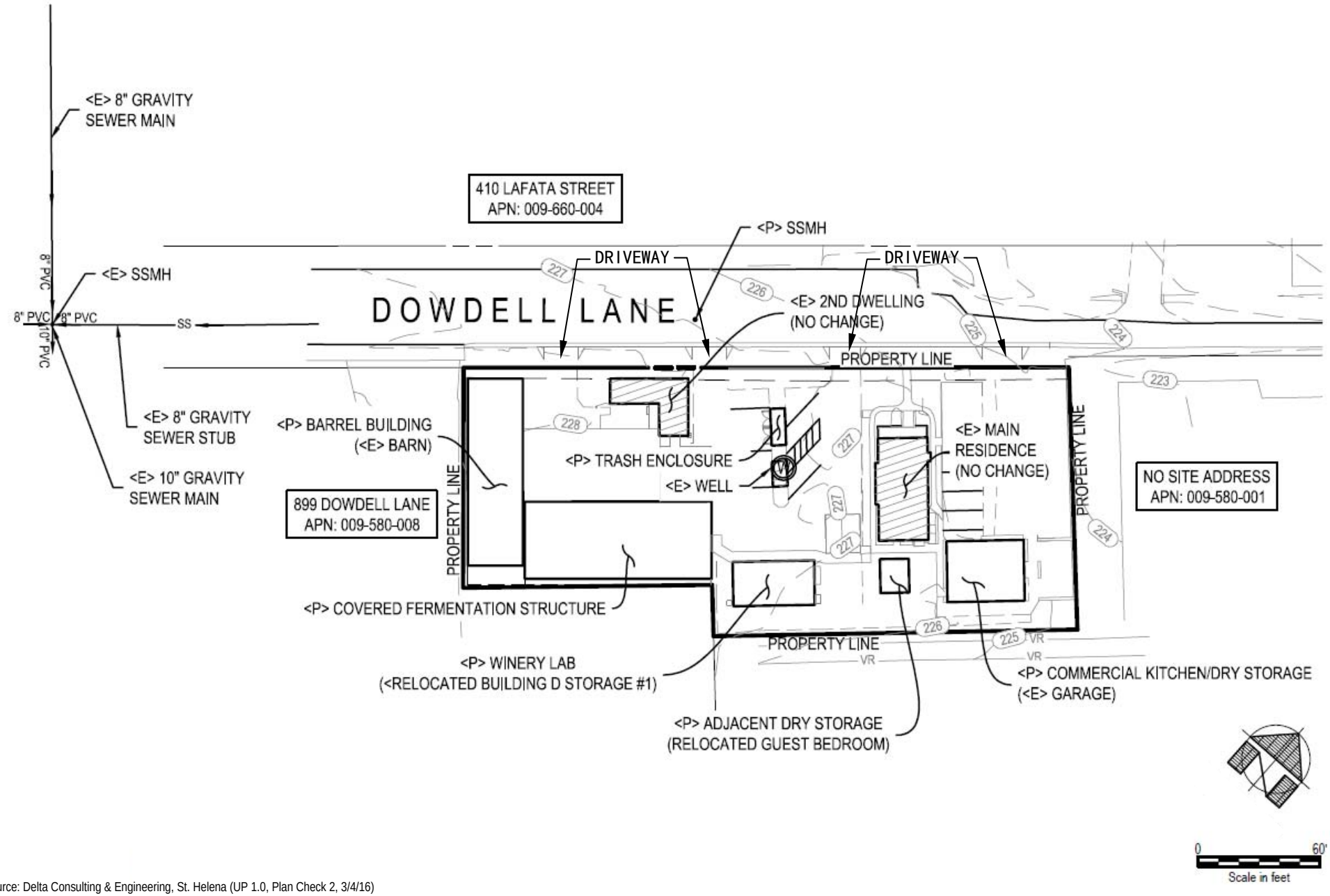
Currently, there are no pedestrian or bicycle facilities on Dowdell Lane along the proposed project frontage. The project site plan indicates a new pedestrian path would be constructed along the entire project frontage interior from the face-of-curb along the south side of Dowdell Lane. The pedestrian path would connect to existing pedestrian sidewalk facilities that begin immediately west of the proposed project site on Dowdell Lane.

Dowdell Lane Operations

Weekday peak hour and weekend mid-day peak hour trips estimated for proposed project uses have all been assigned to Dowdell Lane via SR-29. As with proposed project driveways, this would equate to nine (9) weekday AM and PM peak hour trips and 12 mid-day weekend peak hour trips. However, it is likely that some employee trips may use La Fata Street north or south to access Mills Lane or Vintage Avenue as an alternative to Dowdell Lane to reach SR-29. On a daily basis, the proposed project is expected to add 23 weekday and 32 weekend trips (harvest/crush season). With the exception of the SR-29/Dowdell Lane intersection, all study intersections along Dowdell Lane would continue to operate at LOS A during the weekday and weekend peak hour time periods. With respect to truck trips, the project would generate approximately 5-6 truck trips during the weekday (non-harvest) and about 11-12 daily truck trips on Dowdell Lane during the crush/harvest season.

Sight Distance

Sight distances for vehicles turning in/out of the winery driveways were evaluated. The desired vehicle visibility or "corner sight distance" is a function of the travel speeds on the primary street. Caltrans design standards indicate that for appropriate corner sight distance, "a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the cross road and the



Source: Delta Consulting & Engineering, St. Helena (UP 1.0, Plan Check 2, 3/4/16)

Project Site Plan

North

omni-means

figure 8

driver of an approaching vehicle in the right lane of the main highway.[6] The speed limit on Dowdell Lane is 25 mph but traffic flows are generally unimpeded resulting in speeds of 25-30 mph.

Based on the Caltrans design standards, the Dowdell Lane project driveway(s) require a sight distance of about 250 feet. Visibility on Dowdell Lane to the east and west is approximately 600-800 feet, therefore the sight distance is adequate.

8. Conclusions/Recommendations

The proposed Redmon Winery and Commercial Kitchen project's weekday and weekend peak hour trip generation would not significantly affect intersection LOS on Dowdell Lane. The SR-29/Dowdell Lane intersection would be operating at LOS D during the weekday AM and PM and weekend time periods with proposed project traffic. Proposed project traffic would add less than one (1) second of overall vehicle delay to the intersection and would make up less than one (1) percent of overall peak hour volumes at this intersection consistent with City of St. Helena significance thresholds for unsignalized intersections on Main Street (SR-29). There are two reasons for acceptable level-of-service (LOS) at the SR-29/Dowdell Lane intersection:

3. The completion of the St. Helena SR-29 Channelization Project (Summer—2017). The installation of a two-way-left-turn-lane on SR-29 at Dowdell Lane would greatly improve vehicle access to Dowdell Lane to/from SR-29 and reduce overall vehicle delays. The new two-way-left-turn-lane would allow stop-sign controlled outbound vehicles (making a left-turn) to merge more safely onto SR-29 by providing a refuge lane to merge into southbound through-traffic. Similarly, the TWLTL would also allow southbound motorists on SR-29 to make a left-turn (inbound) to Dowdell Lane without delaying through-traffic on the highway. Indirectly, the planned signal for the SR-29/Grayson Avenue intersection just north of Mills Lane would also benefit traffic at Dowdell Lane (at times) by providing more "gaps" in southbound traffic;

4. The proposed project description does not include any guest visitation or marketing events what-so-ever (just this fact alone greatly reduces the overall traffic generation). The project description focuses on employment and truck deliveries related to proposed winery production and commercial kitchen uses. Again, there would be no tastings, tours, or marketing events.

The proposed project is estimated to generate 9 AM weekday peak hour trips and 9 PM weekday peak hour trips. During the weekend harvest/crush season (worst case), the project is estimated to generate 12 mid-day (late afternoon) peak hour trips. Truck delivery trips would include 5-6 daily trips during non-harvest conditions and 11-12 daily truck trips during the harvest/crush period. All study intersections on Dowdell Lane would continue to operate within accepted City of St. Helena LOS thresholds with proposed project traffic.

Vehicle sight distance to the east and west on Dowdell Lane from proposed project driveway(s) on Dowdell Lane meets the recommended sight distances of 150-200 feet based on vehicle speeds of 25-30 mph.

---

[6] *Caltrans, Highway Design Manual, Sixth Edition, July 1, 20009.*

With regard to driveway access; given that multiple driveways would provide access to various winery production facilities it is recommended that truck deliveries use the first and third driveways (respectively). These driveways would be connected by an internal parking and circulation area. Trucks could enter one driveway and exit out the other driveway without having to turn around.

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	14	47	702	36	90	716
Future Vol, veh/h	14	47	702	36	90	716
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	51	763	39	98	778

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1757	783	0	0	802	0
Stage 1	783	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	93	394	-	-	822	-
Stage 1	450	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	73	394	-	-	822	-
Mov Cap-2 Maneuver	73	-	-	-	-	-
Stage 1	450	-	-	-	-	-
Stage 2	289	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27.3	0	1.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	73	394	822	-
HCM Lane V/C Ratio	-	-	0.208	0.13	0.119	-
HCM Control Delay (s)	-	-	66.9	15.5	10	0
HCM Lane LOS	-	-	F	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.4	0.4	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	14	30	17	1	16	1	11	0	2	1	0	9
Future Vol, veh/h	14	30	17	1	16	1	11	0	2	1	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	33	18	1	17	1	12	0	2	1	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	18	0	0	51	0	0	97	93	42	93	102	18
Stage 1	-	-	-	-	-	-	72	72	-	20	20	-
Stage 2	-	-	-	-	-	-	25	21	-	73	82	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1599	-	-	1555	-	-	885	797	1029	891	788	1061
Stage 1	-	-	-	-	-	-	938	835	-	999	879	-
Stage 2	-	-	-	-	-	-	993	878	-	937	827	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1599	-	-	1555	-	-	869	788	1029	882	779	1061
Mov Cap-2 Maneuver	-	-	-	-	-	-	869	788	-	882	779	-
Stage 1	-	-	-	-	-	-	929	827	-	989	878	-
Stage 2	-	-	-	-	-	-	983	877	-	926	819	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.4	9.1	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	890	1599	-	-	1555	-	-	1040
HCM Lane V/C Ratio	0.016	0.01	-	-	0.001	-	-	0.01
HCM Control Delay (s)	9.1	7.3	0	-	7.3	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	13	3	0	7	0	0
Future Vol, veh/h	13	3	0	7	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	3	0	8	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	17	0	24	16
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	8	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1600	-	992	1063
Stage 1	-	-	-	-	1007	-
Stage 2	-	-	-	-	1015	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1600	-	992	1063
Mov Cap-2 Maneuver	-	-	-	-	992	-
Stage 1	-	-	-	-	1007	-
Stage 2	-	-	-	-	1015	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1600	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	34	82	665	6	40	679
Future Vol, veh/h	34	82	665	6	40	679
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	89	723	7	43	738

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1551	726	0	0	729	0
Stage 1	726	-	-	-	-	-
Stage 2	825	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	125	425	-	-	875	-
Stage 1	479	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	115	425	-	-	875	-
Mov Cap-2 Maneuver	115	-	-	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	394	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.9	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	115	425	875	-
HCM Lane V/C Ratio	-	-	0.321	0.21	0.05	-
HCM Control Delay (s)	-	-	50.5	15.7	9.3	0
HCM Lane LOS	-	-	F	C	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.8	0.2	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	16	7	2	34	0	21	3	4	0	2	5
Future Vol, veh/h	4	16	7	2	34	0	21	3	4	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	17	8	2	37	0	23	3	4	0	2	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	37	0	0	25	0	0	75	71	21	75	75	37
Stage 1	-	-	-	-	-	-	30	30	-	41	41	-
Stage 2	-	-	-	-	-	-	45	41	-	34	34	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1574	-	-	1589	-	-	915	819	1056	915	815	1035
Stage 1	-	-	-	-	-	-	987	870	-	974	861	-
Stage 2	-	-	-	-	-	-	969	861	-	982	867	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1574	-	-	1589	-	-	906	816	1056	906	812	1035
Mov Cap-2 Maneuver	-	-	-	-	-	-	906	816	-	906	812	-
Stage 1	-	-	-	-	-	-	984	867	-	971	860	-
Stage 2	-	-	-	-	-	-	961	860	-	971	864	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.4	9.1	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	914	1574	-	-	1589	-	-	960
HCM Lane V/C Ratio	0.033	0.003	-	-	0.001	-	-	0.008
HCM Control Delay (s)	9.1	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	5	1	0	12	3	0
Future Vol, veh/h	5	1	0	12	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	1	0	13	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	7	0	19	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1614	-	998	1077
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1614	-	998	1077
Mov Cap-2 Maneuver	-	-	-	-	998	-
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	1010	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	998	-	-	1614	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	11	40	716	10	24	790
Future Vol, veh/h	11	40	716	10	24	790
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	43	778	11	26	859

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1695	784	0	0	789	0
Stage 1	784	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	102	393	-	-	831	-
Stage 1	450	-	-	-	-	-
Stage 2	392	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	96	393	-	-	831	-
Mov Cap-2 Maneuver	96	-	-	-	-	-
Stage 1	450	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.3	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	96	393	831	-
HCM Lane V/C Ratio	-	-	0.125	0.111	0.031	-
HCM Control Delay (s)	-	-	47.8	15.3	9.5	0
HCM Lane LOS	-	-	E	C	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.4	0.1	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	8	13	0	8	0	7	1	3	0	0	0
Future Vol, veh/h	0	8	13	0	8	0	7	1	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	14	0	9	0	8	1	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	9	0	0	23	0	0	25	25	16	27	32	9
Stage 1	-	-	-	-	-	-	16	16	-	9	9	-
Stage 2	-	-	-	-	-	-	9	9	-	18	23	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1611	-	-	1592	-	-	986	868	1063	983	861	1073
Stage 1	-	-	-	-	-	-	1004	882	-	1012	888	-
Stage 2	-	-	-	-	-	-	1012	888	-	1001	876	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1611	-	-	1592	-	-	986	868	1063	979	861	1073
Mov Cap-2 Maneuver	-	-	-	-	-	-	986	868	-	979	861	-
Stage 1	-	-	-	-	-	-	1004	882	-	1012	888	-
Stage 2	-	-	-	-	-	-	1012	888	-	997	876	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	8.7	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	993	1611	-	-	1592	-	-	-
HCM Lane V/C Ratio	0.012	-	-	-	-	-	-	-
HCM Control Delay (s)	8.7	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	4	0	0	3	4	0
Future Vol, veh/h	4	0	0	3	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	3	4	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	4	0	7	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	3	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1618	-	1014	1080
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	1020	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1618	-	1014	1080
Mov Cap-2 Maneuver	-	-	-	-	1014	-
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	1020	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1014	-	-	1618	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	14	48	768	39	97	780
Future Vol, veh/h	14	48	768	39	97	780
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	52	835	42	105	848

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1915	856	0	0	877	0
Stage 1	856	-	-	-	-	-
Stage 2	1059	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	74	357	-	-	770	-
Stage 1	416	-	-	-	-	-
Stage 2	333	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	55	357	-	-	770	-
Mov Cap-2 Maneuver	165	-	-	-	-	-
Stage 1	416	-	-	-	-	-
Stage 2	247	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.6	0	1.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	165	357	770	-
HCM Lane V/C Ratio	-	-	0.092	0.146	0.137	-
HCM Control Delay (s)	-	-	29	16.8	10.4	0
HCM Lane LOS	-	-	D	C	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0.5	0.5	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	14	40	17	1	17	1	11	0	2	1	0	9
Future Vol, veh/h	14	40	17	1	17	1	11	0	2	1	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	43	18	1	18	1	12	0	2	1	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	20	0	0	62	0	0	109	105	53	105	113	19
Stage 1	-	-	-	-	-	-	83	83	-	21	21	-
Stage 2	-	-	-	-	-	-	26	22	-	84	92	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1596	-	-	1541	-	-	870	785	1014	875	777	1059
Stage 1	-	-	-	-	-	-	925	826	-	998	878	-
Stage 2	-	-	-	-	-	-	992	877	-	924	819	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1596	-	-	1541	-	-	855	776	1014	866	768	1059
Mov Cap-2 Maneuver	-	-	-	-	-	-	855	776	-	866	768	-
Stage 1	-	-	-	-	-	-	916	818	-	988	877	-
Stage 2	-	-	-	-	-	-	982	876	-	913	811	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.4	9.2	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	876	1596	-	-	1541	-	-	1036
HCM Lane V/C Ratio	0.016	0.01	-	-	0.001	-	-	0.01
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	23	3	0	8	0	0
Future Vol, veh/h	23	3	0	8	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	3	0	9	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	28	0	36	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1585	-	977	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	1014	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1585	-	977	1048
Mov Cap-2 Maneuver	-	-	-	-	977	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	1014	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1585	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	37	89	731	6	41	753
Future Vol, veh/h	37	89	731	6	41	753
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	97	795	7	45	818

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1706	798	0	0	801	0
Stage 1	798	-	-	-	-	-
Stage 2	908	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	100	386	-	-	822	-
Stage 1	443	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	90	386	-	-	822	-
Mov Cap-2 Maneuver	220	-	-	-	-	-
Stage 1	443	-	-	-	-	-
Stage 2	354	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.6	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	220	386	822	-
HCM Lane V/C Ratio	-	-	0.183	0.251	0.054	-
HCM Control Delay (s)	-	-	25	17.4	9.6	0
HCM Lane LOS	-	-	D	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	1	0.2	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	17	7	2	44	0	21	3	4	0	2	5
Future Vol, veh/h	4	17	7	2	44	0	21	3	4	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	18	8	2	48	0	23	3	4	0	2	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	48	0	0	26	0	0	87	83	22	87	87	48
Stage 1	-	-	-	-	-	-	31	31	-	52	52	-
Stage 2	-	-	-	-	-	-	56	52	-	35	35	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1559	-	-	1588	-	-	899	807	1055	899	803	1021
Stage 1	-	-	-	-	-	-	986	869	-	961	852	-
Stage 2	-	-	-	-	-	-	956	852	-	981	866	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1559	-	-	1588	-	-	890	804	1055	890	800	1021
Mov Cap-2 Maneuver	-	-	-	-	-	-	890	804	-	890	800	-
Stage 1	-	-	-	-	-	-	983	866	-	958	851	-
Stage 2	-	-	-	-	-	-	948	851	-	970	863	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.3	9.1	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	900	1559	-	-	1588	-	-	946
HCM Lane V/C Ratio	0.034	0.003	-	-	0.001	-	-	0.008
HCM Control Delay (s)	9.1	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	6	1	0	22	3	0
Future Vol, veh/h	6	1	0	22	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	1	0	24	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	31	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	24	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1612	-	983	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1612	-	983	1075
Mov Cap-2 Maneuver	-	-	-	-	983	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	983	-	-	1612	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	13	44	787	12	28	870
Future Vol, veh/h	13	44	787	12	28	870
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	75	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	48	855	13	30	946

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1869	862	0	0	868	0
Stage 1	862	-	-	-	-	-
Stage 2	1007	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	79	355	-	-	776	-
Stage 1	414	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	76	355	-	-	776	-
Mov Cap-2 Maneuver	204	-	-	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	339	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	204	355	776	-
HCM Lane V/C Ratio	-	-	0.069	0.135	0.039	-
HCM Control Delay (s)	-	-	24	16.7	9.8	-
HCM Lane LOS	-	-	C	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.5	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	14	13	0	14	0	7	1	3	0	0	0
Future Vol, veh/h	0	14	13	0	14	0	7	1	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	14	0	15	0	8	1	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	15	0	0	29	0	0	37	37	22	39	44	15
Stage 1	-	-	-	-	-	-	22	22	-	15	15	-
Stage 2	-	-	-	-	-	-	15	15	-	24	29	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1603	-	-	1584	-	-	968	855	1055	966	848	1065
Stage 1	-	-	-	-	-	-	996	877	-	1005	883	-
Stage 2	-	-	-	-	-	-	1005	883	-	994	871	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1603	-	-	1584	-	-	968	855	1055	962	848	1065
Mov Cap-2 Maneuver	-	-	-	-	-	-	968	855	-	962	848	-
Stage 1	-	-	-	-	-	-	996	877	-	1005	883	-
Stage 2	-	-	-	-	-	-	1005	883	-	990	871	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	8.7	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	978	1603	-	-	1584	-	-	-
HCM Lane V/C Ratio	0.012	-	-	-	-	-	-	-
HCM Control Delay (s)	8.7	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	10	0	0	9	4	0
Future Vol, veh/h	10	0	0	9	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	0	0	10	4	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	11	0	21	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	10	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1608	-	996	1070
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1013	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1608	-	996	1070
Mov Cap-2 Maneuver	-	-	-	-	996	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1013	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	996	-	-	1608	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	15	48	702	38	94	716
Future Vol, veh/h	15	48	702	38	94	716
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	52	763	41	102	778

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1767	784	0	0	804	0
Stage 1	784	-	-	-	-	-
Stage 2	983	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	92	393	-	-	820	-
Stage 1	450	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	72	393	-	-	820	-
Mov Cap-2 Maneuver	72	-	-	-	-	-
Stage 1	450	-	-	-	-	-
Stage 2	283	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.3	0	1.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	72	393	820	-
HCM Lane V/C Ratio	-	-	0.226	0.133	0.125	-
HCM Control Delay (s)	-	-	69.1	15.6	10	0
HCM Lane LOS	-	-	F	C	B	A
HCM 95th %tile Q(veh)	-	-	0.8	0.5	0.4	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	14	36	17	1	19	1	11	0	2	1	0	9
Future Vol, veh/h	14	36	17	1	19	1	11	0	2	1	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	39	18	1	21	1	12	0	2	1	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	58	0	0	107	103	48	103	111	21
Stage 1	-	-	-	-	-	-	79	79	-	23	23	-
Stage 2	-	-	-	-	-	-	28	24	-	80	88	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1593	-	-	1546	-	-	872	787	1021	877	779	1056
Stage 1	-	-	-	-	-	-	930	829	-	995	876	-
Stage 2	-	-	-	-	-	-	989	875	-	929	822	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1593	-	-	1546	-	-	857	778	1021	868	770	1056
Mov Cap-2 Maneuver	-	-	-	-	-	-	857	778	-	868	770	-
Stage 1	-	-	-	-	-	-	921	821	-	985	875	-
Stage 2	-	-	-	-	-	-	979	874	-	918	814	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.3	9.2	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	879	1593	-	-	1546	-	-	1034
HCM Lane V/C Ratio	0.016	0.01	-	-	0.001	-	-	0.011
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	13	6	0	7	3	0
Future Vol, veh/h	13	6	0	7	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	7	0	8	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	21	0	25	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	8	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1595	-	991	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	1015	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1595	-	991	1062
Mov Cap-2 Maneuver	-	-	-	-	991	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	1015	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	991	-	-	1595	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	36	86	665	7	42	679
Future Vol, veh/h	36	86	665	7	42	679
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	93	723	8	46	738

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1556	727	0	0	730	0
Stage 1	727	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	124	424	-	-	874	-
Stage 1	478	-	-	-	-	-
Stage 2	429	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	113	424	-	-	874	-
Mov Cap-2 Maneuver	113	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	391	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.8	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	113	424	874	-
HCM Lane V/C Ratio	-	-	0.346	0.22	0.052	-
HCM Control Delay (s)	-	-	52.9	15.9	9.3	0
HCM Lane LOS	-	-	F	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.8	0.2	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	19	7	2	40	0	21	3	4	0	2	5
Future Vol, veh/h	4	19	7	2	40	0	21	3	4	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	21	8	2	43	0	23	3	4	0	2	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	43	0	0	28	0	0	85	81	24	85	85	43
Stage 1	-	-	-	-	-	-	33	33	-	48	48	-
Stage 2	-	-	-	-	-	-	52	48	-	37	37	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1566	-	-	1585	-	-	901	809	1052	901	805	1027
Stage 1	-	-	-	-	-	-	983	868	-	965	855	-
Stage 2	-	-	-	-	-	-	961	855	-	978	864	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1566	-	-	1585	-	-	892	806	1052	892	802	1027
Mov Cap-2 Maneuver	-	-	-	-	-	-	892	806	-	892	802	-
Stage 1	-	-	-	-	-	-	980	865	-	962	854	-
Stage 2	-	-	-	-	-	-	953	854	-	967	861	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.3	9.1	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	901	1566	-	-	1585	-	-	951
HCM Lane V/C Ratio	0.034	0.003	-	-	0.001	-	-	0.008
HCM Control Delay (s)	9.1	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	5	3	0	12	6	0
Future Vol, veh/h	5	3	0	12	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	3	0	13	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	9	0	20	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1611	-	997	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1611	-	997	1075
Mov Cap-2 Maneuver	-	-	-	-	997	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1010	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	997	-	-	1611	-
HCM Lane V/C Ratio	0.007	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	14	46	716	11	26	790
Future Vol, veh/h	14	46	716	11	26	790
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	50	778	12	28	859

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1699	784	0	0	790	0
Stage 1	784	-	-	-	-	-
Stage 2	915	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	101	393	-	-	830	-
Stage 1	450	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	94	393	-	-	830	-
Mov Cap-2 Maneuver	94	-	-	-	-	-
Stage 1	450	-	-	-	-	-
Stage 2	365	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.7	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	94	393	830	-
HCM Lane V/C Ratio	-	-	0.162	0.127	0.034	-
HCM Control Delay (s)	-	-	50.6	15.5	9.5	0
HCM Lane LOS	-	-	F	C	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.4	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	11	13	0	17	0	7	1	3	0	0	0
Future Vol, veh/h	0	11	13	0	17	0	7	1	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	14	0	18	0	8	1	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	18	0	0	26	0	0	37	37	19	39	44	18
Stage 1	-	-	-	-	-	-	19	19	-	18	18	-
Stage 2	-	-	-	-	-	-	18	18	-	21	26	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1599	-	-	1588	-	-	968	855	1059	966	848	1061
Stage 1	-	-	-	-	-	-	1000	880	-	1001	880	-
Stage 2	-	-	-	-	-	-	1001	880	-	998	874	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1599	-	-	1588	-	-	968	855	1059	962	848	1061
Mov Cap-2 Maneuver	-	-	-	-	-	-	968	855	-	962	848	-
Stage 1	-	-	-	-	-	-	1000	880	-	1001	880	-
Stage 2	-	-	-	-	-	-	1001	880	-	994	874	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	8.7	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	979	1599	-	-	1588	-	-	-
HCM Lane V/C Ratio	0.012	-	-	-	-	-	-	-
HCM Control Delay (s)	8.7	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	4	3	0	3	9	0
Future Vol, veh/h	4	3	0	3	9	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	3	0	3	10	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	9	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	3	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1612	-	1011	1077
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	1020	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1612	-	1011	1077
Mov Cap-2 Maneuver	-	-	-	-	1011	-
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	1020	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1011	-	-	1612	-
HCM Lane V/C Ratio	0.01	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	15	50	768	41	101	780
Future Vol, veh/h	15	50	768	41	101	780
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	54	835	45	110	848

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1924	857	0	0	879	0
Stage 1	857	-	-	-	-	-
Stage 2	1067	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	73	357	-	-	769	-
Stage 1	416	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	53	357	-	-	769	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	416	-	-	-	-	-
Stage 2	242	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.9	0	1.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	162	357	769	-
HCM Lane V/C Ratio	-	-	0.101	0.152	0.143	-
HCM Control Delay (s)	-	-	29.7	16.9	10.5	0
HCM Lane LOS	-	-	D	C	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0.5	0.5	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	14	46	17	1	20	1	11	0	2	1	0	9
Future Vol, veh/h	14	46	17	1	20	1	11	0	2	1	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	50	18	1	22	1	12	0	2	1	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	23	0	0	68	0	0	119	115	59	115	123	22
Stage 1	-	-	-	-	-	-	90	90	-	24	24	-
Stage 2	-	-	-	-	-	-	29	25	-	91	99	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1592	-	-	1533	-	-	857	775	1007	862	767	1055
Stage 1	-	-	-	-	-	-	917	820	-	994	875	-
Stage 2	-	-	-	-	-	-	988	874	-	916	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1592	-	-	1533	-	-	842	766	1007	853	759	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	842	766	-	853	759	-
Stage 1	-	-	-	-	-	-	908	812	-	984	874	-
Stage 2	-	-	-	-	-	-	978	873	-	905	805	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.3	9.2	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	864	1592	-	-	1533	-	-	1031
HCM Lane V/C Ratio	0.016	0.01	-	-	0.001	-	-	0.011
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	23	6	0	8	3	0
Future Vol, veh/h	23	6	0	8	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	7	0	9	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	32	0	37	28
Stage 1	-	-	-	-	28	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1580	-	975	1047
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	1014	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1580	-	975	1047
Mov Cap-2 Maneuver	-	-	-	-	975	-
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	1014	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	975	-	-	1580	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	39	93	731	7	43	753
Future Vol, veh/h	39	93	731	7	43	753
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	101	795	8	47	818

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1710	798	0	0	802	0
Stage 1	798	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	100	386	-	-	822	-
Stage 1	443	-	-	-	-	-
Stage 2	392	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	94	386	-	-	822	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	443	-	-	-	-	-
Stage 2	370	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.7	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	226	386	822	-
HCM Lane V/C Ratio	-	-	0.188	0.262	0.057	-
HCM Control Delay (s)	-	-	24.6	17.6	9.6	-
HCM Lane LOS	-	-	C	C	A	-
HCM 95th %tile Q(veh)	-	-	0.7	1	0.2	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	20	7	2	50	0	21	3	4	0	2	5
Future Vol, veh/h	4	20	7	2	50	0	21	3	4	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	22	8	2	54	0	23	3	4	0	2	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	29	0	0	97	93	26	97	97	54
Stage 1	-	-	-	-	-	-	34	34	-	59	59	-
Stage 2	-	-	-	-	-	-	63	59	-	38	38	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1551	-	-	1584	-	-	885	797	1050	885	793	1013
Stage 1	-	-	-	-	-	-	982	867	-	953	846	-
Stage 2	-	-	-	-	-	-	948	846	-	977	863	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1551	-	-	1584	-	-	876	794	1050	876	790	1013
Mov Cap-2 Maneuver	-	-	-	-	-	-	876	794	-	876	790	-
Stage 1	-	-	-	-	-	-	979	864	-	950	845	-
Stage 2	-	-	-	-	-	-	940	845	-	966	860	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.3	9.2	8.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	887	1551	-	-	1584	-	-	937
HCM Lane V/C Ratio	0.034	0.003	-	-	0.001	-	-	0.008
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	8.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	6	3	0	22	6	0
Future Vol, veh/h	6	3	0	22	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	3	0	24	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	10	0	32	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	24	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1610	-	982	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1610	-	982	1074
Mov Cap-2 Maneuver	-	-	-	-	982	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	982	-	-	1610	-
HCM Lane V/C Ratio	0.007	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	16	50	787	13	30	870
Future Vol, veh/h	16	50	787	13	30	870
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	54	855	14	33	946

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1874	863	0	0	870	0
Stage 1	863	-	-	-	-	-
Stage 2	1011	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	79	354	-	-	775	-
Stage 1	413	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	76	354	-	-	775	-
Mov Cap-2 Maneuver	204	-	-	-	-	-
Stage 1	413	-	-	-	-	-
Stage 2	337	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.8	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	204	354	775	-
HCM Lane V/C Ratio	-	-	0.085	0.154	0.042	-
HCM Control Delay (s)	-	-	24.3	17	9.8	-
HCM Lane LOS	-	-	C	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.5	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	17	13	0	23	0	7	1	3	0	0	0
Future Vol, veh/h	0	17	13	0	23	0	7	1	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	14	0	25	0	8	1	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	25	0	0	33	0	0	51	51	26	53	58	25
Stage 1	-	-	-	-	-	-	26	26	-	25	25	-
Stage 2	-	-	-	-	-	-	25	25	-	28	33	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1589	-	-	1579	-	-	948	840	1050	946	833	1051
Stage 1	-	-	-	-	-	-	992	874	-	993	874	-
Stage 2	-	-	-	-	-	-	993	874	-	989	868	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1589	-	-	1579	-	-	948	840	1050	942	833	1051
Mov Cap-2 Maneuver	-	-	-	-	-	-	948	840	-	942	833	-
Stage 1	-	-	-	-	-	-	992	874	-	993	874	-
Stage 2	-	-	-	-	-	-	993	874	-	985	868	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	8.8	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	962	1589	-	-	1579	-	-	-
HCM Lane V/C Ratio	0.012	-	-	-	-	-	-	-
HCM Control Delay (s)	8.8	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	10	3	0	9	9	0
Future Vol, veh/h	10	3	0	9	9	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	3	0	10	10	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	14	0	23	13
Stage 1	-	-	-	-	13	-
Stage 2	-	-	-	-	10	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1604	-	993	1067
Stage 1	-	-	-	-	1010	-
Stage 2	-	-	-	-	1013	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1604	-	993	1067
Mov Cap-2 Maneuver	-	-	-	-	993	-
Stage 1	-	-	-	-	1010	-
Stage 2	-	-	-	-	1013	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	993	-	-	1604	-
HCM Lane V/C Ratio	0.01	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	14	48	979	39	97	941
Future Vol, veh/h	14	48	979	39	97	941
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	52	1064	42	105	1023

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2319	1085	0	0	1107	0
Stage 1	1085	-	-	-	-	-
Stage 2	1234	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	41	263	-	-	631	-
Stage 1	324	-	-	-	-	-
Stage 2	275	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	25	263	-	-	631	-
Mov Cap-2 Maneuver	112	-	-	-	-	-
Stage 1	324	-	-	-	-	-
Stage 2	169	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.5	0	1.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	112	263	631	-
HCM Lane V/C Ratio	-	-	0.136	0.198	0.167	-
HCM Control Delay (s)	-	-	42.1	22	11.8	0
HCM Lane LOS	-	-	E	C	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0.7	0.6	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	14	40	17	1	17	1	11	0	2	1	0	9
Future Vol, veh/h	14	40	17	1	17	1	11	0	2	1	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	43	18	1	18	1	12	0	2	1	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	20	0	0	62	0	0	109	105	53	105	113	19
Stage 1	-	-	-	-	-	-	83	83	-	21	21	-
Stage 2	-	-	-	-	-	-	26	22	-	84	92	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1596	-	-	1541	-	-	870	785	1014	875	777	1059
Stage 1	-	-	-	-	-	-	925	826	-	998	878	-
Stage 2	-	-	-	-	-	-	992	877	-	924	819	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1596	-	-	1541	-	-	855	776	1014	866	768	1059
Mov Cap-2 Maneuver	-	-	-	-	-	-	855	776	-	866	768	-
Stage 1	-	-	-	-	-	-	916	818	-	988	877	-
Stage 2	-	-	-	-	-	-	982	876	-	913	811	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.4	9.2	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	876	1596	-	-	1541	-	-	1036
HCM Lane V/C Ratio	0.016	0.01	-	-	0.001	-	-	0.01
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	23	3	0	8	0	0
Future Vol, veh/h	23	3	0	8	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	3	0	9	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	28	0	36	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1585	-	977	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	1014	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1585	-	977	1048
Mov Cap-2 Maneuver	-	-	-	-	977	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	1014	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1585	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	37	89	958	6	41	945
Future Vol, veh/h	37	89	958	6	41	945
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	97	1041	7	45	1027

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2161	1045	0	0	1048	0
Stage 1	1045	-	-	-	-	-
Stage 2	1116	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	52	278	-	-	664	-
Stage 1	339	-	-	-	-	-
Stage 2	313	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	44	278	-	-	664	-
Mov Cap-2 Maneuver	155	-	-	-	-	-
Stage 1	339	-	-	-	-	-
Stage 2	264	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.1	0	0.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	155	278	664	-
HCM Lane V/C Ratio	-	-	0.259	0.348	0.067	-
HCM Control Delay (s)	-	-	36.2	24.7	10.8	0
HCM Lane LOS	-	-	E	C	B	A
HCM 95th %tile Q(veh)	-	-	1	1.5	0.2	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	17	7	2	44	0	21	3	4	0	2	5
Future Vol, veh/h	4	17	7	2	44	0	21	3	4	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	18	8	2	48	0	23	3	4	0	2	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	48	0	0	26	0	0	87	83	22	87	87	48
Stage 1	-	-	-	-	-	-	31	31	-	52	52	-
Stage 2	-	-	-	-	-	-	56	52	-	35	35	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1559	-	-	1588	-	-	899	807	1055	899	803	1021
Stage 1	-	-	-	-	-	-	986	869	-	961	852	-
Stage 2	-	-	-	-	-	-	956	852	-	981	866	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1559	-	-	1588	-	-	890	804	1055	890	800	1021
Mov Cap-2 Maneuver	-	-	-	-	-	-	890	804	-	890	800	-
Stage 1	-	-	-	-	-	-	983	866	-	958	851	-
Stage 2	-	-	-	-	-	-	948	851	-	970	863	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.3	9.1	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	900	1559	-	-	1588	-	-	946
HCM Lane V/C Ratio	0.034	0.003	-	-	0.001	-	-	0.008
HCM Control Delay (s)	9.1	7.3	0	-	7.3	0	-	8.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	6	1	0	22	3	0
Future Vol, veh/h	6	1	0	22	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	1	0	24	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	8	0	31	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	24	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1612	-	983	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1612	-	983	1075
Mov Cap-2 Maneuver	-	-	-	-	983	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	983	-	-	1612	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	13	44	1026	12	28	1117
Future Vol, veh/h	13	44	1026	12	28	1117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	48	1115	13	30	1214

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2397	1122	0	0	1128	0
Stage 1	1122	-	-	-	-	-
Stage 2	1275	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	37	251	-	-	619	-
Stage 1	311	-	-	-	-	-
Stage 2	263	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	35	251	-	-	619	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	311	-	-	-	-	-
Stage 2	250	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.1	0	0.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	142	251	619	-
HCM Lane V/C Ratio	-	-	0.1	0.191	0.049	-
HCM Control Delay (s)	-	-	33.1	22.7	11.1	-
HCM Lane LOS	-	-	D	C	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0.7	0.2	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	14	13	0	14	0	7	1	3	0	0	0
Future Vol, veh/h	0	14	13	0	14	0	7	1	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	14	0	15	0	8	1	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	15	0	0	29	0	0	37	37	22	39	44	15
Stage 1	-	-	-	-	-	-	22	22	-	15	15	-
Stage 2	-	-	-	-	-	-	15	15	-	24	29	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1603	-	-	1584	-	-	968	855	1055	966	848	1065
Stage 1	-	-	-	-	-	-	996	877	-	1005	883	-
Stage 2	-	-	-	-	-	-	1005	883	-	994	871	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1603	-	-	1584	-	-	968	855	1055	962	848	1065
Mov Cap-2 Maneuver	-	-	-	-	-	-	968	855	-	962	848	-
Stage 1	-	-	-	-	-	-	996	877	-	1005	883	-
Stage 2	-	-	-	-	-	-	1005	883	-	990	871	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	8.7	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	978	1603	-	-	1584	-	-	-
HCM Lane V/C Ratio	0.012	-	-	-	-	-	-	-
HCM Control Delay (s)	8.7	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	10	0	0	9	4	0
Future Vol, veh/h	10	0	0	9	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	0	0	10	4	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	11	0	21	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	10	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1608	-	996	1070
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1013	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1608	-	996	1070
Mov Cap-2 Maneuver	-	-	-	-	996	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1013	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	996	-	-	1608	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	15	50	979	41	101	941
Future Vol, veh/h	15	50	979	41	101	941
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	54	1064	45	110	1023

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2328	1086	0	0	1109	0
Stage 1	1086	-	-	-	-	-
Stage 2	1242	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	41	263	-	-	630	-
Stage 1	324	-	-	-	-	-
Stage 2	272	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	24	263	-	-	630	-
Mov Cap-2 Maneuver	108	-	-	-	-	-
Stage 1	324	-	-	-	-	-
Stage 2	162	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27.3	0	1.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	108	263	630	-
HCM Lane V/C Ratio	-	-	0.151	0.207	0.174	-
HCM Control Delay (s)	-	-	44.2	22.2	11.9	0
HCM Lane LOS	-	-	E	C	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0.8	0.6	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	14	46	17	1	20	1	11	0	2	1	0	9
Future Vol, veh/h	14	46	17	1	20	1	11	0	2	1	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	50	18	1	22	1	12	0	2	1	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	23	0	0	68	0	0	119	115	59	115	123	22
Stage 1	-	-	-	-	-	-	90	90	-	24	24	-
Stage 2	-	-	-	-	-	-	29	25	-	91	99	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1592	-	-	1533	-	-	857	775	1007	862	767	1055
Stage 1	-	-	-	-	-	-	917	820	-	994	875	-
Stage 2	-	-	-	-	-	-	988	874	-	916	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1592	-	-	1533	-	-	842	766	1007	853	759	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	842	766	-	853	759	-
Stage 1	-	-	-	-	-	-	908	812	-	984	874	-
Stage 2	-	-	-	-	-	-	978	873	-	905	805	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.3	9.2	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	864	1592	-	-	1533	-	-	1031
HCM Lane V/C Ratio	0.016	0.01	-	-	0.001	-	-	0.011
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	23	6	0	8	3	0
Future Vol, veh/h	23	6	0	8	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	7	0	9	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	32	0	37	28
Stage 1	-	-	-	-	28	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1580	-	975	1047
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	1014	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1580	-	975	1047
Mov Cap-2 Maneuver	-	-	-	-	975	-
Stage 1	-	-	-	-	995	-
Stage 2	-	-	-	-	1014	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	975	-	-	1580	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	39	93	958	7	43	945
Future Vol, veh/h	39	93	958	7	43	945
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	101	1041	8	47	1027

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2166	1045	0	0	1049	0
Stage 1	1045	-	-	-	-	-
Stage 2	1121	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	52	278	-	-	663	-
Stage 1	339	-	-	-	-	-
Stage 2	311	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	43	278	-	-	663	-
Mov Cap-2 Maneuver	154	-	-	-	-	-
Stage 1	339	-	-	-	-	-
Stage 2	260	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.7	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	154	278	663	-
HCM Lane V/C Ratio	-	-	0.275	0.364	0.07	-
HCM Control Delay (s)	-	-	37	25.2	10.8	0
HCM Lane LOS	-	-	E	D	B	A
HCM 95th %tile Q(veh)	-	-	1.1	1.6	0.2	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	4	20	7	2	50	0	21	3	4	0	2	5
Future Vol, veh/h	4	20	7	2	50	0	21	3	4	0	2	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	22	8	2	54	0	23	3	4	0	2	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	54	0	0	29	0	0	97	93	26	97	97	54
Stage 1	-	-	-	-	-	-	34	34	-	59	59	-
Stage 2	-	-	-	-	-	-	63	59	-	38	38	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1551	-	-	1584	-	-	885	797	1050	885	793	1013
Stage 1	-	-	-	-	-	-	982	867	-	953	846	-
Stage 2	-	-	-	-	-	-	948	846	-	977	863	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1551	-	-	1584	-	-	876	794	1050	876	790	1013
Mov Cap-2 Maneuver	-	-	-	-	-	-	876	794	-	876	790	-
Stage 1	-	-	-	-	-	-	979	864	-	950	845	-
Stage 2	-	-	-	-	-	-	940	845	-	966	860	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.3	9.2	8.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	887	1551	-	-	1584	-	-	937
HCM Lane V/C Ratio	0.034	0.003	-	-	0.001	-	-	0.008
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	8.9
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	6	3	0	22	6	0
Future Vol, veh/h	6	3	0	22	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	3	0	24	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	10	0	32	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	24	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1610	-	982	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1610	-	982	1074
Mov Cap-2 Maneuver	-	-	-	-	982	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	982	-	-	1610	-
HCM Lane V/C Ratio	0.007	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	16	50	1026	13	30	1117
Future Vol, veh/h	16	50	1026	13	30	1117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	54	1115	14	33	1214

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2401	1122	0	0	1129	0
Stage 1	1122	-	-	-	-	-
Stage 2	1279	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	37	251	-	-	619	-
Stage 1	311	-	-	-	-	-
Stage 2	261	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	35	251	-	-	619	-
Mov Cap-2 Maneuver	141	-	-	-	-	-
Stage 1	311	-	-	-	-	-
Stage 2	247	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.9	0	0.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	141	251	619	-
HCM Lane V/C Ratio	-	-	0.123	0.217	0.053	-
HCM Control Delay (s)	-	-	34.1	23.3	11.1	-
HCM Lane LOS	-	-	D	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.8	0.2	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	17	13	0	20	0	7	1	3	0	0	0
Future Vol, veh/h	0	17	13	0	20	0	7	1	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	18	14	0	22	0	8	1	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	22	0	0	33	0	0	48	48	26	50	55	22
Stage 1	-	-	-	-	-	-	26	26	-	22	22	-
Stage 2	-	-	-	-	-	-	22	22	-	28	33	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1593	-	-	1579	-	-	953	844	1050	950	836	1055
Stage 1	-	-	-	-	-	-	992	874	-	996	877	-
Stage 2	-	-	-	-	-	-	996	877	-	989	868	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1593	-	-	1579	-	-	953	844	1050	946	836	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	953	844	-	946	836	-
Stage 1	-	-	-	-	-	-	992	874	-	996	877	-
Stage 2	-	-	-	-	-	-	996	877	-	985	868	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	8.8	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	966	1593	-	-	1579	-	-	-
HCM Lane V/C Ratio	0.012	-	-	-	-	-	-	-
HCM Control Delay (s)	8.8	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	10	3	0	9	9	0
Future Vol, veh/h	10	3	0	9	9	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	3	0	10	10	0

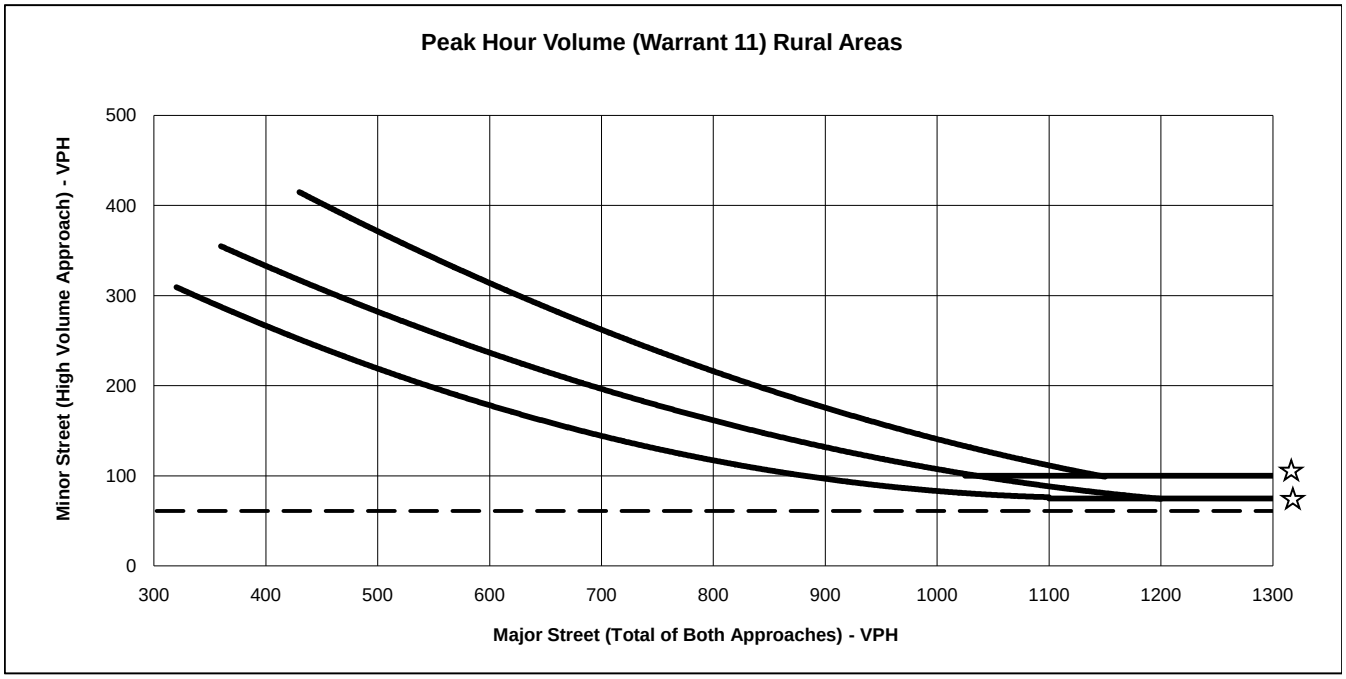
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	14	0	23	13
Stage 1	-	-	-	-	13	-
Stage 2	-	-	-	-	10	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1604	-	993	1067
Stage 1	-	-	-	-	1010	-
Stage 2	-	-	-	-	1013	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1604	-	993	1067
Mov Cap-2 Maneuver	-	-	-	-	993	-
Stage 1	-	-	-	-	1010	-
Stage 2	-	-	-	-	1013	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	993	-	-	1604	-
HCM Lane V/C Ratio	0.01	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*

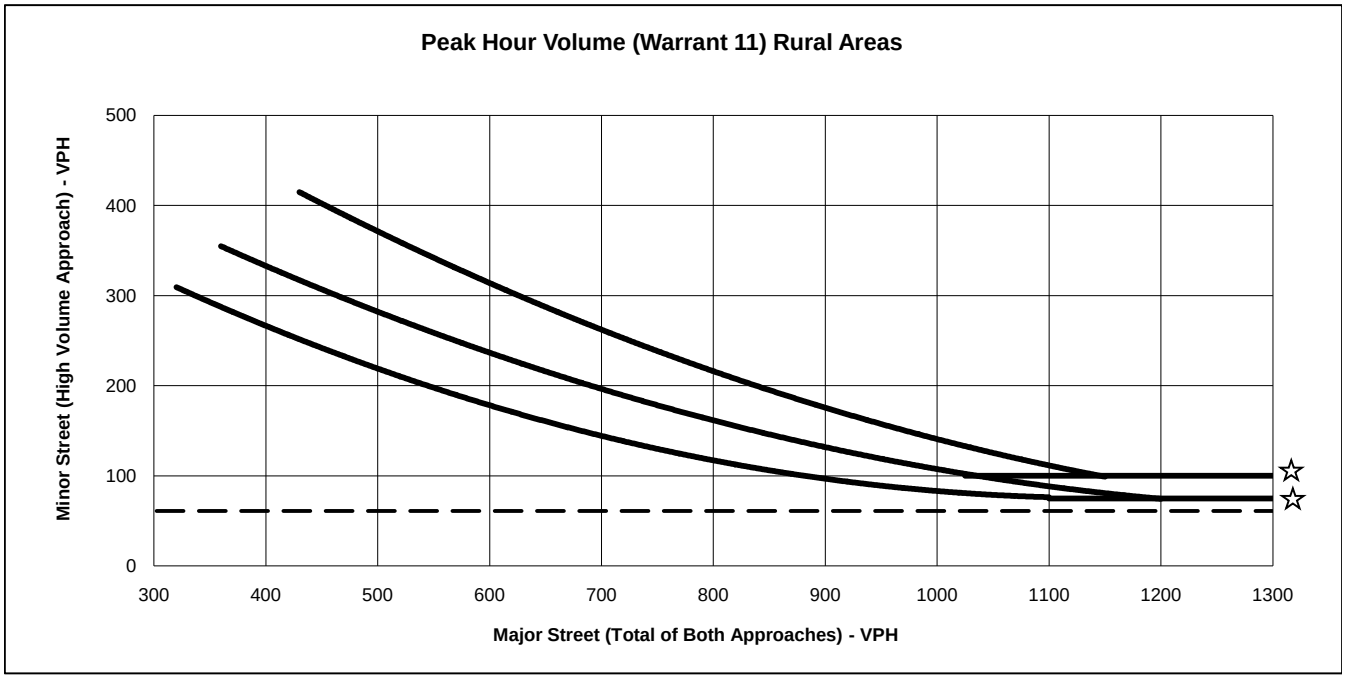


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection:	SR-29 / Dowdell Lane
Scenario:	Existing AM Peak Hour Conditions
Minor St. Volume:	61
Major St. Volume:	1544
Warrant Met?:	**NO**

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection:	SR-29 / Dowdell Lane
Scenario:	Existing AM Peak Hour Conditions
Minor St. Volume:	61
Major St. Volume:	1544
Warrant Met?:	**NO**